

**CUSTOMER BEHAVIOUR OF CELL PHONE USERS-
A CRITICAL STUDY OF HADOTI REGION**

A

Thesis

Submitted for the Award of Ph.D. Degree of

UNIVERSITY OF KOTA

in the

Faculty of Commerce and Management

by

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2017

CANDIDATE’S DECLARATION

I hereby, declare that the work which is being presented in the thesis titled ‘**Customer Behaviour of Cell Phone Users – A Critical Study of Hadoti Region**’ in partial fulfillment of the requirement for the award of Degree of Doctor of Philosophy, carried under the supervision of **Dr. Anand Kumar Jain** and submitted to the Government Commerce College, Kota, University of Kota, Kota represents my ideas in my own words and where others’ ideas and words have been included, I have adequately cited and referenced the original sources. The work in this thesis has not been submitted elsewhere for the award of any other degree or diploma from any institution. I also declare that I have adhered to all the principles of academic honesty and integrity and have not misinterpreted, fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will cause for disciplinary action by the university and can evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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It is certified that the

- (i) Thesis entitled “**Customer Behaviour of Cell Phone Users – A Critical Study of Hadoti Region**” .submitted by Monika Pandey is an original copy of research work carried out by the candidate under my supervision.
- (ii) Her literary presentation is satisfactory and the thesis is in a form suitable for publication.
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PREFACE

The study entitled 'Customer Behaviour of Cell phone Users – A Critical Study of Hadoti Region' is based on a descriptive research conducted with a purpose to get an insight into buying behaviour of cell phone customers of Hadoti region. Growing health and environmental concern with respect to cell phone usage is drawing attention of people at large towards the concept of eco friendly cell phones. Thus, the study also aimed at examining awareness for environmental and health aspects of cell phone and identifying the purchase intention for eco-friendly cell phone of the customers.

The cell phone revolution ushered in India in the year 1995. With over 1164.20 million wireless subscribers till the end of Feb-2017 Indian mobile market stands second largest after China in terms of subscriber base. Hence the cell phone has become an indispensable part of everybody's life. Taking it in view the factors considered at the time of cell phone purchased were deeply examined using factor analysis and then these factors were administered by cluster analysis to find the market segments of the cell phone users in Hadoti region.

The research has utilised primary data collected from May 2016 to September 2016 through a survey of 500 respondents belonging to four cities of Hadoti region namely Kota, Bundi, Baran and Jhalawar. A self-administered questionnaire was used as data collection tool. Data so collected was subjected to qualitative and quantitative analysis using SPSS 24 on the basis of which conclusions were drawn.

The cell phone customers of Hadoti region mostly seek pre-purchase information from friends and relatives. Communication followed by multimedia are the major purposes of purchase of cell phone. 'Physical attributes and multimedia' is the primary concern of most of the customers during the purchase of cell phone. It was found that five market segments of cell phone users exist in Hadoti region of which 'charismatic' market segment is the most prominent one which takes into concern all the aspects of a cell phone. 'Web browsing and social media' is the most often used functional group of smartphone. There is lack of awareness for

health and eco-friendly aspects of cell phone among the users. About half of the cell phone users showed highly positive intention to purchase eco-friendly cell phones. Majority of them wished them to be priced up to Rs.10,000.

The present research study consists of five chapters in all. An attempt has been made to present the research work in a justified manner in form of different chapters. Chapter one provides the conceptual framework of research topic, an introduction to the research methodology followed in the study and a review of literature related to consumer behaviour. An overview of the cellular industry in India has been presented in the second chapter of this thesis. Chapter three provides an insight into the cell phone users' profile and throws light upon the pre-purchase and purchase behaviour of cell phone users. It also projects the five behavioural segments of cell phone users in Hadoti region. Chapter four unveils the post purchase behaviour of cell phone users including smartphone usage pattern and post purchase satisfaction. This chapter also examines the awareness of users for eco-friendly aspects of cell phone and their future purchase intentions for eco-friendly cell phones. Chapter five represents the major findings and conclusions of the present research along with few humble suggestions and future implications of the research.

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ABBREVIATIONS

3G	Third Generation of Mobile Phone Standards and Technology
AIO	Activities, Interests and Opinions
BSNL	Bharat Sanchar Nigam Limited
CDMA	Code Division Multiple Access
COAI	Cellular Operators Association of India
COSEG	Componential Segmentation
CRM	Customer Relationship Management
EDGE	Enhanced Data Rates for GSM Evolution
EFA	Exploratory Factor Analysis
EMF	Electro Magnetic Frequency
EMR	Electro Magnetic Radiations
FCC	Federal Communications Commission
FDA	Food and Drug Administration
GOI	Government of India
GPS	Global Positioning System
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HSPA	High Speed Packet Access
IARC	International Agency for Research on Cancer
ICT	Information and Communication Technology
IDC	International Data Corporation
IMEI	International Mobile Equipment Identity
IP	Internet Protocol
ISDN	Integrated Services Digital Network
LOV	List of Values
LTE	Long Term Evolution
LTV	Customer Lifetime Value
MMORPG	Massively-Multiplayer Online Role-playing Game
MMS	Multimedia Messaging Service

MOMI	Modeling of Mobile Internet Usage and Business
MPR	Mobile Phone Radiations
MVNO	Mobile Virtual Network Operator
NGMN	Next Generation Mobile Networks
OS	Operating System
PDA	Personal Data Assistant
PRIZM	Potential Rating Index for Zip Markets
S60	Series 60 Software Platform
SAR	Specific Absorption Rate
SD	Standard Deviation
SIM	Subscriber Identity Module
SMS	Short Message Service
VAS	Value Added Services
WCDMA	Wideband Code Division Multiple Access
WHO	World Health Organisation
WiMAX	Worldwide Interoperability for Microwave Access
UMTS	Universal Mobile Telecommunications System

Chapter 1

RESEARCH DESIGN AND METHODOLOGY

This chapter is divided into three parts:

- 1.1 Conceptual Framework
- 1.2 Research Methodology and Design
- 1.3 Review of Literature

1.1 CONCEPTUAL FRAMEWORK

Last two decades have witnessed the development and growth of Information Technology and Telecommunication particularly wireless or cellular technology in India and all over the world. With the changing demographic profile of the population in India, there is a high potential of expected growth in telecommunication sector especially in the cell phone market. It is therefore important to understand the buying/customer behaviour of cell phone users to deliver satisfaction to them by offering a product that they really need. For this reason marketing strategies must be based on knowledge of consumer behaviour into every facet of a strategic marketing plan (Solomon, 2002). *In exploring the behaviour of customers towards cell phone, major focus of marketing research involves study of their decision making process.*

All marketing decisions are based on assumptions about consumer behaviour. (Hawkins, 2007).

1.1.1 Consumer and Customer

Customer is 'KING'.

The word customer is derived from the term 'custom' which means 'practice'. Customer means the individual or buyer who buys a product or service from a seller.

When the product purchased is consumed by some other entity then consuming entity is known as consumer. For .g. a husband purchases a cell phone and gifts it to his wife. Here, wife is consumer and husband is customer. The customer is the most important entity of the buying process. Hence, customer is regarded as the 'king'. Firms can satisfy needs only to the extent that they understand their consumer as well as customer.

Although the terms customer and consumer are not synonymous - a customer is a purchaser of a product or a service whereas a consumer is end user of the product or service so purchased. But there are cases when a consumer may also be a customer or vice-a-versa. For eg. a customer buys a cell phone for himself. In this case the purchase behaviour of consumer can be regarded as the customer behaviour.

According to the Cambridge Business English Dictionary the decisions that an individual makes to buy or not to buy a product, and the things that influence his/her decisions is known as customer behaviour. Schiffman, Kanuk and Kumar (2010) defined consumer behaviour as the behaviour that consumer display in searching for, purchasing, using, evaluating and disposing of products and services that they expect will satisfy their needs.

Customer behaviour which plays a pivotal role in designing an effective marketing plan, for it is primarily concerned with customers' buying behaviour that determines how, when and why a customer purchases a product. Perhaps, it is not sufficient to study buying behaviour patterns without knowing what buying behaviour influencers or behavioural variables are involved. Studies of customer behaviour usually deal with

- (i) identification of customers and
- (ii) the respective buying behaviour patterns.

The aim of such studies is to ascertain who buys where, what, when and how. Identification of customers seeks to ascertain who the customers are, which may define the composition of customers involving many characteristics such as gender, age, economic background, education, profession etc. Similar buying

behaviour patterns represent the design of behaviour of a homogeneous customer group or segment.

1.1.2 Segmentation of Cell Phone Users

Market segmentation is a marketing concept involving virtual groups of consumers constructed to help marketers to design and target their strategies. Therefore, the identification of market segments and their elements is highly dependent on the dimensions (variables or criteria) and methods used to define them (Wedel and Kamakura 2000). Segmentation may be defined as a set of variables or characteristics for grouping potential customers into homogeneous groups. The selection of segmentation dimension and methods is crucial with respect to the number and type of segments that are identified in segmentation research, as well as to their usefulness to the firm. The choice of different dimensions may lead to different segment produced. Furthermore, the choices of methods and dimensions are not independent. The segmentation method will need to be chosen on the basis of

- (1) The specific purposes of the segmentation study
- (2) The properties of the segmentation dimensions selected

There are mainly 4 dimensions of segmentation namely geographic, demographic, psychographic and behavioural segmentation. (Kotler, 2003). Among these four geographic, demographic and behavioural are noticeable dimensions as researcher can gather the information directly from the potential user or target market. But variables for psychographic segmentation are invisible or non-noticeable.(Kotler, 2003).

The four dimensions of segmentation are as follows:

Geographic

Region, city size, density, climate

Demographic

Age, family size, family life cycle, gender, income, occupation, education, religion, race, generation, nationality, social class

Psychographic

Lifestyle, personality, values

Behavioural

Occasions, benefits, user status, usage rate, loyalty status, readiness stage, attitude toward product

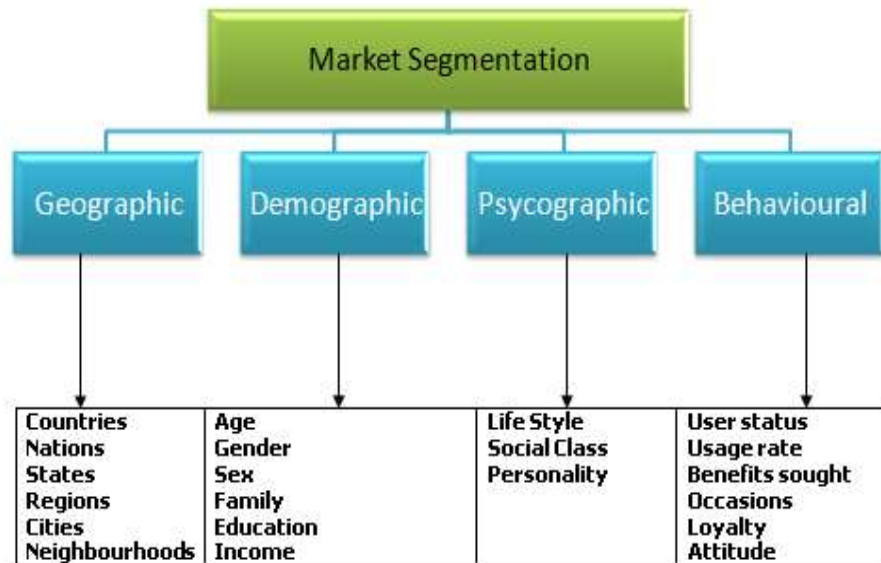


Fig. 1.1 : Dimensions of Market Segmentation

Source : <https://www.bayt.com/en/specialties/q/268053/market-segmentation>

1.1.2.1 Demographic Segmentation

Demographic factors are the most popular bases of segmentation and distinguishing consumer groups. Demographic segmentation divides the markets into groups based on demographic variables such as age, gender, family size, income, occupation, education, religion, race and nationality. Consumer needs, wants, and usage rates are closely associated with demographic variables. It is quite easy to measure these variables than any other type of variables.

- **Age**

It is one of the most common demographic variables used to segment markets. Companies often offer product variants, or adopt varied marketing approaches for different age groups. Age is a determining factor with respect to cell phone as most the new variants of cell phones with exclusive features are targeted at self

dependent youths. Samsung targets customers of age from 15 to 45 who follow the latest technology trends. Some cell phone companies like iBall has also developed a cell phone especially for senior citizens with an emergency SOS button.

- **Gender**

Gender segmentation is an important determinant of color, style of a cell phone. Cell phone covers are offered in feminine coolers and attractive patterns to attract female customers. With a increase in the cases of eve teasing or molestation with girls cell phone companies should introduce cell phones with SOS button which could be used in emergency.

- **Income**

Markets are also be grouped on the basis of income. It determines the personal disposable income of people and affects their buying power and choice. Income is a determining factor to divide the cell phone market. Different cell phones are offered by the company to target consumers of different income group. Eg. Samsung On series for middle income group and Samsung Galaxy S series for higher income group.

- **Family cycle**

Product needs vary according to age, number of persons in the household, marital status, and number and age of children. These variables can be combined into a single variable called family life cycle which influences the buying behaviour of customer. Eg. choice of housing, furniture, food and automobile etc. is affected by family cycle. This factor is of meager importance with respect to cell phones as they are a personal product rather than a family product

1.1.2.2 Geographic Segmentation

Geographic segmentation refers to dividing a market into different geographical units such as nations, states, regions, cities or neighborhood. For example, Mobile service providers segment their market on the basis of telecom circles. Samsung had launched Samsung Guru for rural customer segment and Galaxy series for

urban customer segments in 2012. Nokia 1100 an innovative cell phone with torch was launched in India targeting the rural population.

1.1.2.3 Psychographic Segmentation:

Psychographic segmentation pertains to lifestyle and personality traits. In the case of certain products, buying behaviour predominantly depends on lifestyle, social class and personality.

- **Social class**

Social class can be divided into upper class, middle class and lower class. Companies offer different types of cell phones for specific social classes. Eg. Apple iphone for upper class and Nokia Asha for middle class.

- **Personality characteristics**

It refers to a person's individual character traits, attitudes and habits. Markets are segmented on the basis of individual's competitiveness, ambitions, aggressiveness, submissiveness etc. This type of segmentation is administered when the difference between the offered products of competing brands is very less. Emotional appeal like guilt, fear, shame, proud, happiness etc are used to offer the product to such customers. For eg. Samsung C9 appeals to ambitious and aggressive personalities.

- **Lifestyle**

Consumer's interests are influenced by their lifestyle. Therefore, lifestyle is also reflected in the products they consume or use. The cell phone companies segment the consumers into varied groups on the basis of activities, interests, beliefs and opinions according to which companies determine the feature, attributes and functions of cell phones. For eg. Samsung targets the young customer segments whose lifestyles are driven by heavy consumption of TV and digital media. Their stereotypes are celebrities who influence their aspired lifestyles.

1.1.2.4 Behavioural Segmentation

In behavioural segmentation identification and analyses of the actual behavioural patterns of consumer clusters takes place, which helps the marketers to understand their customers in better manner and enables them to adopt appropriate marketing strategies for the target market.

- **Occasions**

When the customers are divided into segments based on the time and occasion of purchase i.e. biannually, yearly, once in two years or more. People are therefore grouped according to the time (occasions) when they get the idea to buy, make actual purchase or use the purchased item (Armstrong and Kotler, 2005). For example promotional activities of cell phone companies increase during festive seasons to attract the customers who make major purchases during festive seasons.

- **Benefits**

Benefit segmentation is based on the customers' attitude towards features, functionality, usages, benefit of the cell phone and other benefits they may seek from it in the form of discounts, offers, freebies etc. Thus benefit segmentation seeks to find the different kinds of people who look for some specific benefits in product. This helps the cell phone marketer deliver only those benefits in a cell phone that attracts and appeals to the needs of that particular group.

- **User status**

A company customises its marketing strategies for each group by segmenting consumers on basis of user status of product as nonusers, ex-users, potential users, current users of a product

- **Usage rate**

Usage rate segmentation, groups the customers according to usage rate of various functions, features of the cell phone. They are grouped as non-users, frequent users on the basis of frequency of usages.

- **Buyer-Readiness stage**

Buyer-readiness stage refers to customer's awareness and interest towards its features/attributes or the product as a whole. Some customers are unaware of the product, some are aware, some are informed, some are interested, some desire the product and some intend to buy (Kotler and Keller, 2009). The marketers design their marketing strategy especially promotional/communication strategy according to the buyer readiness stage.

- **Loyalty status**

A market can be segmented according to the loyalty of the customers for a particular cell phone brand. The customers who are always loyal towards the same brands are called hard-core loyal. Other people that are loyal toward two or three brands and buy these on a random basis are referred to as being split loyal. A third group of people are those who shift from one brand to another and staying with that brand for a period of time until they shift to another brand. These customers are referred to as shifting loyal. The fourth and final group of loyal are those who do not show loyalty or preference towards one particular brand, but rather buy a product or brand that is on sale or available at the time of the occasion. These customers are referred to as switchers (Kotler and Keller, 2009).

- **Attitude**

Favorable or unfavorable evaluations, feelings, and tendencies of an individual towards an object or idea is known as attitude. For example negative attitude of a customer towards Chinese brand of cell phone. People can be divided into segments based on whether they have an enthusiastic, positive, indifferent, negative or hostile attitude toward a product.

The company needs to study the dimensions underlying different purchase behaviour through market segmentation and adopting best suited market strategies for the selected target segment.

1.1.3 Models of Consumer Behaviour

Customer behaviour or buying behaviour is a multistage process, and the actual purchase by the customer is made at a later stage. The buying process starts long before the actual purchase and has consequences long afterward. In order to predict the buying stage three major “comprehensive” models for consumer decision making were proposed by Nicosia 1966; Engel et al. 1968; and Howard and Sheth 1969.

1.1.3.1 Nicosia Model

Nicosia Model (1966) represents a structural model of the decision-making process of a purchase made by an individual consumer or a whole family.

This model represents an interactive relationship between the product seller and the consumer. It has four basic "fields". Each field represents a sub-program in the model. It is assumed that both the seller and the buyer had no previous experience directly related to the particular product or brand.

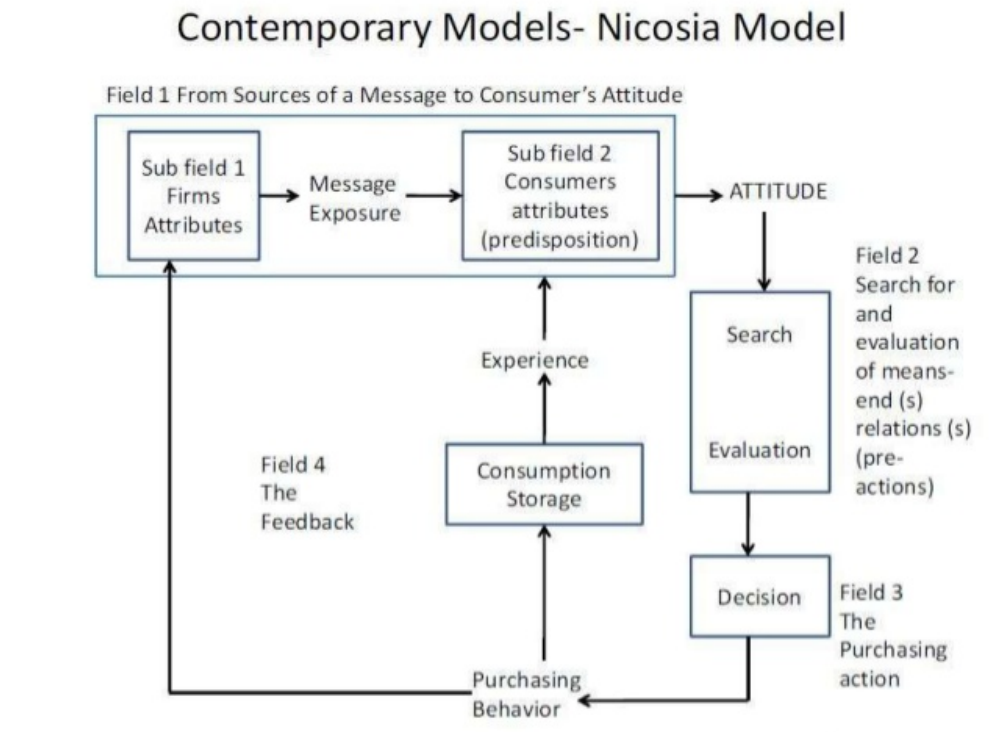


Fig. 1.2: Nicosia Model of Consumer Behaviour

Field one shows that a message either promotional or advertisement is sent from company to the consumer as a result of which change in attitude of consumer may takes place. Field two is represents data search by the consumer from internal and external sources for alternative evaluation. If the result of the evaluation of a given product is satisfactory from the consumer's point of view, consumer is motivated to buy. Field three is related with transforming consumer motivation into the act of purchase. Field four is the stage of consumption where the consumer consumes the product and acquires a new experience based on it. The output is feed back to the company which acquires new information that could be used in preparing future product policy. Fourth field completes the model and completes the consumer loop.

1.1.3.2 Howard Sheth Model

Howard and Sheth (1969) model used six sets of variables to explain the buyer decision process which are as follows:

- **Input Variables** – These input variables that include facts, feelings and images about product, service or brand are rational and emotional elements that grab the attention of a customer. For example, if the customer wants to purchase an air conditioner then will seek information regarding price, tonnage, power consumption, cooling and other features and will also check the promotional offers of the company.
- **Behavioural Determinants** - These variables are the pre-existing elements in consumer's mind and existing predisposition of the consumer influenced by his culture, family and other such factors. Behavioural determinants do not play an overt role rather they play a vital role in buying decisions. For example while buying an air conditioner if the potential buyer considers power saving to be important or air conditioner as status symbol then these thoughts will bear a positive impact on his decision of purchase.
- **Perceptual Reactions** - The perceptual constructs deal with how a consumer obtains and processes information received from different sources. Consumers do not readily accept or believe the information received from inputs variables

at one glance. Consumers process, compare and filter the information and then interpret it.

- **Processing Determinants** - These factors determine how the gathered information is to be evaluated. Consumer will apply some judgmental criteria to evaluate the alternatives. These criteria are factors such as, motivation, learning from the past relevant experience. Learning process will include experience about the product and also on its post- purchase services. These elements play a crucial role in the whole process. Hence, marketing research can be useful in identifying and assessing these subjective (psychological) elements in the consumer buying process.
- **Inhibitors** – External forces in the environment that restrain the purchase of a particular brand and thus inhibit the actual or potential purchase behaviour.
- **Output Variable** - The outcome of the process of interacting elements may result in any of the three behaviour - purchase decision, not to purchase decision or delayed purchase decision.

These models attempt to trace the psychological state of individual consumers from the point at which they become aware of the possibility of satisfying a material need by purchasing and consuming a product to their final evaluation of the consequences of having done so.

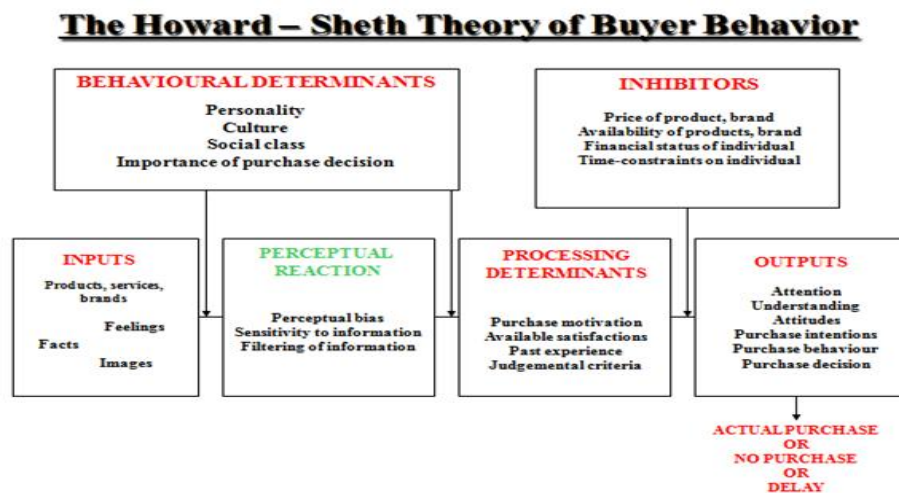


Fig 1.3 : Howard Sheth Model

1.1.3.3 Engel Model

Engel et al., (1968) suggest that high involvement with a product results in an extended problem solving process which starts with problem recognition, followed by an information search, alternative evaluation, purchase, and post purchase activities. This process is supplemented by active information processing involving exposure, attention, comprehension, yielding/acceptance, and retention. The choice determined by the outcome of the information process-aided decision sequence may have satisfying or dissonant outcomes:

Festinger (1957) first introduced the theory of cognitive dissonance for the consumer, which influence future purchasing. Engel and Blackwell (1982) also point out that environmental influences may affect the decision process that affects the Consumer Buying Behaviour including consumer's motivation and intention, and other unpredictable factors (unavailability of the required brand or insufficient funds) that may modification actual choice made by a customer. This model postulates intrapersonal psychological states and events influence the decision process.

A consumer behaviour model represents theoretical construction of phenomena which is significant in influencing the outcome of any consumer problem. Thus models in consumer behaviour provide valuable frame work and guidelines to solve consumer behaviour problems.

1.1.4 Model of Buyer Behaviour

The model of buyer behaviour starts with Stimulus-Response-Model. Stimuli from the environment in form of prevailing economic, technological, political and cultural scenario and stimuli from the marketer in the form of product, price, distribution network, display, promotion material, advertising, sales promotion, events etc. enter the buyer's mind. These stimuli are evaluated by him. The evaluation of stimuli is influenced and directed by the cultural, social, personal and psychological characteristics of the buyer. If the buyer identifies a need for a product getting influenced by the stimuli he then enters the buyer decision process.

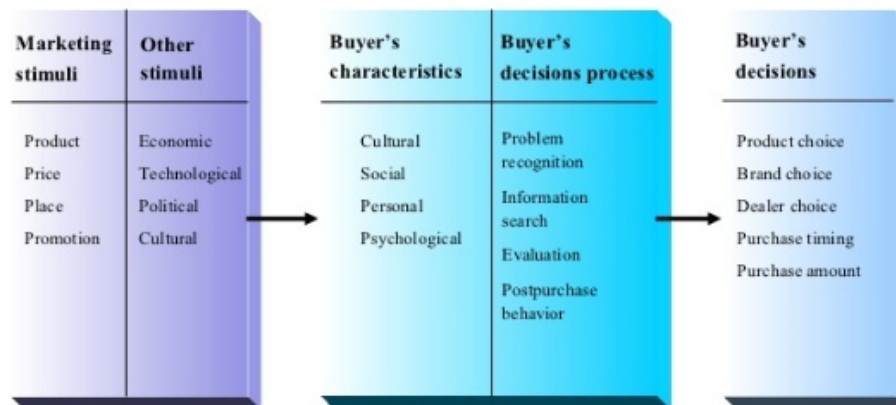


Fig.1.4 : Model of Buyer Behaviour

Source: Philip Kotler (2003)

Buyer decision process includes five stages namely – need recognition, information search (related to what to buy, when to buy, how much to buy and where to buy), evaluation of alternatives, purchase decision and post purchase behaviour. The buying/purchase decision results in product choice, brand choice, dealer choice, purchase timing and purchase amount. Post purchase behaviour includes satisfaction or dissatisfaction from the product use.

1.1.5 Buying Decision Process of a Cell Phone

The consumer generally passes through five stages in a buying decision process: problem recognition, information search, evaluation of alternatives, purchase decision and post purchase behaviour. This Customer Buying Process (also called a Buying Decision Process) describes the process the customer goes through before buying any product. Companies try to deeply understand customer's buying decision process – all the experiences in learning, choosing, using and even disposing of a product (Kotler and Keller, 2016). According to Swait and Adamowicz (2001), consumer selection behaviour is an individualistic process and decision making process of a buyer differs from one individual to another. Similarly, a cell phone consumer passes through all these stages and finally selects the best alternate accordingly.

The customer of cell phone or of any product typically undergoes five stages in a buying decision process namely problem recognition, information search, evaluation of alternatives, purchase decision and post purchase behaviour. This Customer Buying Process (also called a Buying Decision Process) describes the stages that the customer undergoes before buying any product. Similarly, a cell phone consumer passes through all these stages in an individualistic manner and selects the best alternate accordingly. Companies try to fully understand customer's buying decision process – all the experiences in learning, choosing, using and even disposing of a product (Kotler and Keller, 2016).



Fig: 1.5: Buying Decision Process

Source:<http://nikitanikam.blogspot.in/2014/08/customer-buying-decision-process.html>

1.1.5.1 Problem/Need Recognition

Belch & Belch (2003) indicated that the stage of problem recognition appears when consumer sees a significant difference between his/her current state of affair or actual state and some desired or ideal state. A person's actual state can decline if it is not satisfied with the current state of affairs, or if the product is out of stock, or if new needs or wants are evolved. (Solomon, et al., 2013). In the case of cell phone, problem recognition is the identification of need of a new cell phone for satisfying the basic or newly emerged needs of social networking, information search, visual/multimedia entertainment or upgrading and enjoying new features. Problem recognition is directly related to need recognition.

Michaluk (2009) the founder of Crack berry developed ‘hierarchy of smartphone needs’ as the hierarchy of needs for cellular devices. This model discusses platform for smartphone consumers in form of five levels in ‘Hierarchy of Smartphone Needs’. The bottommost level of this hierarchy denotes ‘connectivity, compatibility and security’. According to Michaluk, basic features that a smart phone user needs without which a smartphone is no longer a phone or a data-enhanced device with adequate coverage and secure data connection, GPS system Wi-Fi etc. The second level is ‘daily usability and performance’. Consumers set their priorities by using a smart phone, and become dependent on it. So, they take into consideration its performance such as battery life, reliability, speed, ease of use, and aesthetics.

The third stage of hierarchy of smartphone needs is ‘Communication and Productivity’. Consumer has inclination for core features of a cell phone i.e. communication. Therefore he looks for better voice quality, speaker, and web browser. The fourth stage is ‘features for everyday life’. In this stage, consumer looks for a smartphone that serves as a substitute for various other devices which are used in daily life such as alarm clock, calculator, camera, video recorder, media player and navigator.

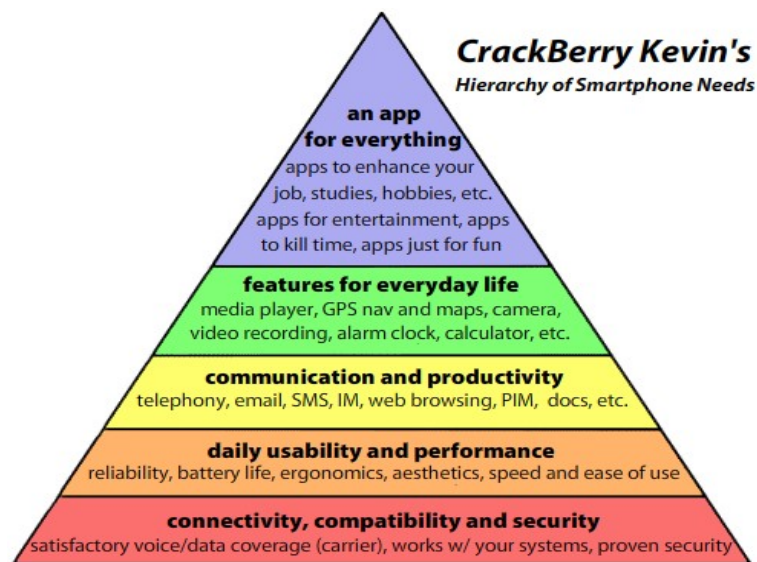


Fig.:1.6: Crack Berry Kevin’s Hierarchy of Smartphone Needs (Michaluk, 2009)
Source: <https://crackberry.com/crackberry-kevins-hierarchy-smartphone-needs-smartphone-round-robin>

The topmost level of the pyramid is 'an app for everything' that matches with Maslow's self-actualization level. It signifies a smartphone which enhances life of the user by offering different apps that may be productivity, entertainment or fun focused.

1.1.5.2 Information Search

After need recognition a consumer acquires information about need satisfier. A consumer can obtain information from various sources like family members, friends, acquaintances, websites, online reviews, seller, media advertisements, displays at shops or point of sales etc. The selection of this source is affected by his age, gender, education, profession. Similarly, in the purchase behaviour of cell phone after recognising need of a cell phone consumer searches for specific information related to different cell phone available in the marketplace. He gathers the information about the following from different sources:

- Cell phone Brand
- Cell phone models
- Price, Features and Attributes
- Alternatives

The information sources are of two types which are listed as under:

Internal Sources

- Internal sources include the consumer himself. Here, consumer collects the information from his own learning or past experiences.

External Sources

- External sources of information for a cell phone include friends, family, advertisements, seller, online resource etc.

1.1.5.3 Evaluation of Alternatives

Laroche et.al.(2003) mentioned evaluation of alternatives as an important activity in consumer decision making process. In this stage of evaluation, consumer

compares their own evaluation standard criteria with acquired information about alternatives. Consumer may use objectives like price, warranty etc, and subjective attributes such as image and performance as criteria of evaluation. (Belch & Belch, 2003). In case of cell phone, numerous brands with different specifications, features and attributes are available in various price categories. Prospective buyers of cell phone evaluate the available alternatives on the basis of personal purchase criterion.

1.1.5.4 Purchase Decision

This ultimate stage of purchase decision is an outcome of evaluation of alternatives. Blech and Blech (2003) conceptualises this stage as the end goal of a customer which starts with determining for the product that he desires or wishes to purchase as a satisfier of his needs. Buyer ends up in final product selection after evaluating various alternatives and concludes the purchase. Nowadays, different cell phone brands are coming up with updated features and technology and new applications and functions. Consumers prefer buying new and updated cell phone models that suit their needs and propensity to spend. Consumers match their purchase motives with features and attributes of cell phone often under price consideration.

1.1.5.5 Post Purchase Evaluation

The experiences that follow purchase of cell phone is the post purchase behaviour. A marketer's job does not end when the product is bought. (Kotler, 2012). Blech and Blech (2003) discussed post purchase evaluation as an important stage for marketers where customers evaluate and analyse the product after experiencing its performance. After making the cell phone purchase consumer use and experience the features, functions and usability of product. The cell phone is considered satisfactory if it meets the needs or exceeds the expectations or otherwise dissatisfactory. They sometimes regret their decisions or on contrary feel satisfied with their decisions of purchase. Post purchase dissonance is negatively related to the level of satisfaction which the consumer draws out of the product usage. A high level of post-purchase dissonance largely occurs due to a number of

alternatives available, good performance of alternatives or attractiveness of alternatives etc.

As part of post purchase consumer behaviour research of cell phone, marketer also identifies the usage frequency of features or attributes of smartphone by the consumers and explores the major shift in their aspirations which helps the marketer in strategic decisions like pruning continuing, modifying any cell phone model or its features and attributes. With the rising concern for health and environment the customers give due concern to safe and eco-friendly products. Hence, it is important for the marketers to be informed of the awareness of the customers on the issue of electromagnetic radiations emitted by the cell phone and its health impact. It consideration often affects the buying decision of the cell phone customer to great extent.

Many research studies have been undertaken world over to explore and understand customer preferences in the cell phone buying. The present study tries to determine the factors which affect buying behaviour of consumers' during purchase of the cell phone. The study also tries to find out the primary purpose of cell phone purchase and the sources of information in the pre purchase phase of the buying decision process. An attempt has been made to examine the impact of various factors associated with the cell phone on the buying decision of the customer. It also analyses the post purchase behaviour of the customer.

1.1.6 Factors Affecting Consumer Buying Behaviour

Consumer buying behaviour is to a great extent dependent on the type of product he/she wants to buy. This process begins with the need recognition and identification of the product. In the case of a cell phone the a consumer realises the need for a mobile handset that may serve his various purpose like communication, web browsing, social networking, multimedia, music etc. During information search they collect information from different sources like friends advertisements, websites based on which analyses the pros and the cons and lastly decide on whether to purchase or not. The need recognition, information search,

evaluation and subsequent stages of buying behaviour are affected by different factors which influence their customer buying behaviour.

These factors are as follows:

1. Cultural
2. Social
3. Personal
4. Psychological

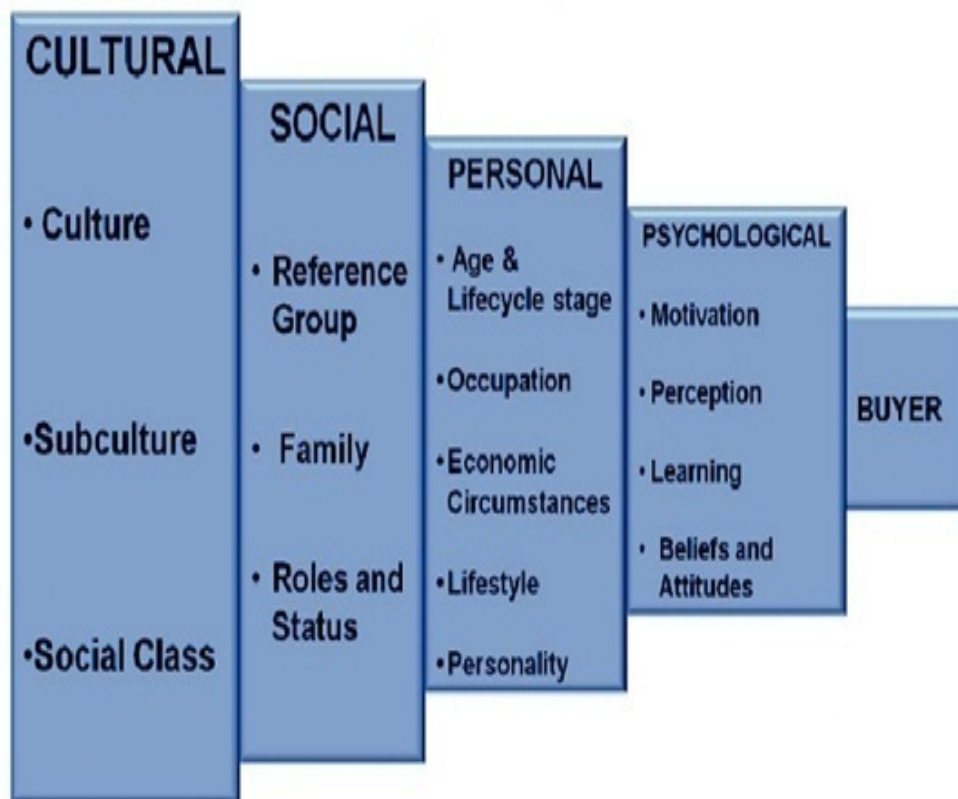


Fig. 1.7: Factors Affecting Consumer Buying Behaviour

Source : <https://itmaverick.wordpress.com/2012/11/11/consumer-buying-behaviour-2/>

1.1.6.1 Cultural Factors

Cultural factors are further divided into three sub factors:

- (i) Culture (ii) Sub Culture (iii) Social Class

Culture: – Culture is a set of basic values perceptions, wants, and behaviour that an individual learns from society, family and other social institutions. Culture plays an important role in determining an individual's need, want and behaviour. Every group or society is characterised by a culture that influences buying behaviour of customers greatly. Due to variation in culture from country to country the buying behaviour of customers also varies across the world. For example the language of display, labeling etc. in the case of a cell phone is determined by the country it will be marketed in.

Sub Culture: - Each culture can be subdivided into sub cultures. A sub culture is shared by any social institution or a group of individuals by recognising a common value system based on experiences and situations. For example nationalities, religions, castes, races and geographic regions.

Social Class: – Society is an organised set up in the form of a social structure or social classes. Social class is an ordered division characterised by occupation, standard of living, economic status, personal disposable income, education, profession etc. Social class plays a significant role in determining the marketing strategies for a cell phone.

1.2.6.2 Social Factors

A consumer's behaviour is also influenced by social factors, such as the

- (i) Groups
- (ii) Family
- (iii) Roles and status.

Groups: – Consumer behaviour of an individual is directly influenced by his membership of groups. These groups are of two types – primary and secondary. Primary groups are those which are informal groups and the individual is in regular interaction with them like ones family, friends, neighbors, colleagues and peers etc. Secondary groups are more formal and have less regular interaction among members for eg. clubs, professional associations, trade unions etc. Primary group play a significant role in influencing the choice of cell phone during purchase

Family: – Family size, number of members, their age has a strong influence on customer behaviour of the cell phone. The family member play different roles in the buying process such as initiator, influencer, decided, buyer etc. Marketers are interested in identifying the roles that family members like husband, wife, parents, relatives and children play and the extent of their influence on the buying process.

Roles and Status: – A customer belongs to different primary and secondary group. The person's position in each group defines both his role and status. A role means the set of activities the person is expected to perform by the people around them. A person has to play multiple role in the society. For example, a male may play role of a husband, father, brother or a son. Role is also based on his position and status like role of manager, doctor, engineer etc. Role and status have significant influence on the choice of cell phone. For eg choice of brand, features and application of the cell phone are often chosen as per the role and statuses of the customer.

1.1.6.3 Personal Factors

It includes:

Age and Life cycle Stage: – Choice of a product is determined by age of consumer and stage in his life cycle. Choice of features, colour, style, memory of cell phone etc is often influenced by the age of the consumer.

Occupation: – Consumer's occupation also affects the choice of cell phone. Choice of features/attributes of the cell phone is influenced by occupation.

Economic Situation: – An individual's economic situation influences the choice of brand and features of the cell phone during purchase.

Life style: – Life Style is an individual's pattern of living i.e. consumer's major AIO dimensions, i.e. activities (profession, hobbies, shopping etc.) like interests (pastimes, choice of product, recreation) and opinions (about themselves, others, Products). For example bike mode app in Samsung J7 cell phone .

Personality and Self-concept:- Each individual has a distinct personality which influences his purchase behaviour and purchase decision. Personality is

characterised by the unique psychological state that is reflected in relatively consistent and lasting responses to one's own environment. For eg. aggressive personality prefers rugged product.

1.1.6.4 Psychological Factors

Motivation: – Level of motivation drives the effort to satisfy a need. It directs an individual to seek the product that satisfies his need or want.

Perception: – People select, organise, and interpret information to form a perception for the product. They relate this information with their past experiences and knowledge about the product and perceive accordingly. Sources of information like advertising, friends and relatives, websites, retailers play an important role in framing perception of the cell phone customer.

Learning: – As stated above past experiences of self and others, information from different sources like magazines, television, advertisements helps the customer to learn about the product. Learning brings in change in an individual's behaviour.

Beliefs and attitudes: – Belief is a subjective thought of an individual that he holds about a product. Eg. colour is associated with gender. Favourable or unfavourable evaluations, feelings, and tendencies of an individual towards an object or idea is known as attitude. For example negative attitude of a customer towards Chinese brands of cell phone.

1.1.7 Types of Buying Behaviour

Customer decision making varies with the nature of the product or the type of buying decision. Assael distinguished four types of buying behaviour based on degree of customer's involvement and the degree differences between the brands.

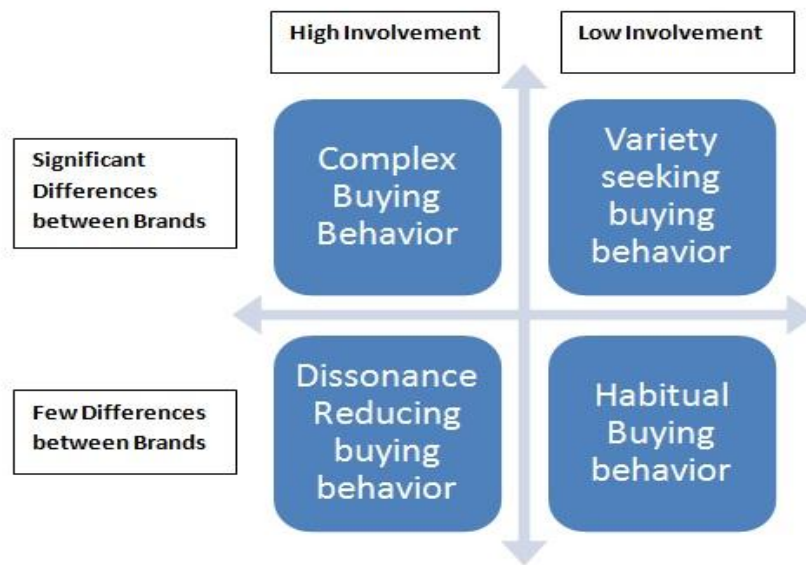


Fig 1.8 : Types of Buying Behaviour

Source :http://www.mbaskool.com/2015_images/stories/jan-images/anku-buybehvr.jpgFig.

The four different categories of buying behaviour are as follows-

1. Complex Buying Behaviour
2. Dissonance Reducing Buying Behaviour
3. Habitual Buying Behaviour
4. Variety Seeking Buying Behaviour

1.1.7.1 Complex Buying Behaviour

Customer is involved in complex buying behaviour when there is high level of involvement in the product purchase and he is aware of considerable differences among available brands. Complex consumer buying behaviour is also observed when the price of the product is high, frequency of purchase is low and the product is highly self-expressive. Purchase of a cell phone or a laptop involves complex buying behaviour since both the products are expensive and a variety of brands is available. A customer feels confused as he may not know what attributes to look for in order to decide for a specific brand.

In this type of buying behaviour a cell phone customer tries to collect information from different sources on features of different brands, their benefits, price, brand image etc. and evaluates such information with respect to his needs and capacity to spend. Therefore, the marketer of a product like cell phone needs to develop strategies that help the customer in learning about the benefits, attributes and features that may satisfy his needs.

1.1.7.2 Dissonance Reducing Buying Behaviour

In dissonance reducing buying behaviour customer involvement is very high as the product is expensive, infrequently purchased and risky. At the same time he finds less significant differences among available brands. In this case customer buys the product which is easily available. Eg. carpets

1.1.7.3 Habitual Buying Behaviour

In habitual buying behaviour the customer involvement is low since the product of low price and there is absence of significant difference among brands. Products like salt, matchstick etc. are purchased without collecting any information about brand or characteristics. Customers depict no brand loyalty for such products. They just go to the store and purchase the product irrespective of any specific brand.

1.1.7.4 Variety Seeking Buying Behaviour

Variety seeking behaviour is characterized by low customer involvement and brand switching. Although the price of the product in this buying behaviour is low but there are significant differences among brands. The customers reach for different brands and do not repurchase the same product or brand for the sake of variety rather than dissatisfaction.

Hence, among different types of buying behavior complex buying behavior is seen in context to cell phone.

1.2 RESEARCH DESIGN AND METHODOLOGY

Research methodology involves the theoretical analysis of the set of methods and principles applied in a branch of knowledge. It is a systematic plan for conducting research in a field of study. Research methodology highlights the research problem, research objectives and the research design followed in a study. It also portrays data collection and data analysis procedures of the research.

Research methodology determines the process used to collect information and data for the purpose of analysis and evaluation. It also serves as a platform of finalising the sampling plan which includes sampling frame, sampling technique and sample size and the method of identification of sample size. Research methodology also removes the ambiguity regarding the research design to be followed. It clarifies the doubts related to the progress of research and steers the research through different stages. Research methodology involves the theoretical analysis of the set of *methods* and principles applied in a branch of knowledge. It steers the research through different stages. Research methodology highlights the research problem, research objectives and research design followed. It also portrays data collection and data analysis procedures of the research.

1.2.1 Nature of the Study

Consumer behaviour research is a scientific study of the processes consumer use to select, secure, use and dispose of the products and services that satisfy their needs. It is widely recognised that consumer behaviour is the key to contemporary marketing success. Information and knowledge of customer behaviour directly affect marketing strategy. (Hawkins et.al., 2003). This is because of the marketing concept that the firms exist to satisfy customer needs. (Winer, 2000). Firms can satisfy those needs only to the extent that they understand their customers.

Cell phone market is characterised by rapid technological change. The industry is also witnessing strong competition due of a large number of Chinese players entering the Indian market and posing threat to both national and other international brands. All these interventions impede consumers' understanding and

consequently affect their customer behaviour and decision making process. Understanding the actual changing pattern of customer behaviour with respect to the different market segments is of great importance to cell phone marketers, especially in designing marketing strategies and tactics. Hence, there is a genuine need to identify the factors that influence the buying behaviour of customers in different market segments.

1.2.1.1 Scope of the Study

The study is confined to the Hadoti region of Rajasthan state in India. The Hadoti region which lies in south eastern part of Rajasthan include four districts - Kota, Bundi, Jhalawar and Baran.

The present study focuses on customer behaviour of cell phone users which has been divided into three stages – pre purchase behaviour, purchase behaviour and post purchase behaviour.

The study takes into account the customer behaviour only in the context of cell phone. Thus it is important to note that the present study is confined to customer behaviour of cell phones only. Mobile phone and cell phone have similar meaning in the study and have been used interchangeably in the study.

1.2.1.2 Importance of the Research

The present study has created an inventory of factors that are considered at the time of purchase by the customers belonging to different customer segments of Hadoti region of Rajasthan.

To the Marketers

The research serves as a guiding tool to cell phone manufacturing/marketing companies to evaluate their marketing strategies for attracting the customers of one or more customer segments. The customer segmentation is highly relevant to the marketing managers as the factors affecting the choice of cell phone among different behavioural segments have been deeply discussed, highlighting their both demographical characteristics as well as behavioural patterns during purchase. A model of market segmentation is developed that provides an insight

into potential/additional bases for segmentation which may help the marketers to develop suitable positioning, and marketing communication strategies for targeting consumers through appropriate cues.

This research may help the marketers to identify the consumer group (segments) concerned with environment and health aspects of cell phone based on which they could explore the opportunities in the eco friendly cell phone business according to their demographical and behavioural profiles..

To the Society

The survey conducted as part of research has worked as an awareness campaign for the customers and helped them to graduate from '*the unaware customers*' to '*aware customers*', from the health and environmental perspective of cell phone. As an interventional activity respondents were counseled regarding the '**eco-health-friendly**' habits of cell phone use. The research study also contributes to the existing literature on consumer behaviour of cell phone by studying the underlying factors considered by the customers during purchase of cell phone.

1.2.2 Research Problem

Defining the marketing research problem is one of the most important and difficult tasks in a marketing research. According to Luke and Rubin (2004) major task of management is to recognize and diagnose problems. The problem may have existed for some time unrecognized unless someone asserts that it does. Thus problem recognition and its definition is the first stage of any research.

Malhotra and Dash (2009) rightly mentioned that research problem is a broad statement of the general problem and identification of the specific components of the marketing research problem.

Extensive literature was reviewed in context to consumer buying behaviour for cell/mobile phone. Eventually, a gap was identified from the customer perspective. Although substantial number of studies have been undertaken in different parts of the country in the area of consumer behaviour, but very little attention has been paid with a holistic view of identifying market segments, the factors influencing buying behaviour of each segment along with concern for

health and environment issues at the time of purchase in Hadoti region. This gap also defines the research problem. Hence, a serious need for research was felt for the same.

The solution to such research problem lies in examining the purchase behaviour of different segments of cell phone and identifying the determinants of their purchase decision. Awareness of respondents on environmental and health issues related to cell phone and determining the level of usage of features and functions of smartphone by the users is also important for judging consumer behaviour.

1.2.3 Research Objectives

A purpose lies beneath every activity. The objectives of the present research study have been set taking into consideration the gap identified in the literature review.

Major objectives of the underlying research are as follows:

1. To compile the profile of cell phone users in Hadoti region.
2. To identify the purpose of purchase of the cell phone and the sources of pre-purchase information.
3. To examine and analyse the factors influencing purchase decision.
4. To appraise different behavioural segments of cell phone users.
5. To examine the usage level of different features, functions and applications of smart phone among consumers.
6. To examine the awareness and cognition of users about environmental, health and safety issues related to a cell phone.

1.2.3.1 Secondary Objectives

The secondary objectives derived from the major research objectives are as follows:

1. To examine the relationship between demographical characteristics and possession of smartphone
2. To identify the future purchase motives of the users for eco friendly cell phones.

1.2.4 Hypotheses

Hypothesis is defined as “a proposition or a set of proposition set forth as an explanation for the occurrence of some specified group of phenomena either asserted merely as a provisional conjecture to guide some investigation or accepted as highly probable in the light of established facts” (Kothari, 2004).

Mainly four categories of null hypotheses are developed to achieve the objectives of the present research study. These null hypotheses are as follows:

- **Demographics and Cell Phone Profile**

Hypotheses to test the significant difference in responses of cell phone users towards their cell phone usage profile on the basis of their demographical characteristics like gender, age, education, occupation and monthly income. The null hypotheses in this category are listed below:

- **Demographics and Possession of Smartphone**

H0 1 : There is a non-significant association between possession of Smartphone with regard to different demographics

There are five types of demographical characteristics considered in the study. Hence, five sub hypotheses were formulated to test if a non-significant association exists between possessions of Smartphone with regard to corresponding demographic characteristic. (Gender, age, education, occupation and monthly income).

- **Pre-purchase Behaviour**

Null hypothesis to test the significant difference in responses of cell phone users towards:

1. Sources of pre-purchase information of cell phone

H0 2 : There is a non-significant difference in the preference given to different sources of information where customers seek pre-purchase information for cell phone.

2. The purpose of purchasing cell phone.

H0 3: There is a non-significant difference in the preference given to different purposes of purchase of cell phone.

- **Behavioural Segments of Cell Phone Users**

H0 4 : There is a non-significant difference between customer segments with regard to different factors influencing purchase behaviour.

- **Purchase Behaviour**

Gender and Factors affecting cell phone purchase

H0 5g: There is a non-significant difference in the concern for factors while purchasing cell phone with regard to gender

Age and Factors affecting cell phone purchase

H0 5a: There is a non-significant difference in the concern for factors while purchasing cell phone with regard to age

Education and Factors affecting cell phone purchase

H0 5e : There is a non-significant difference in the concern for factors while purchasing cell phone with regard to education

Occupation and Factors affecting cell phone purchase

H0 5o : There is a non-significant difference in the concern for factors while purchasing cell phone with regard to occupation

Monthly Income and Factors affecting cell phone purchase

H0 5i : There is a non-significant difference in the concern for factors while purchasing cell phone with regard to monthly income.

- **Purchase intention for Eco-friendly Phone**

H0 6 : There is a non-significant relationship between intention to purchase an eco-friendly cell phone and level of awareness for environment and health issues of cell phone.

1.2.5 Research Design

Malhotra, Hall, Shaw and Oppenheim (2004) rightly mentioned research design as a framework or blueprint for conducting the marketing research project.[6] It specifies the details of the procedures necessary for obtaining the information needed to structure and / or solve marketing research problems. Research design discusses what, when, where, how much data should be sufficiently collected.

Descriptive research studies are concerned with describing the characteristics of a particular individual, or of a group. (C.R. Kothari, 2006)

A descriptive research design was followed to accomplish the objectives of the present study. A survey was administered to a selected sample for collection of data from a specific population. Survey is an important tool for collecting and analyzing information from selected sample. marketing researchers uses survey to study the factors influencing the customer behaviour.

Descriptive research answers the questions who, what, where, when and how. Therefore, a descriptive research design was adopted due to the nature of the study. The purchase pattern of the cell phone customers was studied in depth to understand the various aspects concerned with cell phone choice with reference to their different demographic profiles.

Descriptive research has been used to behaviourally segment the cell phone customers on the basis of attributes of cell phone at the time of purchase. It helped to get comprehension of complex customer behaviour of cell phone users.

As part of the research customers' concern for health, environment and safety at the time of purchase of cell phone and their awareness for health, environmental issues related to cell phone was also examined to accomplish research objectives.

According to American Marketing Association, in a descriptive research design major emphasis is on determining the frequency with which something occurs or the extent to which two variables co-vary. In other words, descriptive research design is aimed at collecting data to describe the characteristics of a population through various quantitative measures.

Thus, the descriptive research design was found to be appropriate for the present study as it was important to gauge the influence of different features and attributes of the cell phone on the customer behaviour and at the same time study the various aspects of cell phone purchase behaviour.

1.2.6 Sampling Plan

Sample is the source of information for study or the group objects whose characteristics are to be measured. An appropriate sample is one which optimally represents the sampling unit and is within the reach of the researcher.

1.2.6.1 Sampling Frame

Sampling frame is a comprehensive list of individuals or unit in the population from which selection of the sample is made. (Chandran Emil, 2004).[7] In this research all the cell phone users of Hadoti region qualified to be part of the sample.

1.2.6.2 Sampling Technique

A convenience sampling technique was utilized in selection of sample whereby cell phone customers of different age, education, gender, occupation and income were included on basis of convenience of the researcher. Convenience sampling is a non-probabilistic sampling technique where the members of the sampling frame or population have unequal chance of being included in the sample.

All the respondents were owner of cell phones. However, the study excluded the owners that were not the original customers or those who had received the mobile phones purchased by someone else.

1.2.6.3 Sample Size

All the cell phone users residing in Hadoti Region of Rajasthan irrespective of their age, gender, educational qualification, profession or income qualified to be the respondent of the survey.

The main source of data was primary. Data was collected through a survey of sample size of 500 respondents of Hadoti region.

The total population of the four cities of Hadoti region as per census survey 2011 was N=1291062. The sample size for this population size (1,291,062) was calculated using the following parameters –

confidence level as 95% ($Z = 1.96$), error of margin $e = 5\%$ and $\sigma = 0.56$.

where, σ represents standard deviation and e is standard error.

The sample size of the research denoted by n was determined by using the formula for finite population as follows:

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

The calculated value of sample size n came out to be 482

Hence, a total of 550 cell phone users from four cities of Hadoti Region of Rajasthan- Kota, Jhalawar, Bundi and Baran were contacted for filling questionnaires. After accounting for no returns, no response, incomplete and ineligible questionnaires, a total rounded of 500 questionnaires were retained and considered surveyed and were used in the final analysis.

1.2.7 Geographical Coverage of the Research

The study is confined to the Hadoti region of Rajasthan state in India. The Hadoti region which lies in south eastern part of Rajasthan include four districts - Kota, Bundi, Jhalawar and Baran.

The present study focuses on customer behaviour of cell phone users which has been divided into three stages – pre purchase behaviour, purchase behaviour and post purchase behaviour. The study takes into account the customer behaviour only in the context of cell phone. Thus it is important to note that the present study is confined to customer behaviour of mobile phone only. Mobile phone and cell phone have similar meaning in the study and have been used interchangeably in the study.

The distribution of sample is as follows:

Table 1.1 - Distribution of Sample

City	No. of Respondents	%
Kota	244	48.8
Baran	99	19.8
Bundi	84	16.8
Jhalawar	73	14.6
Total	500	100.00

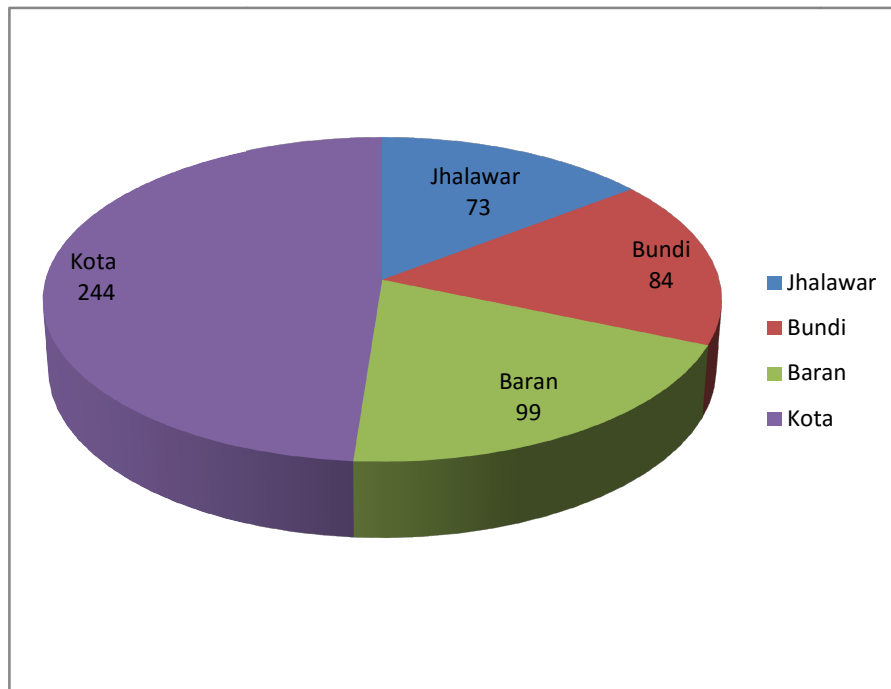


Fig.1.9 : Distribution of Sample

48.8% respondents belong to Kota. 19.8% respondents belong to Baran while 16.8% participants belong to Bundi and 14.6% respondents belong to Jhalawar.

1.2.7.1 Introduction to Hadoti Region

Rajasthan is the largest state of India by area. It is situated in the northwest of India. It shares boundaries with Pakistan in the west, Gujarat in the southwest, Madhya Pradesh in the southeast, Uttar Pradesh and Haryana in the northeast and Punjab in the west. Rajasthan occupies 10.4% land of Indian mainland, an area of

342,239 square kilometers (132,139 sq.m.). Rajputs, Rajpurohits, Charans, Jats, Gurjars, Bishnois and other tribes have greatly contributed in building the state of Rajasthan. Although Hindi and English are the most widely used languages in Rajasthan but Hindi and Rajasthani comprising of multiple dialects are the most widely spoken languages in Rajasthan. As per 2011 census the literacy rate of Rajasthan is 67.06 (80.51% male and 52.66% female) and the total population is 68,621,021. The economy of the state primarily depends on agriculture and pastoral farming. Cotton and tobacco are the major cash crops grown in Rajasthan. The major industries are based on minerals, agriculture and textile. Rajasthan is pre-eminent in quarrying and mining in India. Rajasthan is divided into Hadoti, Mewar, Marwar, Dhundhar, Shekhawati and Mewat regions.

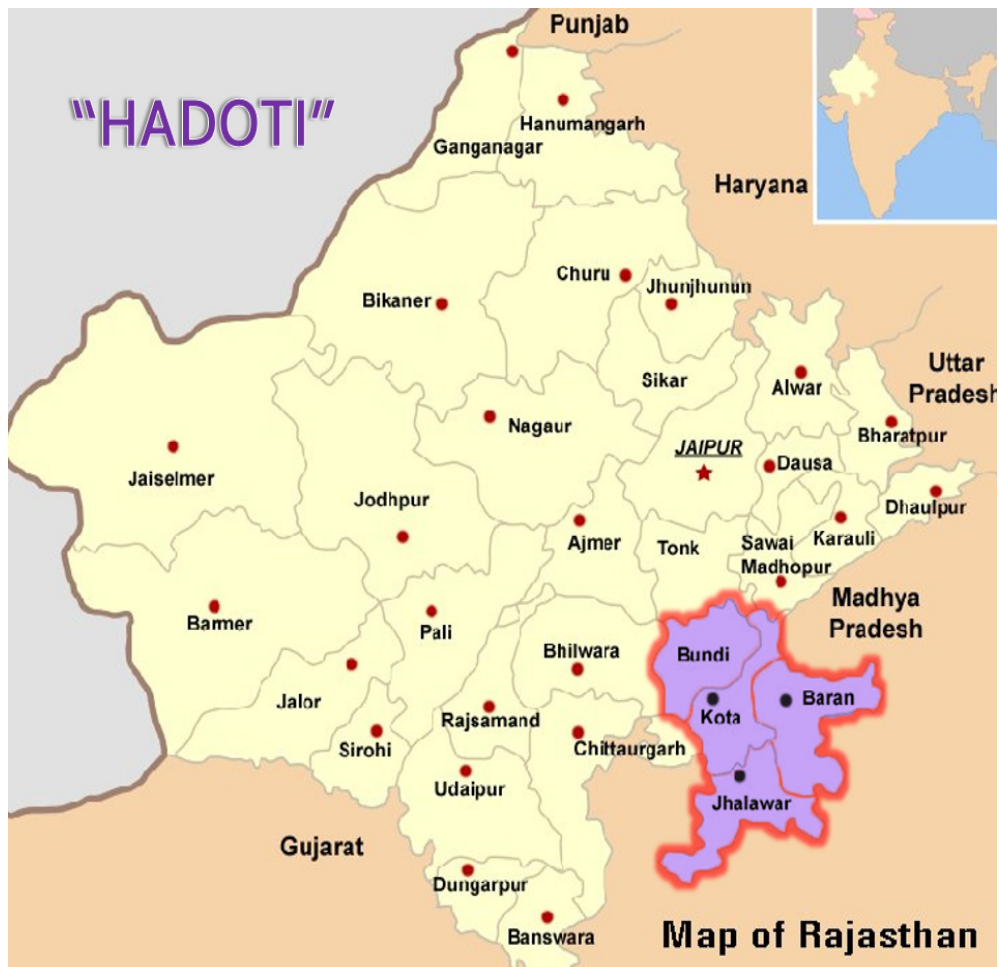


Fig 1.10 : Hadoti Region

Hadoti

Hadoti named after the 'Hada' rulers, lies in plateau belt of Rajasthan comprising of four districts - Kota, Bundi, Jhalawar and Baran. It lies in the south-east region of the state. Hindi and Rajasthani are the major languages spoken in this area. Chambal, Kalisindh and Parvati are important rivers that flow through this region.

Kota

Kota is one of the six divisional headquarters of Rajasthan and has been named after Bhil chieftain, Kotya. Kota which lies on the banks of river Chambal is located 240 km south of capital Pink City, Jaipur. Kota has emerged in last few years as the 'education city' of India - due to its flourishing coaching industry. Every year around 2 lakh students come here to seek coaching for competitive examinations like engineering and medical entrance. There are 5 universities and various other academic institutions including a technical university, a Medical College, a Dental College, Polytechnics, ITI's in Kota city. As per 2011 census there are 5 tehsils in Kota district (Sangod, Digod, Ladpura, Ramganj Mandi and Pipalda) and the total population of the district is 1950491. The literacy rate is 77.48 while the sex ratio is 889. The population of Kota city is 1,001,694. It is reported as the 47th most populated city in India. As per World Economic Forum (cited UN Habitat Data), Kota has been ranked as seventh most densely populated city of world with 12100 people per sq km in the year 2017. Kota city has 24-hour water supply besides Thiruvananthpuram.

Bundi

The town of Bundi is situated 35 km from Kota. The city lies near a narrow gorge, and is surrounded on three sides by hills of the Aravalli Range. Bundi had said to derive its name from a former Meena tribe man called Bunda Meena. As per 2011 census there are 5 tehsils in Bundi district (Bundi, Nainwa, Hindoli, Keshoraipatan and Indragarh) and the total population of the district is 1113725. The literacy rate is 62.31 while the sex ratio is 886. The population of Bundi city is 104,457.

Jhalawar

Jhalawar which literally means the abode of the Jhalas (a Rajput ruler) lies on the edge of Malwa Plateau. The Kali Sindh River flows northward through the center of the district. As per year 2011 census there are 7 tehsils in Jhalawar (Jhalrapatan, Pirawa, Pachpahar, Aklera, Khanpur, Gangdhar and Manohar Thana) and the total population of the district is 1411327 and the literacy rate is 62.13 while the sex ratio is 905. The population of Jhalawar city is 66919.

Baran

On 10th April 1991, Baran district was carved out of erstwhile Kota District as 33rd district of Rajasthan. Bajra, Jowar and Maize etc. are major kharif crops grown in the area whereas major Rabi crops grown are wheat, gram and mustard. Thus Baran has tremendous scope for agro-based industrialisation. As per year 2011 census there are 8 tehsils (Baran, Chipabarod, Kishanganj, Chhabra, Atru, Shahbad, Anta and Mangrol) in Baran district and the total population of the district is 1223921 and the literacy rate is 67.38 while the sex ratio is 902. The population of Baran city is 117992.

1.2.8 Respondents' Profile

This section provides a glimpse of personal and socio-demographic profile of the respondents. The findings are based on a survey conducted with a sample size of 500 respondents. Following tables summarise the distribution of sample profile by different variables.

1.2.8.1 Gender of Respondents

Table 1.2 and subsequent figure 1.11 provides gender-wise classification of the respondents.

Both male and female respondents using cell phones have been surveyed. The surveyed sample consists of about 62% male users and about 38% female cell phone users.

Table 1.2 : Distribution of Respondents Gender-wise

Gender	N	%
Male	309	61.8
Female	191	38.2
Total	500	100.00

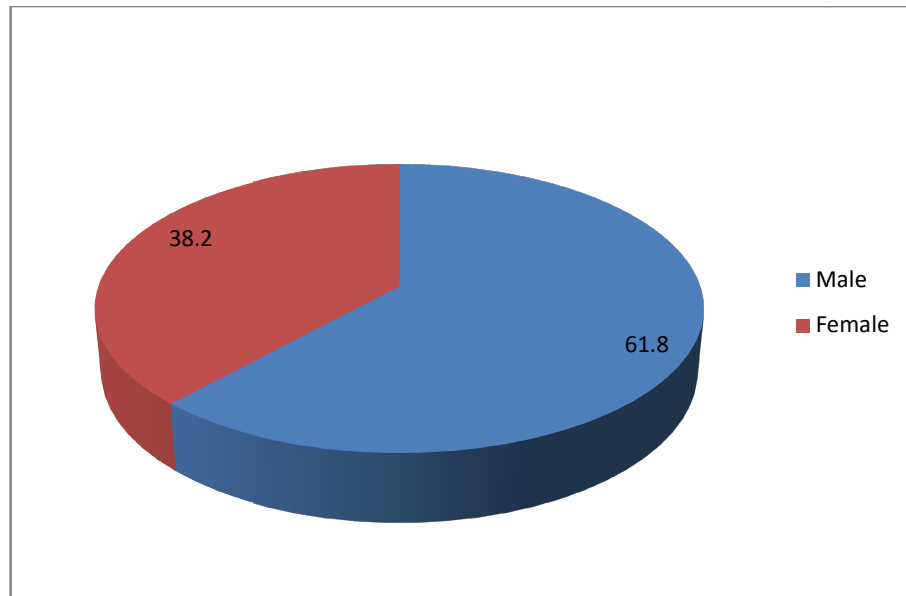


Fig. 1.11 : Distribution of Respondents Gender-wise

1.2.8.2 Age of Respondents

It is important to classify the respondents on the basis of age. The table 1.3 and subsequent figure 1.12 represents the classification of respondents in terms of age group they belong to.

Respondents belong to different age group. About 32.2% of the respondents are in the age group of 21-30 years while 30.8% and about 17.8% respondents are in the age group of 31-40 years and 41-50 years respectively. It is important to note that small percentage of participants in the sample are either up to 20 years or 51-60 years of age. Remaining 2.6% are above 60 years of age.

Table 1.3: Distribution of Respondents Age-wise

Age	N	%
Up to 20 years	48	9.60
21-30 years	161	32.20
31-40 years	154	30.80
41-50 years	89	17.80
51-60 years	35	7.00
Above 60 years	13	2.60
Total	500	100.00

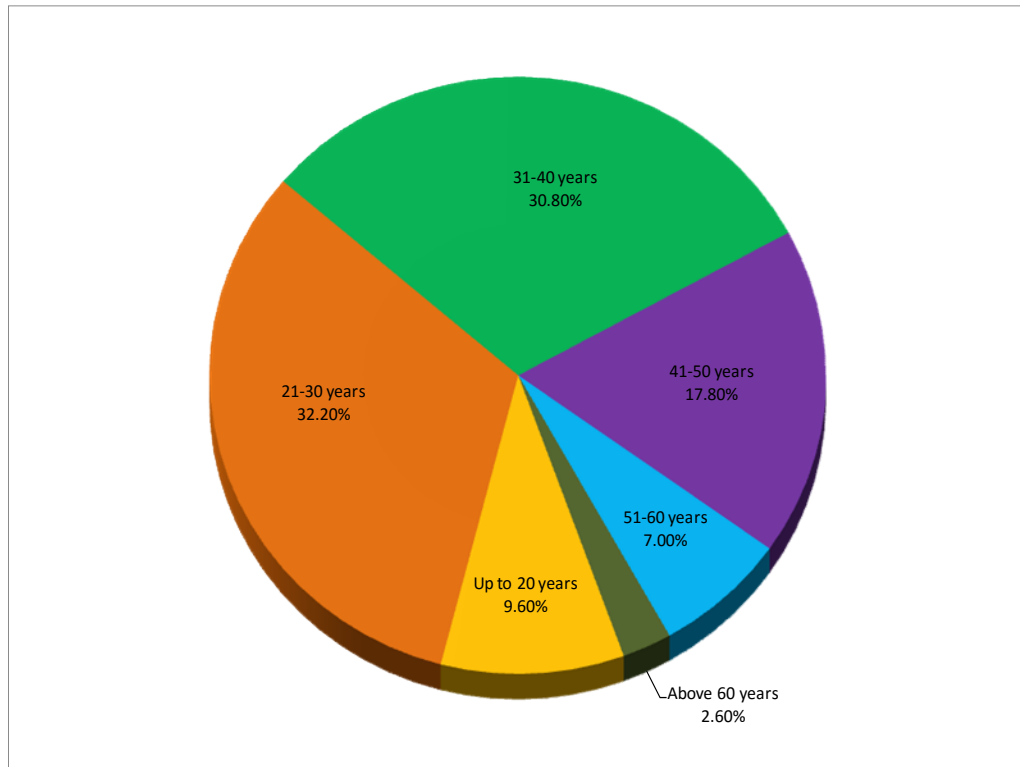


Fig 1.12: Distribution of Respondents Age-wise

1.2.8.3 Education of Respondents

Table 1.4 and subsequent figure 1.13 represent the educational qualification of the respondents.

Table 1.4: Distribution of Respondents Education-wise

Education	N	%
Uneducated/illiterate	28	5.60
Less than Secondary	29	5.80
Secondary / Sr. Secondary	67	13.40
Graduate	193	38.60
Post Graduate	93	18.60
Professional	86	17.20
No Response	4	0.80
Total	500	100.00

It can be interpreted from the table 1.4 that the respondents came from different educational background. Majority of the participants of the sample were Graduate, 17.2% were professionally qualified (Doctors, Engineers, Pharmacists, Chartered Accountants, Educationists, Architects, Lawyers etc). 13.4% of the respondents were Secondary / Sr. Secondary passed. While 5.6% and 5.8% of the respondents comprised of uneducated and less than secondary educated respondents.

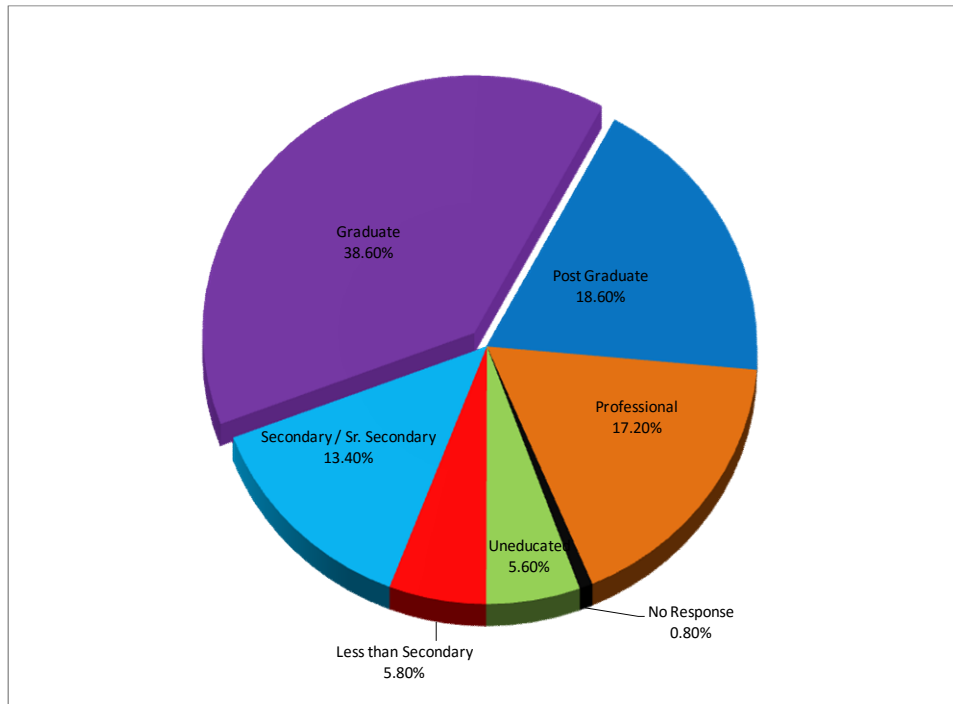


Fig. 1.13: Distribution of Respondents Education-wise

1.2.8.4 Occupation of Respondents

Table 1.5 and subsequent figure 1.14 presents the response related to occupation of respondents.

Table 1.5: Distribution of Respondents Occupation-wise

Occupation	N	%
Student	76	15.20
Service	183	36.60
Business	67	13.40
Retired	15	3.00
Professional	48	9.60
Housewife	110	22.00
No Response	1	0.20
Total	500	100.00

It can be interpreted from the table that majority of the participant (36.6%) of the survey were rendering their services at offices, shops, households, educational institutions etc. However, around 22% of respondents were housewife and about 15.2% were students. Around were 13% engaged in own business or trade whereas 9.6% were professionals. But a relatively smaller percentage of the sample participants, 3% included retired personnel.

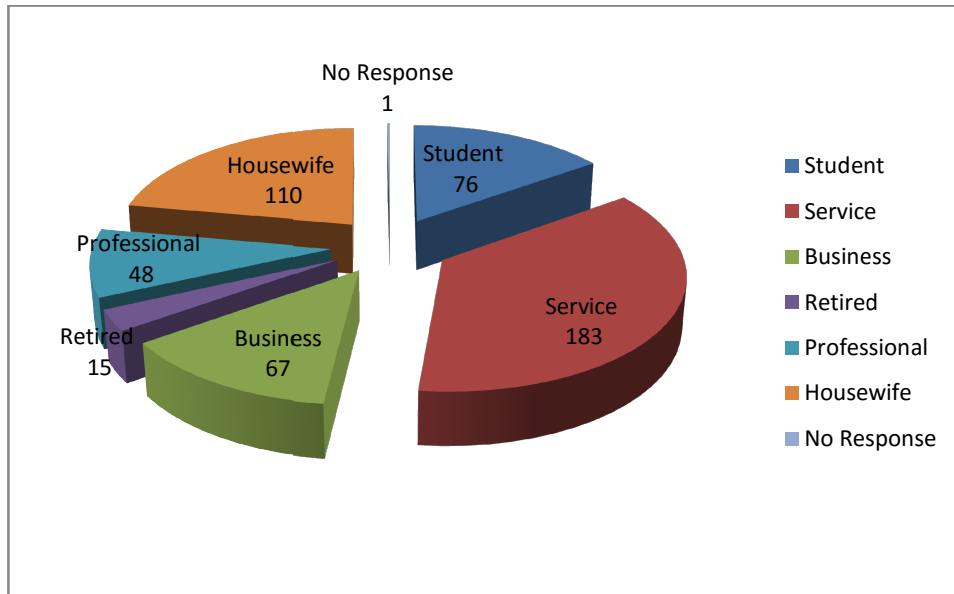


Fig. 1.14: Distribution of Respondents Occupation-wise

1.2.8.5 Monthly Income of Respondents

Table 1.6 and subsequent figure 1.15 shows the monthly income of the respondents. Income level of customer might play a key role in the choice of cell phone.

Table 1.6: Distribution of Respondents Monthly Income-wise

Monthly Income	N	%
< 15,000	77	15.40
15,000 - 30,000	138	27.60
30,000 - 45,000	75	15.00
45,000 - 60,000	74	14.80
> 60,000	127	25.40
No Response	9	1.80
Total	500	100.00

Majority of the participants of the survey i.e. about 27.6% belonged to the group of monthly income of Rs.15, 000-30,000. Around 25% were in the category of monthly income of more than Rs.60, 000 whereas about 9% belonged to the group of monthly income less than Rs. 10, 000. About 15% of respondents said that their monthly income was less than Rs. 15,000, Rs.30,000-45,000 and Rs.45,000 - 60,000 per month.

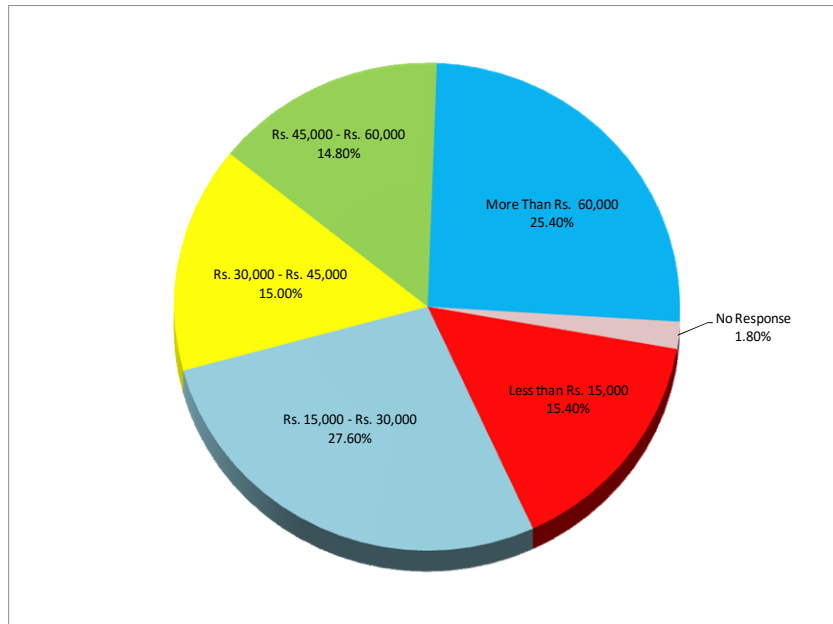


Fig. 1.15: Distribution of Respondents Monthly Income-wise

Thus sample composition has a representation of the respondents belonging to different demographic profiles based on gender, age, educational qualification, occupation and monthly income which helped in better generalization of results.

1.2.9 Data Collection

According to requirements of the research data was collected by both primary and secondary means.

1.2.9.1 Primary Data

Survey method is the most extensively used technique for primary data collection, especially in social sciences. Survey, is used to learn about knowledge, beliefs, preferences, and satisfaction about subject of the study. The survey instrument, usually a questionnaire is required to develop. (Kotler, Keller, Koshy, & Jha, 2009).

For flawless and credible primary data collection, survey method was extensively used in the present study. In order to collect primary data from the customers a self-designed questionnaire was administered to a sample to study the purchase pattern of the cell phone. Questionnaire is an important tool for collecting and analysing information from selected sample. It is the source of information for study whose characteristics are to be measured. Marketing researchers widely adopt survey method to study the factors influencing the customer behaviour.

The survey was undertaken from May, 2016 to September 2016 in the cities of Kota, Bundi, Baran and Jhalawar to get a wide cross section of cell phone users. The average time taken by the cell phone users to fill the questionnaire was about 15 minutes. Over a large extent, the respondents took lot of interest in filling the form. The data collection was completed in about five months of time. The data so collected was coded in MS-Excel worksheet.

1.2.9.2 Secondary Data

Secondary data was collected from websites (TRAI, Department of Telecommunication, corporate sites of cell phone brands etc.), census report,

annual reports, newspapers, magazines, articles, journals, published and unpublished research theses, books, conference proceedings, periodicals etc. Data related to number of subscribers in Hadoti region was sought under 'Right to Information' from Ministry of Telecommunications, TRAI, BSNL, COAI etc. but all these agencies depicted their inability to supply such data.

1.2.10 Data Collection Instrument

“A Questionnaire consists of a set of questions presented to the respondents. Because of its flexibility, it is by far the most common instrument used to collect primary data” (Kotler et al., 2009).

1.2.10.1 Determining Constructs and Statements

In order to conduct an effective and efficient survey a questionnaire was developed after undertaking in-depth literature review and discussions with 25 cell phone users who were asked to tell about the characteristics of their cell phone owned. They were encouraged to list down the various attributes and features that they consider during the purchase of cell phone. Through this raw data a list of 32 statements as specific items were identified and used for the study. Similarly, the functions and applications used by smart phone users were also identified to determine the usage rate of those applications. Thus a list of 24 items (functions and applications) was identified. In order to collect facts about cell phone and their subscriptions interviews of officials at BSNL Kota, COAI (Cellular Operators Association of India), mobile service providers in Rajasthan were conducted. Dealers and sellers of cell phones in the 4 cities were also approached to collect relevant information about cell phones. Such Interviews also provided valuable information in designing the final questionnaire.

It contained both open and closed ended questions. “Open-end questions allow respondents to answer in their own words and often reveal more about how people think. Closed-end questions specify all the possible answers and provide answers that are easier to interpret and tabulate.”(Kotler et al., 2009).

Thus a structured, undisguised and self administered questionnaire was prepared which was tested through a pilot survey. It took over six months to frame the questionnaire.

1.2.10.2 Measurement Tools - Likert Scale

Likert scales are designed to measure attitudes or opinions of respondents using fixed choice response formats in form of a scale. Likert Scale is a method of transforming quantitative value to qualitative data, to make it suitable for statistical analysis. It is the most widely used rating Scale.

In 1932 Dr. Rensis Likert developed the principle of measuring attitudes by asking people to respond to a series of statements about a topic, in terms of the extent to which they agree with them, and so tapping into the cognitive and affective components of attitudes. These are ordinal scales that measure levels of agreement/disagreement. In its final form, the Likert Scale is an odd (five or seven) point scale with the neutral point. Each point represents pre-coded responses.

A Likert-type scale assumes that the strength/intensity of experience is linear, i.e. it may arranged in a continuity from strongly agree to strongly disagree, based on the assumption that attitudes can be measured.

Likert scale was used in Question No. 19 and 21 to measure the concern for different attributes or characteristics of cell phone during its purchase and post purchase satisfaction of cell phone users respectively on a scale of 1 to 5.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral/Neither nor Disagree	Agree	Strongly agree

Similarly, Question No. 20 measured the usage level of features, functions and applications of smart cell phone users on a scale of 1 to 5.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

Question number 22 aimed to check awareness of cell phone users about environment and health related issues of cell phone. This was a dichotomous type (Yes/No) of question. Remaining questions from 23 to 25 were also regarding environment concerns of mobile phone users.

1.2.10.3 Pilot Study

The pilot study is the pedestal of any research. In the present research pilot survey was conducted through 50 cell phone users of the Hadoti region (Kota, Bundi, Jhalawar and Baran).

The respondents were asked to fill the questionnaire and give comments and suggestions in terms of clarity and completeness of the questionnaire. Revisions were incorporated as per their suggestions. Thus the questionnaire was finalized according to the understanding of the respondents and requirements of the research.

1.2.10.4 Validity and Reliability of Questionnaire

- **Validity**

The content validity of questionnaire was determined as follows:

After designing first draft of the questionnaire, questionnaire was given to few experts in the related fields and their opinion was sought. After getting opinion of experts necessary changes in the questionnaire like order of questions, language of few statements, questions are done and some unnecessary questions were removed and few new questions were added. Thus in this way content validity of self-designed questionnaire was determined.

- **Scale Reliability Tool**

The question of reliability addresses to the issue whether this instrument produces the same results each time it is administered to the same person in same setting. In the psychometrics, reliability is used to describe the overall consistency of a measure. A measure is said to have a high reliability if it produces similar results under consistent conditions. Cronbach Alpha is calculated to measure the internal

consistency and reliability of the instrument. Cronbach Alpha is measured on the same scale as a Pearson's Coefficient of Correlation and typically varies between 0 and 1. The closer the alpha is to 1, the greater the internal consistency of the items in the instrument being assessed. The threshold value for considering scale to be reliable is 0.7. (Hair et al, 2006)

A measuring instrument is reliable if it provides consistent results. Internal consistency and reliability of instrument/questionnaire that was used in the present research work was the result of these reliability tests for question no. 19, 20 and 21 in which likert scales have been used is given below:

Table 1.7: Reliability Test

Question Number	No. of Items	Cronbach's Alpha
19	32	0.957
20	24	0.946
21	10	0.937

Since all the calculated reliability values (Cronbach's Alpha Value) for the scales used were much higher than 0.7 which came out to be excellent and therefore all item scales used in the respective questions were considered reliable, indicating the acceptance of research testing.

1.2.10.5 Structure of Questionnaire

The questionnaire was designed with the key purpose of identifying the different factors that influence customer behaviour when choosing between different mobile phone brands in the Hadoti region of Rajasthan. Therefore each question was framed with the aim of extracting some information that would provide an insight and help in understanding the complex buying behaviour of the mobile customers. Questionnaire contents included interval data (income), ordinal (5-point Likert scale), categorical (yes/no) however the "other" chance was allowed. The questionnaire was also tested for validity.

Lower response rate was avoided by approaching the respondents personally. Each participant was given complete liberty to refuse to participate in this survey, only after their consent they were given a questionnaire to fill. Correct purpose of the study was explained to them to have sincere, unbiased and truthful answer. Any doubts related to the contents of the questionnaire were clarified on spot. The questionnaire was translated in Hindi by including short, clear and easily understandable statements and increasing conviction among hindi and local language speaking respondents.

Questionnaire was divided in 5 sections. Each section contained questions on some relevant aspects. Section I was related to the demographic profile of the respondents -age, gender, education, profession and income. Section II contains general questions related to the mobile phone owned by the consumers. Section III dealt with preferential features and attributes influencing the customer behaviour of cell phone users at the time of purchase. Section IV was framed to examine the post purchase satisfaction and Section V explores the awareness of respondents on health and environment issues related with the cell phone.

1.2.11 Data Analysis

Primary data was collected using questionnaire. Data was coded in MS Excel and represented using tables and pie charts to give a clear picture of the research findings. Processing and analysis of data was done using statistical software SPSS 24, by means of descriptive and inferential analysis.

Mathematical and statistical techniques have been used in the study for examining the data collected. Graphs, tables and appropriate statistical tools of data analysis factor analysis, ANOVA, Friedman Test, Z Test and Chi-test have been used with the help of SPSS 24 analytical software to examine quantitative data. Hypotheses have been tested using Chi Square Test Friedman Test, Z Test.

- **Z Test**

Z-test is based on normal probability distribution and is used for judging the significance of several statistical measures, particularly the means. The relevant

statistics “Z’ is worked out and compared with its probable value at a specific level of significance for judging the significance of measure concerned. It is applied when the sample is large and population variance is known.

In the present study Z-test was used for judging the significance of difference between means of two independent samples i.e. male and female towards different factors that influence the choice of customers. To test the significance of difference between the two sample means, the difference is expressed in terms of standard normal variate (Z) by dividing the difference with standard error.

$$Z = \frac{|\bar{X}_1 - \bar{X}_2|}{SE}$$

Where \bar{X}_1 = Mean of first series

\bar{X}_2 = Mean of second series

SE = Standard error

$$SE = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}$$

- **Analysis of Variance (ANOVA)**

The analysis of variance frequently referred to as the ANOVA is a statistical technique specially designed to test whether the means of more than two quantitative populations are equal. This technique was developed by, R. A. Fisher in 1920s and is capable of fruitful application to a diversity of practical problems. Basically, it consists of classifying and cross classifying statistical results and testing whether the means of a specified classification differ significantly. In this way it is determined whether the given classification is important in affecting the results.(Srivastava, Shenoy & Sharma, 1989). In the present research the data has been classified on the basis of different demographic characteristics (age, education, profession, monthly income) and tested if the means of different groups classified on any of the criterion differ significantly.

- **Technique of Analysis of Variance**

The ANOVA can one-way, two-way, three-way or N-way. In one-way classification the data are classified according to only one criterion. It is

customary to summarise calculations for sums of squares of variance, together with their number of degrees of freedom and mean squares in a table called the analysis of variance table, generally abbreviated ANOVA. The specimen of ANOVA table is given below:

Table 1.8 Analysis of Variance (ANOVA) Table: One-way classification Model

Source of Variation	SS (Sum of squares)	v (Degrees of Freedom)	MS (Mean Square)	Variance Ratio of F
Between samples	SSC	v_1	MSC	F
Within samples	SSE	v_2	MSE	

Where,

SST = Total sum of squares of variations.

SSC = Sum of squares between samples

SSE = Sum of squares within samples

MSC = Mean sum of squares between samples

MSE = Mean sum of squares within samples

- **Friedman Test**

The Friedman test is a non-parametric statistical test developed by Milton Friedman. Similar to the parametric repeated measures ANOVA, it is used to detect differences in treatments across multiple test attempts. The procedure involves ranking each row (or block) together, then considering the values of ranks by columns. A classic examples of use is - n wine judges each rate k different wines. If any of the k wines ranked consistently higher or lower than the others is analysed using Friedman Test. In the present research Friedman test was administered while evaluating the purpose of purchase of cell phone and the sources of collection of data before purchase.

The Friedman test is used for one-way repeated measures analysis of variance by ranks. For the Friedman test, the observations come in sets of K observations. Within a set, the observations are dependent, but between sets the observations are independent. For the Friedman test, the dependent variable must be measured on at least an ordinal scale, and the null hypothesis states that the preferences are equal for the K levels of a factor.

- **Factor Analysis**

Factor analysis which is applied as a data reduction method was first termed by Thurstone in 1931. Factor analysis is one of the most common inter dependency technique mainly used to classify variables by reducing the number of variables and to identify structure in the relationships between variables. It is used when there is a systematic interdependence among relevant set of variables. In the present study factor analysis was applied to construct the structure of determinants of choice of cell phone and categorising the different usages function.

The Principal Component Analysis is the most widely used method of factor analysis and the most common method of factor rotation is the varimax rotation (Kinnear & Gray, 2010; Zikmund et al., 2010). Principal component technique looks at the correlation of different variables to reveal the relationship between them, and then reduces the variables by empirically summarizing them or combining them into a small number of factors under common themes (Tabachnick and Fidell, 2007). Usually, a few components will account for most of the variation, and these components can be used to replace the original variable.

- **Cluster Analysis**

Cluster analysis or clustering is the task of grouping a set of objects in such a way that objects in the same group (called a cluster) are more similar (in some sense or another) to each other than to those in other groups (clusters). It is a main task of exploratory data mining, and a common technique for statistical data analysis, used in many fields, including machine learning, pattern recognition, image

analysis, information retrieval, bioinformatics, data compression, and computer graphics.

The term cluster analysis (first used by Tryon, 1939) encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories. Cluster analysis aims at sorting different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise. Cluster analysis simply discovers structures in data without explaining why they exist. In marketing it is widely used for market segmentation.

In the present cluster analysis has been administered to segment the customers of cell phone with respect to concern for different variables related to features, price, mobile technology, environment, health and safety by them during purchase.

1.2.12 Limitations

Every work has its own limitations. This study was also constrained with limitations.

- Respondents were reluctant to give response open heartedly and they were skeptical about giving personal information fearing that such information may be utilised against them.
- Since the results and conclusions were based on the response or information provided by the respondents hence 'response error' might have crept in. Similarly, sampling errors like 'drop in' and drop out' error might have persisted.
- Owing to limited size of the sample, study could not be taken for inductive generalization.
- Limited knowledge and experience of the researcher in the field of research might have led to interpretational error.

1.3 REVIEW OF LITERATURE

Literature review is the key component of a research since it evaluates what needs to be researched. While researching the customer behaviour of cell phone the literature review establishes the theoretical framework, appreciates something of the sequence and fosters growth of knowledge, directs how the flow of study be structured so that an effective research could be undertaken.

In this chapter, an attempt has been made to review different studies in context to customer behaviour of mobile/cell phone users by sub-dividing the concept into smaller facets to cover every aspect of customer behaviour. This literature review is categorised according to the research objectives with a purpose to serve as a roadmap for identifying the determinant factors influencing cell phone selection among customers in similar context.

1.3.1 Consumer Behaviour

The aim of marketing is to meet and satisfy targeted consumer's needs and profitability of the concern (Premlatha, Sundaram & Jijoy, 2012). All marketing decisions are based on assumptions about consumer behavior (Hawkins, 2007).

Consumer behavior is one of the most popular and important terms in marketing. Kundi J. et al (2008) stated that consumer behavior refers to the mental and emotional process and the observable behavior of consumers during searching, purchasing and post consumption of a product or service. Consumer behavior is the study of when, why, how and where people do or do not buy products (Sandhusen, Richard L; 2000). Schiff man, Kanuk and Kumar (2010) defined consumer behavior as the behavior that consumers display in searching for, purchasing, using, evaluating and disposing of products and services that they expect will satisfy their needs. As stated earlier a buyer generally passes through five different stages in the buying decision process. These stages are need recognition, information search, evaluation of alternatives, purchase and post-purchase.

1.3.2 Customer Behaviour of Cell Phones Users

Among various contemporary mobile communication technologies, the cell phone is regarded as “the most radiative domestic appliance ever invented.”(Coghill, 2001).The cell phone is an essential component of early twenty-first century societies, markets, and economies. Mobile handsets nowadays have become an integral part of human daily life and personal communication across the globe.(Mesay, 2013).The cell phone handset in particular has become the synechdocal symbol of major socio-economic transformations the world over (Reyes, 2016).In contemporary society, cell phone is integrated into individual’s daily life, and technology now tends to be more and more important to people, and it influences the type of human’s life deeply. Today's cell phone is a pervasive tool. It has become such an important aspect of a user's daily life that it has moved from being a mere 'technological object' to a key 'social object' (Srivastava, 2010).Historically, a mobile phone has been costly devices it was primarily used by business users (Kendall, 1997). With an accelerator of technology, the smart phone market has developed rapidly (Fillion et al. 2012). In 2008 Singh assumed that by the year 2022–2023, number of cell phones will be higher than the number of people in India.

Although a cell phone was initially designed for voice communication, its functionalities have been increasingly expanded to perform various tasks and fulfill different purposes (Fang et al. 2006; Leung & Wei 2000; Nysveen, Pedersen & Thorbjornsen, 2005). Advances in mobile technology have enabled a wide range of applications to be developed that can be used by people on the move.(Harrison, Flood, Duce, Fernandes, 2000) noted that individuals give importance to availability of new choices.

Based on previous studies, the use of a mobile phone can be divided into four main categories - communication-oriented (i.e. sending or receiving e-mail), entertainment-oriented (i.e. listening to music, playing a game, and watching a video clip, movie clip), personal information-oriented (i.e. using personal organiser, checking personal schedule, setting alarm , and using office

applications) and commercial transaction-oriented (i.e. checking bank account, m-shopping, and paying bills/e-payments, etc).

Riquelme (2001) in his study identified the amount of self-knowledge of customers while purchasing a mobile phone. The research which was based on survey of 94 consumers, emphasized six attributes viz., phone features, connection fee, access cost, mobile to mobile phone call charge rates, other call rates, and free calls significantly in making mobile purchase.

Dorsch, Grove and Darden (2002) conducted a research on customer choice of mobile phone. They rightly mentioned that from the perspective of marketing, consumer's purchase process can be classified into a five step problem solving process such as: need recognition, information search, give alternatives evaluation, purchase activity and post purchase evaluation. As in any other case this five step process of decision making rightly fits behavior of purchase making decision or complex decision purchase process of a mobile handset. But often the decision may also be influenced by symbolic preference associated with some brands.

Liu (2002) examined the factors affecting the brand decision in the mobile phone industry in a study conducted in Asia. It was developed that attitude towards the mobile phone brand and attitude towards the network were two distinct characteristics in the choice of cellular phone. The choice of mobile phone brand was greatly influenced by then new features such as memory capacity and SMS. There was also inclination towards purchasing phones with better capacity and larger screens.

Stat/MDR Research Institute Report (2002), belonged to the times when color display screen were launched and had driven consumers into stores to purchase new mobile phones. It was found that color display was the most important choice criteria for consumers then as compared to new features or higher data rates.

Pakola et. al.(2002)studied the motives that laid an impact on Finnish consumer behavior as well as highlighted the major mobile phone services used. General information about the users was also collected. It was noted that for price and

properties (features) closed to 80 percent and over 85 percent of the respondents emerged as the most important motives affected their purchase decision of mobile phone.

Karjaluoto (2003) and Alkio (2004) interpreted in their study that a large number of respondents preferred purchasing the mobile phone handset with value added facilities like camera, large screen, familiar brand and low price. The study also concluded that the gender did not have any impact on purchase preference of the respondents.

Karjaluoto et. al. (2005), conducted similar study to explore the factors that influence intention to acquire new mobile phones on one hand and factors that influence change of mobile phone on the other. Focus group interviews with 79 graduate students and a survey of 196 respondents was conducted respectively. The actual choice of brands is influenced by price, brand, interface, and properties while the basic reason to change mobile phone among students was technical problems.

Xihao and Yang (2005) conducted a cross nation empirical study to investigate the difference of social influence specifically reference groups on consumer behaviour and purchase decisions. Three types of reference groups influence (informational influence, utilitarian influence, and value-expressive influence) were studied in the research. A web-based questionnaire was used to collect the data from about 200 participants in each country. A significant difference in the cell phone consumer purchasing patterns was found in terms of social reference a group influence that was particularly due to differences in fundamental cultural and social traditions between the U.S. and China.

Karjaluoto et.al. (2005) stated that mobile phone market is among the most turbulent market due to intense competition and rapid change. They conducted two studies in Finland with a concern to look at consumer buying decision process and explore the factors that determine consumer choices between different mobile phone brands. Customers' intentions to acquire a new mobile phone and factors that influence on mobile phone change on the other have also been studied. Focus group interviews of 79 graduate students were

conducted in study 1 followed by a survey of 196 respondents in study 2. Through these studies it was explored that students changed their mobile phones due to technical problems. The most influential factors affecting the choice between brands were price, brand, interface, and properties.

Ling, Hwang and Salvendy (2007) investigated the relationship among the design features of the cell phone. The most important design features and design factors were also identified as preference in cell phone through a survey of college students. The results of the survey indicated that the physical appearance, size and menu organization of the mobile phone were primarily the most determinant factors affecting the choice of mobile phones.

Eric and Bright (2008) conducted a study in Kumasi Metropolis of Ghana. It was interpreted from the results of the study that the most important factor that determined the mobile phone was reliable quality of the mobile phone brand followed by user-friendliness of the mobile phone. It was found in a study conducted by **Mack & Sharples (2009)** that usability is indeed important in mobile phone choice. Features, aesthetics and cost were found to be other important attributes that influenced the product choice.

Singh and Goyal (2009) undertook a study to understand the difference in the importance given by different age and gender groups to the factors considered while buying mobile handsets in India. It was noted that mobile phone customers aged 18-30 years were less price sensitive than customers of other age groups. These customers gave more importance to physical appearance, brand, value added features, and core technical features more than users of any other age groups. But the consumers of age group 50 years and above considered price to be more important than consumers of other age groups. On analysis it was concluded that significant differences existed between different age groups as regards to the importance given to all the factors. But post - purchase services was an exception. This difference came out to be highest for the brand closely followed by core technical features of the mobile phone. Gender differences have also existed for these factors.

Jagwinder (2009) on basis of his study concluded that the mobile handset users of age group of 18-30 years are less price sensitive than consumers of other groups; rather they consider 'physical appearance', 'brand', 'value added features', and 'core technical features' more important than users of any other age groups. On the contrary, the consumers of age group 50 years and above have given greater importance to 'price' than consumers of other age groups.

Chang (2009) developed an empirical model to explore the factors that influence consumers' behaviour while using a mobile phone as a converged device, i.e., using different functions and services on a mobile phone for multiple purposes. Convergence in this domain is particularly regarded as a social phenomenon. Chang was the first to provide an exploratory study of individual uses of a mobile phone for personal information management (PIM), e-mail, entertainment, and commercial transaction. It identified the antecedent factors that influence the above behavior and behavioral intentions drawn from the Technology Acceptance Model (TAM). It was found that although the TAM has been effective in explaining behaviors in the context of single-functional technologies, it needs further enrichment when applying it to multi-function (converged) technologies.

Sharma (2010) attempted to gather information about the mobile phone users particularly youth residing in Bhutan. A study was conducted among 254 Bhutanese consumers. Factor analysis was used as a tool to identify the factors that influence the consumer behavior. The study also tried to discover the motives of young Bhutanese consumers to purchase new mobile phones. The outcome of the study identifies five product attributes namely battery life, looks, signal reception, product features, and technology as factors accountable for making brand choice of a mobile phone by the youth community of Bhutan.

Mokhlis and Yaakop (2012) focused on identifying the importance of different choice criteria in mobile phone selection by conducting a study among Malaysian consumers. This quantitative study was based on data drawn from 376 university students. Descriptive statistics, factor analysis, and Friedman test were employed to analyze the data. Component factor analyses were administered which resulted in 7 dimensions image, price, personal recommendation, innovative features,

durability and portable aspects, media influence and post-sales service. Among these three most important factors influencing consumer choice of cell phones came out to be innovative features, recommendation and price.

Subramanyam and Venkateswarlu (2012) undertook a study to explore the factors influencing buyer behavior of cell phone buyers in Kadapa district in India. According to the results, the determining factors influencing the purchase of mobile handset. Were income, advertising and level of education of family.

Premlatha, Sundaram & Jijoy (2012) in their study observed the customer behavior of mobile phones user's at Univer Cell stores in Kerala. About 200 customers of mobile phone were surveyed at Univer Cell stores in different parts of Kerala with an aim to get an insight into their buying behavior. It was concluded that the purchase of mobile phones is influenced by friends and advertising on Television.

Malasi (2012) in a study of undergraduate university students in Kenya investigated the influence of product attributes on mobile phone preference. The study indicated that varying product attributes' influences the undergraduate students' preferences on mobile phones. Color themes, visible name labels, and variety of models of mobile phone brand, packaging for safety, degree of awareness on safety issues, aesthetics of the phone and other aspects of product and brand attributes were considered by them.

Muhammed (2012) diagnosed the consumer behavior of university students during purchase of mobile phone handsets and investigated factors that influence intention to acquire new mobile phones and the reasons underlying mobile phone change.

Saifet.al. (2012) conducted a study to find the factors affecting consumers' choice of mobile phone selection. It was interpreted that new technology features influenced the consumers to purchase new mobile phone.

Kumar and Kumar (2012) undertook a study in Erode city. This study highlighted the factors which influenced the customers to purchase Mobile Phones. The buying behavior of the consumer while purchasing. Mobile Phones

and the consumer satisfaction level towards different branded mobile phones were also studied. In case of customer dissatisfaction the reasons for it were also explored. It was concluded that the consumer buying a mobile phone which satisfies his wants and are always influenced by some considerations which leads him to select a particular brand or a particular store in preference to others

Mesay (2013) noted in his study that in Ethiopia subscribers took numerous factors into consideration during the mobile phone buying decision process. Price was evaluated first followed by mobile phone features as the most important variables amongst all. Price also acted as a motivational force that influenced them to opt for a mobile phone purchase decision.

Soomro and Ghumro (2013) conducted an exceptional study that investigated the perception of young respondents of various universities of Sindh with respect to considerations and preferences during purchase of mobile phone handsets and mobile phone services of various companies. The results of this study supported many of the hypotheses, which were in line with the studies of Liu (2001),

Harrison et al. (2013) concluded in his study that the usefulness of mobile devices has increased greatly in recent years allowing users to perform more tasks in a mobile context. The range and availability of mobile applications is expanding rapidly. With the increased processing power available on portable devices, developers are increasing the range of services that they provide.

Uddin, Lopa and Oheduzzaman (2014) attempted to uncover the underlying factors that influence customers choice of mobile phone. The research was undertaken in Khulna city of Bangladesh. The research outcomes showed that the most significant factor that affected the customer choice was physical attributes of mobile phone. Some other factors were pricing, charging and operating facilities, size and weight, friends' and colleagues' recommendations, neighbor's recommendations and advertising – that played a significant role in mobile phone choice.

Velumani (2014) made an effort to understand the buying behavior of Nokia mobile phone in Erode district. It was found that mobile phone users had high

awareness for Nokia services. The After sales Services of Nokia mobile phone attracted customers. They preferred to own Nokia mobile phone because of its quality, model, price, services and memory capacity.

Siddique et al. (2014) in a study conducted in Bangladesh, examined the relationship between purchase decision for a mobile phone and its features. He also estimated the variation in purchase decision for various features through the customers. A sample of 80 respondents was randomly selected from the students of the Comilla University, Bangladesh. Findings showed that camera, brand image, long lasting battery, internet facility, multimedia, performance and colour of mobile handset influences buying decision significantly whereas internal and external memory capacities, warranty period, price, customer-care service, country of origin had less significant influence on buying decision.

Khan (2014) undertook an empirical study through an image-based survey of college students in Pune city. Three critical factors namely price, brand and brand ambassador were considered as drivers of purchase decision. It was found that there was specificity of responses in imaged based survey for brand and brand ambassador and not for price.

Alshuridehet.al. (2015) examined the major factors that mobile phone brand choice through analyzing a set of pre-behavior and post-behavior factors from a Jordanian customer's perspective. A structured questionnaire was used as tool of research and was circulated among students of three main Jordanian universities. A Multinomial Logistic Regression analysis was employed as a result of which it was interpreted that if there is positive experience with previous mobile phone then customer repeats the purchase whereas in case of a bad experience with previous mobile leads to switching of customer to others brands,

Juwaheer et. al. explored the various factors which lay impact on the selection of mobile phones among young customers in Mauritius. An integrated framework to investigate the factors that influence the selection of mobile phones was developed using various constructs such as branding, pricing, mobile phone features, lifestyle, and demographic variables. The relative significance of these factors in determining the selection of mobile was also investigated. The Mobile

Phone Selection Model (MOPSM) was further validated by means of questionnaire which was administered to 150 young mobile phone users through a survey. It was interpreted from the analysis that pricing was a key determinant in selection of mobile phones by young customers followed by top of mind awareness and perceived brand value. Mobile phone features and young consumer's lifestyle also laid impacting on mobile phone selection. Inferential analysis revealed that there was significant relationship between mobile phone selection and the demographics of the consumers.

Sethi and Chandel (2015) determined the preference of consumers towards entry level smart phones. In conjoint analysis relative importance of attributes was analyzed and brand image came out to be the most important attribute used as a selection variable while purchasing smart phone, followed by price and purpose, whereas the camera, Screen size and RAM did not play significant role in purchase decision.

Mramba (2015) examined the influence of brand name on customer purchase decision. The study was conducted in Tanzania and data was collected using questionnaire and interviewing 160 cell phone users. The findings reflected that customers' judgment in buying decision of the mobile phone is significantly influenced by three variables - his need, country of origin of brand, and the durability of handset. According to this research customers are not loyal to any specific brand name. This means that when customers are offered mobile phone of different brand names they mainly consider three aspects - if it fulfill his needs, its country of origin and if it is durable.

Yusuf et. al. (2015) conducted a research study in the northern regions of Malaysia to find how price, social influences, relative advantage and brand image affects demand of smart phones. The primary data was collected from 120 respondents who lived in Perlis and were randomly selected. The responses obtained were analysed using several statistical tools. It was concluded that price, social influences, relative advantage and brand image have significant impact on the demand of smart phones.

Ganlari, Deka and Dutta (2016) focused their research to analyse the external and internal factors which influence a consumer's choice of a smartphone. The consumer attitude for smartphones and its influence on purchase decision of mobile phone brand was also studied. The key factors affecting consumer's attitudes and behaviours towards smartphone purchase were also explored using quantitative analysis. The findings show that the Indians are positive towards use of smartphones and are using them in their daily life. Most of them are satisfied with their smartphones as they fulfill their needs. Branding, design of the cell phone, technical aspects, performance play a vital role in influencing purchase decision.

1.3.3 Segmentation of Cell Phone Users

Customer segmentation involves clustering based on common characteristics of demographic, psychographic profile of customers that enables the marketing firm for differentiated treatment of its customers by sales, distribution, customer service, etc.

Cohen and Ramaswamy (1998) rightly quoted that market segmentation is being used by marketers for better customer understanding, product development, and formulating appropriate marketing strategies. Segmentation clearly divides the market into distinct groups of customers, who can later be specifically targeted based on the marketing strategy.

Cindy Krum stated in her study that there are five different kinds of mobile phone users: **Up-to-Date** - use their mobile phone as a resource to keep them connected with real-time information about the world around them. **Social and Curious**- enjoy bringing others together, networking and planning events, **Busy and Productive** - very concerned with all information related to their own personal efficiency and their ability to cope with a busy schedule, **Latest and Greatest** - want to be the first to try something, even if there is no guarantee that they will be satisfied with it, **Just the Basics** - not really interested in the phone, except for the fact that it makes life easier.

Zhu et.al. (2009) empirically tested the linkage of consumer preferences for product attributes to their lifestyle. The study that was based on theory of product

characteristics and studies on lifestyle segmentation segmented the consumers into four lifestyle clusters based on their preferences for different mobile charging attributes. The implications of the findings were aimed at managers using lifestyle segmentation approach in product positioning.

Hande Kimiloğlu, V. Ashhan Nasır, Süphan Nasır (2010) explored consumer segments with different behavioral profiles in the mobile phone market. Pragmatic consumers give high concern to the physical, functional and convenience-based attributes of the product. The abstemious group regard both functionality along with design. While value-conscious consumers seek a product by focusing on price, the charismatic segment is the want-it-all group which considers many attributes like technological excellence, practicality, durability, shape/design and functionality.

Lukman and Michaelidou (2014) developed taxonomy of mobile phones in their study. The taxonomy so developed was based on a survey of 416 consumers which was further analyzed using factor analysis and cluster analysis to find four distinct clusters namely cognitive adopters, prestige-seeking emotional innovators, emotional adopters, and prestige-seeking cognitive innovators. Based on findings it was concluded that prestige-seeking emotional innovators and prestige-seeking cognitive innovators have relatively higher level of innovativeness and prestige price sensitivity,

Haverila, Rod, and Ashill (2013) concluded through their multi country study that inter-market segments of cell phone exist in five countries namely Finland, UAE, China, Canada and New Zealand, but their existence varies to some degree from country to country. Data gathered from 403 high school and 892 undergraduate students' were analysed using two level cluster analysis. The segments were profiled with gender, country of residence and frequency of usage of certain cell phone functions as background variables.

Kim and Park (2014) had examined mobile phone purchase and usage behaviors of early adopter groups in Korea. Segmentation by means of factor analysis and cluster analysis was employed to classify early adopter groups in accordance with

their activities, interests, and opinion. The study contributes to classify early adopter groups and indicated implications pertaining to mobile phone vendors and cellular service providers who target early adopters segments characterized differently.

Lee and Sundar (2015) investigated the relation between cultural psychology and aesthetic motivations for mobile-phone customization. It was concluded in the study that eastern cultures are igniting the need to publicly express oneself through visible accessories like mobile phones. Other contributions of this empirical study included defining of aesthetic motivations for cosmetic customization of mobile phones as personal-media accessories and practical implications for the design of customization options as well as cross-cultural marketing of mobile phones.

1.3.4 Cell Phone Usage Pattern

In 2004 **Market Analysis and Consumer Research Organization (MACRO)** conducted a study in Mumbai with the purpose to enumerate the usage pattern of teenagers and young mobile phone users and examine the triggers that influence the purchase decision. One on one interview technique was used for data collection. Respondents were aged 15-30 years belonging to SEC households on random convenience sampling basis. Gaming was a regular activity among majority of respondents. Only one third of respondents were aware of health risks of cell phone.

Osman, Talib and Sanusi (2012) conducted an exploratory study to understand the contemporary dynamics of the Malaysian Smartphone market. This study examined the familiarity of users towards Smartphone, name of the brand of the owned Smartphone and service providers and the factors that influence their purchase decision. The consumers' preferences on Smartphone specifications at the time of purchase such as shape, colour, design, computing power, operating platform, and price were examined. Consumers' usage pattern of Smartphone for functions like sending email, web browsing, gaming, and document reading were also investigated. The

findings suggest that younger age group customers with purchasing power were the most attractive market for Smartphone especially male who are more concerned for technical aspects of the Smartphone such as computing powers, operating systems and software applications along with media and entertainment applications. In terms of the usage the “smartness” of Smartphone is unexploited and yet to be fully utilized by the consumers. Most often used functions/usages are entertainments, instant messaging, Internet browsing, and email. While other functions such as GPS, document editing, and business related functions are not commonly utilized.

Akanferi, Aziale & Asampana (2014) undertook an empirical Study on mobile phone usage among Young Adults university students in Ghana in which a quantitative research approach was applied. Accidental sampling technique was followed to select 1000 respondents. Data was collected using self administered questionnaire. It was found that cell phones were used more frequently for making and receiving calls, internet surfing, chatting on Whatsapp, multimedia messaging and listening to music and radio. Primary purpose of using cell phones among young adults was entertainment rather than business and education-related functions. They have therefore become addicted to listening music and instant messaging via Whatsapp, facebook and the like. The most popular cell phones among young adults included Samsung, Nokia, Blackberry and Techno. Other cell phone brands patronised at the minority level were Sony Ericsson, Motorola, Panasonic, Siemens and LG.

Research New Zealand conducted a survey on use of Smartphone and other Mobile Communication Devices in 2015 to identify the usage pattern of laptops, tablets, PC's Smartphone and other mobile phones (feature phones). Majority of Smartphone users are using their cell phone to connect to the internet. Social networking was a major activity undertaken by 78 percent respondents followed by listening to music playing games.

1.3.5 Satisfaction of Cell Phone Users

Hanif, Hafez & Riaz, (2010) stated that customer satisfaction is an evaluation of difference between the actual performance of the product and expectations about the product before use. As per Bae, 2012 customer satisfaction is the expectation regarding quality or it is a pre-consumption judgment or expectation of consumer before consuming a product. Maxham (2001) described satisfaction as an outcome of purchase where consumer compares cost and reward with the anticipated results. It is the perceived feeling of a customer for a product in form of set standards. If his expectations match with the standard he is satisfied else dissatisfied. (Eggert & Ulaga, 2002). Yuan Hu, Ching-Chan & Cheng (2010) concluded that no one is as important as customers and their satisfaction is the ultimate objective of the marketing activities.

Goode, Davis & Jamal (2005) developed a neural network model to study the relationship between customers' overall satisfaction and various key input factors of mobile phone by predicting the overall level of customer satisfaction derived from mobile phones in UK. Eleven input factors were used in the model, the most important of which were experience of product quality, level of service charges, level of call charges, and level of satisfaction with the service provider.

Haverila (2011) investigated the mobile phone feature preferences among male respondents in Finland. The conceptualization of the feature preferences was also studied with their relationship to customer satisfaction and repurchase intent of the mobile phone. The results indicated that battery/talk time was a significant feature for the respondents. It was revealed in the study that the respondents perceived six logical factors among the feature preferences i.e. business functionality, support functions, aesthetics with design, parts with processes, solidity, and tones with games. The initial three factors correlate with customer satisfaction whereas the business functionality factors correlate with repurchase intent.

Maiyaki, Mokhtar & Noor (2011) established the relationship between service quality and customer satisfaction on customer loyalty with regards to mobile

phone usage. The study was conducted among 341 postgraduate university students of Asia, Middle-east and Africa studying in Malaysia. It was found that service quality and customer satisfaction significantly affect the level of customer loyalty of mobile phone users. Thus it was concluded that the elements of customer satisfaction were significant in determining the level of customer loyalty to a particular mobile service provider.

Ganiyu, Uche, Elizabeth (2012) undertook a study with the aim to investigate relationship between customer satisfaction and customer loyalty. It was interpreted from the study that strong relationship exists between two and customer satisfaction was the indicator of customer loyalty. Although it was also concluded that customer satisfaction is not alone responsible for creating a loyal customer base. Other studies showed that in competitive business environments, great differences exist between satisfaction and loyalty as satisfaction is a passive customer condition, and loyalty is an active or proactive relationship with the brand.

Belaluddin & Akhter (2012) explored the factors influencing satisfaction of the mobile phone service customers in Bangladesh. Data was collected through a questionnaire survey. Data was analyzed using an iterated factor analysis with principal component analysis (PCA) and structural equation modeling (SEM). It was interpreted that service quality and fair price have indirect influence on customer satisfaction. The results did not establish any significant direct impact of service quality on customer satisfaction. On the basis of study mobile phone operators were recommended to formulate operations and marketing strategies that focus on expectations of customers to enhance level of satisfaction. Similarly industries involved services may reveal similar relationship features in respect to ties and constructs.

1.3.6 Health and Environmental Issues of Cell Phone

Mobile phones are often referred as a '**health time bomb**'. In order to communicate with the cellular network, mobile phones emit low levels of radio waves (also known as Radio Frequency or 'RF' energy). While using mobile

phone one gets exposed to EMR (Electro Magnetic Radiations) which are dangerous and becoming a serious health risk.

Johansen et.al.(2001) suggested that individuals who want to refrain themselves from radiofrequency exposure can limit their exposure, by using an ear piece and limiting cell phone use, particularly among children. Similarly, the Food and Drug Administration (FDA or USFDA), federal agency of the United States Department of Health and Human Services have suggested steps to reduce the exposure to radiofrequency energy which are as follows:

- Reserve the use of cell phones for shorter conversations or for times when a landline phone is not available.
- Use a hands-free device, which places more distance between the phone and the head of the user.

Gandhi & Anita (2007) in her research conducted at Guru Nanak Dev University, Amritsar administered a correlation between mobile phone use (exposure to radio frequency radiations) and DNA and chromosomal damage in lymphocytes of people using mobile phones was explored and it was indicated that it may have long-term consequences in terms of neoplasia and/or age-related changes. Exposure to radiofrequency radiations has been reported to affect physiological, neurological, cognitive and behavioral changes. (Gandhi et al. 2005).

Panda et al. (2010) administered a study at PGIMER, Chandigarh, which recommended following criteria's for evading from the harmful rays emitted by cell phones.

- Mobile phones should not be used continuously and not more than one hour in a day. Hands free technology to be used where excessive use of the mobile phone is unavoidable. Microphones and Bluetooth should be used so that the handset remains away from the ear and thus evades the direct impact of harmful electromagnetic radiations on the ear and the brain.
- People should avoid long talks and discussions on mobile phones as far as possible.

Raja D. (2015) stated that the SAR (Specific Absorption Rate) value is a measure of amount of radio frequency intensity or energy absorbed by body when using cell phones. It is defined as the power absorbed per mass of tissue and has units of watts per kilogram (W/kg). Although there is consensus among researchers on the concern that radiations emitted by mobile phone have an impact on human beings, but no concrete scientific assessment of the impact of mobile phone radiations (MPR) on human beings is available.

The **World Health Organization (WHO)** reviewed studies on mobile phone safety and has included mobile phones in Group 2B, i.e. 'possible' human carcinogen (WHO, 2014). Group 2B categorization indicates that there is convincing evidence that the agent causes cancer in experimental animals but there is lack of information whether it causes cancer in humans or not (IARC, 2015).

Saini (2017) attempted to analyze the awareness of the student community in Delhi (India) on the issue of MPR and its health impact and also about regulations such as SAR. According to the results of survey very little awareness exists about SAR value and about 88% of the respondents were not aware of what SAR means in terms of MPR. The surveyed population revealed, camera to be the most popular specification or feature of a mobile phone.

Despite the fact that there is a plethora of research regarding the cell phone feature preferences, there appears to be lack of research regarding the relationship of the demographics of mobile phone users and various features and attributes as determinant of choice of cell phone in the purchase phase. Moreover, a need to study the level of frequency of use of different features and functions of mobile phone by users was felt that would provide an indication towards most preferred applications in a Smartphone. It was discovered that no such study has been conducted with this objective till date. A gap exists in the literature with concern to analysis of post purchase satisfaction with respect to demographical characteristics of the mobile phone users. Thus the review of literature suggests that the study should be conducted by subdividing the customer behavior in three phases – pre purchase behavior, purchase behavior and post purchase behavior.

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Chapter 2

CELL PHONE TECHNOLOGY-AN OVERVIEW

Invention of cellular phone in 20th century is the greatest boon to mankind. This amazing mobile transmission technology has made life very fast and the world very small to live in terms of communication. Ever since the cellular world came into existence, telecommunication industry is growing at a rapid rate. With 7.6 billion mobile subscriptions worldwide till Jan 2017, cell phones have rapidly graduated from their primary role of voice communications to become an essential and indispensable device for every individual. [1]

The number of mobile subscriptions exceeds the mobile subscribers (5.2 billion subscribers worldwide), which is largely due to inactive subscriptions, multiple device ownership or optimization of subscriptions for different types of calls.

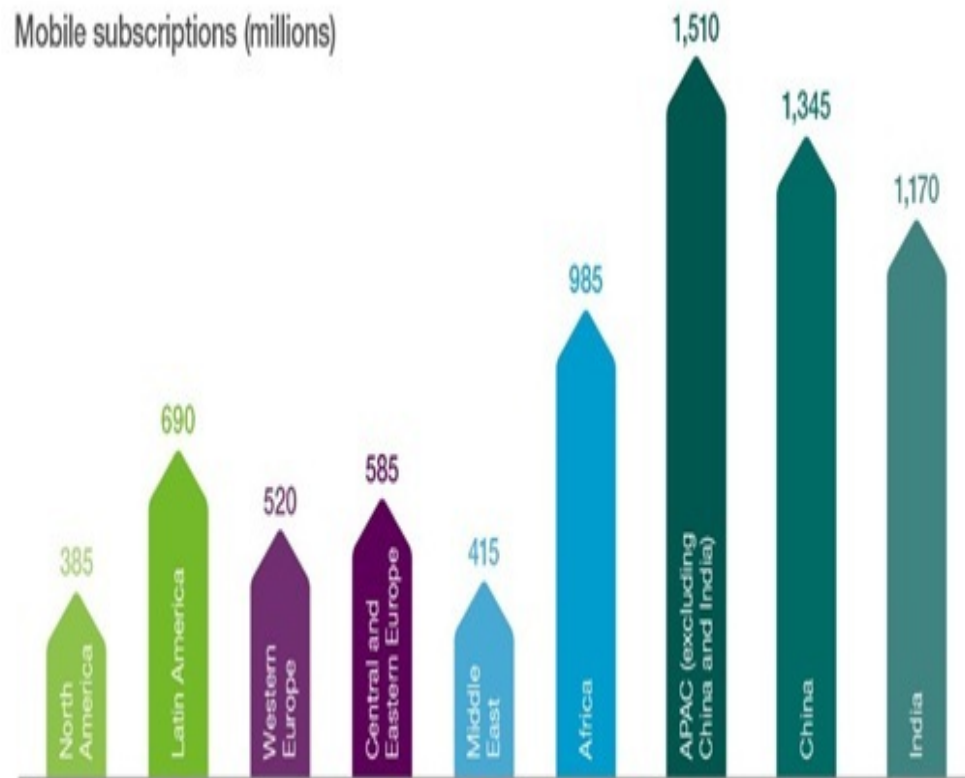
In addition to basic telephony modern mobile phones also support a wide variety of other services. Users purchase Cell phones not only for getting in touch with others but also for social networking, clicking and sharing pictures, shooting videos, playing games, listening to music, downloading images, reading news, surfing on the Internet, chatting online with friends & families and even banking Or e-shopping via mobile apps.

2.1 Cellular Revolution in India

The cell phone revolution ushered in India in August 1995 by Shri Jyoti Basu, Chief Minister of West Bengal, when he made the first call to Union Telecom Minister Sukhram. Sixteen years later 4th generation services were also launched in Kolkata.

There were over 1,164.20 million wireless subscribers at the end of Feb-2017 (TRAI) which accounts for 85% of the Indian population and about 15% of the world's online population.[2] Wireless subscriber base in India is growing at a rate of 13.2% YoY. Indian mobile market stands second largest after China in

terms of subscriber base and is one of the fastest growing markets in the world. According to Ericsson Mobility Report, released in June 2016 the mobile subscriptions are expected to hit 1.4 billion by 2021.[3] As per Ericsson Mobility Report, released in June 2017 India grew the most in terms of net subscription additions (+43 million), followed by China (+24 million), Indonesia (+10 million), Pakistan (+5 million) and Nigeria (+3 million) during the first quarter of 2017.[4]



Source: Ericsson Mobility Report, released in June 2017

Fig 2.1 : World Region – wise Mobile Subscriptions (Q1 2017)

The strong subscription growth in India was mainly due to an attractive ‘VoLTE welcome’ offer by Reliance Jio, a service operator. In this plan voice and data were offered free. Thereafter it came up with ‘Jio Prime’ offer in which unlimited voice and data were offered at a very nominal rate.

Table 2.1 - Highlights of Telecom Subscription Data

Particulars	Wireless	Wireline	Total (Wireless+ Wireline)
Total Telephone Subscribers (Million)	1164.20	24.35	1188.55
Net Addition in February, 2017 (Million)	13.75	0.003	13.75
Monthly Growth Rate [§]	1.19%	0.01%	1.17%
Urban Telephone Subscribers (Million)	671.63	20.52	692.15
Net Addition in February, 2017 (Million)	11.00	0.01	11.01
Monthly Growth Rate [§]	1.66%	0.05%	1.62%
Rural Telephone Subscribers (Million)	492.57	3.83	496.39
Net Addition in February, 2017 (Million)	2.75	-0.01	2.74
Monthly Growth Rate [§]	0.56%	-0.16%	0.56%
Overall Tele-density*(%)	90.70	1.90	92.59
Urban Tele-density*(%)	166.77	5.10	171.86
Rural Tele-density*(%)	55.92	0.43	56.35
Share of Urban Subscribers	57.69%	84.29%	58.24%
Share of Rural Subscribers	42.31%	15.71%	41.76%
Broadband Subscribers (Million)	243.13	18.18	261.31

Source : TRAI Report - Feb 2017

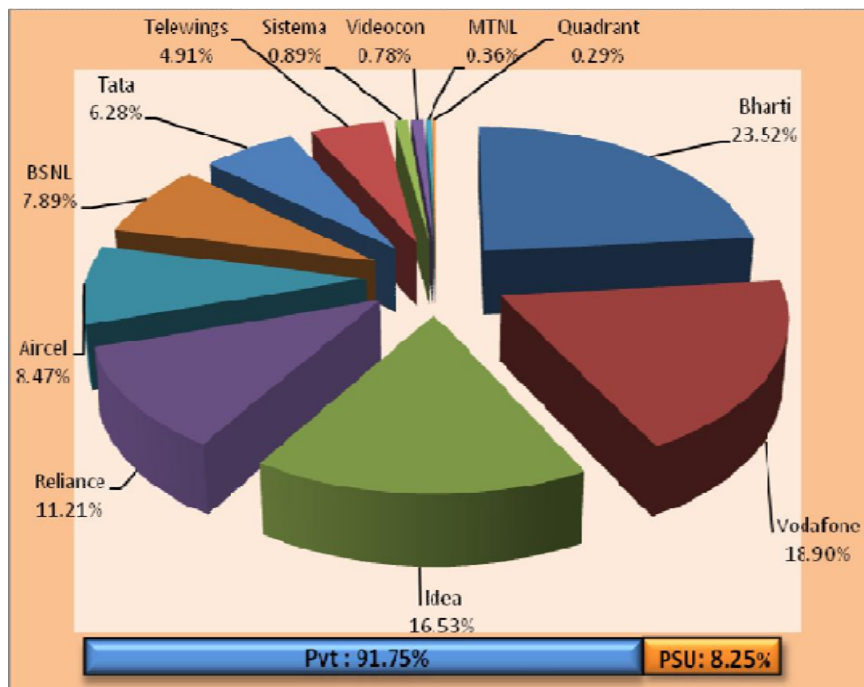


Fig 2.2 : Market Shares in term of Wireless Subscribers as on 28th February, 2017

Source: TRAI Report Feb 2017

Telecom industry in India is regulated and controlled by Telecom Regulatory Authority of India (TRAI). It is an independent regulatory body established under the Telecom Regulatory Authority of India Act on 20 February, 1997 to regulate telecom services and tariffs in India. Earlier telecom services and tariffs were regulated by the Central Government. TRAI is headed by a Chairman. The present chairman of TRAI is Shri R.S. Sharma. The head office of TRAI is located in New Delhi with 5 regional offices at Bhopal, Bangaluru, Jaipur, Kolkata and Hyderabad. Regional offices are headed by a Secretary. The present Secretary is Shri Sudhir Gupta. TRAI operates under the Ministry of Telecommunications, Government of India (GOI).

TRAI ensures the orderly growth of the telecom sector with protection of the interests of both telecom service providers and consumers. It encourages technological developments and innovations while making recommendations for service providers - how they can improve their efficiency and technical compatibility. TRAI establishes quality of service (QoS) standards and supervises revenue sharing by service providers. TRAI ensures that Indian telecom service providers are acting in a way that best safeguards the interest of consumers (relating to metering and billing) and are operating in compliance with universal telecom service obligations. It regularly issues orders and directions on various subjects such as tariffs, interconnections, quality of service, Direct to Home (DTH) services and mobile number portability.

According to TRAI February 28, 2017, the private access service providers held 91.19% market share of the wireless subscribers whereas two PSUs BSNL and MTNL held only 8.81% of the market share. The graphical representation of access service provider-wise market share and net additions in wireless subscriber base are given in Fig. 2.2.

There are 671.63 million urban and 492.97 million rural mobile subscribers in India (Fig. 2.3). GSM is comfortably maintaining its position as the major mobile technology with around 90% of the mobile subscriber market, remaining share is occupied by CDMA for the time being.

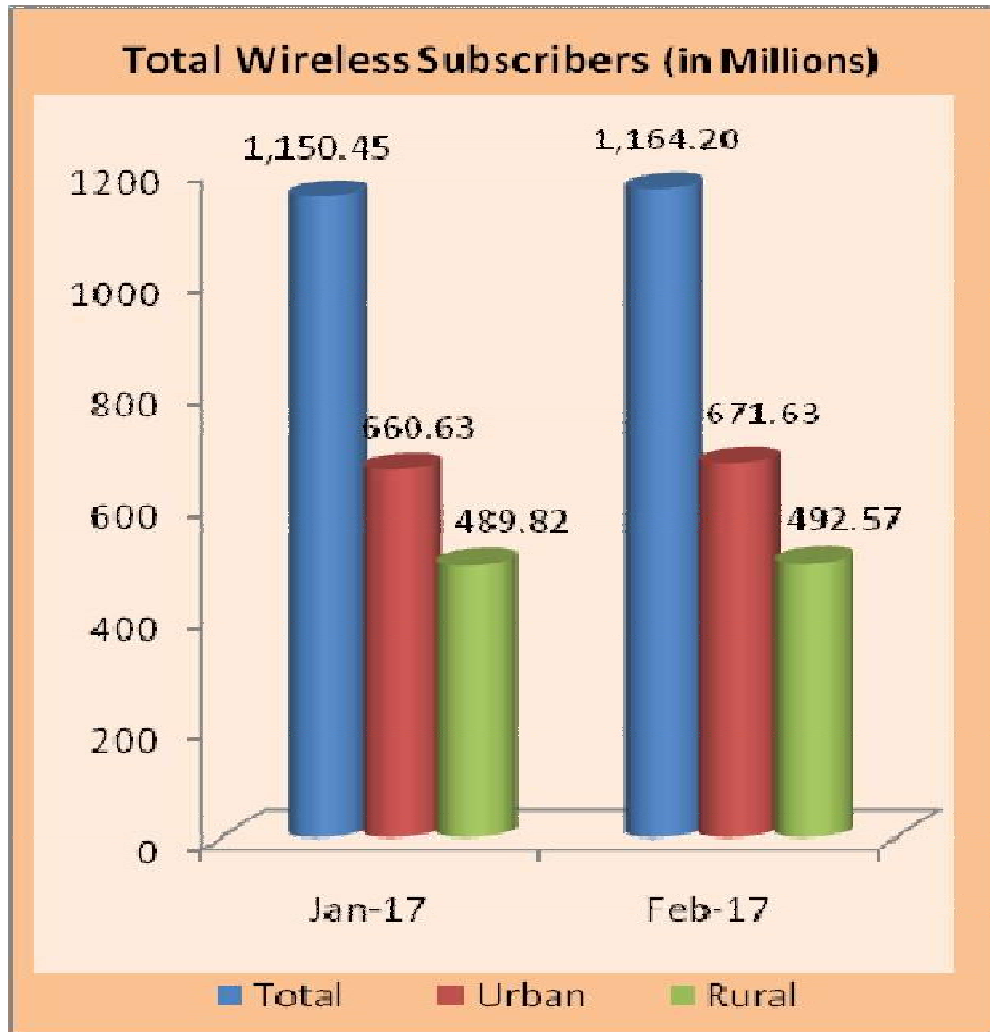


Fig 2.3 : Urban/Rural Mobile Subscribers in India

Source: TRAI Report Feb 2017

Competition has caused the call price to drop to the extent that call rates in India have become cheapest in the world. The mobile subscriber base has also grown by a factor of over a hundred and thirty, from 5 million subscribers in 2001 to over 1164 million subscribers as of Feb 2017.[5] India primarily follows the GSM mobile system, in the 900 MHz band. Nowadays, service providers also operate in the 1800 MHz band. Some 3G *operations* are carried out in 2100 MHz band. Major mobile phone service providers in India are Airtel, Vodafone, Reliance Jio, Idea Cellular, Aircel, Reliance Communications, TATA and BSNL/MTNL. There are few small players as well like Telenor, MTS etc that operate in few states.

2.1.1 State-wise Subscriber Base in India

The country is divided into multiple zones roughly along state boundaries called circles. There are 22 telecom circles (Table 2.2) at present in India:

Table 2.2
State-wise Subscriber base in India

Telecom circle	Wireless subscriber base in million (Feb 2017)
Andhra Pradesh	84239144
Assam	21461347
Bihar & Jharkhand	83551103
Delhi	53471540
Gujarat & Daman & Diu	71117600
Haryana	24773957
Himachal Pradesh	10283735
Jammu and Kashmir	11701813
Karnataka	69160699
Kerala & Lakshadweep	38812518
Kolkata	29120374
Madhya Pradesh & Chhattisgarh	69050769
Maharashtra & Goa	93556657
Mumbai	36485865
North East	12559863
Orissa	33868226
Punjab	37783833
Rajasthan	66857367
Tamil Nadu(including Chennai since 2005)	88769334
Uttar Pradesh(East)	103933854
Uttar Pradesh (West) & Uttarakhand	66429151
West Bengal	57211469
TOTAL	1164200218

Source: TRAI Report Feb 2017

North east telecom circle includes Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, & Tripura. West Bengal telecom circle includes Andaman-Nicobar and Sikkim.

2.1.2 Subscriber Base in Rajasthan

The total number of mobile subscribers in Rajasthan as on 28 February, 2017 is 66.8 million. (TRAI, Feb 2017).Rajasthan is the 9th largest wireless telecom circle in India accounting for 5.74% of the total subscribers in India.

Bharti Airtel held the first position with 20.8 million subscribers followed by Vodafone with 12.15 million subscribers. Reliance Jio, launched on September 5, 2016 has emerged as fastest growing mobile service provider with creation of 5.07 million subscribers in less than 5 months.

Table 2.3

Service Provider-wise Subscribers in Rajasthan

Service Provider	No. of Subscribers
Bharti	20856003
Reliance	5875858
Vodafone	12156346
Tata	1165209
Idea	8286342
Aircel	6666458
BSNL	5381117
Sistems	1398394
Reliance Jio	5071640
Total	66857367

(Source:TRAI Report February, 2017)

2.2 Introduction to Cellular Technology

In the wireless mobile technology the communication area is divided into 'cells' of prescribed size and each cell has one mobile base station which is commonly known as mobile tower. When any phone in a cell is in switch ON mode, it keeps on sending signals to the nearest mobile tower or base station via microwave transmission. Mobile base station keeps records of SIM and related data into network computer for all the mobile phone (switched on) in the coverage of that network tower. When caller tries to call any other person in another area which is also covered by another cell of network, mobile number data is then constantly

transmitted to network computer of the nearest mobile base station of the caller. Immediately after verification of the number, network computer tries to locate the called person via nearest cell and base station. When the called number is traced by nearest base station a corresponding ring is rung on receiver's phone.

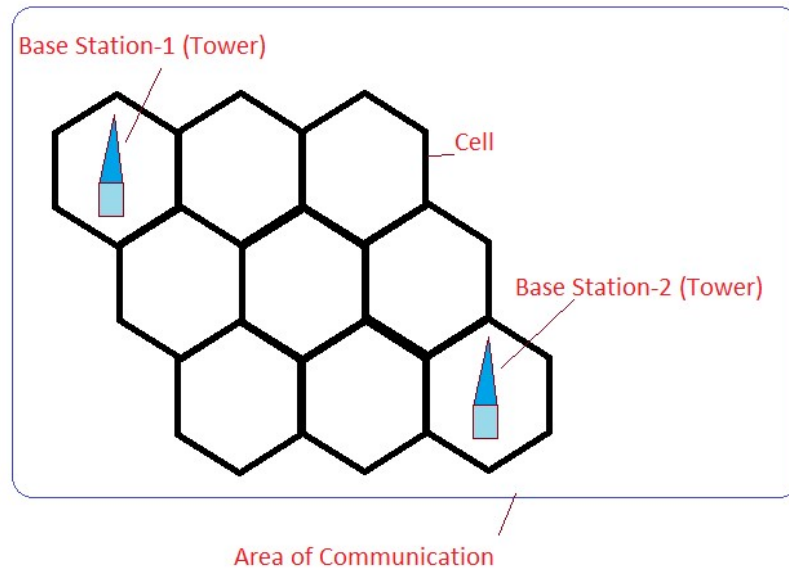


Fig. 2.4 : Cellular Network Communication

2.2.1 Working of a Cell Phone

A mobile phone or cell phone uses radio waves to communicate while moving around a wide geographic area. In order to do so it connects to a cellular network provided by a mobile phone operator, allowing access to the public telephone network. In the most basic form, a cell phone is essentially a two-way radio that makes and receives telephone calls over a radio link, using a radio transmitter and a radio receiver.

In order to transmit or receive radio signals cell phones have at least one radio antenna. In earlier times cell phones had only one antenna as the transmitter and receiver while nowadays cell phones have multiple receiving or transmitting antennas. Other than these antennas Wi-Fi, Bluetooth and/or GPS antennas may also be there.

When the cell phone is connected with other subscriber, the cell phone converts sender subscriber's voice into an electrical signal, which is then transmitted via radio waves to the nearest cell tower. The cell towers or the base station of the receiver and the transmitter creates unique channel between them. The network of cell towers then relays the radio wave at the speed of light. These radio waves transport digitalized voice or data in the form of oscillating electric and magnetic fields to the receiver's cell phone, which converts it to an electrical signal and then back to sound again. In this process magnetic fields are created which are called the electromagnetic field (EMF). The rate of oscillation is called frequency. In the basic form, a cell phone works just like a walkie-talkie in contrast to a cordless telephone which is used only within the short range of a single, private base station.

The connectivity between a cell phone and its cellular network depends on both signals and is affected by many factors, such as the distance between the phone and the nearest cell tower, the number of impediments between them and the wireless technology (e.g. GSM vs. CDMA). A poor reception (fewer bars) normally indicates a long distance and/or much signal interruption between the cell phone and the cell tower.

2.3 History and Growth of Cell Phone

In 1876 Alexander Graham Bell developed the telephone technology using the equipment designed for telegraph. In this technology calls were connected with the help of operators. In early 1890s pillar of the mobile telephony came into existence when Charles Stevenson invented radio communication for keeping contacts with the offshore lighthouses. Marconi transmitted signals over the distance of 2 kms in the year 1894. By 1906 Fessenden developed the capability of broadcasting music through radio.

Later in 1926 first class passenger trains, running from Berlin to Hamburg used the merger of radio telephone technology. Thereafter this technology began to be used for air traffic safety. These radio telephones were even used by German tanks at large scale during the Second World War.

The cell phone technology is based on radio technology. It developed from 1940's onwards with two way radios as ancestor of the mobiles phone. Before advent of cell phones these radios also called the mobile rigs were mounted on ambulances, police cruisers, taxicabs. These two way radios enabled taxi drivers or police officers to communicate with one another or with a central base. The first official cell phone was used in 1946 by the Swedish police. But it was distinctive of earlier used two way radio technology as then the technology was connected to the telephone network. But the phone could make more than 6 phone calls before the car's battery got discharged.

In 1956, Ericsson Company developed the earliest fully automatic cellular phone system called MTA (Mobile Telephone System A) in Sweden. Although this gadget operated automatically but it weighed over 80 pounds (about 40 kg). Thus due to its bulkiness it failed to attract the users. Later its improved versions weighing around 20 pounds were developed but they again proved to be ineffective in attracting customers.



Fig. 2.5 : Evolution of Cell Phone

Source: <http://www.tech-faq.com/history-of-cell-phones.html>

In 1973 Martin Cooper, employee and researcher of Motorola demonstrated the first handheld cellular phone named Motorola Dynatac that resembled the present day mobile phone. With dimensions of 5 inches width and 9 inches length, these mobile phones had recharge time of around 10 hours, talk time of 35 minutes and gave comfortable talking experience to their users. The only drawback of this cell phone was that it did not have a display screen. But with passing time, this mobile phone gradually improved by leaps and bounds. The first commercial automated cellular network was launched in Japan by NTT in 1979.

In 1981, there was simultaneous launch of the Nordic Mobile Telephone (NMT) system in Denmark, Finland, Norway and Sweden which was followed by other countries in the early 80s to mid-1980s. Although these first generation (1G) systems supported simultaneous calls, but they were even till then based on analog technology.

In 1991, the second generation (2G) *digital cellular technology* was launched in Finland by Radiolinja on the GSM standard, which sparked competition in the sector, as the new operators challenged the incumbent 1G network operators.

In 2001, NTT DoCoMo launched the third generation (3G) in Japan based on the WCDMA standard. This was followed by 3.5G, 3G+ or turbo 3G enhancements based on the high-speed packet access (HSPA) family, allowing UMTS networks to have higher data transfer speeds and capacity.

In the year 2007 Apple launched its Iphone based on iOS. In 2008 the first android based cell phone was introduced. By 2009, it was evident that 3G networks would not be compatible with the growth of bandwidth-intensive applications. Hence, with advent of data-optimised 4th-generation technologies the industry turned to it which had claimed speed improvements up to 10-fold over existing 3G technologies. The WiMAX standard (Sprint, US) and the LTE standard, were the first two commercially available technologies billed as 4G. They were first offered by Telia Sonera in Scandinavia. 4G Network has now functional in India as well.

2.4 Generations of Cell Phones

The modern day telephone technology started when three engineers from BELL Labs, W. Rae Philip and Douglas H. Ring introduced the idea of base stations or cell towers and developed hexagonal cells for mobile phones in 1947. These cell towers could transmit and receive signals in three directions instead of two as against in the case of two way radios. Porter an engineer at Bell Labs further suggested the positioning of cell towers at corners of hexagons instead of center. Later this idea of base stations became a turning point in the history of cell phone.

Even with continuous refinements in the mobile technology, the then user had to stay within one cell area as the base stations of the respective cell area were unable to transfer the cellular phone calls from one base station to another. Therefore, when users made a phone call, they were unable to continue their call after they crossed a set range. But the call handoff system developed by Amos Edward Joel (an engineer at BELL Labs) in 1970 prevented the dropping of phone calls while moving from one area to another.

With the advent of Global System for the mobile communications the effective use of radio spectrum became possible. Resultantly, there were improvements in voice quality, international roaming facilities along with compatibility with ISDN systems. It also provided coverage to the remote areas that was not effective with ISDN, GSM and cellular phones. Satellite phones were introduced whose base stations were built in the geostationary satellites. Thus no place on the earth was now untouched by the cell phones.

The development of mobile phones and mobile technology can be defined as generations of cell phones that can be described as follows:

2.4.1 First Generation (1G) Cellular Phones

The First Generation (1G) of cell phones started in 1983 by showcasing the first portable cellular phone to the world named the Motorola Dyna TAC 8000X. It was approved by the Federal Communications Commission (FCC) in the United States. Over the decades Motorola had developed the technology for cellular

phones as a result of which DynaTAC 800X took 15 years to be launched into the market at a heavy cost of over 100 million dollars. It was a lightweight cell phone as compared to contemporary phones and weighed only about 28 ounces. Its dimensions were 13 inches x 1.75 inches x 3.5 inches and it was often called the 'Brick' for its shape. Major credit of its development goes to Dr. Martin Cooper of Motorola.

The first commercial automated cellular network was launched in Japan by NTT in 1979. Two years later in 1981 the Nordic Mobile Telephone (NMT) system was simultaneously introduced in Denmark, Finland, Norway and Sweden, followed by other countries in the early to mid-1980s. These first generation (1G) systems supported far more than simultaneous calls, but they were still based on analog technology.

2.4.2 Second Generation (2G) Cell Phones

The Second Generation (2G) cell phone was developed in Finland in 1993. It was in this year that first SMS text message was sent and cell phone began to support data services. The Second Generation (2G) cell phones were supported by digital circuit switched transmissions. Quick network signals, lowered number of dropped calls and increased call quality were some of its distinguishing characteristics.

2G cellular phones were truly portable and had a small size battery. Advances in battery and computer chip technology made 2G cell phones much smaller and lighter than their predecessors.

2.4.3 Third Generation (3G) Cellular Phones

Third Generation or 3G cellular phones launched in 2001 allowed operators to offer a huge range of advanced services such as video calling and HSPA data transmission. Although 3G came only a few years after 2G, but due to many innovations in technology and services, standards for 3G are different depending on the network.

The two main requirements that most 3G networks and cell phone providers follow are: 2 Megabytes of maximum data rate for indoor and 384 kilobytes for outdoor use. 3G mobile phones usually include innovations to receive much more than phone calls. For instance, along with sending SMS text 3G phones also offer email and Internet access streaming radio, TV, video calling as well as Wi-fi.

2.4.4 Fourth Generation (4G) Cellular Phones

4G or fourth-generation wireless is IP network based cellular communications that will excel the third generation (3G) cell phones.4G enabled cell phones like any other smart phones can act like a personal digital assistant (PDA) – i.e. clicking pictures, shooting videos, calling, playing videos etc. They can also work like a Wi-Fi router whereby smartphone users can create their personal hotspots and share bandwidth with other people. The major difference is in these 4G smart phones are that they are capable to get fast internet speeds like a home cable set-up.

The main technological difference between 3G and 4G is the elimination of circuit switching, instead employing an all-IP network. Its IP-based wireless internet runs at speeds ranging from 100 Mbps (in cell-phone networks) to 1 Gbps (in local Wi-Fi networks).4G provides a new definition to entertainment focused mobile internet services, which would have been unimaginable just a few short years ago.

4G LTE

LTE is nowadays a buzzword. It is a version of 4G that is fast becoming the latest advertised technology. LTE, which stands for ‘*Long Term Evolution*’, is the fastest, most consistent variety of 4G that provides very technical process for high-speed data for cell phones and other cellular devices. It is most close to the technical standards set by U.N. In the U.S., it has primarily been deployed by Verizon, which offers it in over 200 markets.

4G VoLTE

VoLTE stands for ‘*Voice Over LTE*’. It is a HD voice calling Service over 4G LTE rather than 2G/3G network VoLTE networks support both voice and data

at the same time, without hampering the other. VoLTE allows to send voice and data over the network simultaneously without affecting the quality of voice. Whereas, the traditional LTE networks may or may not support data and voice together, or may affect the quality of the voice call.

2.4.5 Fifth Generation (5G) Cellular Phones

The next major phase of mobile telecommunication standards beyond the current 4G/IMT-Advanced standards is 5G. 5G network requirements as defined by Next Generation Mobile Networks Alliance (NGMN Alliance) are as follows:

- Data rates to be supported by users.
- Simultaneously 1 Gbit/s to be offered to many workers in same office.
- Massive sensor deployments to be supported by several hundreds of thousands of simultaneous connections.
- Significantly enhanced Spectral efficiency compared to 4G.
- Improved Coverage.
- Enhanced Signaling Efficiency.
- Significantly Reduced Latency as compared to LTE.

NGMN Alliance is expected to get functional by 2020.

2.5 Types of Cell Phone

As the use of cell phone is increasing, mobile firms are in neck to neck competition with each other to produce profitable, innovative cell phones. This has led to creation of variety of cell phones. Cell phones can be categorised into three types: classic or basic cell phones, feature phones and smartphones.

2.5.1 Basic Cell phones

Basic or a classic cell phone refers to conventional cell phones. These low-end cell phones provide basic facility of making calls, sending short messages through SMS and a basic camera. They are devoid of advanced features but are low priced

and provide ease of use. They are available in variety of different forms, colours and designs, allowing bottom of the pyramid (BOP) cell-phone users to have plenty of choices before them.

2.5.2 Feature Phones

Feature phones are a perfect compromise between smartphones and basic cell phones. One of the differentiating marks of a feature phone is that it has a limited proprietary OS, as opposed to the robust operating system of a smartphone. A feature phone's OS does not support third-party applications.

A feature phone does not include push mail. Moreover, it does not support document editing as against a smartphone. A feature phone primarily focuses on calling, short messaging, multimedia, web browsing, short-range wireless communications (infrared, Bluetooth).

2.5.3 Smartphones

Cell phones offering features like email, internet access, short-range wireless communications (infrared, Bluetooth), business applications, gaming, voice/video recording, photography, business applications and general computing capabilities are called smartphones.

Smartphones have nowadays come closer to a computer with responsive touch-screens, Wi-Fi and internet connectivity, HD cameras and data streaming.

Smartphones operate on robust operating system (OS), GPS, conferencing and 4G internet speeds. The most popular OS's that support smartphones are Android, Apple's iOS, BlackBerry and Windows Phone. All operating system are meant for meeting particular need and level of technical usability.

Smart phones are able to provide advanced functions to their users such as information gathering seamlessly, social networking applications embedded in smartphone including instant messaging, Facebook and Twitter, entertainment application including multimedia and gaming, and many more. It can also provide additional value added service application such as LBS (location based service)

that can provide customised information and application to the user that depends on their location and preferences. (d' Alessandro and Trucco, 2012).[6]

Along with basic functions smartphone allow users to perform tasks like editing documents, handling social media accounts, managing email, accessing voicemail through voicemail inbox, interactive gaming, GPS (Global Positioning System), connectivity through Bluetooth and/or USB/infrared, creating spreadsheets and e-shopping/e-banking which were conventionally performed on desktop or laptop. Mobile phones are not used for calls only, especially modern mobile phones.

As a result of its functionality users are having more interaction with their phone and spend most of their time dealing with smartphone applications and services. According to Gartner, a research firm, increasing demand for cellular devices and government's push for digital currency would account smartphone sales to reach 62 percent of total mobile phones sales in India by 2018.

2.5.4 Phablets

A phablet is a communication device that is a perfect combination of a smartphone and a tablet. It is primarily differentiated by its screen size, which varies from 5 to 7 inches. Phablets are ideal for watching movies, reading eBooks and working with detailed apps. Popular models are the iPhone 6+ and the Galaxy Note series.

2.6 Primary Components of a Cell Phone

The common components found in all cell phones are:

- **A battery:** power source for the cell phone functions.
- **An input mechanism:** allows the user to feed information, give instructions or interact with the cell phone. In feature phone input mechanism is a keypad, but in smart phone it is touch screen.
- **A screen:** displays the user's typing, displays text messages, contacts etc.
- **Basic mobile phone services :** allows a user to make/receive calls and send/receive text messages.

- **SIM Card**– A small microchip called a *Subscriber Identity Module* or SIM card is required to be inserted in cell phone to allow it to function. The SIM securely stores International Mobile Subscriber Identity (IMSI) which is a service-subscriber key (IMSI) that authenticates the user of the cell phone. In 1991, the first SIM card was developed for the Finnish wireless network operator Radiolinja by Munich smart card maker Giesecke & Devrient.
- **IMEI**–All cell phone are identified by their unique *International Mobile Equipment Identity* (IMEI) number.*(One can dial *#06# to see IMEI No.)*
- **Operating System** - Many types of mobile operating systems (OS) are available for smartphones, including: Android, BlackBerry, webOS, iOS, Symbian, Windows Mobile Professional (touch screen), Windows Mobile Standard (non-touch screen), and Bada. Among the most popular OS are the Android, iOS (Apple iPhone), and windows.

Android is a mobile operating system (OS) developed by Google. Android is the first completely open source mobile OS, meaning that it is free to any cell phone mobile network.

Cellular Service Standards

The two competing standards in cellular service for wireless communication are

- GSM (Global System for Mobile Communications)
- CDMA (Code Division Multiple Access).

GSM is Time Division Multiple Access that means it divides the whole radio frequency bands into number of small frequencies that are further divided into number of time slots which are used by individual users. On the other hand, CDMA which is Code Division Multiple Access relates only to the air interface — the radio portion of the technology. In CDMA a specific code is written for each user and the user has access to whole frequency band.

2.7 Major Cell Phone Brands in India

IDC Quarterly Mobile Phone Tracker Report states that a total of 344.3 million smartphones were shipped worldwide in the first quarter of 2017.[7] The report stated that 27 million smartphones were shipped in India in first quarter of 2017 which saw a 14.8% growth as compared to the same period last year. Home-grown vendors, on the other hand, have drastically dropped to 13.5% in the Q1 2017 from 40.5% in Q1 2016.

Table 2.4
IDC Quarterly Mobile Phone Tracker World-wide (May 2017)

Period	Samsung	Apple	Huawei	OPPO	vivo	Others
2016Q1	23.8%	15.4%	8.4%	5.9%	4.4%	42.1%
2016Q2	22.7%	11.7%	9.3%	6.6%	4.8%	45.0%
2016Q3	20.9%	12.5%	9.3%	7.1%	5.9%	44.3%
2016Q4	18.0%	18.2%	10.5%	7.3%	5.7%	40.2%
2017Q1	23.3%	14.7%	10.0%	7.5%	5.5%	39.0%

Source: IDC, May 2017

India would be the second largest smartphone market by end of 2017. With the change in technology and launch of 4GLTE and 4G VoLTE in India major transformation in mobile handset industry might be observed in course of time. Sticking with a 3G-portfolio or prioritizing the price game over product experience might work against the dominance of Indian brands.

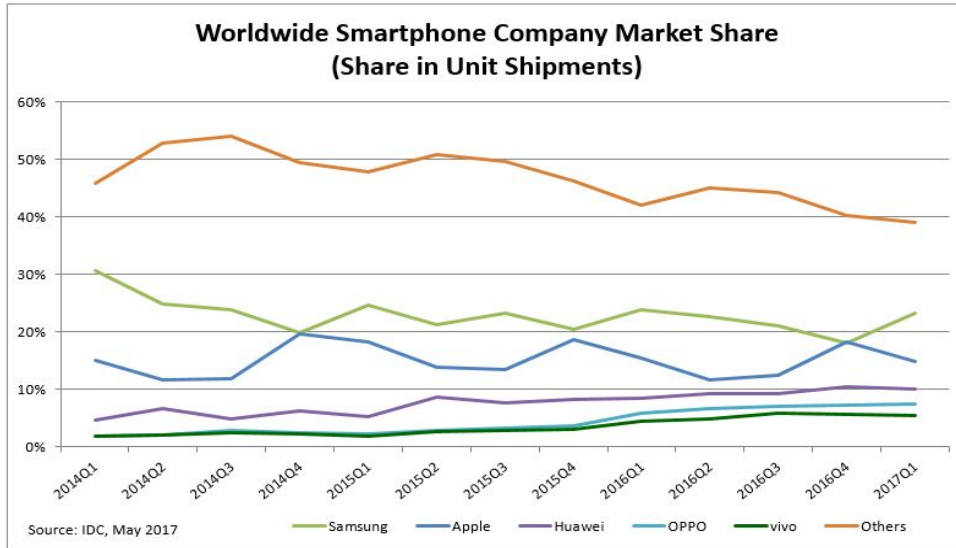


Fig 2.6: World-wide Smartphone Company Market Share

In India users change their cell phone set every year. So it can be said that the average life of a cell phone is around a year. Falling call rates and unit prices of handsets are driving demand for mobile phones in India. As a result of which Indians show great interest in the purchase of cell phones. According to JP Morgan, the continued relevance of feature phones makes India the biggest feature phone market globally (comprising about 30% of total volume). Many Indian and foreign brands are popular in India.

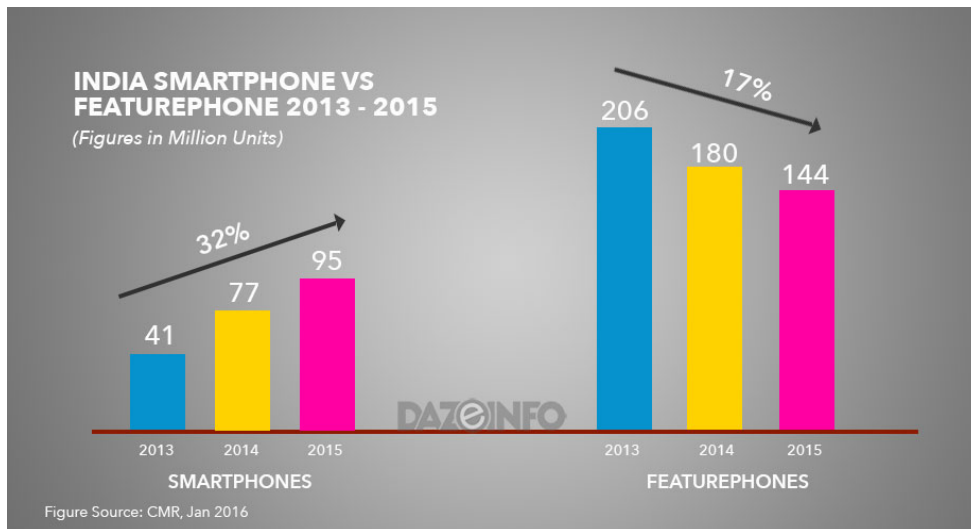


Fig 2.7 : Smartphone Vs Featurephone Sales in India

The leading brands in the Indian market are as follows:

- **Samsung**

Samsung is among some of those cell phone companies that are gaining their ground in the Indian cell phone market. Samsung had launched over 100 cell phone models both smart and feature, keeping in view the Indian social economy. Samsung's 'Dual SIM' and 'touch screen' models are very popular. As per the Cyber Media Research (CMR) report 2016, Samsung led the overall mobile handset industry with 24.5 percent share with both feature phone and smartphone categories having almost similar market shares. It maintained its leading position in feature phone category with a 28% volume share in 2016. According to IDC Asia/Pacific Quarterly Mobile Phone Tracker Q1 2017 Report Samsung led the smartphone category with 16.9% sequential growth.[7]

With other manufacturers reducing production, Samsung managed to grow its cell phone sales due to design qualities, superior sound quality, better customer service and higher brand value. Credit of its high volume support and popularity of its smartphones among middle and upper-middle class societies goes to the expansion of the Galaxy portfolio with models such as Galaxy Star pro and Galaxy S Duos. The J-series and A-series also generated significant sales volumes in their respective segments. The Samsung Z4 launched recently is aimed at new smartphone users. It is based on Samsung's in-house Tizen (Tizen 3.0) operating system which is a custom fork of Android.[8]

- **Lenovo**

In the smartphone category, Lenovo's portfolio is driven by Lenovo-Motorola combine. This Dual-Brand Strategy is attracting different kinds of customers and in diverse platforms. While Lenovo sells both offline and online, Moto sells exclusively online. Flagship models Moto E3 Power, Moto G4 and Lenovo's Vibe K5 series have acted as the key drivers for its growth to 9.9% market share and helped to get third position during the quarter four 2016 (IDC Report).[9] Lenovo has emerged as the most used Chinese mobile brand in India followed by Gionee, Xiaomi, and Oppo, according to a report by Cyber Media Research

(CMR) for first quarter of 2017. The data collected as of March 2017 for the installed base of mobile handsets in India depicted the usage of top three Chinese mobile brands in different states where Lenovo is the most preferred brand in seven states of India.[10] To boost its sales, Lenovo converted its PC and laptop outlets to smart connected device stores where Lenovo smartphones could also be sold. Further to meet the service requirements, the company has opened Lenovo-Motorola exclusive service centres. The company's decision to fuel only the demand for 4G handsets and future safe devices in changing landscape towards 4G has helped it to stay ahead of the technology curve and generate volume sales.

Table 2.5
Smartphone Vendor Highlights - India



Smartphone Vendor Highlights - India

Vendor Group	Q4 2016		Vendor Group	CY 2016	
	Market Share	QoQ Growth		Market Share	Annual Growth
Samsung	25.1%	-13.1%	Samsung	24.8%	3.2%
Xiaomi	10.7%	15.3%	Lenovo Group*	8.9%	14.8%
Lenovo Group*	9.9%	-17.4%	Micromax	8.8%	-37.9%
OPPO	8.6%	29.9%	Reliance Jio	7.1%	2122.7%
Vivo	7.6%	50.8%	Xiaomi	6.6%	119.4%

Source: IDC Quarterly Mobile Phone Tracker, Q42016

*Lenovo Group includes both Lenovo and Motorola

Source: IDC Asia/Pacific Quarterly Mobile Phone Tracker 2016

- **Micromax**

Micromax, an Indian brand occupied the overall third spot in the year 2016. **Micromax** is selling cell phones in India since 2008. It focuses on keeping price of their cell phone low compete with international brands. In 2014, Micromax's sales exceeded those of Samsung but later it missed. In June 2015, Micromax launched 'Micromax Canvas Silver' which it claimed was the slimmest

phone in the world. Micromax smartphones run the Android Operating System and has few smartphones in its portfolio that operate Microsoft's Windows Phone 8.1. In an attempt to regain market share lost to the Chinese counterparts, Micromax has earlier launched Micromax Vdeo Series 4G Mobiles. Vdeo series aimed at entry level smartphone buyers or the first time smartphone users. With the entry of Reliance Jio services, India has witnessed tremendous adoption to 4G enabled mobile phones. Micromax has started rolling out basic smartphones with 4G capabilities under Bharat series to attract the early 4G adopters. Company has already launched Bharat 2 - which is considered as one of India's cheapest 4G mobile phone. Lately Canvas 2(2017) has been launched which offers one-year one-screen guarantee. Its Corning Gorilla Glass 5 can withstand falls from a height up to 1.6 meters which is the average 'selfie taking height'.

- **Xiaomi**

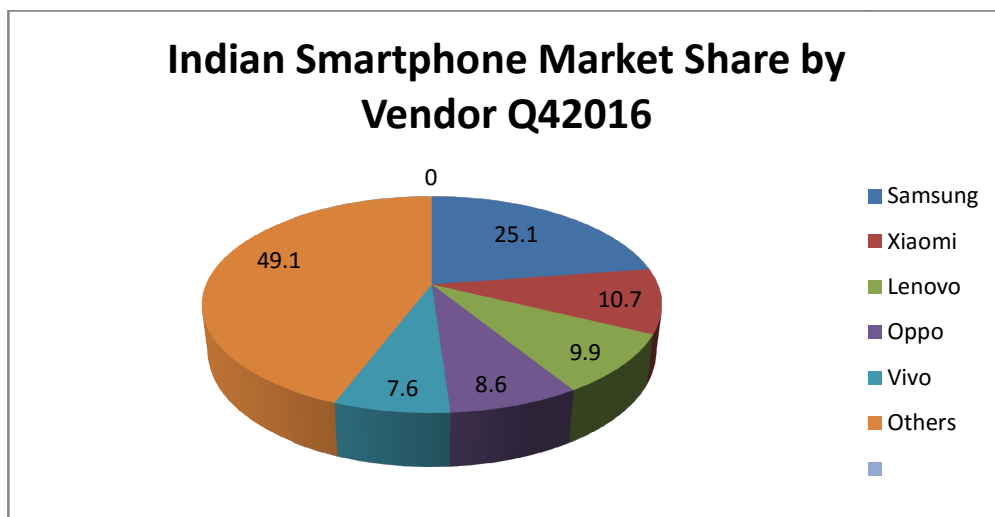
The Chinese word for "millet", **Xiaomi** comes up with smartphone under brandname 'Mi' in India. Xiaomi is known for the best smartphone in terms of performance at economic price. Xiaomi stood second with 39.8% sequential growth in first quarter of 2017. (IDC, Q12017 Report). The rise of Chinese smartphone player has hit the Indian manufacturers which earlier held the top position. Online sales of smartphone market was 31.2 per cent in the year 2016 and Xiaomi along with Lenovo dominated this channel volume.

- **Sony**

Xperia derived from the word 'experience' is the brand name of smartphones and tablets from Sony Mobile. After doing well in India from 2012-14, it observed a downward trend in mobilephone sales due to the outdated version of Android which was 1.6 at a time when competitors were on 2.1. There was a great delay in the updating of the firmware at the end of Xperia, because of the heavily skinned OS, as well as Timescape and Mediascape which needed to be reprogrammed every time an update was made.

- **Apple iphone**

Apple’s iPhone is one of the expensive cell phone of choice in India. The iPhone has gained popularity in India, helping the company to become the number one premium device manufacturer. Apple follows the niche strategy and deliberately keeps its product line short by offering just one model a year for all customers, while making it an expensive, high-end product. Apple mobile is based on iOS operating system which is a robust OS capable of multitasking and graphics in order to meet ever growing consumer expectations.



Source: IDC Asia/Pacific Quarterly Mobile Phone Tracker Q4 2016

Fig 2.8 : Indian Smartphone Market Share

Chinese brands like Oppo and vivo have also managed to establish themselves in the market in mere two years of launch in India. Oppo gained 29.9% in the Q4 2016, as a result of strong retail presence coupled with aggressive marketing. Vivo also observed a 50.8% sequential growth.

Other Indian brands like Karbonn, Lava, Intexetc have also posed threat to the international brands. These brands are being preferred because of their price range and additional multimedia features. Cyber Media Research (CMR) Report for the first quarter of 2017 states that indigenous brand Micromax has emerged as the most used Indian cell phone brand, followed by Lava and Intex. The report claimed that MILK (Micromax-Intex-Lava-Karbonn) brands are the four leading Indian brands with their dominance in most of the states. Samsung, Apple and

Huawei have retained their top positions with 22.8 per cent, 14.9 per cent and 9.8 per cent shares Nokia, once the undisputed leader of the mobile phone market in India, now operates through HMD Global, a Finnish company which has been licensed to produce Nokia-brand mobile phones and tablets. In a pursuit to regain its lost supremacy, Nokia unveiled the Nokia 6, Nokia 5, Nokia 3 and a revamped version of the iconic Nokia 3310 at the Mobile World Congress (MWC) 2017. The Nokia has the largest manufacturing facilities for mobile phones in the world at Sriperumbudur in Tamil Nadu.

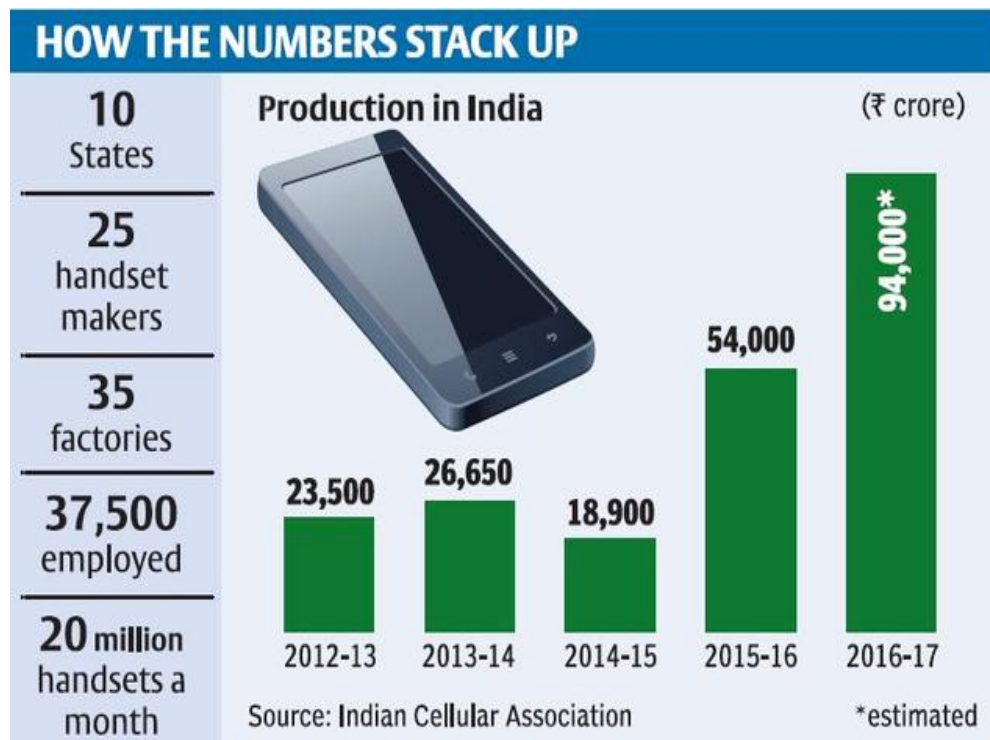


Fig 2.9: Cell Phone Handsets Production in India

According to the Indian Cellular Association (ICA), the industry body representing mobile phone brands, there was a robust rise in handset manufacturing from Rs. 19,000 crore (2014-15) to 94,000 crore in 2016-17.[11]

As many as 25 firms are setting up phone assemblies and generating employment for over 37,000 people. According to ICA data such assembly units are coming up across 35 locations in 10 States, and are capable of producing 20 million handsets

a month, Indian cell phone brands like Micromax, Lava and Intex are already sourcing their handset models from their respective factories.

In India out of the estimated 220 million mobile phones sold in 2015-16, 110 million had some form of manufacturing in India. Even Chinese brands such as Vivo and Xiaomi are following a local manufacturing strategy. The share of China-based brands touched as high as 46% in the fourth quarter of 2016 whereas the share of homegrown vendors slipped to 19 percent.

Feature phones constituted about 59 percent of the overall mobile market in India. According to CMR (Cyber Media Research) Report the total mobile phones shipments in 2016 were 262 million units out of which 145 million units were feature phones and 113 million units were smartphones. Moreover 66 percent of the phones shipped in the third quarter 2016 were 'Made in India'. Samsung emerged as the leader even in feature phone category with 24.5% market share, followed by homegrown manufacturers like Lava and Intex with 12.3% and 11% market share respectively. The remaining 52.2% market share in feature phones category is shared by other 103 brands.

2.8 Basic Functions of Cell Phones

Modern day mobile phones can do a lot more than traditional functions of making and receiving telephone calls. The different functions of a cell phone are as follows.

- **SMS.** Via Short Message Service (known popularly as *texts* with the adjective *texting*) helps to send short messages to other mobile phones. It is a cheap, easy and extremely popular mode of sending messages. Ringtones and logos can be sent by SMS and it can even be used to pay for things like recharge of mobile phones in a real world environment - by sending a message to a vending machine for example, the product is dispensed and your bill debited accordingly. Paypal uses SMS messaging to allow the transfer of funds between individuals and/ or vendors who have subscribed to their service Pay Pal Mobile.

- **MMS.** Multimedia messaging service is an enhancement of 3G over 2G SMS Texts. By utilising the fast data transfer speeds of the 3G network it is possible to send much bigger messages including not just text but pictures, voice recordings and even video.
- **Internet.** Access to the Internet and email via the GPRS and WAP systems was facilitated for the first time by 2G cell phones. Although the data transfer was too slow but it was big turning point for the consumers. As a result of which people were not able to realise that they can access Internet and email at very reasonable speeds on the new 3G network. Lately launched data based 4G is fastest of all.
- **Colour Screens.** One can watch the video content, play games or look at pictures on their mobile phones
- **PDA.** Cell phones are loaded with 'personal data assistant' functions. Some have large touch-pad screens where one can select icons with an attached pointer or finger. Utility functions like Address books, diaries, notepads, word processing and spreadsheet facilities are few exclusive functions valuable for a travelling businessperson. Most cell phones have organiser like calendar, calculator and notepad functions.
- **Camera Phones.** Latest cell phones are loaded with camera of different resolutions and additional capacity to film short videos. Panorama or rotating cameras - or even two cameras allow video conferencing.
- **Blue-tooth** This is a type of short-range radio signal - in effect a wireless connection that allows the transfer of information between compatible devices such as laptops, cameras and mobile phones. It helps to transfer photos, videos, ringtones and music between phones without the need for any cables
- **Infra-red.** It also allows the sharing of information between compatible devices

- **MP3 Players.** Many phones have personal music players where one can download music from the Internet, upload it from the computer or swap it between phones with blue-tooth.
- **FM Radio.** Listen to radio or music on the move with the help of headphones or speaker is also an inbuilt feature of many cell phones. The advent of higher speed 4G connections has made mobile internet radio possible.
- **Video Games.** 2G mobiles often included simple black and white games like snake and tetris. With 3G and 4G transfer speeds and modern handsets provide opportunity to play either in built or downloaded games.
- **Expandable Memory.** Downloading games and music requires plenty of storage space in the form of small memory chips (SD cards) that can be transferred via the correct converter into a compatible computer, printer or camera.
- **Video calling.** The combination of an in built camera and fast data transfer speeds of the 3G and 4G handset leave land-line phones in the wake of mobiles with video calling. Voice and visuals are exchanged simultaneously between the communicators without any delay from one corner of the world to another.
- **Instant messaging.** It is a type of online chat where real-time text exchange takes place over the Internet, bi-directionally between two parties. The message whether text, visual or audio is transferred when any one of the user chooses to complete a thought and select "send". Nowadays instant messaging can add file transfer, clickable hyperlinks, video calling also.

2.9 Cell Phone and Health concerns

With the enormous increase in the usage of cell phone the effect of radiations emitted from them on human health is a subject of recent diagnosis and research. Mobile phones use electromagnetic radiation in the microwave range 800 – 1800 MHz which is transmitted in all directions in form of waves. These waves can be absorbed and reflected by surrounding objects before they reach the nearest cell

tower. For example, while in use when the phone is placed next to the head, a significant portion (over half in many cases) of the emitted energy can be absorbed into the head and body.

Although a significant number of individual, epidemiological and experimental research studies suggest no definite causative relationship between exposure to cell phones and harmful biological effects in humans are inconclusive. Some recent studies have found an association between cell phone use and certain kinds of brain and salivary gland tumors. Lennart Hardell and other authors of a 2009 meta-analysis of 11 studies from peer-reviewed journals concluded that cell phone usage for at least ten years "approximately doubles the risk of being diagnosed with a brain tumor on the same ('ipsilateral') side of the head as that preferred for cell phone use."

On 31 May 2011 it was stated by World Health Organization/International Agency for Research on Cancer (IARC) that cell phone use may possibly represent a long-term health risk, classifying its radiation as 2B, "possibly carcinogenic to humans" after a team of scientists reviewed studies on cell phone safety.[12] which ranks it alongside coffee and other possibly carcinogenic substances. It has also been experimented that handling of handsets results in exposure to toxic substances like lead, copper, arsenic, zinc, cadmium, PVC. A study of past cell phone use cited in the report a "40% increased risk for gliomas (a type of brain cancer) in the highest category of heavy users (reported average: 30 minutes per day over a 10 year period)."Certain countries, including France, have warned against the use of cell phones especially by minors due to health risk uncertainties. However, a study published on 24 March, 2012 in the British Medical Journal questioned these estimates, because the increase in brain cancers has not paralleled the increase in cell phone use.

The Bio Initiative Report 2012 (BIR-2012) on standards for electromagnetic radiations claimed that the evidence for risk to health from wireless technologies and electromagnetic fields (EMFs) has substantially increased since 2007.[13]

In wake of above studies the most stringent international norms that limits the SAR value (specific absorption rate - a measure of the rate that body tissue absorbs radiation energy during cell phone use) of cell phone handsets have been adopted in India in order to comply with the guidelines issued by DoT (Department of Telecommunications). Regulations notified by the Government of India requires for every mobile phone to display the SAR value of the model so the consumers can make an informed decision before each purchase (DoT GoI,2012).From 1st Sept.2013,only the mobile handsets or cell phones with revised SAR value of 1.6W/kg averaged over 1 gram of human tissue are permitted to be manufactured or imported in India. The limits for SAR are determined by the strength of the electromagnetic field necessary to reach the body in average 30 minutes when the cell phone is held at the ear. This limit ensures that the equipment like cell phone is operating within the prescribed parameters. Even if there are differences in SAR levels among cell phone models, all of them must meet RF exposure guidelines. Compliance with these norms has made Indian telecom regulations 10 times more rigid than they are in over the 90% of the countries across the globe (Table 2.6).

Table 2.6

SAR Values for Mobile Handsets of Some Countries

Country	SAR Value Limits
China	2 W/Kg averaged over 10g of tissue
Singapore	2W/Kg averaged over 10g of tissue
Ghana	2W/Kg averaged over 10g of tissue
Brazil	2W/Kg averaged over 10g of tissue
Nigeria	2W/Kg averaged over 10g of tissue
Japan	2W/Kg averaged over 10g of tissue
Republic of Korea	2 W/Kg averaged over 10g of tissue
Europe	2 W/Kg averaged over 10g of tissue
Australia	1.6W/Kg averaged over 1 g of tissue
USA	1.6 W/Kg averaged over 1 g of tissue
Canada	1.6 W/Kg averaged over 1 g of tissue

Source:http://www.trai.gov.in/sites/default/files/EMF%20Information%20Paper_30.07.2014.pdf

As per telecom regulations Specific Absorption Rate (SAR) value information is to be compulsorily displayed on the mobile handsets similarly as IMEI (International Mobile Equipment Identity) is displayed. The information on SAR values to be made available to the consumer at the point of sale. The information of SAR value of any cell phone can be retrieved by dialing the Unstructured Supplementary Service Data (USSD) code *#07# on the same mobile phone. Some old models of cell phone may not have this code enabled in them. In order to ensure the compliance of SAR limit,cellphone manufactured and sold in India or imported from other countries are being randomly checked after establishment of TEC-SAR Laboratory in the year 2012. It is mandatory for all cell phone hand set sold in India to be available in hands free mode in order to comply with relevant standards.

On January 25, 2012, all indigenous manufacturers of handset were instructed by the Department of Telecommunications of India to make necessary changes in the design, software and packaging of their respective handsets which was implemented from September 1, 2013.[14] To regulate indigenous as well as imported mobile phones, the Bureau of Indian Standard (BIS) has been asked to frame standards for all mobile phones under the BIS Act 1986. All cell phone handsets sold in India should comply with relevant Bureau of Indian Standard's (BIS) benchmark.[15]

2.10 Cell Phone and Environmental Concern

Many studies have been conducted that show, around 40-50% of the environmental impact of a cell phone occur when the printed wiring boards and integrated circuits are manufactured. A user replaces their cell phone on an average every 11 to 18 months, these discarded cell phones then add to environmental issues and electronic waste following manner: .

- Conventional cell phone utilises non-renewable resources like nickel, lead, zinc, cadmium, mercury, polyvinyl chloride (PVC), brominated flame

retardants etc. and precious metals like silver. PVC is burnt to recover copper from wires which release harmful gases in environment

- Incineration of disassembled part releases highly volatile matter in air.
- The e-waste contains toxic materials such as Lead and mercury that are hazardous to both people and our environment. When these toxic elements mix with the soil and water through leachate, they affect the health of HMAs (Humans, Animals and Trees).
- Cell phone waste is trashed, landfilled which results in loss of precious metals. More than 150 million mobile phones are scrapped every year and only 20 percent of these cell phones are recycled. So one can assume the amount of e-waste that is generated and added to already existing pool of e waste. The more critical state is that this e-waste lies unattended.

2.11 Green Marketing Mix of an Eco- Friendly Cell phone

Marketing is in charge of collecting market data but is also responsible for disseminating information about the impact of products on the environment and society. (UNEP, 2007)[16]

According to Polonsky and Rosenberger (2001) green marketing is a holistic, integrated approach that continually re-evaluates how firms can achieve corporate objectives and meet consumer needs while minimizing long-term ecological harm.[17] Peattie (2001) stated that green marketing aims to describe marketing activities which attempt to reduce the negative social and environmental impacts of existing products and production systems, and which promote less damaging products and services.[18]

A model of a green marketing-mix of a eco-friendly cell phone containing all 4P's:

Product: The greenness of product lies in process or design approach which considers the environmental aspects of product design phase, material sourcing and production; the product itself as an outcome of the process and the use of that product; and the effect of that product after it becomes obsolete, which can be

expanded to cover the previous phases by taking the whole life cycle into account.[19] The three key factors that indicate actual greenness of cell phone are recyclable, renewable materials so that handsets may be recycled after use, eco-friendly design process and low-powered chargers. Taking above key factors in consideration a cell phone producer should offer eco friendly product which is environmentally safe and may not contaminate the environment but should prevent environmental damages.

Green Marketing utilizes greenness of product mix of a cell phone which lies in:

- Recyclable or renewable material of cell phone - Recyclable materials can be put back into circulation, reducing the health risks to the community. The materials that are contained in old cell phones can often be recycled and reused to make a variety of other products. Recycling may include disassembly and shredding. Disassembly means disassembly of packages and plastics that may be incinerated. Shredding includes recovery of metals and minerals that may be utilized in future. Sometimes cell phone companies assign recyclable job to another company that qualifies to recycle them by collecting used cell phone from customers, rather than customers wrestling with disposal guidelines themselves, it is often much easier to just sell or donate old cell phones to company so assigned. Galaxy Exhilarate, the Samsung Replenish is a cell phone sold through Sprint. It is Platinum Certified by UL Environment.
- Design process- It includes considerations during material choice stage of design process for enhancing recyclability and disassembly of cell phone during end of life stage; striving for minimized material and energy usage at all stages of the life.
- Use of non-toxic chemicals – Researches reveal that conventional cell phone are made up of toxic chemicals that contain lead, nickel, bromine, chlorine, phthalates. Antenna of cell phone contains highest bromine which is 10% by weight. Headphone contains PVC with phthalates over 1-5% by weight. Material usage decisions focus on elimination or reduction of use lead and other toxic chemicals to their lowest levels

- Low power chargers – Most cell phones are nowhere close to being green — their chargers are energy inefficient, they contain hazardous chemicals, and they are not designed for upgrading or easy recycling. On the other hand, low power chargers consume less power in charging a mobile phone thereby saving energy. This signifies that they do not require to be charged as considerably, so chargers are not left on for prolonged overfilled charging thus wasting energy.
- Solar powered cell phone – This Cell Phone is fitted with solar rechargeable battery. Power is generated through solar battery. Standardized solar chargers are energy efficient and eco-friendly.

Price: Prices for such cell phone may be a little higher than conventional alternatives due extensive research and discovering and implementing costlier green processes. But target groups like for example LOHAS (Lifestyles of Health Sustainability - customers with sense of environment and social responsibility) are willing to pay extra for green products. Companies gradually attempt to offer cell phone at an affordable price to increase adoption rate in all target groups.

Cellular companies may offer certified refurbished phone at low prices. Companies like TechForward, NextWorth, Gazelle, Recellular of US pay cash in return for used cell phone. They refurbish the cell phones and resell in the refurbished market. The cell phones which cannot be refurbished are recycled.

Place: A green distribution logistics is of crucial importance that implies reducing size and weight of packaging of cell phone. Small packaging requires less space and is lighter to transport. More products can be transported in the same space, reducing the driven kilometers and emission from use of transport fuels. Environmentally sound packaging will also reduce costs. Main focus of packaging is on making it ecological which is made up of post-consumer recyclable waste like flax-fiber and other eco – friendly material and utilising soy ink for labeling. In a new eco-friendly packaging light cardboard is replaced by plywood and recyclable plastic is replaced by non-recyclable aluminum coated plastic foil.

Promotion: A communication in market with stress on green aspects of cell phone as product; depiction that if handset is actually being recycled – Testimonials that companies adhering to their claim of recycling mobile phone after use, is not being ‘greenwashed.’” (Ginsberg and Boom, 2004)[20]. There's a difference between being merely compliant and being truly if any, green.”(Michael Morgan, 2009); Environmental activism (Green Hosting) by a cell phone company may be communicated. The fact that a company spends on environmental protection may be advertised; sponsoring the natural environment is also very important; and last but not least, ecological products may probably require special sales promotion.

2.12 Conclusion

Cell phone is the most popular and convenient mode of communication in the 21st century. With the exponential evolution through 4Generations there has been equally exponential growth in use of the services, It works on wireless mobile technology and the communication area is divided into 'cells' hence it is also called cell phone. There are four types of cell phone basic phone, feature phone, smartphone and phablets. Samsung, Lenovo, Micromax, Xiaomi are the major brands of mobile phones in India. There is rising concern for environment and health on account of mobile phone as mobile e-waste contains harmful minerals like lead and mercury which is harmful for both health and environment it emits electromagnetic magnetic radiations (EMR) when in use. These EMR have been categorized as 2B (ie carcinogenic) by WHO. So there is need for the cell phone marketers to adopt green marketing of cell phone and offer green cell phone to the customers.

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Chapter 3

BUYING BEHAVIOUR AND BEHAVIOURAL SEGMENTATION OF CELL PHONE USERS IN RAJASTHAN (HADOTI REGION)

Buying behaviour is an amalgam of needs and desires which after passing through series of stages ends up with the purchase action. The buying process starts with the problem or need identification. The customer then searches for information from different sources – with concern to the available products that can satisfy his needs. The alternatives are then evaluated and the product/brand that best fits his needs is included in his decision set and makes final choice. Buying behaviour can be divided into pre-purchase, purchase behaviour and post purchase behaviour.

Pre-purchase information is the key to decision making process and influences the final choice to a great extent. Pre-purchase behaviour includes realisation/identification of need and the purpose of purchase. It then involves the collection and evaluation of pre-purchase information by the customers.

In the present research study a sample of 500 cell phone customers of Hadoti region belonging to different demographic profiles were surveyed with a purpose to examine their customer behaviour with regard to cell phone. The survey was conducted from May 2016 to September 2016. A detailed study of the cell phone users' profile and analysis of the pre-purchase, purchase and post-purchase behaviour of the respondents has been undertaken.

CELL PHONE USERS' PROFILE

3.1 Duration of Using Cell phone

Respondents were asked to state that for how long they have been using a cell phone. Table 3.1 and subsequent figure 3.1 represents the response.

Table 3.1: Duration of Using Cell Phone

Duration of Using Cell phone	N	%
Up to 3 years	157	31.40
4-6 years	144	28.80
7-9 years	81	16.20
10-12 years	77	15.40
More than 12 years	39	7.80
No Response	2	0.40
Total	500	100.00

The data in the table 3.1 and corresponding figure 3.1 reveal that 31.4% of the respondents have been using cell phone for the last 3 years whereas about 29% respondents have been using it for the last 4-6 years, while about 16% of the participants have been using it for the last 7-9 years. About 15% of the respondents have been using it for 10-12 years on the other hand only 8% have been using it for more than 12 years.

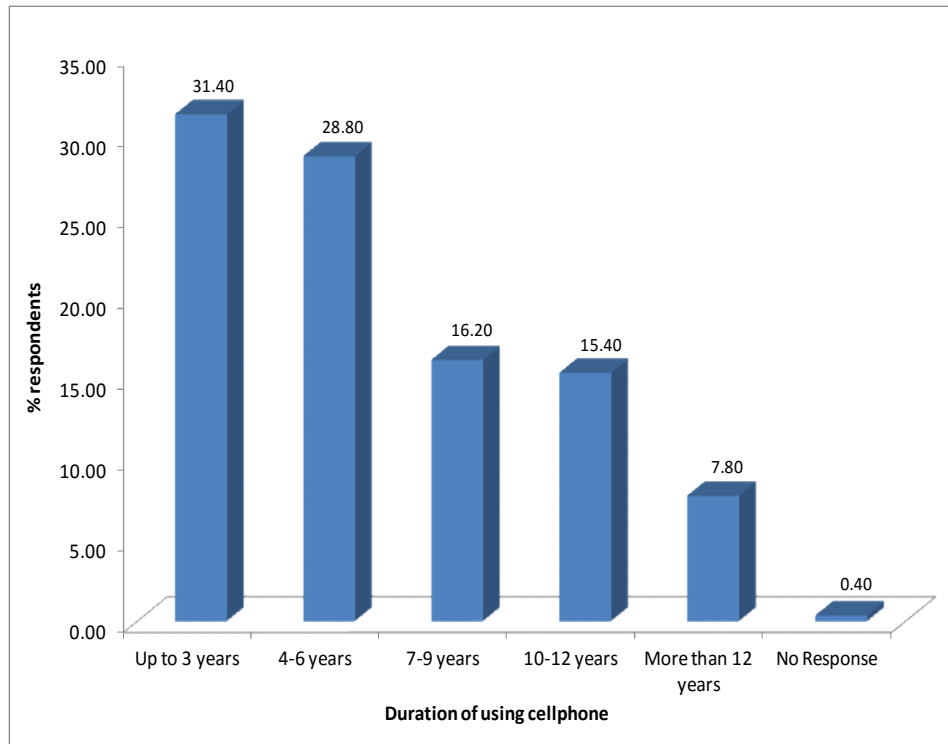


Fig. 3.1: Duration of Using Cell phone

3.2 Number of Cell phones Purchased in Last Five Years

The respondents were asked to state the total number of cell phone purchases made by them in the last five years. The responses are as follows (Table 3.2):

Table 3.2 Number of Cell Phones Purchased In Last Five Years

Number of Cell phones purchased	N	%
One	88	17.60
Two	131	26.20
Three	107	21.40
Four	60	12.00
More than 4	112	22.40
No Response	2	0.40
Total	500	100.00

Table 3.2 and corresponding figure 3.2 reveal that 26.2% of the respondents have made two purchases of cell phone and 22.4% respondents have made more than four purchases of cell phone. About 21% participants have purchased three cell phones while 17.6% participants have purchased only one cell phone. Four purchases of cell phone have been made by 12% participants.

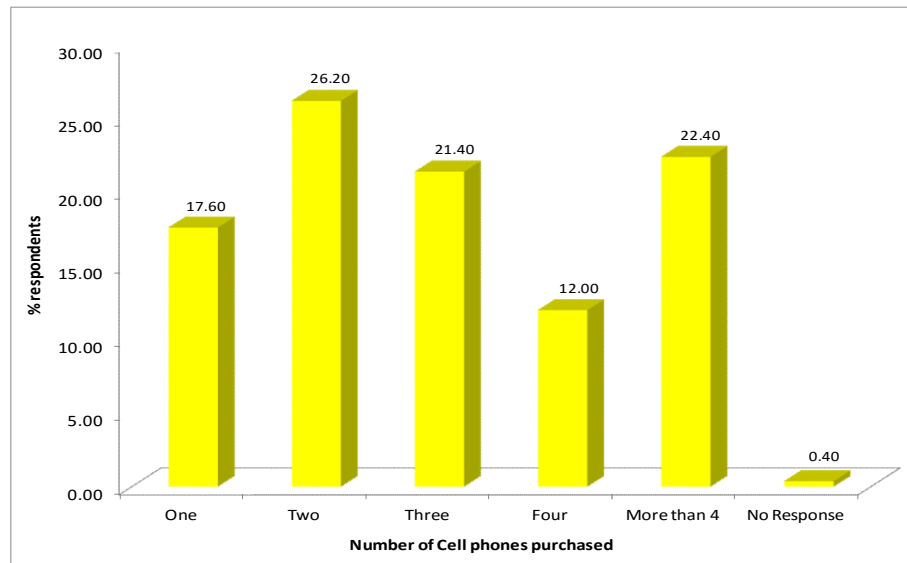


Fig. 3.2 : Number of Cell phones Purchased in Last Five Years

3.3 Cell Phone Brand Purchased

Cell phone users were asked to state the brand of the cell phone they are currently using. Responses of the cell phone users for this question are represented in table 3.3 and subsequent fig. 3.3

Table 3.3: Cell Phone Brand Purchased

Brand	N	%
Samsung	145	29.00
Micromax	68	13.60
Lenovo	59	11.80
Redmi Xiaomi	34	6.80
Intex	25	5.00
Oppo	24	4.80
Apple/iPhone	39	7.80
Others	106	21.20
Total	500	100.00

Table 3.3 shows that 29% of the respondents have lately purchased Samsung cell phone and 13.6% respondents have purchased Micromax brand of cell phone. About 12% participants have purchased cell phone of brand Lenovo while about 8% participants have purchased Apple/iphone. About 7%, 5% and 5% have purchased Redmi, Intex and Oppo respectively. Remaining 21% cell phone purchases have been made of other brands by the participants.

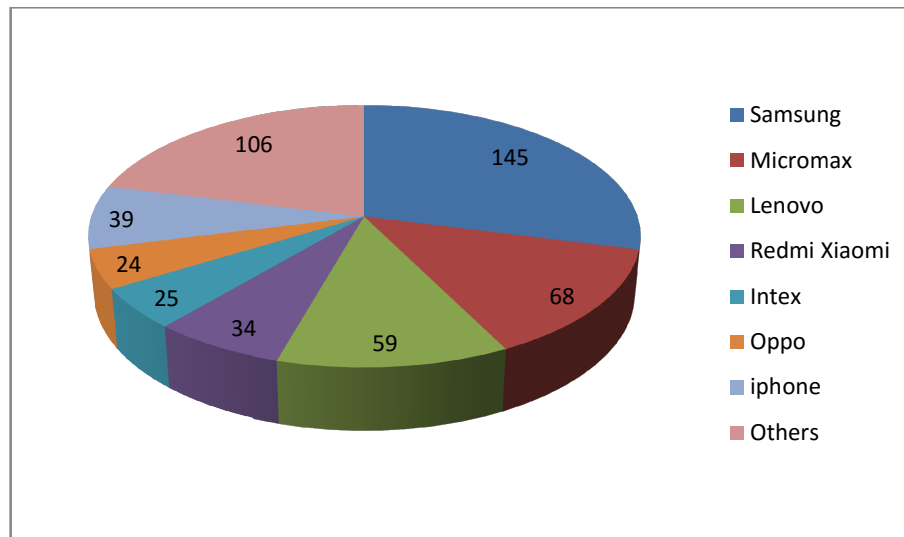


Fig. 3.3: Cell phone Brand Purchased

Samsung offers both feature phones as well as smart phones. Hence it emerged as most preferred brand. Similarly Micromax also deals in both feature phone and smart phone. It came out as the second most preferred brand.

The Others include following brands shown in table 3.4. Highest percentage of cell phones have been purchased of brand HTC (3.4%) Nokia (3.2%) followed by Gionee and Vivo that were purchased in equal percentage (2.60%) by the respondents, followed by Videocon (2.2%) and Motorola (1.4%).

Table 3.4: Other Cell phone Brand Purchased

Other Brands	N	% of total Brands
Karbons	2	0.40
Motorola	7	1.40
OnePlus	1	0.20
Gionee	13	2.60
HTC	17	3.40
MTS	1	0.20
Vivo	13	2.60
Sony	5	1.00
Videocon	11	2.20
Spice	8	1.60
Nokia	16	3.20
Xolo	2	0.40
Lava	4	0.80
jivi	2	0.40
LYF	2	0.40
Blackberry	2	0.40
Total	106	21.20

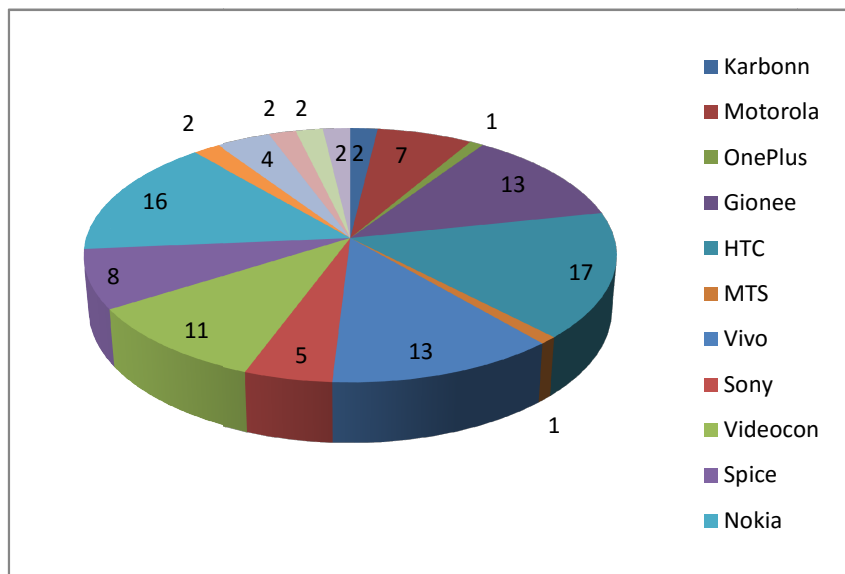


Fig. 3.4: Other Cell Phone Brands Purchased

3.3.1 Cross tables between Brands owned and Demographic Profiles

Cross tables between brands owned and demographic profile of respondents were developed to represent the distribution of brands across different demographic profile of respondents.

3.3.1.1 Cross Tabulation of Gender and Cell phone Brand Purchased

Table 3.5: Cross Tabulation of Gender and Cell Phone Brand Purchased (%)

Gender / Brand	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	iPhone	Others
Male	93 30.09	46 14.88	31 10.03	20 6.47	11 3.55	13 4.20	30 9.70	65 21.03
Female	52 27.22	22 11.51	28 14.65	14 7.32	14 7.32	11 5.75	9 4.71	41 21.46

Table 3.5 and subsequent fig. 3.5 show that out of 309 male majority of the male (30.09%) own Samsung brand. Similarly, out of 191 female 27.54% own Samsung brand. Micromax brand is owned by 14.88% male and 11.51% female. About 10% male and 14.65% female possess Lenovo brand. Intex is a more preferred brand among female (7.32%) than male (3.55%). Oppo is an equally preferred brand among both male and female customers. Iphone is a more preferred brand among male (9.70%) than female (4.71%).

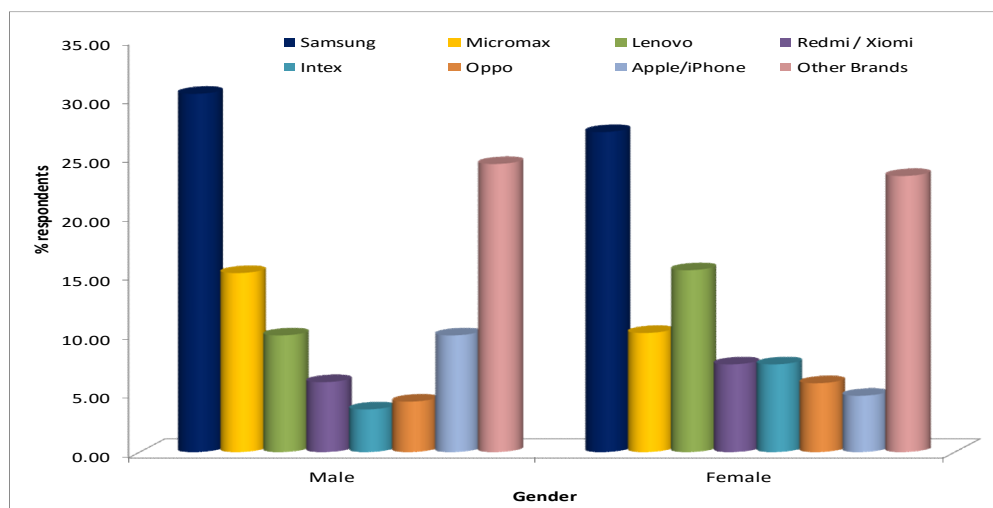


Fig. 3.5: Cross Tabulation of Gender and Cell Phone Brand Purchased

3.3.1.2 Cross Tabulation of Age and Cell phone Brand Purchased

Table 3.6: Cross Tabulation of Age and Cell phone Brand Purchased

Age/ Brand	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	iPhone	Others
Up to 20 years	18 (37.5)	3 (6.25)	6 (12.5)	4 (8.33)	0 (0.00)	4 (8.33)	1 (2.08)	12 (25.00)
21-30 years	55 (34.16)	16 (9.93)	17 (10.55)	9 (5.59)	6 (3.72)	8 (4.96)	14 (8.69)	36 (22.36)
31-40 years	35 (22.72)	27 (17.53)	26 (16.88)	15 (9.74)	11 (7.14)	7 (4.54)	13 (8.44)	20 (12.98)
41-50 years	26 (29.21)	18 (20.22)	5 (5.61)	1 (1.12)	6 (6.74)	5 (5.61)	6 (6.74)	22 (24.71)
Above 50 years	11 (22.92)	4 (8.33)	5 (10.41)	5 (10.41)	2 (4.17)	0 (0.00)	5 (10.41)	16 (33.33)

Samsung brand is the most popular among respondents up to 20 years (37.5%) and 21-30 years (34.16%) age groups. Among 89 respondents belonging to the age group of 41-50 years, 20.22% owned Micromax brand. Lenovo was a preferred choice for respondents in 31- 40 years of age group (16.88%) which consisted of 154 respondents.

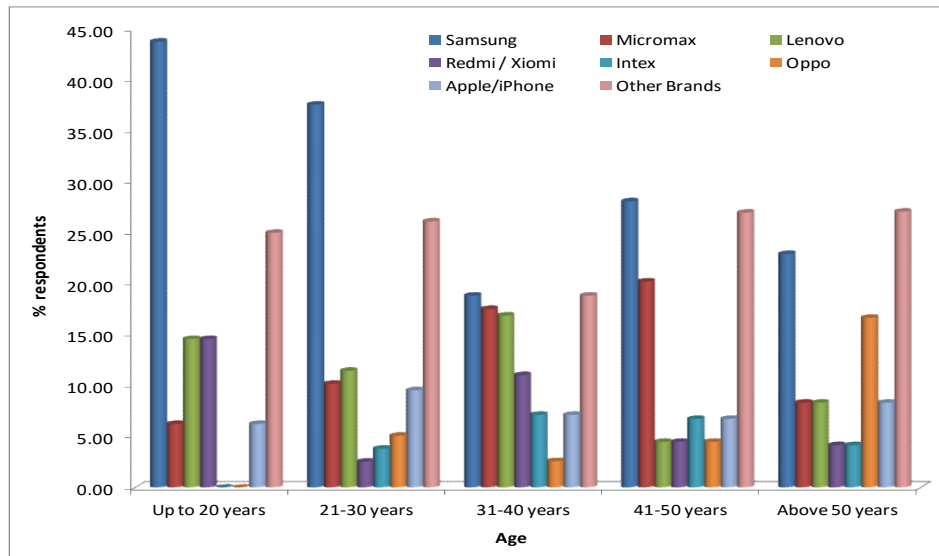


Fig. 3.6 : Age and Cell phone Brand Purchased

About 9.74% respondents in the age group 31-40 years owned Redmi brand. Intex is also a popular brand in the same age group. Samsung can be again observed as a preferred brand (16.67%) among respondents above 50 years of age. This age group consists of 48 respondents. Both Oppo and iPhone are a preferred brand in 21-30 years age group which consists of 161 respondents.

3.3.1.3 Cross Tabulation of Education and Cell phone Brand Purchased

Table 3.7 : Cross Tabulation of Education and Cell phone Brand Purchased

Education/ Brand	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	Apple	Other Brands
Illiterate	3 (10.71)	5 (17.86)	0 (0.00)	0 (0.00)	2 (7.14)	0 (0.00)	0 (0.00)	18 (64.28)
Below Secondary	6 (20.69)	5 (17.24)	5 (17.24)	2 (6.90)	5 (17.24)	0 (0.00)	0 (0.00)	6 (20.69)
Secondary/ Sr. Secondary	14 (20.90)	18 (26.87)	5 (7.46)	6 (8.90)	5 (7.46)	3 (4.45)	0 (0.00)	16 (23.88)
Graduate	67 (34.72)	25 (12.95)	41 (21.24)	9 (4.66)	6 (3.11)	12 (6.2)	10 (5.18)	23 (11.9)
Post Graduate	25 (26.88)	8 (8.60)	3 (3.22)	5 (5.37)	4 (4.3)	7 (7.52)	17 (18.27)	24 (25.8)
Professional	28 (32.56)	6 (6.98)	5 (5.81)	12 (13.95)	2 (2.33)	2 (2.33)	12 (13.95)	19 (22.09)

It can be noted from table 3.7 and subsequent fig. 3.7 Samsung is most popular brand among graduates (34.72%), post graduates (26.88%), below secondary level (20.69%) and professionally educated customers (32.56%).

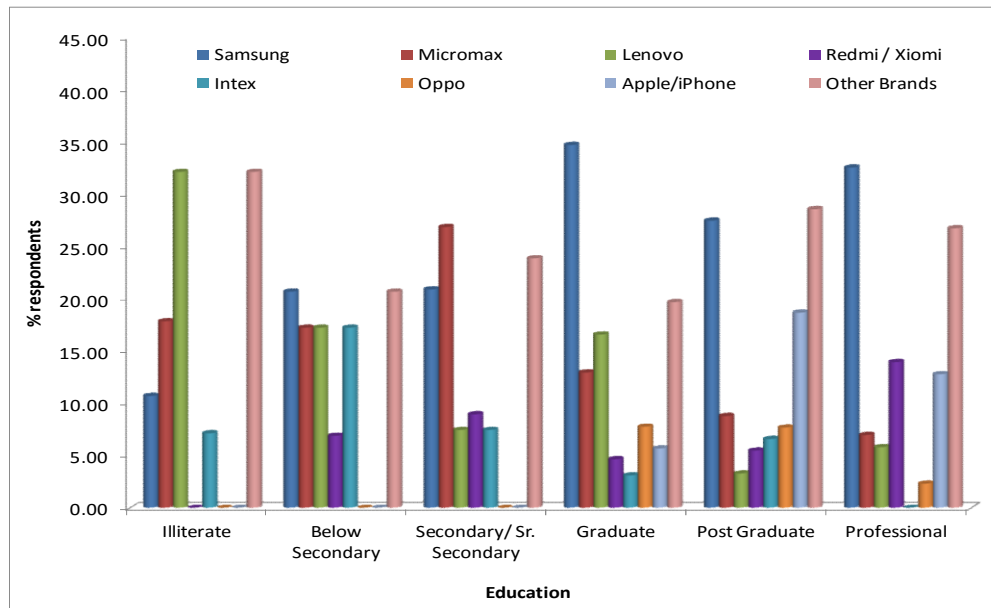


Fig. 3.7 : Education and Cell phone Brand Purchased

3.3.1.4 Cross Tabulation of Occupation and Cell phone Brand Purchased

Table 3.8 : Cross Tabulation of Occupation and Cell phone Brand Purchased

Occupation	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	Apple iPhones	Other
Student	21 (27.63)	4 (5.26)	11 (14.47)	8 (10.53)	2 (2.63)	3 (3.95)	5 (6.58)	22 (28.9)
Service	58 (31.69)	25 (13.66)	18 (9.84)	5 (2.73)	7 (3.83)	9 (4.92)	18 (9.84)	43 (23.49)
Business	23 (34.32)	10 (14.92)	6 (8.95)	2 (2.9)	3 (4.48)	1 (1.49)	9 (13.4)	13 (19.40)
Retired	1 (6.66)	3 (20)	0 (0.00)	2 (13.33)	2 (13.33)	4 (26.67)	1 (6.66)	2 (13.33)
Professional	17 (35.4)	4 (8.33)	5 (10.42)	9 (18.75)	1 (2.08)	4 (8.33)	3 (6.25)	5 (10.41)
Housewife	25 (22.72)	21 (19.09)	19 (17.27)	8 (7.27)	10 (9.09)	3 (2.72)	3 (2.72)	21 (19.09)

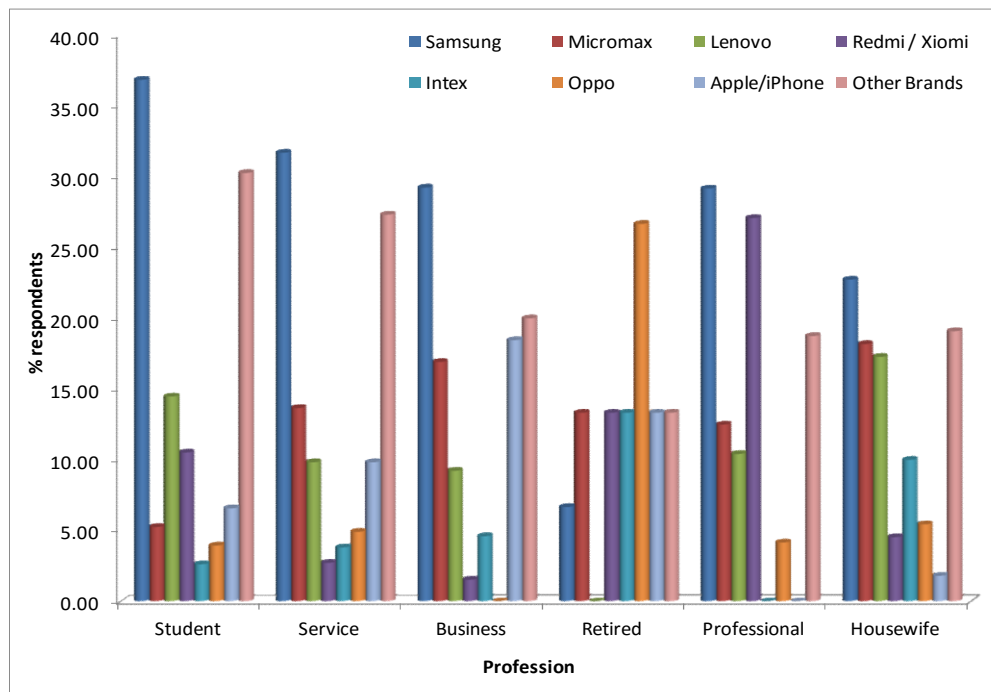


Fig. 3.8 : Occupation and Cell phone Brand Purchased

Table 3.8 and subsequent fig. 3.8 show that Samsung is the most patronised brand among all the categories of occupation namely student, service, business,

professional and housewife. Out of 76 students, 29.8% preferred ‘other brands’. Micromax is a popular brand among people engaged in service. It is also preferred by retired personnel. Similarly, about 9.84% of the respondents rendering their services preferred Lenovo brand. Redmi is a popular brand (18.75%) among professionals. Samsung is the most patronised brand among all the categories of occupation namely student, service, business, professional and housewife. Micromax is a popular brand among people engaged in service. It is also preferred by retired personnel. Similarly, about 9.84% of the respondents rendering their services preferred Lenovo brand. Redmi is a popular brand (18.75%) among professionals. Iphone is also preferred by servicemen to a great extentIphone is also preferred by servicemen to a great extent.

3.3.1.5 Cross Tabulation of Monthly Income and Cell phone Brand

Cross Tabulation of Monthly Income and Cell phone Brand

Table 3.9 : Cross Tabulation of Monthly Income and Cell phone Brand

Monthly Income	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	iPhone	Other Brands
Up to Rs. 15000	13 (16.88)	18 (23.38)	11 (14.29)	3 (3.90)	1 (1.30)	2 (2.59)	0 (0.00)	29 (37.66)
Rs. 15000 - Rs. 30000	31 (22.46)	23 (16.66)	27 (19.56)	4 (2.94)	16 (11.59)	2 (1.44)	1 (0.74)	34 (24.63)
Rs. 30000 - Rs. 45000	22 (29.33)	14 (18.67)	6 (8.00)	10 (13.33)	5 (6.67)	1 (1.33)	6 (8.00)	11 (14.66)
Rs. 45000 - Rs. 60000	23 (31.08)	8 (10.81)	12 (16.21)	5 (6.76)	0 (0.00)	10 (13.51)	2 (2.70)	14 (18.91)
More Than Rs. 60000	52 (40.94)	3 (2.36)	2 (1.57)	12 (9.45)	3 (2.36)	9 (7.09)	30 (23.62)	16 (12.59)

Table 3.9 and subsequent fig. 3.9 show that Samsung is the most patronised brand among all the categories of monthly income (except one i.e. Upto Rs.15000). Micromax brand emerged as a popular brand among 16.66% respondents belonging to income group ‘Upto Rs.15000’. This income group has a total of 77 respondents. Lenovo is a very popular brand among respondents belonging to income group ‘Rs.15000 – Rs 30000’ (19.56%). Intex which is also mostly purchased by customers in income category ‘Rs.15000 – Rs30000’ is patronised by 11.76% of the total 138 respondents belonging to this category. Due to premium price and exclusive features of Apple iPhone, it is a very popular brand in the monthly income distribution of ‘More than Rs. 60000’ having a total of 127 respondents.

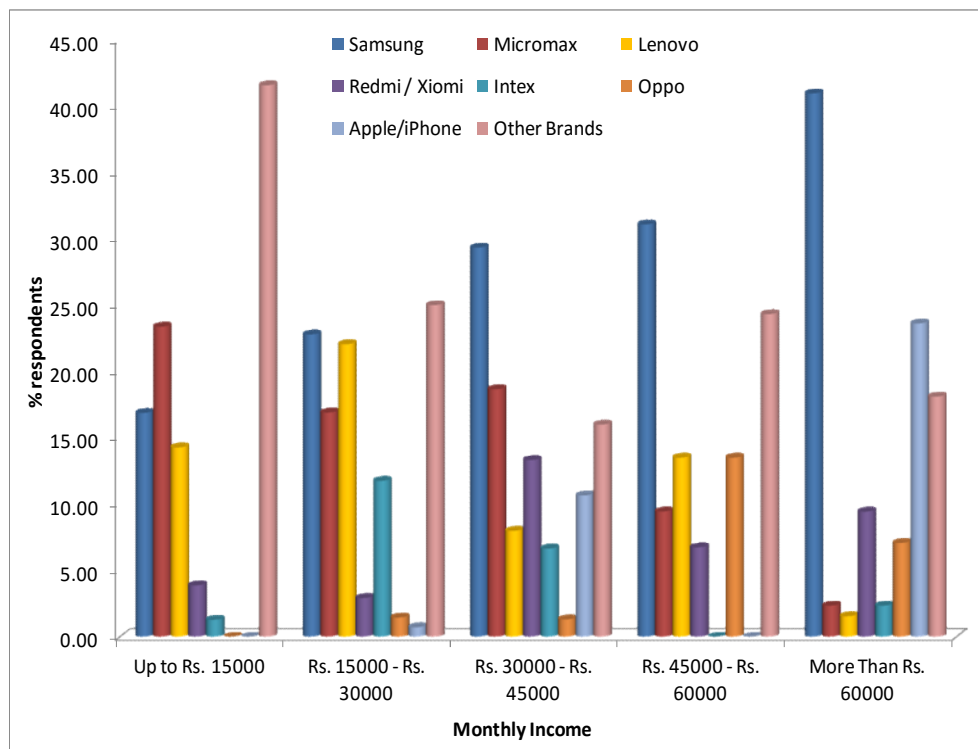


Fig. 3.9 : Monthly Income and Cell phone Brand Purchased

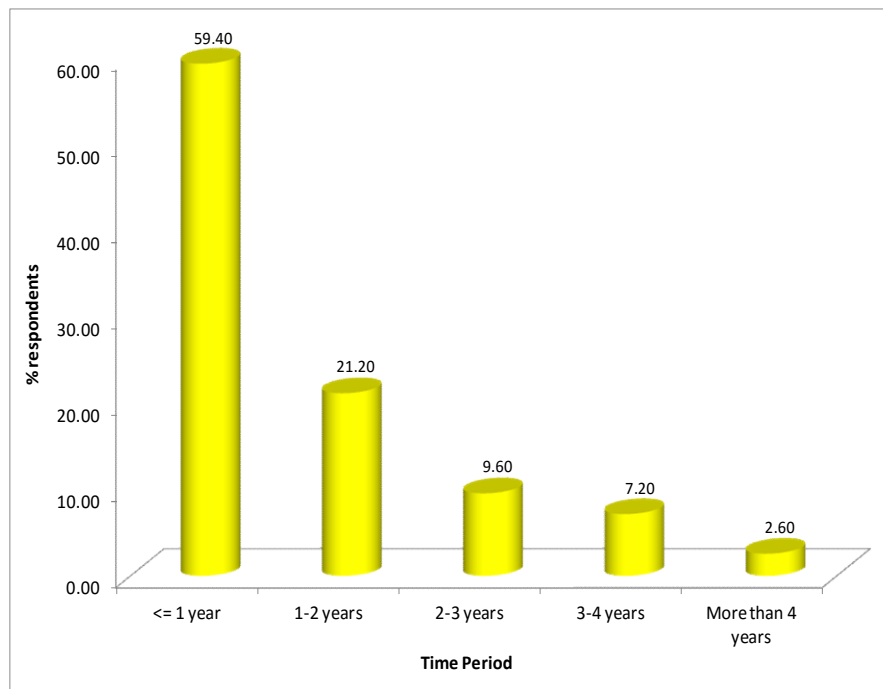
3.4 Duration of Use of Current Cell phone

Respondents were asked to state how long they have been using their current cell phone or when did they purchase their current cell phone. Table 3.10 shows the summed up responses.

Table 3.10: Duration of Use of Current Cell phone

Duration of Use of Current Cell phone	N	%
Up to 1 year	297	59.40
1-2 years	106	21.20
2-3 years	48	9.60
3-4 years	36	7.20
More than 4 years	13	2.60
Total	500	100.00

About 59% of the respondents said that they have been using their current cell phone for the last one year while 21% respondents have been using it for 1-2 years. This shows that majority respondents change their cell phone on an average every year. Only 10% and 7% have been using their present cell phone for 2-3 years and 3-4 years respectively.



3.10: Duration of Use of Current Cell phone

3.5 Possession of a Smartphone

Respondents were asked if their cell phone was a smartphone. The responses have been tabulated.

Table 3.11: Possession of a Smartphone

Possession of Smartphone	N	%
Yes	324	64.80
No	176	35.20
Total	500	100.00

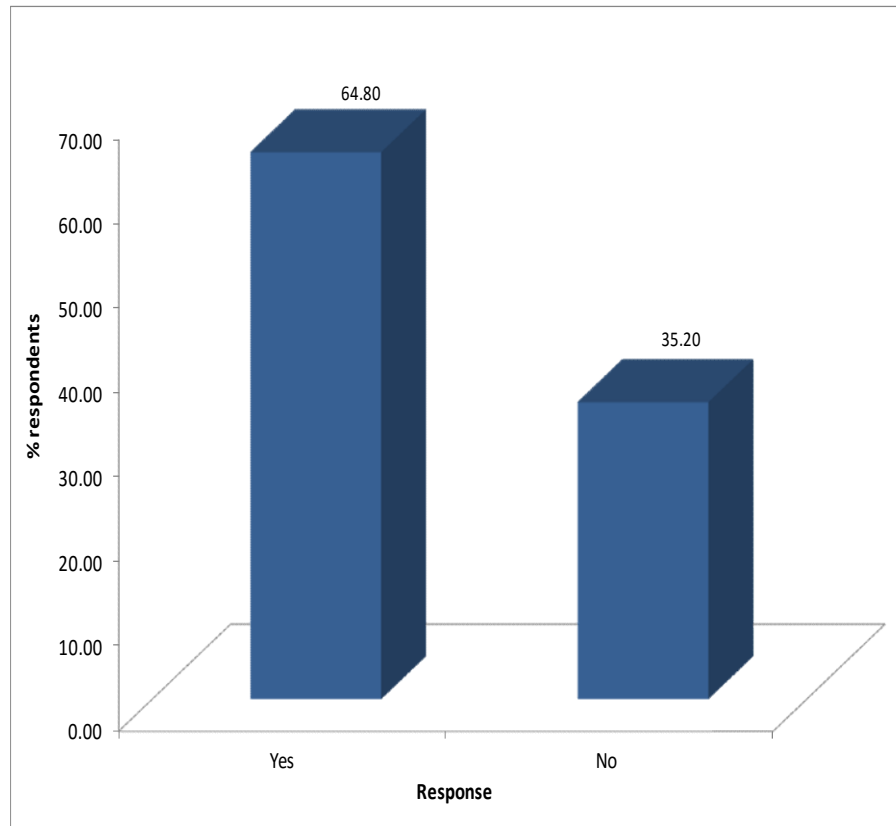


Figure 3.11: Possession of a Smartphone

About 65% respondents owned a cell phone while remaining participants either did not own a smartphone or did not know if their phone was a smart phone.

3.5.1 Hypotheses Testing

Demographic Profile and Possession of a Smartphone

Cross Tables have been developed in context to possession of Smartphone corresponding to different demographic characteristics. Significant association between different demographic characteristics and possession of Smartphone has been also verified using Chi Square test in the corresponding sections.

Chi Square statistics is a non-parametric (distribution free) test designed to analyse group differences when the dependent variable is measured at a nominal level. It does not require equality of variances among the study groups.

A **chi-square test for independence** compares two variables in a frequency table to find if they are associated with each other. In a more general sense, it tests to see whether distributions of [categorical variables](#) have significant association between them or differ from each other. Chi Square value is calculated using

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where, O = Observed Frequency, E = Expected Frequency

*In all the test results * (One Star), ** (Two Star), and *** (Three Star) represent significant / highly significant difference or relationship i.e. Null Hypothesis is rejected. NS represents non-significant relationship or difference i.e. Null Hypothesis is accepted*

3.5.1.1 Gender and possession of Smartphone

H0 1a : There is a non-significant association between gender with regard to possession of Smartphone

Table 3.12 : Gender and Possession of Smartphone

Gender	Smartphone Owned	
	Yes	No
Male	203 (65.69)	106 (34.30)
Female	121 (63.35)	70 (36.64)

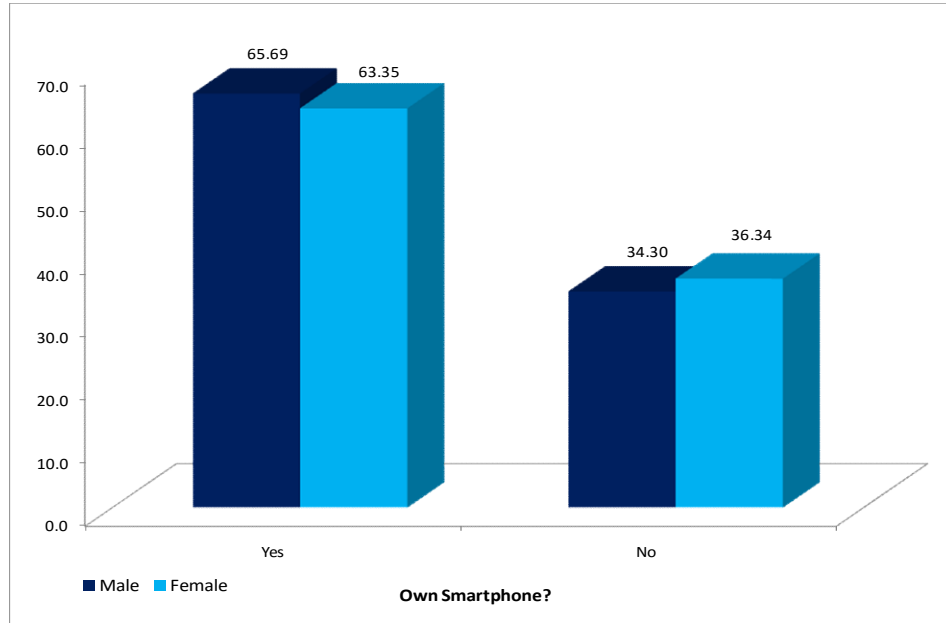


Fig. 3.12 : Gender and Possession of a Smartphone

Distribution table 3.12 reveals that a greater proportion of male (65.69%) respondents possessed smart phone than female (63.35%).

Chi Square test was administered to find the association between gender with regard to possession of Smartphone. Table 3.13 summarises the result as follows:

Table 3.13 : Chi-Square Test

χ^2	Df	Result
0.285	1	NS

Test Result

χ^2 critical table value = 3.84 compared with the calculated χ^2 value ($\chi^2 = 0.285$) was found to be greater at 5% significance.

Hence *the null hypothesis is accepted H0 1a.*

Test result in table 3.13 represents a non-significant association ($\chi^2 = 0.285$, $p > 0.05$) between gender with regard to possession of smartphone. Therefore, there is no relation between possession of smartphone with regard to gender and both

male and female are independent of each other with concern to owning a cell phone.

3.5.1.2 Age and Possession of a Smartphone

H0 1b : *There is a non-significant association between age with regard to possession of a Smartphone*

Table 3.14 : Age and Possession of a Smartphone

Age	Smartphone Owned	
	Yes	No
Up to 20 years	35 (72.92)	13 (27.08)
21-30 years	116 (72.05)	45 (27.95)
31-40 years	99 (64.29)	55 (35.71)
41-50 years	45 (50.56)	44 (49.44)
Above 50 years	29 (60.42)	19 (39.58)

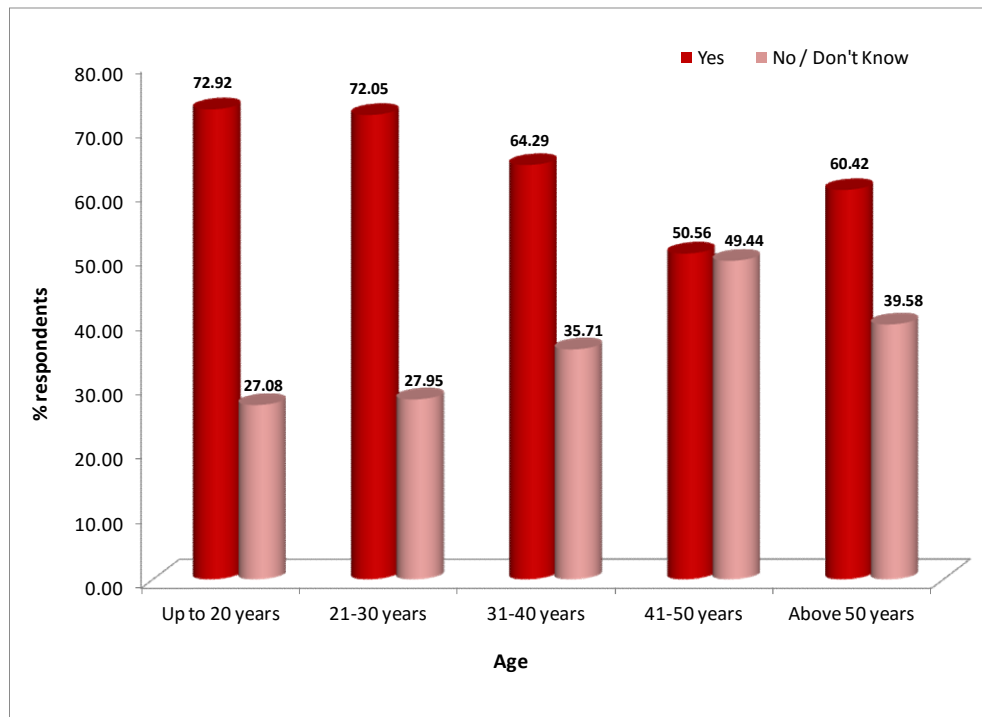


Fig 3.13: Age and Possession of a Smartphone

Table 3.15: Chi-Square Test Result

χ^2	Df	Result
13.428	4	**

Chi Square test was administered to find association between different age groups with respect to possession of smartphone

Test result

The χ^2 critical table value = 13.28 at 1% significance was found to be smaller than the calculated χ^2 value ($\chi^2 = 13.428$, $p < 0.01$).

Hence the *null hypothesis is rejected* **H0 1b**

Test results given in table 3.15 depict that a highly significant association between age groups exists with respect to possession of Smartphone. Possession of smartphone is significant between different age groups i.e it varies with age.

3.5.1.3 Education and Possession of Smartphone

H0 1c: *There is a non-significant association between education with regard to possession of a Smartphone.*

Table 3.16 : Education and Possession of a Smartphone

Education	Smartphone Owned	
	Yes	No
Illiterate	0 (0.00)	28 (100.00)
Below Secondary	11 (37.93)	18 (62.07)
Secondary/Sr. Secondary	37 (55.22)	30 (44.78)
Graduate	149 (77.20)	44 (22.80)
Post Graduate	66 (70.97)	27 (29.03)
Professional	60 (69.77)	26 (30.23)

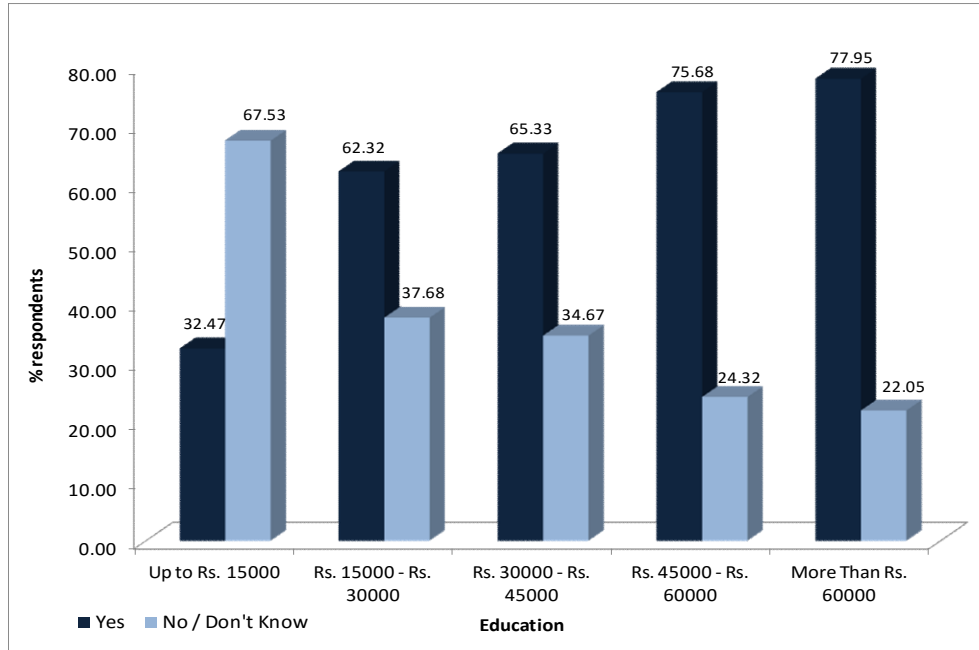


Fig. 3.14 : Education and Possession of a Smartphone

Chi Square test was applied to see the association between education with regard to possession of Smartphone.

Table 3.17 : Chi-Square Test

χ^2	Df	Result
79.225	5	***

Test result reveals that a significant association between level of education with regard to possession of cell phone exist as χ^2 critical table value = 20.52 at 0.1% significance is smaller than the calculated χ^2 value ($\chi^2= 79.225, p<0.001$).

Hence, allowing *the rejection of the null hypothesis H0 1c*.

This shows that the possession of cell phone is significantly related with education. Distribution table 3.17 reveals that possession of smart phone is dependent on literacy of the respondent as it can be seen that no illiterate person was found possessing a smart phone. Graduates (77%) followed by postgraduates (70%) and professionals (69%) are more inclined towards owning a smart phone.

3.5.1.4 Occupation and possession of Smartphone

H0 1d : There is non-significant association between occupation with regard to possession of a Smartphone

Table 3.18 : Occupation and possession of Smartphone

Occupation	Smartphone Owned	
	Yes	No
Student	65(85.53)	11 (14.47)
Service	122 (66.67)	61 (33.33)
Business	38 (56.72)	29 (43.28)
Retired	9 (60.00)	6 (40.00)
Professional	27 (56.25)	21 (43.75)
Housewife	62 (56.36)	48 (43.64)

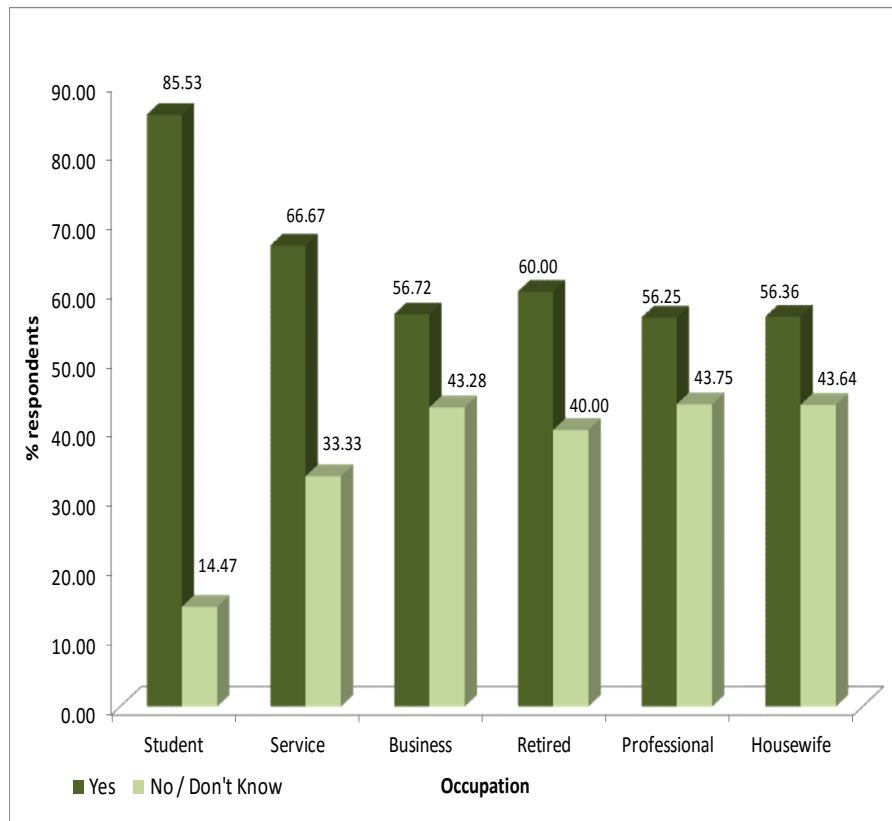


Fig. 3.15 : Occupation and possession of SMARTPHONE

Table 3.18 depicts possession of smart phone is highest among respondents engaged in service (37.77%) whereas percentage of possession of smartphone was least among retired respondents (2.79%). Chi Square test was applied to see the association between occupation and possession of Smartphone.

Table 3.19- Chi-Square Test

χ^2	Df	Result
21.614	5	***

Test Result reflects χ^2 critical table value = 20.52 at 0.1% level of significance, is smaller than the calculated χ^2 value ($\chi^2 = 21.614$, $p < 0.001$)

Hence the *null hypothesis is rejected H0 1d*.

Test results show a highly significant association between occupation with regard to possession of a Smartphone. This shows that the possession of cell phone is dependent on the occupation the person is in.

3.5.1.5 Monthly Income and possession of Smartphone phone

H0 1e : *There is non-significant association between monthly income with regard to possession of Smartphone phone.*

Table 3.20 : Monthly Income and possession of Smartphone

Monthly Income	If SMARTPHONE Owned	
	Yes	No
Up to Rs. 15000	25 (32.47)	52 (67.53)
Rs. 15000 - Rs. 30000	86 (62.32)	52 (37.68)
Rs. 30000 - Rs. 45000	49 (65.33)	26 (34.67)
Rs. 45000 - Rs. 60000	56 (75.68)	18 (24.32)
More Than Rs. 60000	99 (77.95)	28 (22.05)

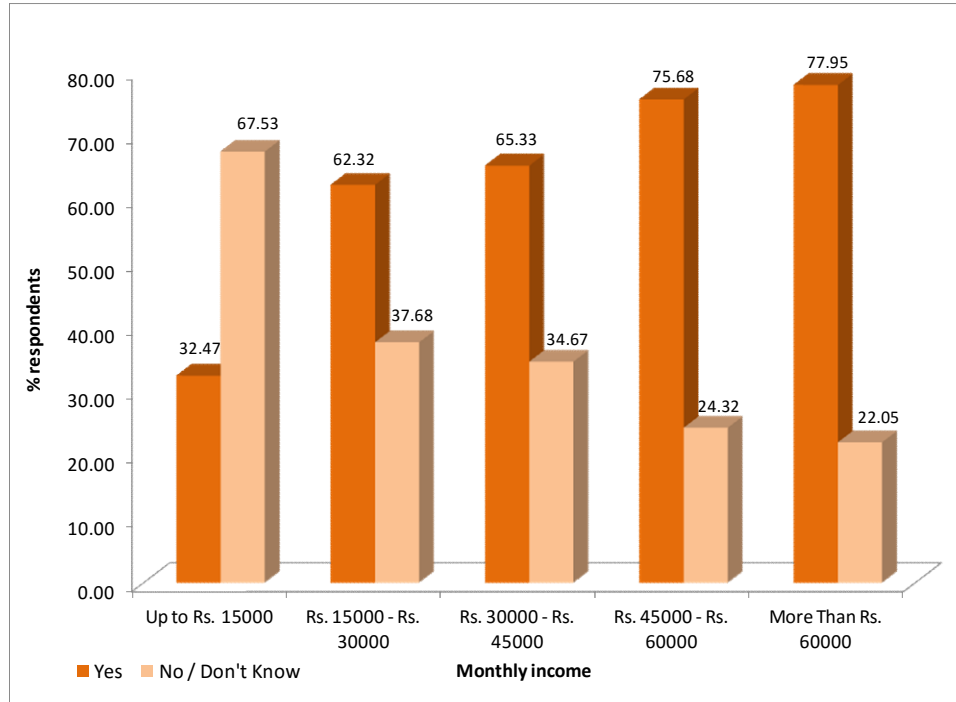


Fig. 3.16 : Occupation and Possession of Smartphone

Chi Square test was administered to see the association between income with respect to possession of Smartphone.

Table 3.21 : Chi-Square Test

χ^2	Df	Result
48.653	4	***

Test result reveals that a significant association between level of education and possession of cell phone exist as χ^2 critical table value = 18.47 at 0.1% level of significance is smaller than the calculated χ^2 value ($\chi^2 = 48.653$, $p < 0.001$) Hence, the *rejection of the null hypothesis H0 1e* is allowed.

Thus there is a highly significant association between monthly income with regard to possession of Smartphone. Distribution table 3.20 reveals that the proportion of possession of smart phone is highest (31.43%) among people having income more than Rs.60000. People possessing smart phone are more in income group 15000 to 30000 (27.3%) than among people in income group 30,000-45,000 (15.56%) and 45,000-60,000 (17.78%).

3.5.2 Platform of Smartphone

Owners of smartphone were asked to state the platform of cell phone they were using Table 3.22 and subsequent fig. 3.17 represent their responses.

Table 3.22: Platform of Smartphone

Platform	N	%
Windows	2	0.6
Android	271	83.6
iPhone/IOS	39	12.03
Blackberry	2	0.06
Others	0	0.00
Don't know	10	3.00
Total	324	100.00

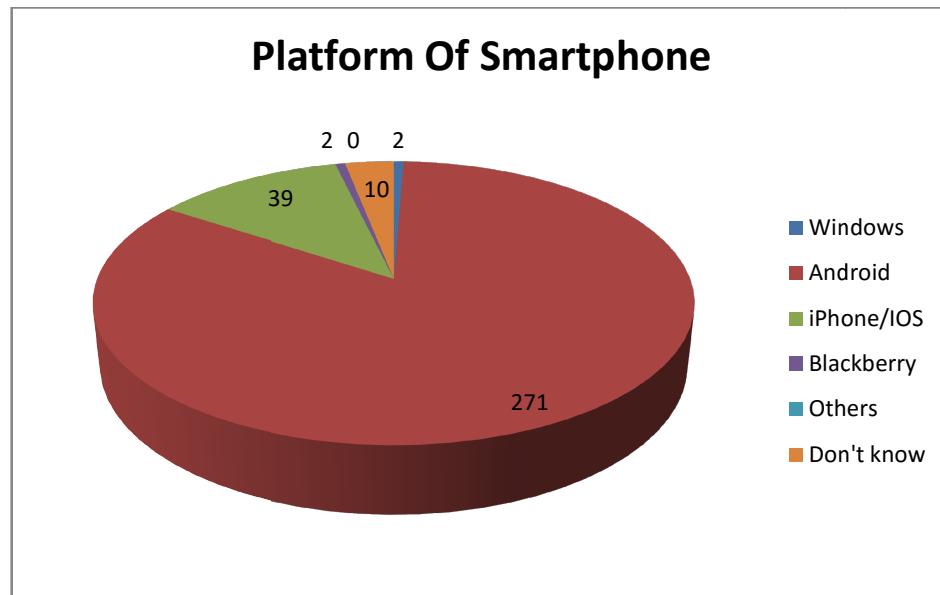


Fig. 3.17 : Platform of Smartphone

The participants of the sample owning a smartphone were asked to state the platform they were using. About 84% of the respondents stated that they were using Android Operating System followed by iOS platform users who constituted 12.03% of the total smartphone customers.

3.6 Price of Cell Phone Currently Owned

Respondents were asked to state the price of the cell phone currently owned. It was asked in the form of an open ended question. The responses have been coded and summarised in table 3.23.

Table 3.23 : Price of Cell Phone Currently Owned

Price of Cell Phone Current Owned	N	%
Up to Rs. 5000	166	33.20
Rs. 5000 - Rs. 10000	159	31.80
Rs. 10000 - Rs. 15000	71	14.20
Rs. 15000 - Rs. 20000	37	7.40
Above Rs. 20000	62	12.40
No Response	5	1.00
Total	500	100.00

About 33% respondents have been using cell phone priced upto Rs. 5000. About 32% respondents have purchased cell phone priced between Rs. 5000-10000. Only 14.2% and 7.4% participants have been using cell phone priced for Rs.10000-15000 and Rs. 15000-20000 respectively.

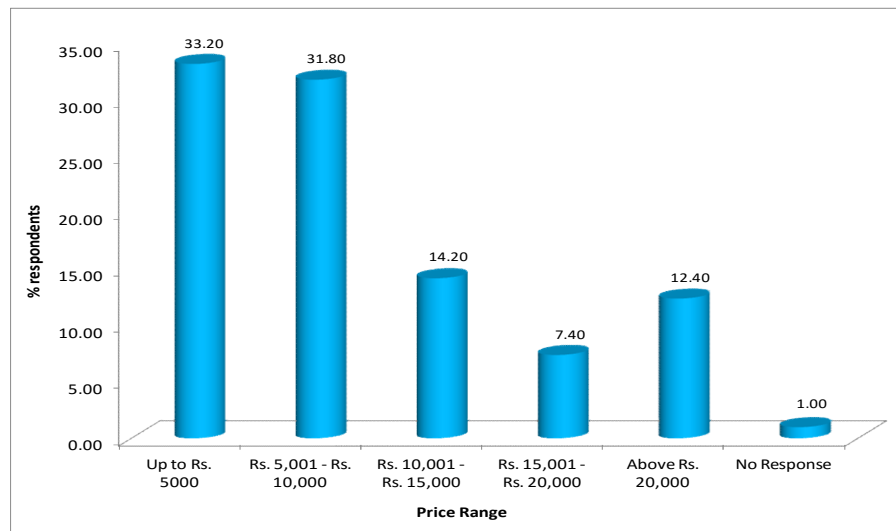


Fig. 3.18 : Price of Cell Phone Currently Owned

PRE PURCHASE BEHAVIOUR OF CELL PHONE USERS

3.7 Sources of Pre-purchase Information

Pre-purchase behaviour is a customer decision making process in which the customer perceives a need and actively seeks out information concerning products that will satisfy his need. The pre-purchase information search plays a key role in making purchase decision for a product.

In the pre purchase phase a customer may gather information about the different brands, variants of brands, their attributes etc. Customer explores and compiles information from different sources and then evaluates its authenticity and applicability so that an effective decision of brand choice could be taken. The pre-purchase information is also important during the actual usage stage as the consumers tend to compare the product functioning with the pre-purchase information which frames the expectations for the product.

Similarly, a cell phone customer also gathers pre purchase information for different brands of cell phone related to their features and functions, offers and discounts, existing customer experiences and their views etc.

Response Table

In the present study the respondents were asked to rank the different sources of information in the order of preference or their perceived importance. Responses (Both frequency & percentage) have been summarised in the table 3.24.

About 49% respondents have given first rank to 'friends and relatives' and 10.80% have ranked it as second source of information. About 11.2% customers have ranked advertising as the first source but maximum number of customers (20.2%) have ranked it second. Similarly, 10% of the respondents have taken information from the websites in the first priority but on the contrary maximum customers i.e.18.2% have ranked it fourth. According to 4.4% respondents, customer review/feedback on website is the most preferred source of information whereas 7.6% respondents preferred seller's opinion as first choice in contrast maximum (23.8%) respondents have ranked it at sixth position. Only 5.6% respondents have taken information from other sources at the first rank.

Table 3.24 : Sources of Pre-purchase Information (Frequency and Percentage Distribution)

Entities (Sources of Information)	Rank						
	I	II	III	IV	V	VI	VII
Friends and Relatives	245	54	76	40	43	11	26
	49.00	10.80	15.20	8.00	8.60	2.20	5.20
Advertisement/Publicity (Newspaper/Magazines)	57	130	129	75	47	28	22
	11.40	26.00	25.80	15.00	9.40	5.60	4.40
Advertisement/Publicity (Television)	56	101	101	92	97	42	5
	11.20	20.20	20.20	18.40	19.40	8.40	1.00
Website of desired mobile phone brand	50	65	37	91	89	90	64
	10.00	13.00	7.40	18.20	17.80	18.00	12.80
Customer Reviews/Feedback on websites	22	53	50	70	66	119	106
	4.40	10.60	10.00	14.00	13.20	23.80	21.20
Seller's Opinion	38	43	58	69	89	118	80
	7.60	8.60	11.60	13.80	17.80	23.60	16.00
Others (Fairs, Catalogues, Kiosks, Events)	28	51	45	56	55	76	175
	5.60	10.20	9.00	11.20	11.00	15.20	35.00

3.7.1 Hypothesis Testing

Null hypothesis to find a significant difference in the ordinal preferences given by customers to various sources of pre-purchase information is as follows:

H0 2 : *There is a non-significant difference in the preference given to different sources of information where customers seek pre-purchase information for the cell phone.*

The **Friedman test**, a non-parametric test is used to test differences between responses of customers when the dependent variable being measured is ordinal. It is an alternative to the one-way ANOVA with repeated measures.

Friedman test has been administered for identifying if there is any significant difference in the ordinal preferences given by the customers to various sources of pre-purchase information.

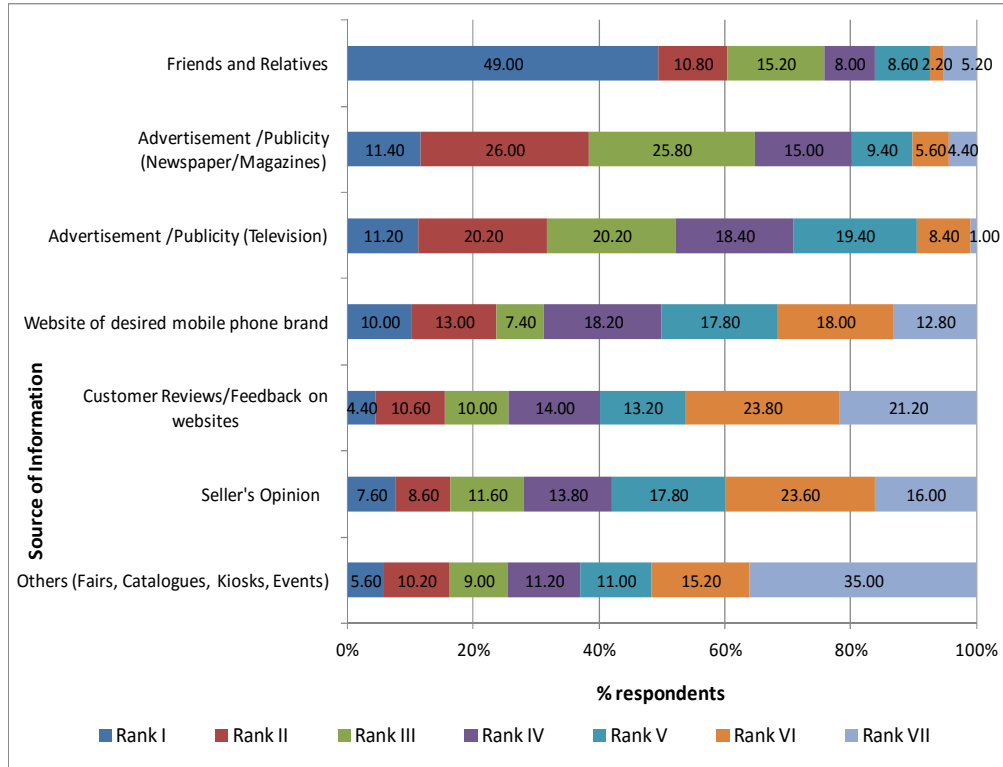


Fig. 3.19 : Sources of Pre-purchase Information

Table 3.25: Friedman Test for Sources of Information

Entity (Source of Information)	Mean Rank Score	Rank	Chi Sqr Statistic	Df	Result
Friends and Relatives	5.58	1	604.96	6	***
Advertisement/Publicity (Newspaper/Magazines)	4.81	2			
Advertisement/Publicity (Television)	4.54	3			
Website of desired mobile phone brand	3.68	4			
Customer Reviews/Feedback on websites	3.14	6			
Seller's Opinion	3.31	5			
Others (Fairs, Catalogues, Kiosks, Events)	2.95	7			

Test Result

Mean scores of all the ranks against each source of information have been calculated. Final ranks were given to the different sources of information according to these mean scores as shown in table 3.25. Mean rank scores is calculated as weighted average mean and has been verified using chi square test. Chi square test is administered to find if distributions of categorical variables have significant association between them.

Since χ^2 critical table value = 22.46 at 0.01 % level of significance, is smaller than the calculated χ^2 value ($\chi^2= 604.96$, $p<0.001$)

Hence, *the null hypothesis H0 2 is rejected.*

The Friedman test has been administered. The calculated Chi Square value ($\chi^2= 604.96$, $p<0.001$) indicates highly significant difference in preference of respondents regarding different sources of pre purchase information.

It is evident from the table 3.25 that ‘friends and relatives’ is the major source of pre-purchase information. It is given first preference (5.58) followed by advertisement (newspaper) and advertisement (television) with 4.81 and 4.54 mean score respectively. Websites, seller’s opinion, customers’ review and other sources have also been ranked accordingly.

3.8 Purpose of Cell phone Purchase

H0 3 : *There is a non-significant difference in the preference given to different purpose of purchasing a cell phone.*

Nowadays, cell phones are coming up with number of distinguishing features enabling users to do much more on their cell phone than just making phone calls. Innovative functions and features have enabled cell phones to serve different purpose of users. Taking this in view respondents were asked to rank the different purposes of purchasing a cell phone in order of preference. Responses are summarised in the table 3.26:

Table 3.26 : Purpose of Cell phone Purchase

Purpose of Purchase	Rank						
	I	II	III	IV	V	VI	VII
Communication (Calling/Receiving Calls)	226	77	50	76	20	25	20
	45.20	15.40	10.00	15.20	4.00	5.00	4.00
Social Networking/Instant Messaging (Facebook, Twitter, WhatsApp etc.)	86	85	62	65	64	45	41
	17.20	17.00	12.40	13.00	12.80	9.00	8.20
E-commerce (e- banking, paying bills, e-shopping)	20	29	15	59	105	128	89
	4.00	5.80	3.00	11.80	21.00	25.60	17.80
Business applications (emails, text editing, voice-mail)	16	25	37	50	130	114	76
	3.20	5.00	7.40	10.00	26.00	22.80	15.20
Web browsing/Internet Search	18	43	85	81	49	65	107
	3.60	8.60	17.00	16.20	9.80	13.00	21.40
Camera features/functions (Camera /Video)	102	89	114	73	33	26	24
	20.40	17.80	22.80	14.60	6.60	5.20	4.80
Entertainment (MP3/MP4/FM Radio/TV)	25	121	98	42	47	44	77
	5.00	24.20	19.60	8.40	9.40	8.80	15.40

About 45.2% respondents have given first rank to *communication* as the major purpose of purchase of cell phone and 15.4% have ranked it as the second source of information. Maximum number of respondents i.e. about 17.2% customers have ranked *social networking and instant messaging* as the first purpose of

purchasing cell phone, closely followed by 17% respondents who ranked it as second. Only 4% of the respondents ranked *e-commerce* as first while maximum customers i.e. 25.6% have ranked it as sixth. Only 3.2% respondents have considered *business applications* as the most preferred purpose of purchase whereas maximum (26%) respondents have ranked it as fifth. 3.6% respondents have ranked *web browsing* as first but maximum 21.4% respondents have ranked it as seventh. 20.4% respondents have ranked *camera features and functions* as first whereas 22.8% ranked it as third. Only 5% of the respondents have ranked *entertainment* as the first place whereas 24.2% have ranked it as second.

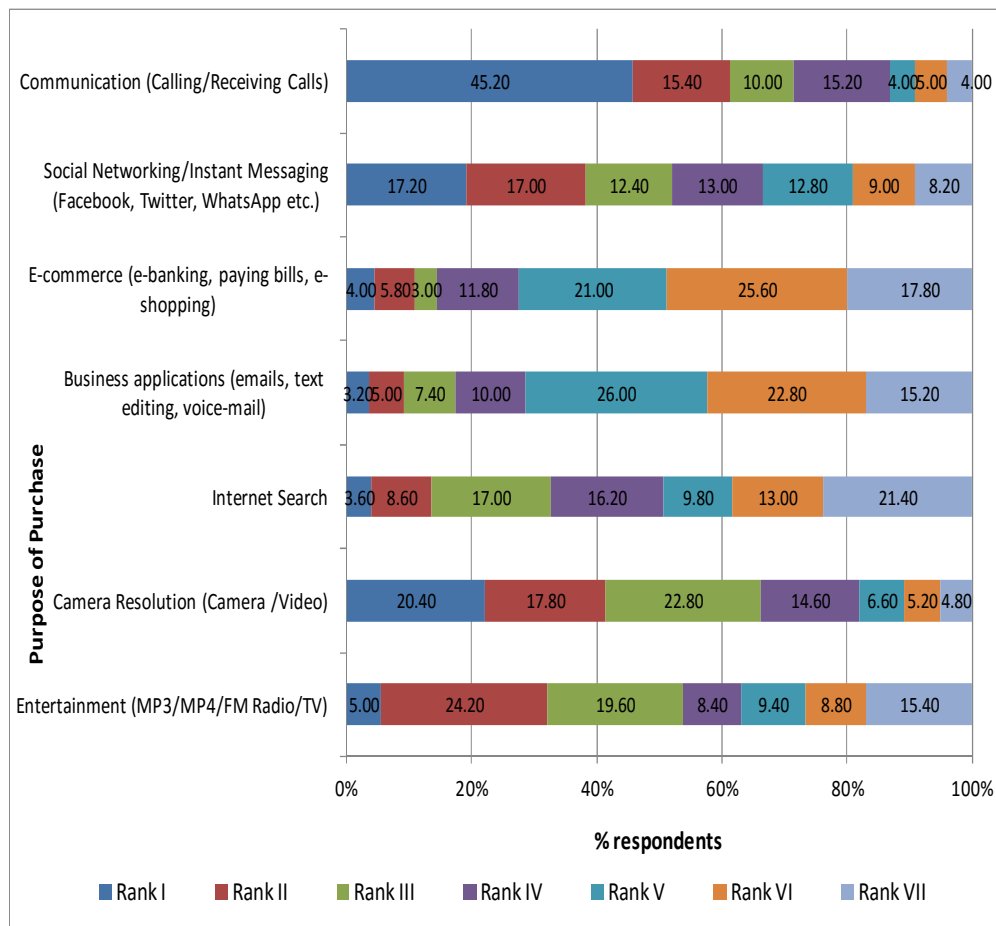


Fig. 3.20 : Purpose of Cell phone Purchase

Friedman test was administered to see whether ranks given by respondents to different purposes of cell phone that directed them in selecting the present brand differ significantly or not.

Table 3.27 : Friedman Test

Purposes of Purchase	Score	Rank	Chi Sqr	Df	Result
Communication (Calling/Receiving Calls)	5.35	1	550.14	6	***
Social Networking/Instant Messaging (Facebook, Twitter, WhatsApp etc.)	4.45	3			
E-commerce (e-banking, paying bills, e-shopping)	2.87	7			
Business applications (emails, text editing, voice-mail)	2.96	6			
Internet Search	3.38	5			
Multimedia (Camera /Video)	5.00	2			
Entertainment (MP3/MP4/FM Radio/TV)	4.06	4			

Test result

Mean rank score was calculated and final ranks were given to different purpose of purchase according to the mean score. Mean rank score was verified using chi square test and tested using chi square statistics Since χ^2 critical table value = 22.46 at 0.1% level of significance is smaller than the calculated χ^2 value ($\chi^2=550.14, p<0.001$)

Hence, *the null hypothesis H0 3 was rejected.*

Therefore, the test result reflects that a significant difference exist in the preferences of the customers for the *purpose of purchase* of cell phone that influences their purchase decision.

Finally ranks were given to different purpose of cell phone purchase based on mean score. Table 3.27 reflects that that respondents have given first preference to communication (calling/receiving phone calls), then to multimedia (camera/video), next rank came out to be social networking/instant messaging followed by entertainment, internet search and sixth and seventh rank were given to business commerce and e-commerce respectively.

PURCHASE BEHAVIOUR AND BEHAVIOURAL SEGMENTATION OF CELL PHONE USERS

Purchase Decision is the penultimate stage of the consumer buying process where the actual purchase of product takes place. Prior to this stage customers evaluate and compare different products/brands on the basis of varying factors/product attributes and ensure if the offered product or brand can deliver the benefits that the customers are seeking, match with their needs and wants. After evaluation customers make the final choice of what to buy where to buy and purchase the product that best satisfies their needs and wants.

An attempt has been made in the study to understand the purchase behaviour of the cell phone users by examining the sales point or the place where the cell phone is purchased and determining the time taken to decide the brand of cell phone to be purchased. Further the factors affecting the choice of cell phone were also analysed by applying factor analysis. On the basis of these factors behavioural segmentation of the cell phone users in the Hadoti region has been administered.

3.9 Place of Purchase

As part of purchase process respondents were asked to state the sales point where the current cell phone in use was purchased. Table 3.28 and corresponding figure represent the responses.

Table 3.28: Place of Purchase

Place of Purchase	N	%
Brand Store	84	16.80
Online Shop (Flipkart, ebay, Amazon etc)	142	28.40
Dealer	164	32.80
Retail Chain Store (Reliance Digital, NEXT etc)	47	9.40
Others (Second Hand Mobile Shop, B2B Store, Friend)	58	11.60
No Response	5	1.00
Total	500	100.00

Maximum respondents (32.8%) purchased their current cell phone from dealers followed by online shops (28.4%) and Brand Store (16.8%). Least purchases were made from Retail Chain Stores (9.4%). Retail Chain store like Reliance Digital is situated only in Kota city hence a lesser percentage of people preferred this point.

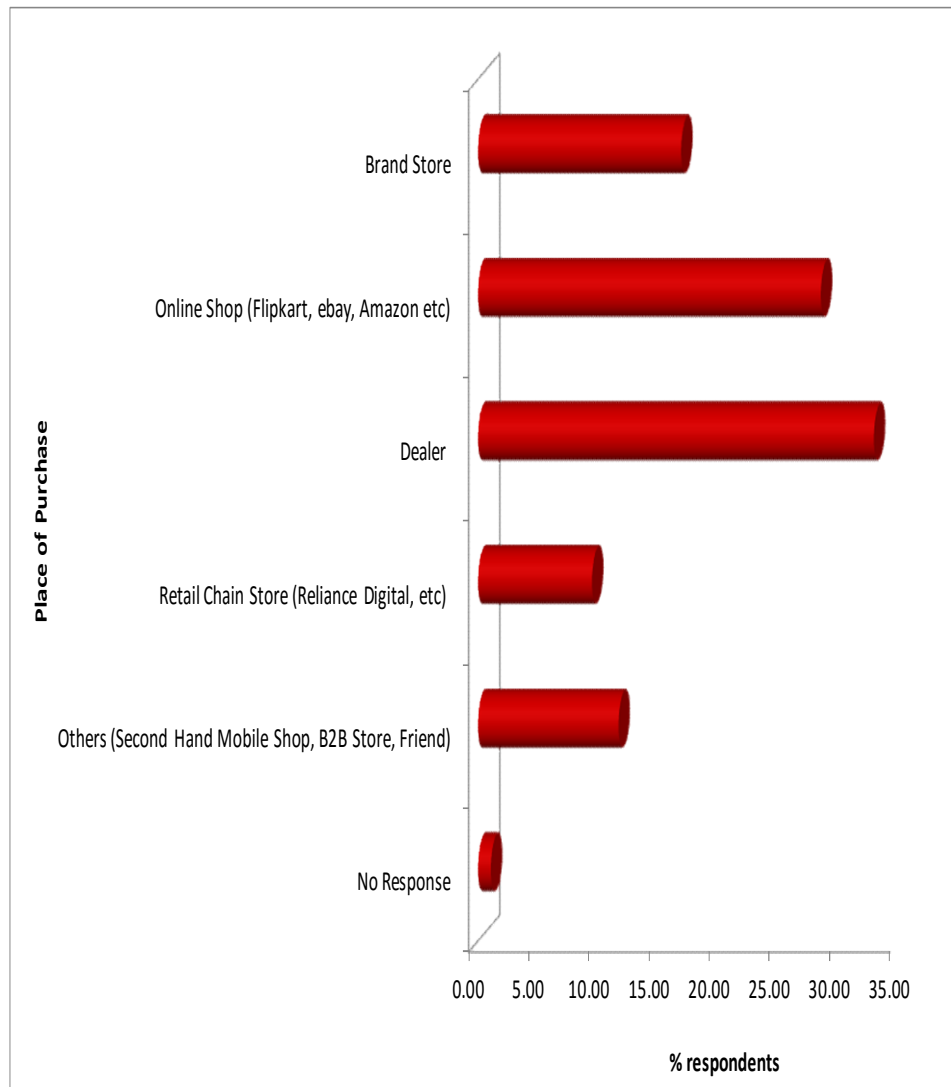


Fig. 3.21: Sales point where Current Cell phone Purchased

3.10 Time Taken to Decide Brand of Cell phone

Respondents were asked to state the time taken to decide upon the brand of cell phone. The responses have been summarised in table 3.29 given below:

Table 3.29: Time Take to Decide Brand

Time Taken to Decide Brand of Cell phone	N	%
Instantly	118	23.60
1-2 week	204	40.80
2-4 weeks	90	18.00
More than a month	76	15.20
No Response	12	2.40
Total	500	100.00

Majority (41%) of the respondents took only 1-2 weeks to decide upon the brand of cell phone whereas 23.6% participants took such decision instantly. About 18% and 15% took 2-4 weeks and more than a month respectively.

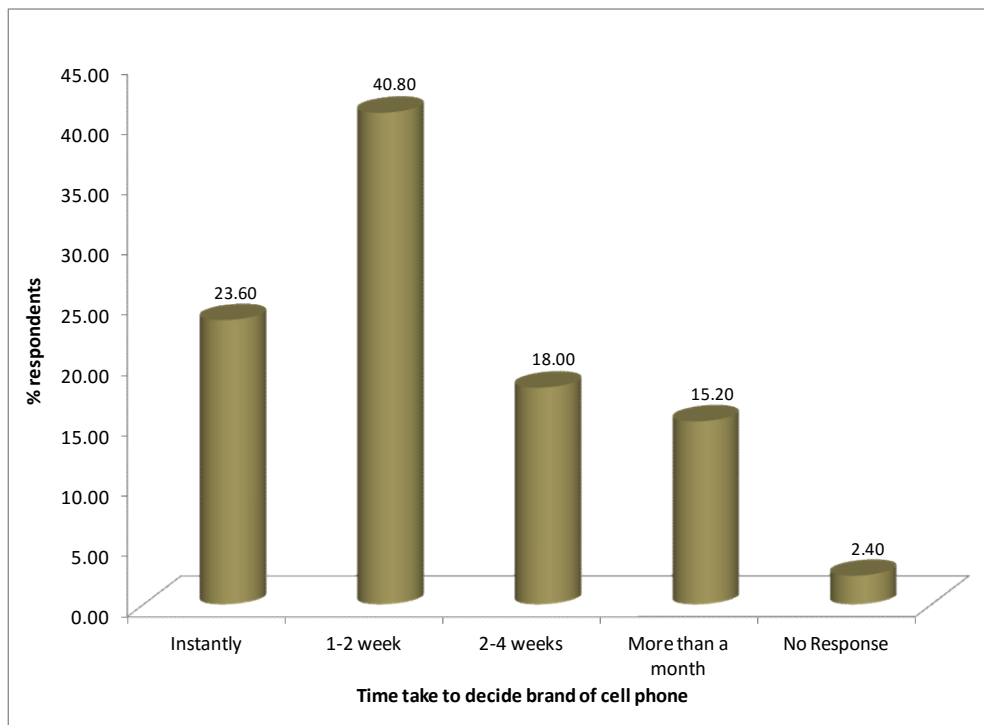


Fig. 3.22: Time Taken to Decide Brand

3.11 Factors Determining Purchase Decision of Cell phone Users

Different factors determine the purchase decision of the cell phone users. In the present study 32 variables were identified after undertaking extensive literature review to extract the key factors that affect the purchase decision of cell phone

users. A total of 500 cell phone users were asked to state the importance levels of 32 variables during the purchase of cell phone on a five-point interval scale (1-5) that ranged from “Strongly Disagree” to Strongly Agree”. The data so collected was thoroughly analysed using ‘exploratory factor analysis’ and the factors that determine the purchase behaviour were extracted.

3.11.1 Exploratory Factor Analysis

Exploratory Factor analysis uncovers the latent structure of a relatively large set of variables and explores the underlying relationships between measured variables. Factor Analysis is a widely chosen method of data reduction, as it is suitable for identifying correlations among variables in a complex set of data. (Mitchelmore and Rowley, 2013)

The purpose behind applying a factor analysis was to minimise the number of variables without compromising on the amount of information in the analyses. (Steward, 1981)

Factor analysis aims to find the underlying factors that influence the cell phone purchase decision. It has been found that the customers consider various factors before choosing brand of cell/mobile phones. Some of the factors influence customers’ decision greatly while others have comparatively low impact on the purchase decision. In this study the researcher had made no "a priori" assumptions about relationships among factors.

3.11.1.1 Validity Analysis

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy

To analyse the strength of association among variables the Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was applied. The KMO was computed to determine the suitability of using factor analysis. KMO measure of sampling adequacy shows that sample is adequate for conducting factor analysis. The value of KMO varies from 0 to 1 and high values (close to 1.0) generally indicate that a factor analysis may be useful with the data. The calculated value of KMO in this research was 0.929 which was greater than 0.800 and according to Kaiser the

value greater than 0.800 is meritorious, indicating that the sample was adequate to consider data normally distributed and conducting factor analysis.

3.11.1.2 Bartlett's Test of Sphericity

Bartlett's Test of Sphericity was conducted then to test multivariate normality of data and whether correlation matrix was an identity matrix. In the Bartlett's test the highly significant value ($p < 0.001$) of Chi Square shows that the data does not produce identity matrix and thus approximately multivariate normal and acceptable for factor analysis. After checking the validity of the data Factor Analysis using Principal Component Analysis (PCA) was applied to explore the underlying factors associated with items.

Table 3.30: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.929
Bartlett's Test of Sphericity	Approx. Chi-Square	11357.882
	df	406
	Result	.000

3.11.1.3 Communalities

Communality means common variance shared by a variable with all other variables. Thus if the communality of a variable is high, the extracted factors account for a big proportion of the variable's variance. This means that the particular variable is reflected well via the extracted factors, and hence that the factor analysis is reliable.

The initial communalities as well as communalities after extraction of all 32 items are shown in Table 3.30. The communalities in the present analysis ranged from 0.491 to 0.929 which was approximately equal or much more than the minimum value of .5 suggested by Stewart (1981)

Table 3.31 : Communalities

Statements	Initial	Extraction
4. Screen Display type (LED/LCD/AMOLED etc) was a concern	1.000	0.665
5. Presence of Service Centre in my city or neighboring city in Hadoti region was a concern	1.000	0.547
6. Audio and video Functions influenced my choice	1.000	0.686
7. Screen Size was a major criteria in making final choice	1.000	0.713
8. I preferred loud Speaker, ringtone volume/good Sound Quality	1.000	0.630
9. Internet /WiFi Connectivity was important to me	1.000	0.668
10. Availability of colours offered options for choice to me	1.000	0.589
11. Aesthetics (Shape, Sleekness & Style) appealed to me	1.000	0.599
12. Terms of Payment (EMI etc) are an attraction to me	1.000	0.775
13. SAR Value/IMEI number was checked by me	1.000	0.654
14. Battery Backup	1.000	0.887
15. Number of SIM slots was an important concern	1.000	0.678
16. Exchange/discount offers of mobile phone influenced my choice	1.000	0.760
17. Country of Origin influenced my purchase particular brand	1.000	0.622
18. Operating System is a parameter of my choice set	1.000	0.635
19 Availability of drop-box/basket for dropping discarded cell phone	1.000	0.889
20. Physical Durability was important to me	1.000	0.491
21. Processor & Generation(2G/3G/4G) is important to me	1.000	0.673
22. I preferred Torch and a camera with flash	1.000	0.672
23. Brand Image influenced my choice of purchase	1.000	0.716
24. Inbuilt Apps attracted me	1.000	0.694
25. Availability of Bluetooth & Infrared was a concern	1.000	0.691
26 Price of cell phone influenced my choice	1.000	0.929
27. Memory size (Internal/Extendable) influenced my choice	1.000	0.708
28. I looked for Camera Functions/Resolution in my choice	1.000	0.653
29. Light Weight of Cell phone influenced my final choice	1.000	0.559
30. Accessories offered with phone influenced my choice	1.000	0.630
31. FM/Radio and MP3/MP4 influenced my choice	1.000	0.585
32. Authorization (authorized dealer, Brand Store) of point of purchase was important	1.000	0.529

Table 3.32 : Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.86	47.78	47.78	13.86	47.78	47.78	6.24	21.53	21.53
2	2.04	7.02	54.80	2.04	7.02	54.80	3.49	12.04	33.57
3	1.41	4.85	59.66	1.41	4.85	59.66	3.49	12.02	45.59
4	1.21	4.16	63.81	1.21	4.16	63.81	3.42	11.81	57.40
5	1.02	3.52	67.34	1.02	3.52	67.34	2.88	9.94	67.34
6	.82	2.83	70.17						
7	.79	2.71	72.88						
8	.70	2.43	75.31						
9	.67	2.31	77.61						
10	.59	2.03	79.64						
11	.56	1.93	81.58						
12	.53	1.83	83.41						
13	.49	1.69	85.10						
14	.43	1.49	86.59						
15	.42	1.45	88.04						
16	.41	1.41	89.46						
17	.36	1.24	90.69						
18	.36	1.23	91.93						
19	.32	1.11	93.04						
20	.31	1.07	94.12						
21	.29	.99	95.11						
22	.27	.94	96.05						
23	.27	.92	96.97						
24	.25	.85	97.82						
25	.22	.78	98.60						
26	.20	.71	99.30						
27	.17	.60	99.90						
28	.02	.08	99.98						
29	.01	.02	100.00						

3.11.1.4 Total Variance Explained

Table 3.32 represents underlying factors associated with items generated by SPSS on extraction with Principal Component Analysis (PCA) Method. The table shows 67.34% of variation in cell phone purchase concerns by the customers explained by five factors. The total variance explained (67.34%) by these five components exceeds the 60 percent threshold criterion commonly used in social science researches (Hair et al., 2006).

While administering exploratory factor analysis of variables that are given due concern during purchase of cell phone, it was found that some items were distorting grouping of items in proper factors, hence reliability of 32 items was calculated (which was coming out to be 0.953) at the same time it was noted that if item number 1, 2 and 3 are removed reliability of remaining items will be increased. Hence after removing item number 1, 2, and 3 reliability of remaining 29 was calculated again and the new value was 0.960 which shows that if we remove item number 1, 2 and 3 from factor analysis, better factor analysis results can be obtained, hence in the final factor analysis three items were removed and total 29 items were retained for factor analysis.

Varimax rotation method was used to extract factors. Among the extracted factors obtained after *20 iterations of rotations* only those factors have been retained whose eigen value is greater than 1

Inclusion of a variable in a factor is dependent on its factor loading for that particular factor which shows its correlation with that factor. This denotes strength of relationship of the item with the latent construct and predicts convergent and discriminate validity of the scales. (Hair et al.,2006). Table 3.33 represents the extracted factors and the factor loading for each item included in the respective factor. Almost all the factor loadings are greater than 0.5 (appropriate for a social science research) except three items (28.30 and 32) whose factor loadings are approximately equal to 0.5 which is suitable in a social science research.

Table 3.33 : Factors and Factor Loading

Factor	Item	Factor Loading
F1	15. Number of SIM usage was an important concern	0.702
	7. Screen Size was a major criteria in making final choice	0.695
	8. I preferred loud Speaker, ringtone volume/good Sound Quality	0.663
	11. Aesthetics (Shape, Sleekness & Style) appealed to me	0.638
	5. Presence of Service Centre in my city or neighboring city in Hadoti region was a concern	0.628
	6. Audio and video Functions influenced my choice	0.611
	22. I preferred Torch and a camera with flash	0.577
	20. Physical Durability was important to me	0.576
	27. Memory size (Internal/Extendable) influenced my choice	0.574
	31. FM/Radio and MP3/MP4 influenced my choice	0.569
	29. Light Weight of Cell Phone influenced my final choice	0.550
	17. Country of origin influenced my purchase of particular brand	0.535
	10. Availability of colours offered options for choice to me	0.518
	30. Accessories offered with phone influenced my choice	0.475
28. I looked for Camera Functions/Resolution in my choice	0.468	
F2	18. Operating System is a parameter of my choice set	0.723
	21. Processor & Generation(2G/3G/4G) is important to me	0.659
	4. Screen Display type (LED/LCD/AMOLED etc) was a concern	0.622
	9. Internet /WiFi Connectivity was important to me	0.540
F3	26 Price of cell phone influenced my choice	0.882
	12. Terms of Payment (EMI etc) are an attraction to me	0.795
	16. Exchange/discount offers of mobile phone influenced my choice	0.762
F4	23. Brand Image influenced my choice of purchase	0.768
	25. Availability of Bluetooth & Infrared was a concern	0.692
	24. Inbuilt Apps attracted me	0.688
	32. Authorization (authorized dealer, Brand Store) of point of purchase was important to me	0.430
F5	14. Battery Backup was a consideration	0.739
	19. Availability/presence of dropbox of the brand for dropping discarded mobile phone (for recycling) in my city or neighbouring city in Hadoti region was checked	0.731
	13. SAR value compliance (Electromagnetic radiations) with Indian standards and presence of IMEI No. was checked	0.717

Extraction Method: Principal Component Analysis

3.11.1.5 Scree Plot

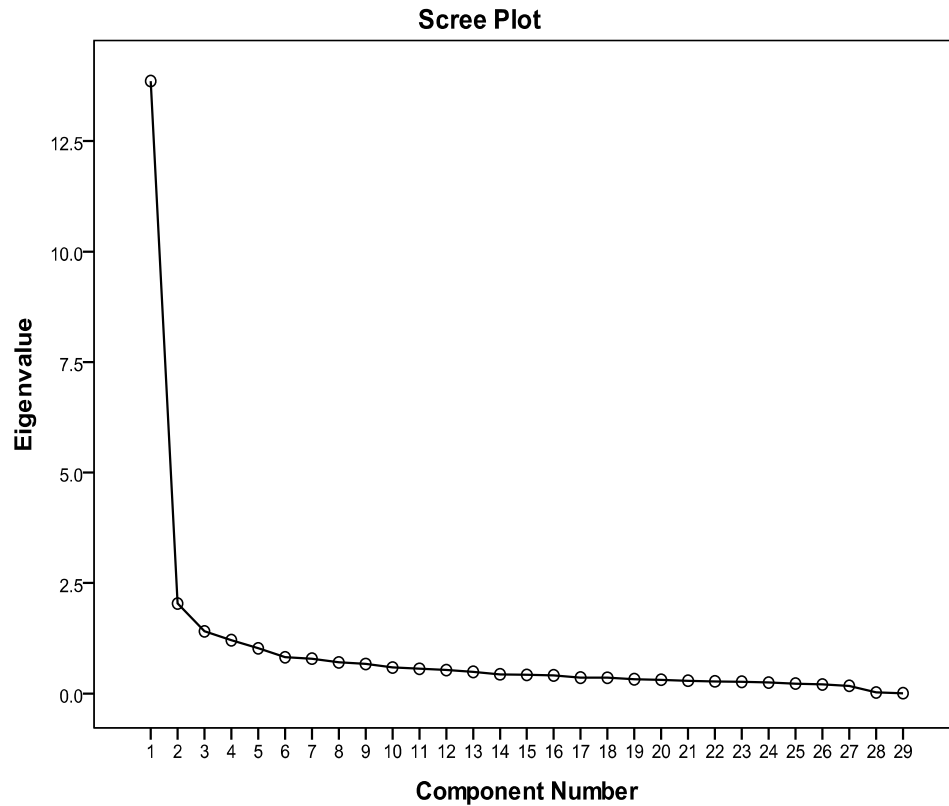


Fig 3.23-Scree Plot

The Scree Plot Test, another popular test for the number of factors is also called Cattell's scree criterion. (Pallant, 2005). Both the eigen value rule and the scree plot are accurate if the sample is greater than 250 and the communalities are greater than 0.6. A scree plot represents the eigen values of variables on the y-axis and the number of factors on the x-axis. It is always in the form of downward curve. The scree plot involves plotting the Eigen values of the factors, and looking for the point (also known as the 'elbow') at which the plot begins to level off from vertical to horizontal. In this case, similar result is suggested by the scree plot, which would suggest the retention of five significant factors. The results of Cattell's scree plot are shown in Figure 3.23.

The scree plot shown in Figure 3.23 also depicts 5 factors. Since the sample size is greater than 250. Hence, the results obtained above are also supported by the

scree plot. These five factors represent the concerns which are considered the most by the cell phone customers at the time of purchase.

3.11.1.6 Labeling Extracted Factors

On the basis of table 3.32 which shows the variance explained and table 3.33 which represents the loading of each variable on each of the extracted factors, following conclusions can be drawn:

- 1. Factor 1 is a linear combination of 15 variables (15,7,8, 11,5,6, 22,20,27,31,29,17,10,30, 28) with Eigen value of 13.86 it explains 47.78% of variance.*
- 2. Factor 2 is a linear combination of 4 variables (18,21,4,9) with Eigen value of 2.04 it explains 7.02% of variance.*
- 3. Factor 3 is a linear combination of 3 variables (26,12,16) with Eigen value of 1.41 it explains 4.85% of variance.*
- 4. Factor 4 I is a linear combination of 4 variables (23,24,25,32) with Eigen value of 1.21 it explains 4.16% of variance.*
- 5. Factor 5 is a linear combination of 3 variables (14,19, 13) with Eigen value of 1.02 it explains 3.52% of variance.*

As shown in Table 3.33 five factors were extracted. All these factors have been appropriately named according to the variables that have been loaded on each factor.

- **Factor 1 : Price and Payment Terms Factor**

First factor clearly justified its name Price and payment terms as all the 3 statements which constituted this factor assess monetary aspects of cell phone purchase. These variables are – price of cell phone, payment terms and discounts/offers on cell phone purchase.

- **Factor 2 : Physical Attributes/features and Multimedia**

The second factor is named physical attributes/features and multimedia as all the 15 variables like (screen size, no. of SIM slots, speakers, shape, sleekness,

colour, weight of cell phone, audio/video functions, camera functions, torch, physical durability, memory size, FM/Radio accessories) as shown in table 3.33 are loaded together to form this factor are concerned with physical attributes and multimedia features of cell phone.

- **Factor 3 : Mobile Technology and Connectivity**

The third factor is named mobile technology and connectivity as all 4 loaded variables assess and accommodates various attributes about the technological superiorities. These loaded variables are related to generations, Operating system and screen display type and internet/internet connectivity concerned aspects hence, the factor is rightly named as mobile technology and connectivity.

- **Factor 4 : Brand Image and Applications (Apps)**

Factor four emerged by name Brand Image and applications (Apps) since the 4 statements which are loaded together to form this factor ensure the availability of applications/apps, blue tooth, authorisation of dealer and brand image of cell phone which are related with the various applications of the cell phone, reliable image of the dealer and image of the cell phone brand in the minds of the customers.

- **Factor 5 : Health, Safety and Environment**

Factor five is named Health, safety and environment since all the 3 variables in this factor assess the concern of customers for knowing the SAR (Specific Absorption Rate) value which is associated with the amount of energy (watt) emitted through electromagnetic radiations of cell phone is absorbed by per kilogram of body weight and IMEI No. (International Mobile Equipment Identity) and battery life of a cell phone. A longer battery life saves energy. Thus the name of the factor effectively commensurate with the items included.

These five distinct factors may be regarded as decision-making criterion used by the customers during purchase of a cell phone in the Hadoti Region of Rajasthan.

3.11.1.7 Test of Reliability of Extracted Factors

Reliability in an Exploratory Factor Analysis (EFA) is to computed by computing Cronbach's alpha for each factor. The EFA is considered reliable if the Cronbach's alpha computed for each factor is above 0.7. Table 3.34 shows the computed chronbach's alpha values for each factor. Since the computed chronbach's alpha values for each factor are greater than 0.7 and the overall reliability of the exploratory factor analysis comes out to be 0.960 which is regarded as 'meritorious'. Therefore the five extracted factors are highly reliable may be utilised in further analysis.

Table 3.34 : Test of Reliability of Extracted Factors

Factor	Cronbach's Alpha Value	No. of Items
<i>Price and Payment Terms</i>	0.942	15
<i>Physical Attributes/features and Multimedia</i>	0.821	4
<i>Mobile Technology and Connectivity</i>	0.908	3
<i>Brand Image and Applications (Apps)</i>	0.812	4
<i>Health, Safety and Environment</i>	0.904	3
Overall	0.960	29

After conducting the reliability test of the factor analysis, the extracted factors have been utilised in administering cluster analysis to behaviourally segment the cell phone users of Hadoti region on the basis of their customer behaviour.

3.12 Behavioural Segmentation of the Cell phone Users

Consumer segmentation is a marketing concept which involves virtual groups of consumers (segments) constructed to help marketers to design and target them with their specific strategies. A segment is a cluster of entities which think and act homogeneously. A segment consists of accounts that behave in similar way such that they are distinct from other segments. Different segments have varying needs, wants and usage behaviour. The basic purpose of segmentation is to better

understand prospective customers and to determine who they are and what they value in order to win over their purchase decision.

There are four dimensions of segmentation – Geographic, Demographic, Psychographic and Behavioural. ***Behavioural segmentation*** divides the market into virtual groups of customers based on their attitudes and perception towards the product, benefits sought, their usage rate, user status and other factors. The objective of this segmentation is to identify the behavioural characteristics of different customer groups so that the marketers may address their specific needs or wants by developing new products or customise the offered products/services/marketing mix and adopt suitable positioning strategy to attract one or more segments.

3.12.1 Customer Segments of Cell phone Users

Identification of customers of cell phone seeks to ascertain who the customers are, which may define the composition of customers or customer groups involving many characteristics such as gender, age, economic background, education, occupation, behavioural patterns etc. Similar buying behaviour patterns for cell phone represent the design of behaviour of a homogeneous customer group known as customer segment of the cell phone. However, it would be valuable to see how well the segments have been identified and could be generalised to other user populations. Marketing strategies for a cell phone or any other product are designed taking into concern these customer segments. Further the factors that determine the brand choice among these segments lay an impact on user experience in decision making process.

3.12.1.1 Cluster Analysis

The Cluster Analysis is an explorative analysis that identifies segment within the data. Cluster analysis is also called segmentation analysis or taxonomy analysis. In the present study specifically, it tries to identify homogenous groups among cell phone Users. Cluster analysis is used to identify groups of cases if the grouping is not previously known.

The Cluster Analysis includes a sequence of analyses - factor analysis, cluster analysis, and finally, discriminant analysis. A factor analysis reduces the dimensions and variables into factors making cluster analysis easier to run. In the next analysis cluster analysis identifies the grouping and develops a model of clusters/segments profiles. Lastly, a discriminant analysis checks the goodness of fit of this model. Since the cluster analysis does not have any tests of significance, a discriminant analysis always follows a cluster analysis.

Cluster analysis identifies natural clusters among many variables without designating any of them as a dependent variable. (Hair et al., 2006). In the present study Exploratory Factor Analysis was administered on the rating responses against 32 attributes/items considered by the customers during purchase of a cell phone. This yielded five distinct factors as decision-making criterion used by the customers during purchase. In this section, the sample of 500 cell phone users is clustered into distinct groups by using these five factors as the bases for segmentation. For this purpose, initially, the five factors obtained by factor analysis (F1 to F5 in Table 3.33) were computed by taking the average of the importance levels assigned to the items loading under each. Then, a K-means cluster analysis was run to segment customers. Thus, the customers were finally segmented into five clusters according to the similarities and differences in their concern for the five extracted factors.

Table 3.35 : Frequency Distribution of Each Cluster

Cluster	N	%
Voguish	115	23.00
Abstemious	93	18.60
Techno Savvy	72	14.40
Value Conscious	57	11.40
Charismatic	163	32.60
Total	500	100.00

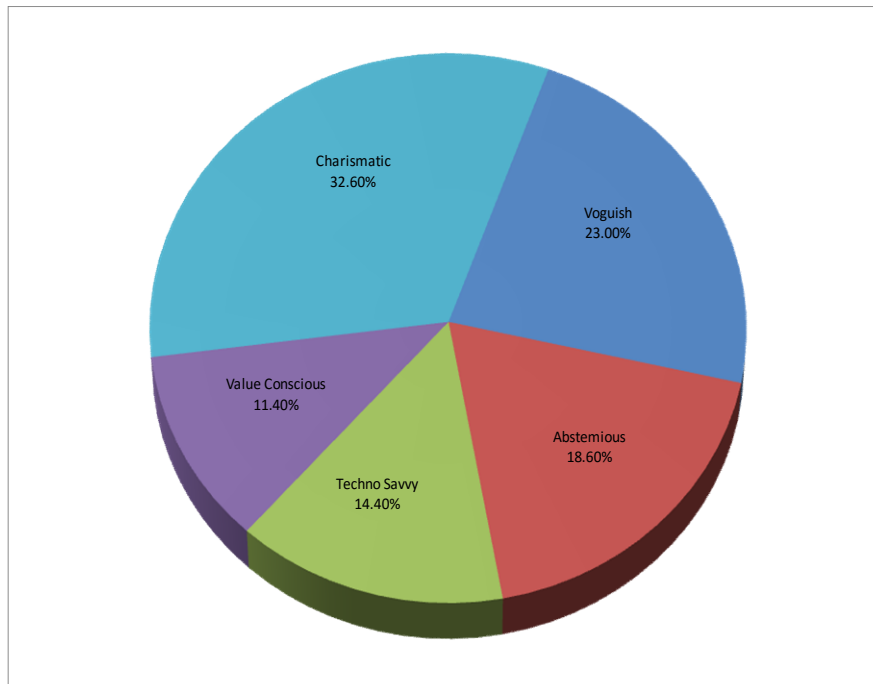


Fig 3.24 : Distribution of Clusters

The final cluster centers that represent the mean importance of each decision-making criterion for each cluster can be seen in Table 3.36.

Table 3.36 : Final Cluster Centers

Factor	Cluster Names				
	Voguish	Abstemious	Techno Savvy	Value Conscious	Charismatic
Physical Attributes and Multimedia	3.61	2.02	3.70	2.60	4.00
Mobile Technology and Connectivity	3.62	2.02	4.01	2.30	4.01
Price and Payment Terms	2.99	1.59	1.86	2.90	4.04
Brand Image and Applications	3.38	1.89	2.86	2.34	3.91
Health, Environment and Safety	2.72	1.73	3.58	2.63	4.08

3.12.1.2 Behavioural Segments Defined

Cluster 1 – Voguish

A male dominated segment with majority of the customers being graduates in the age group of 21 to 30 years, income level of Rs.15001- 30000 and mostly engaged in service. It is the second largest segment (23%) of the cell phone users in Hadoti region. The members of this segment are trendy and look for latest features in terms of physical attributes, camera functions, technology, applications (apps) etc. They are also conscious about brand image and country of origin of cell phone brand (like Samsung from South Korea, Micromax from India). Price is also a determining factor of their cell phone purchase.

Cluster 2 – Abstemious

A female dominated segment with majority of the customers being graduates, housewives in age group of 31 to 40 years and in the income level of 15001-30000. One of the striking characteristics of this segment is following a minimalistic approach in the purchase decision making for a cell phone. This customer group attaches moderate level of importance to the physical attributes, multimedia features or mobile technology and connectivity.

They are rather indifferent about many factors related to the technological, physical attributes, health and safety aspects. Moreover they display an intentional attitude by showing how unimportant the price of the product is to them.

Cluster 3 - Techno savvy

A male dominated segment with majority of the customers being postgraduates and professionals in the age group of 41 to 50 years, in the income level of more than Rs. 60000 and mostly engaged in service. This customer group focuses on physical attributes such as size, colour weight, screen size and multimedia like camera and multimedia features and also lay strong emphasis on mobile technology like operating systems, generation etc and internet connectivity as the most important factors while purchasing a cell phone. Such customers get impressed by technological superiorities, aesthetics general and give due regard to health, safety and environment issues by checking the SAR value and IMEI no. of offered cell phone and availability of drop box in their city or in vicinity.

Cluster 4 – Value Conscious

A male dominated segment with majority of the customers being graduates in age group of 31 to 40 years, income level of 15001- 30000 and engaged in service. The most significant characteristic of this customer group is the fact that they attach almost medium importance to all the five factors. Although price and payment terms criteria has slightly more significant role to play in decision making. The primary concern is to get mediocre experience of all attributes and features of cell phone at an appropriate price. They are more interested in getting value out of the money spent.

Cluster 5 – Charismatic

A male dominated segment with majority of the customers being graduates in the age group of 21 to 30 years and 31-40 years, in the income level of more than Rs. 60000 and engaged in service. This cluster is the largest segment in Hadoti region with 32.6% respondents. This cluster attaches a highest level of importance to almost all of the decision making criteria among all other segments. The lowest importance level can be observed only for applications and brand image. This is not surprising since this cluster has the *want-it-all* kind of customers. It is the most price sensitive segment among all other segments.

3.12.1.3 Discriminant Test

Discriminant validity shows that the measure is unique in some way. Discriminant validity gauges the extent to which measures of two different constructs are comparatively distinctive from each other, and that their correlation values are neither an absolute value of 0 nor 1. (Campbell and Fiske, 1959).

3.12.1.4 Hypotheses Testing

H0 4: *There is a non significant difference between the customer segments with regard to different factors*

Hence, five subsequent hypotheses have been developed corresponding to each factor which were statistically tested using ANOVA statistic. One-way analysis of variance (ANOVA) is used to determine if there exist any statistically significant

differences between the means of two or more independent groups. In the present study one way ANOVA has been administered to find if there is a significant difference between different customer segments with regard to different factors.

H0 4a: There is a non significant difference between the customer segments with regard to Physical Features and Multimedia

Calculated value of F (F=308.679, $p < .001$) is greater than table value = 4.69 at 0.1% level of significance hence, *null hypothesis H0 4a is rejected.*

There is a significant difference between different customer segments with regard to physical features and multimedia.

H0 4b: There is a non significant difference between the customer segments with regard to Mobile Technology and Connectivity

Calculated value of F (F=309.011, $p < .001$) is greater than table value = 4.69 at 0.1% level of significance hence *null hypothesis H0 4b is rejected.*

There is a significant difference between different customer segments with regard to mobile technology and connectivity.

H0 4c: There is a non significant difference between the customer segments with regard to Price and Payment Terms

Calculated value of F (F=322.011, $p < .001$) is greater than table value = 4.69 at 0.1% level of significance hence *null hypothesis H0 4c is rejected.*

There is a significant difference between different customer segments with regard to price and payment terms.

H0 4d: There is a non significant difference between the customer segments with regard to Brand Image and Applications

Calculated value of F (F=199.993, $p < .001$) is greater than table value = 4.69 at 0.1% level of significance hence *null hypothesis H0 4d is rejected.*

There is a significant difference between different customer segments with regard to brand image and applications.

H0 4e: There is a non significant difference between the clusters with regard to Health, Environment and Safety

Calculated value of F (F=322.011, $p < .001$) is greater than table value 4.69 at 0.1% level of significance, hence, *null hypothesis H0 4e is rejected.*

There is a significant difference between different customer segments with regard to health, environment and safety.

Table 3.37 : Differentiating Power of Each Factor in Cluster Analysis

Factor	F	Result	Hypotheses
Physical Features and Multimedia	308.679	.000	Rejected
Mobile Technology and Connectivity	309.044	.000	Rejected
Price and Payment Terms	322.011	.000	Rejected
Brand Image and Applications	199.993	.000	Rejected
Health, Environment and Safety	283.923	.000	Rejected

On applying One-way ANOVA test, computed F value identifies the significance level of cluster differences for these five criteria and shows that all factors have significant differentiating value (Table 3.37) among the clusters.

The result shows that the “price and payment terms”, “mobile technology and connectivity” and “physical feature and multimedia” emerged as highly significant differentiating factors with the highest F values. This outcome also confirms the validity of the cluster analysis.

3.12.1.4 Demographic Characteristics of Clusters/Segments

In addition to the behavioural distinctions between these segments, there are a few significant demographic-based differences as well. In terms of gender, the Cluster 1 (Voguish) group is the most male-dominated cluster of all the clusters with a distribution of 70.5 percent male and 29.5 percent female followed by Cluster III where 68 percent are male customers and 32 percent are female customers. Whereas Cluster II is female dominated with about 54% female customers and 48 % male, compared to the other two groups whose male-female percentage composition is approximately 61 to 64 percent and 36 to 39 percent respectively.

About 54% of the customers in Cluster I, *Voguish* (with highest 39% customers in 21 to 30 years age) and 33% customers of Cluster II i.e. *abstemious* (with highest 45% housewives) have monthly income above Rs. 30000. The above findings indicate that male customers of cluster I, *voguish* and cluster III, *techno savvy* relatively put strong emphasis on physical attributes, multimedia features and mobile technology, internet connectivity in their decision-making than female customers. But customers of Cluster III, *techno savvy* are also inclined towards environment, health and safety issues than customers of Cluster I. It is also evident that the female dominated Cluster II lays very low emphasis on all the five factors and followed a minimal approach in their cell phone purchase.

Another striking demographic distinction was visible in the age distribution of the sample. The cluster V had the highest percentage of cell phone customers aged up to 20 years as compared to the other four clusters. While 32 percent of the customers in cluster III were highest in number in age ranging between 41 to 50 years while the percentage ranged from 9 to 25 percent for the other four clusters. This is highly parallel to the larger number of postgraduate and professionally qualified customers in the cluster III which also has highest number of customers (43%) with monthly income more than Rs.60000. The customers of this cluster put relatively equal emphasis on Physical Attributes / Multimedia, Mobile Technology and Connectivity along with environment, health and safety aspects.

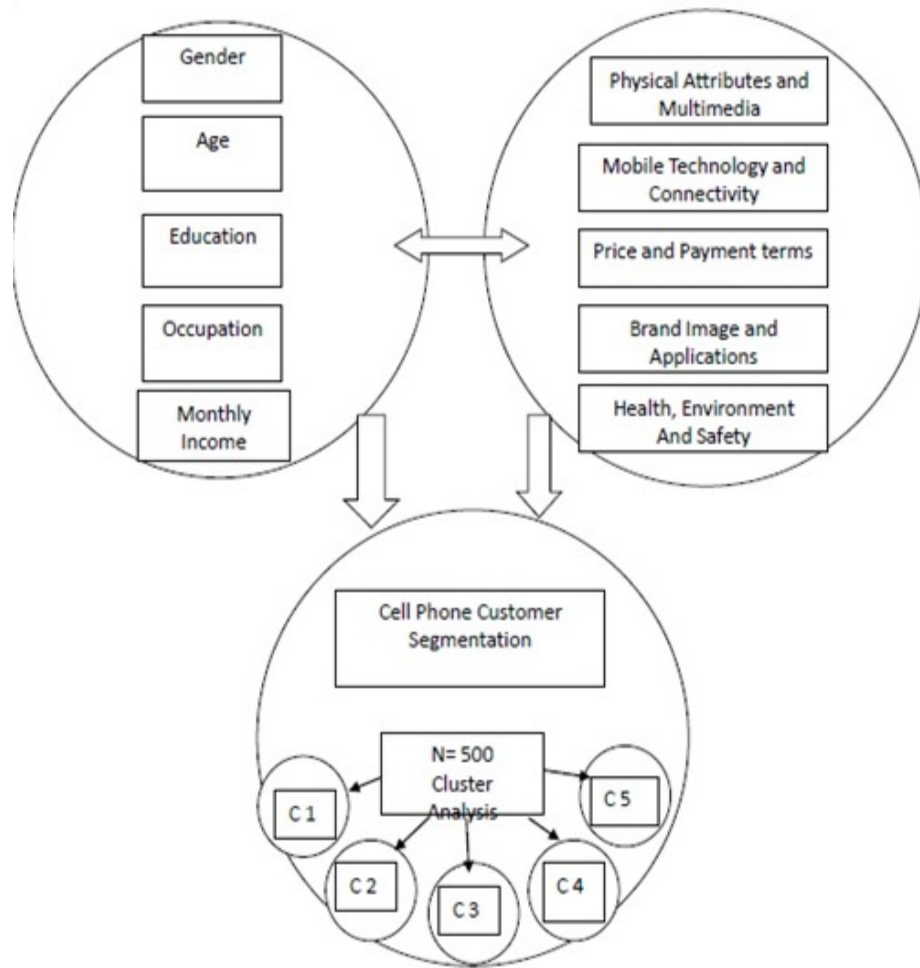
Male dominates cluster I (*Voguish*) had highest percentage of graduate customer (61.6%) and customers engaged in service as occupation (52.5%). Similar trend was evident for cluster V (*Charismatic*) largest of all the clusters with 37.5% graduate customer and 34% customers engaged in service, both being highest in their respective cluster. Male dominated Cluster V (*Charismatic*), with 66% customers having monthly income above 30000 gave highest importance to all the factors among all other cluster. Whereas another male dominated Cluster IV which has highest customers (47.3%) in age range of 31 to 40 years and second highest customers (33.3%) in Rs 15000-30000 monthly income range (after cluster I) put highest emphasis on price and payment terms as compared to other factors.

Table 3.38 : Demographic Characteristics of Clustered Cell Phone Users

N = 500	Cluster 1 n = 115	Cluster 2 n = 93	Cluster 3 n = 72	Cluster 4 n = 57	Cluster 5 n = 163
Age					
Up to 20 years	8.70	5.38	4.17	5.26	16.56
21-30 years	39.13	22.58	25.00	29.82	36.81
31-40 years	27.83	34.41	25.00	47.37	27.61
41-50 years	17.39	25.81	31.94	10.53	9.82
Above 50 years	6.96	11.83	13.89	7.02	9.20
Gender					
Male	70.54	46.24	68.06	63.64	61.49
Female	29.46	53.76	31.94	36.36	38.51
Education					
Illiterate	0.89	19.57	0.00	15.79	0.00
Less than Secondary	4.46	7.61	5.56	12.28	3.68
Secondary/ Sr. Secondary	17.86	14.13	0.00	10.53	17.18
Graduates	61.61	27.17	29.17	29.82	37.42
Post Graduates	5.36	16.30	34.72	17.54	22.70
Professionals	9.82	15.22	30.56	14.04	19.02
Occupation					
Student	20.00	0.00	12.68	7.02	24.54
Service	52.17	30.11	30.99	29.82	34.36
Business	8.70	8.60	12.68	28.07	14.72
Retired	1.74	4.30	0.00	0.00	5.52
Professional	4.35	11.83	15.49	17.54	6.75
Housewife	13.04	45.16	28.17	17.54	14.11
Monthly Income					
Less than 15000	8.70	31.18	11.11	28.07	9.20
15001-30000	36.52	23.66	23.81	33.33	24.54
30001-45000	16.52	17.20	11.11	8.77	17.18
45001-60000	17.39	16.13	11.11	5.26	17.79
More than 60000	20.87	11.83	42.86	24.56	31.29

The clusters or the customer segments discussed have their own respective characteristics and choice pattern that determines their purchase behaviour.

Marketers may consider these clusters in determining their marketing strategies.



Source: Developed by Researcher

Fig 3.25: Model of Segmentation of Cell phone Customers of Hadoti Region

3.13 Hypotheses Testing - Demographics and Factors

In order to test a non-significant difference in the concern for factors while purchasing cell phone with regard to different demographic characteristics, null hypotheses were formulated and tested.

*In all the test results * (One Star), ** (Two Star), and *** (Three Star) represent significant / highly significant difference or relationship i.e. Null Hypothesis is rejected. NS represents non-significant relationship or difference i.e. Null Hypothesis is accepted.*

3.13.1 Factors and Gender

In order to test a non-significant difference between the concern for respective extracted factor with regard to gender while purchasing cell phone, five set of null hypotheses were formulated and tested.

Z-Test was applied to test the significant difference between gender towards factors considered during purchase of cell phone. *Z-test* is a parametric test used to determine whether two population means (male and female) are significantly different when the variances are known and the sample size is large.

$$Z = \frac{|\bar{X}_1 - \bar{X}_2|}{SE}$$

Where \bar{X}_1 = Mean of first series

\bar{X}_2 = Mean of second series

SE = Standard error

$$SE = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}$$

3.13.1.1 Physical Attributes and Multimedia Vs. Gender

In order to test whether there is a non-significant difference in the concern for 'physical attributes and multimedia' while purchasing cell phone with regard to gender, null hypothesis was formulated and tested.

H0 5ga : *There is a non-significant difference in the concern for physical attributes and multimedia features while purchasing cell phone with regard to gender*

Table 3.39 : Physical Attributes and Multimedia Vs. Gender

Gender	N	Mean	SD	Z	Result
Male	309	3.38	0.83	1.24	NS
Female	191	3.28	0.98		

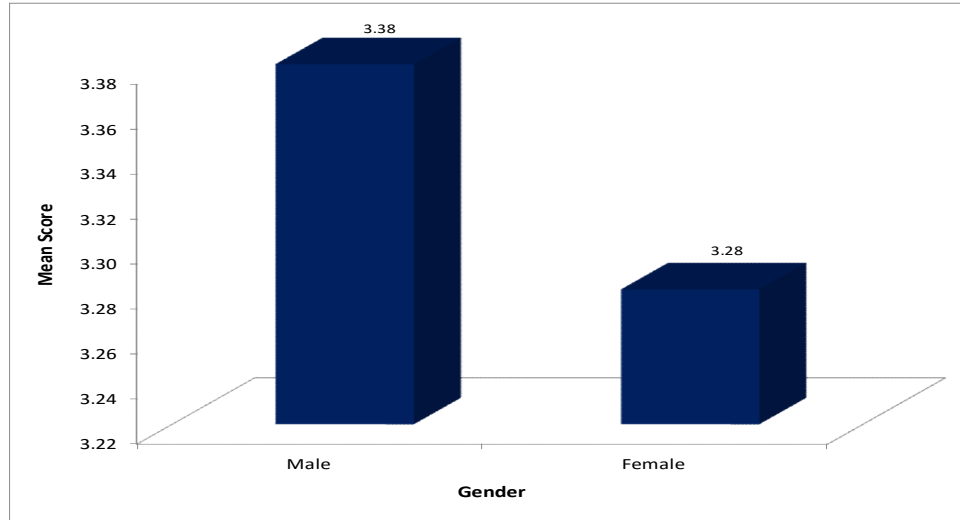


Fig. 3.26 : Physical Attributes and Multimedia Vs. Gender

Test Result

To find that whether a non-significant difference exists between the concern for physical attributes and multimedia with regard to gender of the customers, Z test has been applied to find significant difference between means of male and female respondents. As represented in table 3.39, the calculated value of Z ($Z= 1.24, p >.05$) is less than the standard value 1.96 at 5% level of significance, so the *null hypothesis H0 5ga is accepted*. Therefore, it may be interpreted that there is a non-significant difference between male and female customers towards concern for physical attributes and multimedia which is one of the major factor influencing purchase decision. Mean score shows that there is almost similar concern for physical Attributes and Multimedia among both male and female customers.

3.13.1.2 Mobile Technology and Connectivity Vs. Gender

In order to test whether there is a non- significant difference in the concern for mobile technology & connectivity with regard to gender, null hypothesis was formulated and tested.

H0 5gb : *There is a non-significant difference in the concern for mobile technology and connectivity while purchasing cell phone with regard to gender*

Table 3.40 : Mobile Technology and Connectivity Vs. Gender

Gender	N	Mean	SD	Z	Result
Male	309	3.44	0.93	2.38	*
Female	191	3.22	1.04		

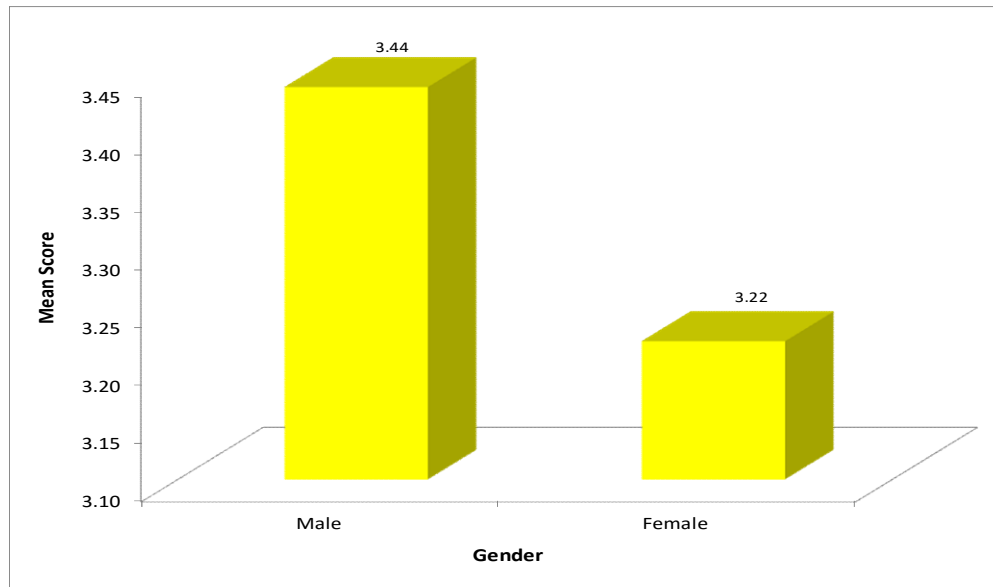


Fig. 3.27 - Mobile Technology and Connectivity Vs. Gender

Test Result

Z-test was applied to find out the significant differences between male and female customers towards Mobile Technology and Connectivity. Since the calculated value of Z ($Z=2.38$, $p<.05$) is slightly more than the standard value 1.96 at 5% level of significance. Hence, the *null hypothesis H0 5gb is rejected*.

Therefore it may be interpreted that there is a significant difference between responses of male and female customers towards Mobile Technology and Connectivity factor, an important determinant influencing purchase decision for cell phone. Mean score (Table 3.40) shows that the male customers were slightly more concerned for mobile technology and connectivity than female customers.

3.13.1.3 Price and Payment Terms Vs. Gender

In order to test whether there is a non-significant difference in the concern for price & payment terms with regard to gender, null hypothesis was formulated and tested.

H0 5gc : There is a non-significant difference in the concern for price and payment terms while purchasing a cell phone with regards to gender.

Table 3.41 : Price and Payment Terms Vs. Gender

Gender	N	Mean	SD	Z	Result
Male	309	2.93	1.08	0.70	NS
Female	191	2.85	1.17		

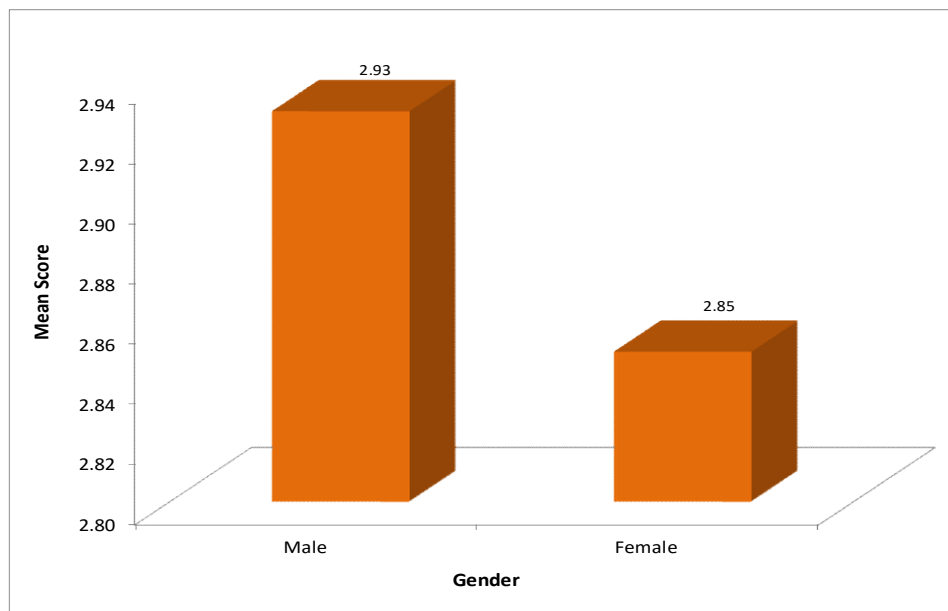


Fig. 3.28 : Price and Payment Terms Vs. Gender

Test Result

Z-test was applied to find if non-significant differences exist between male and female customers towards Price and Payment Terms. Table 3.41 shows the value of Z ($Z=0.70$, $p>.05$) is much less than the standard value 1.96 at 5% level of significance, so the *null hypothesis H0 5gc is accepted*. Therefore it may be interpreted that there is no significant difference between male and female

customers towards Price and Payment Terms which is a factor influencing purchase decision. Mean score shows that there was almost similar concern for price and payment terms among both male and female customers.

3.13.1.4 Brand Image and Applications (Apps) Vs. Gender

In order to test a non- significant difference in the concern for brand image & applications (apps) with regard to gender, null hypothesis was formulated and tested.

H0 5gd : *There is a non-significant difference in the concern for brand image & applications (apps) and while purchasing a cell phone with regard to gender*

Table 3.42: Brand Image & Applications Vs. Gender

Gender	N	Mean	SD	Z	Result
Male	309	3.14	0.89	1.70	NS
Female	191	2.99	1.08		

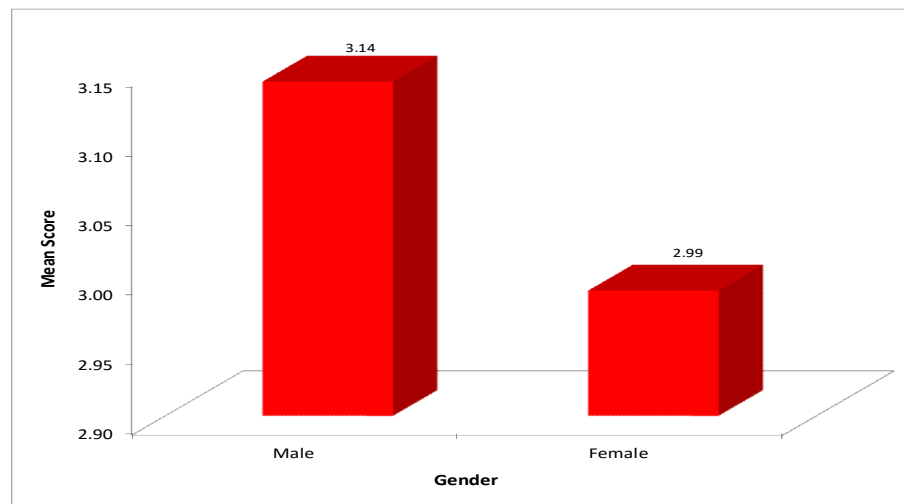


Fig. 3.29 : Brand Image and Applications (Apps) Vs. Gender

Test Result

Z-test was administered to find out the non-significant differences between male and female customers towards concern for brand image and applications (Apps) in the purchase of cell phone. Since the value of Z ($Z= 1.52, p>0.05$) is less than the standard value 1.96 at 5% level of significance, so the *null hypothesis H0 5gd is*

accepted. Therefore it may be interpreted that there is no significant difference between male and female customers towards brand image and applications which is a determinant factor influencing purchase decision for a cell phone. Mean scores also show that there is almost similar concern for brand image and applications among both male and female customers.

3.13.1.5 Health, Environment and Safety Vs. Gender

In order to test whether there is a non- significant difference in the concern for health, environment & safety with regard to gender, null hypothesis was formulated and tested

H0 5ge : *There is a non-significant difference between gender in the concern for health, environment and safety while purchasing cell phone.*

Table 3.43 : Health, Environment and Safety Vs. Gender

Gender	N	Mean	SD	Z	Result
Male	309	3.14	0.97	1.16	NS
Female	191	3.02	1.14		

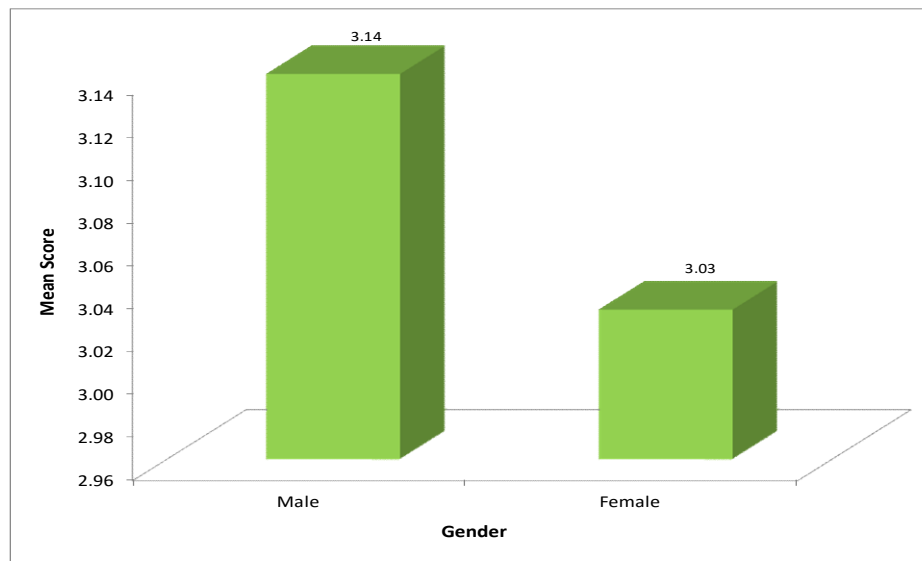


Fig. 3.30 : Health, Environment and Safety Vs. Gender

Test Result

Z-test was administered to find whether non-significant difference exist between male and female customers towards health, environment and safety factors.

Table 3.43 given above shows that the value of Z ($Z=1.15$, $p>.05$) is less than the standard value 1.96 at 5% level of significance, so the *null hypothesis H0 5ge is accepted*. Therefore it may be interpreted that there is no significant difference between responses of male and female customers towards health, environment and safety factors which influence purchase decision. Mean score shows that the male customers and female customers are almost equally concerned for health, environment and safety.

3.13.2. Factors and Age

In order to test significant difference between age in the concern for respective extracted factor while purchasing cell phone null hypotheses were formulated and tested.

One-way analysis of variance (ANOVA) has been used to determine if there exists any statistically significant difference between the means of two or more independent groups. In the present study one way ANOVA was administered to find if there is a significant difference between concerns for different factors while purchasing cell phone with regard to age.

3.13.2.1 Physical Attributes and Multimedia Vs. Age

In order to test whether a non-significant difference in the concern for physical attributes and multimedia with regard to age exists, null hypothesis was formulated and tested

H0 5aa : *There is a non-significant difference in the concern for physical attributes and multimedia features while purchasing cell phone with regard to age.*

Table 3.44: Physical Attributes and Multimedia Vs. Age

Age Group	N	Mean	SD	F	Df	Result
Up to 20 years	48	3.74	0.84	4.855	4, 495	***
21-30 years	161	3.45	0.72			
31-40 years	154	3.18	0.91			
41-50 years	89	3.21	0.90			
Above 50 years	48	3.36	1.20			

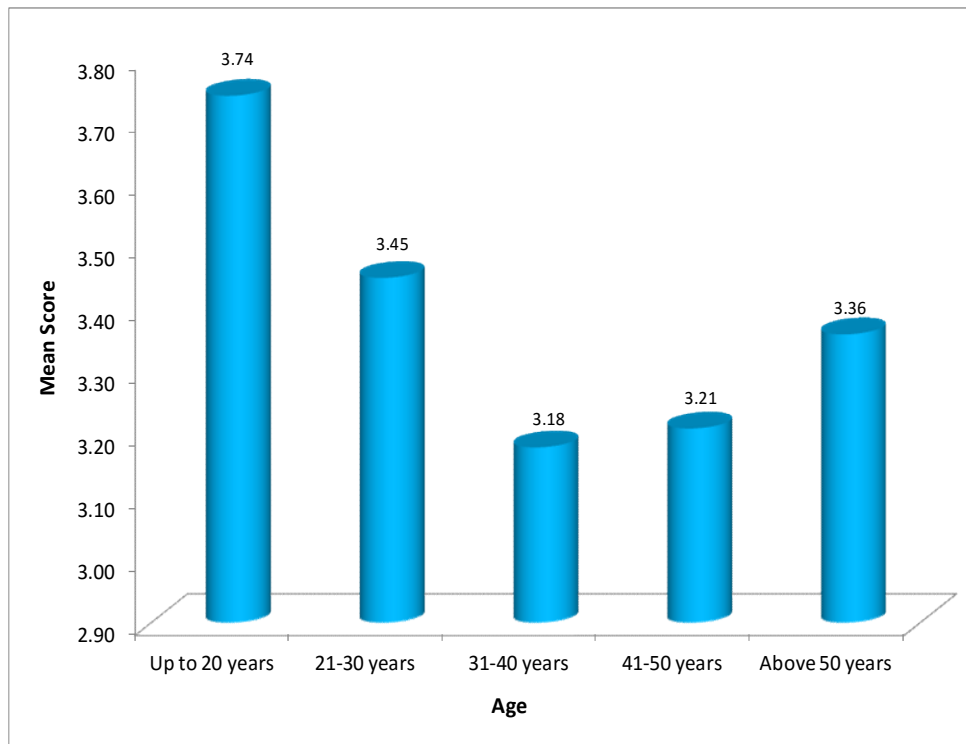


Fig. 3.31: Physical Attributes and Multimedia Vs. Age

Test Result

To test whether a non-significant difference in the concern for ‘physical attributes/multimedia’ with regard to age exists, one-way ANOVA was applied. The test result shows that the F critical table value = 4.69 at 0.1% is smaller than calculated F value (F = 4.855, $p < 0.001$) therefore *null hypothesis H0 5aa is rejected*. It can be interpreted that there is highly significant difference between

the cell phone users of different age groups towards concern for physical attributes and multimedia features.

Table 3.44 represents the mean of the concern for ‘physical attributes/multimedia’ by the customers belonging to different categories of age. It can be interpreted from the table that maximum concern for physical attributes and multimedia features in cell phone purchase decision was made by customers aged up to 20 years followed by customers aged 21-30 years and then by those above 50 years of age and in the last by those aged 41-50 years.

3.13.2.2 Mobile Technology and Connectivity Vs. Age

In order to test whether a non-significant difference in the concern for mobile technology and connectivity with regard to age exists, null hypothesis was formulated and tested

H0 5ab : There is a non-significant difference in the concern for mobile technology and connectivity while purchasing cell phone with regard to age.

Table 3.45 : Mobile Technology and Connectivity Vs. Age

Age Group	N	Mean	SD	F	Df	Result
Up to 20 years	48	3.84	0.74	4.269	4, 495	**
21-30 years	161	3.41	0.88			
31-40 years	154	3.21	0.96			
41-50 years	89	3.25	1.05			
Above 50 years	48	3.34	1.24			

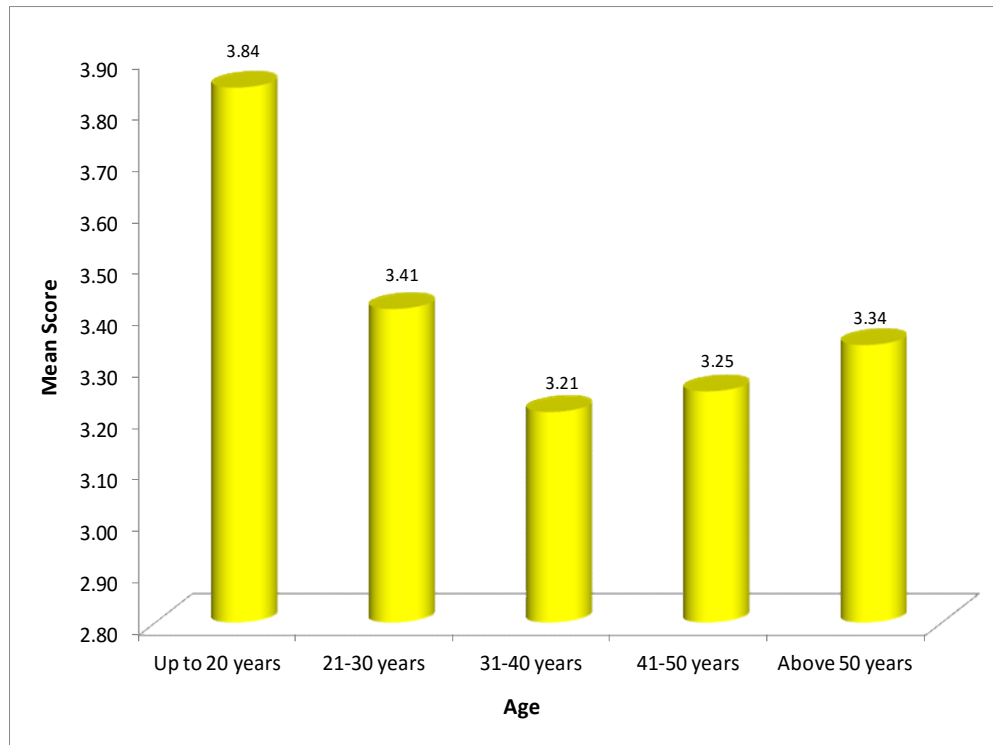


Fig. 3.32 : Mobile Technology and Connectivity Vs. Age

Test Result

Whether a non-significant difference in the concern for mobile technology and connectivity, with regard to customer age exist, was tested statistically using one-way ANOVA. The test result reveals that the F critical table value = 3.45 is smaller than calculated F value ($F = 4.269$, $p < 0.01$). Hence the *null hypothesis H₀ 5ab* is *rejected* indicating that there is a highly significant difference in the concern for mobile technology and connectivity by the respondents of different age groups.

Table 3.45 shows that the means for mobile technology and connectivity with regard to customers belonging to different categories of age. It can be interpreted from it that maximum concern for mobile technology and connectivity in cell phone purchase decision was made by customers with age upto 20 years followed by customers aged 21-30 years and then by those above 50 years and in last by those aged 41-50 years and 31-40 years.

3.13.2.3 Price and Payment Terms Vs. Age

In order to test if a non-significant difference in the concern for price & payment terms with regard to age exists, null hypothesis was formulated and tested

H0 5ac : *There is a non-significant difference in the concern for price and payment terms while purchasing cell phone with regard to age*

Table 3.46 : Price and Payment Terms Vs. Age

Age Group	N	Mean	SD	F	Df	Result
Up to 20 years	48	3.20	1.01	6.990	4, 495	***
21-30 years	161	3.14	1.01			
31-40 years	154	2.89	1.04			
41-50 years	89	2.48	1.16			
Above 50 years	48	2.62	1.41			

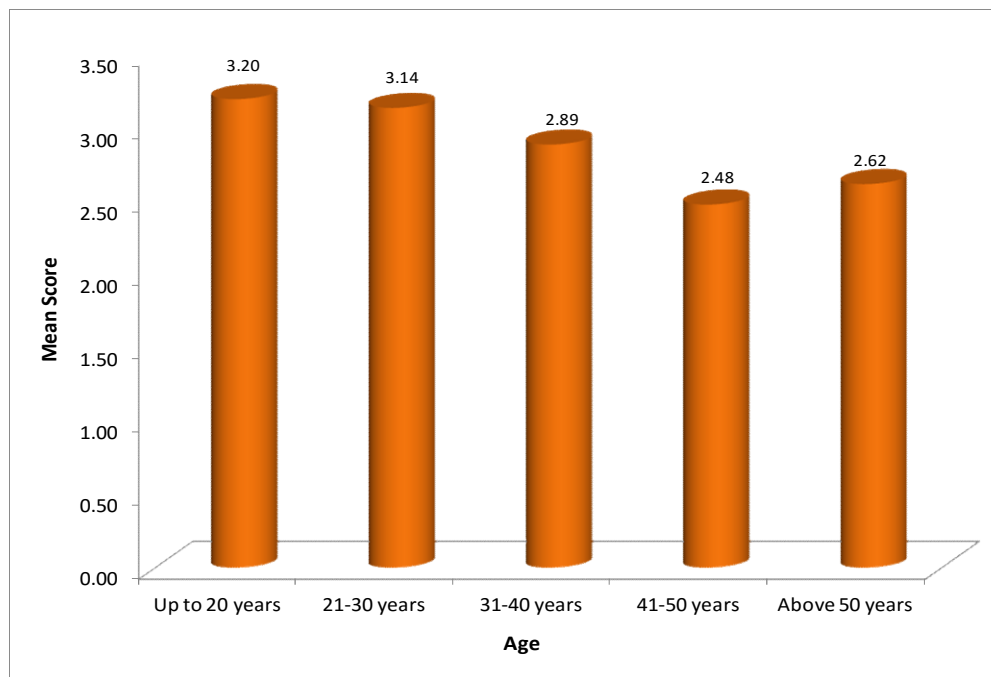


Fig 3.33: Price and Payment Terms Vs. Age

Test Results

One-way ANOVA was administered to find if a significant difference in the concern for price and payment terms during cell phone purchase with regard to age of customer exists.

The test result revealed that the F critical table value = 4.69 at 0.1% level of significance is smaller than calculated F value ($F = 6.990$, $p < 0.001$). Hence the ANOVA was highly significant, allowing *rejection of the null hypothesis H0 5ac* and indicating that there is a statistically highly significant difference between concern for price and payment terms and age of customers

Table 3.46 shows the mean of concern for price and payment terms by the customers belonging to different categories of age. It can be interpreted from it that maximum concern for price and payment terms in cell phone purchase decision was made by customers with age up to 20 years followed by customers aged 21-30 years and then by those aged 31-40 years and in last by those above 50 years and 41-50 years.

3.13.2.4 Brand Image & Applications Vs. Age

In order to test a non-significant difference in the concern for brand image & applications (apps) with regard to age, the null hypothesis was formulated and tested.

H0 5ad : *There is non-significant difference in the concern for brand image & applications while purchasing cell phone with regards to age.*

Table 3.47 : Brand Image & Applications Vs. Age

Age Group	N	Mean	SD	F	Df	Result
Up to 20 years	48	3.38	0.93	2.598	4, 495	*
21-30 years	161	3.18	0.88			
31-40 years	154	3.03	0.94			
41-50 years	89	2.93	0.96			
Above 50 years	48	2.89	1.29			

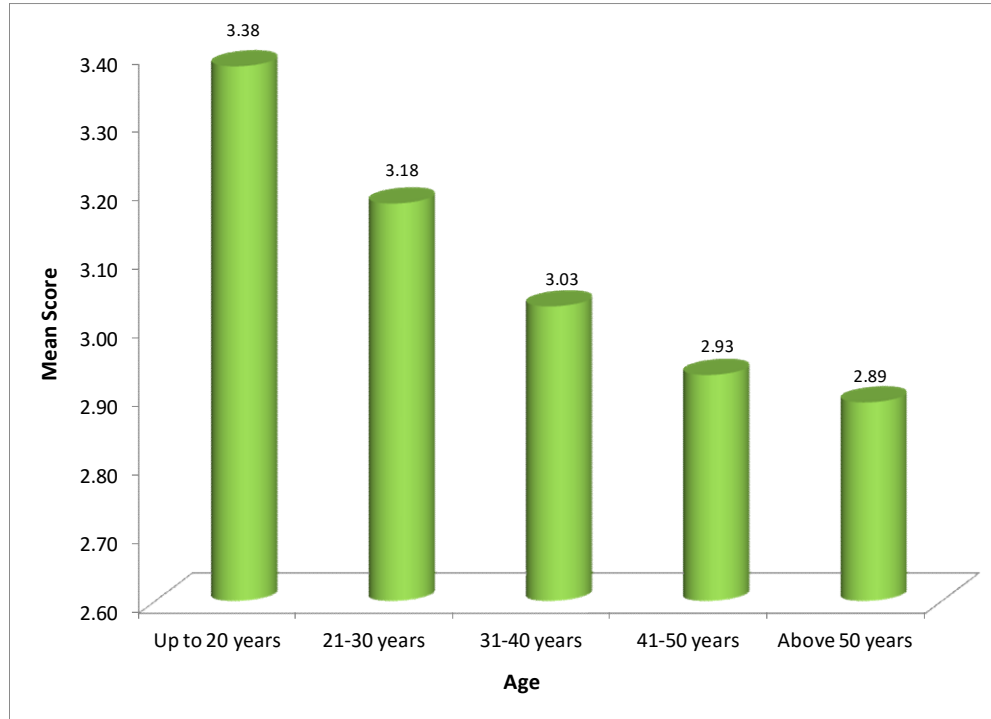


Fig. 3.34 : Brand Image & Applications Vs. Age

Test Results

Whether a non-significant difference in the concern for ‘brand image and applications’ with regard to age of customer exists was tested statistically using one-way ANOVA. The test result given above shows that the F critical table value = 2.39 at 5% significance level is smaller than calculated F value ($F = 2.598$, $p < 0.05$). The ANOVA was significant, allowing *rejection of the null hypothesis H0 5ad*. Thus it is interpreted that there exists a significant difference between concern for ‘brand image and applications’ with regard to age.

Table 3.47 given above shows the mean of concern for ‘brand image and applications’ by the customers belonging to different categories of age. It can be interpreted from it that maximum concern for brand image and applications in cell phone purchase decision was made by customers with age up to 20 years followed by customers aged 21-30 years and then by those aged 31-40 years and in last by those aged 41-50 years and above 50 years.

3.13.2.5 Health, Environment and Safety Vs. Age

In order to test if a non-significant difference in the concern for health, environment & safety with regard to age exists, null hypothesis was formulated and tested.

H0 5ae : *There is non-significant difference in the concern for health, safety and environment while purchasing cell phone with regard to age.*

Table 3.48 : Health, Environment and Safety Vs. Age

Age Group	N	Mean	SD	F	Df	Result
Up to 20 years	48	3.42	1.03	1.884	4, 495	NS
21-30 years	161	3.13	0.97			
31-40 years	154	2.98	1.04			
41-50 years	89	3.03	1.12			
Above 50 years	48	3.18	1.10			

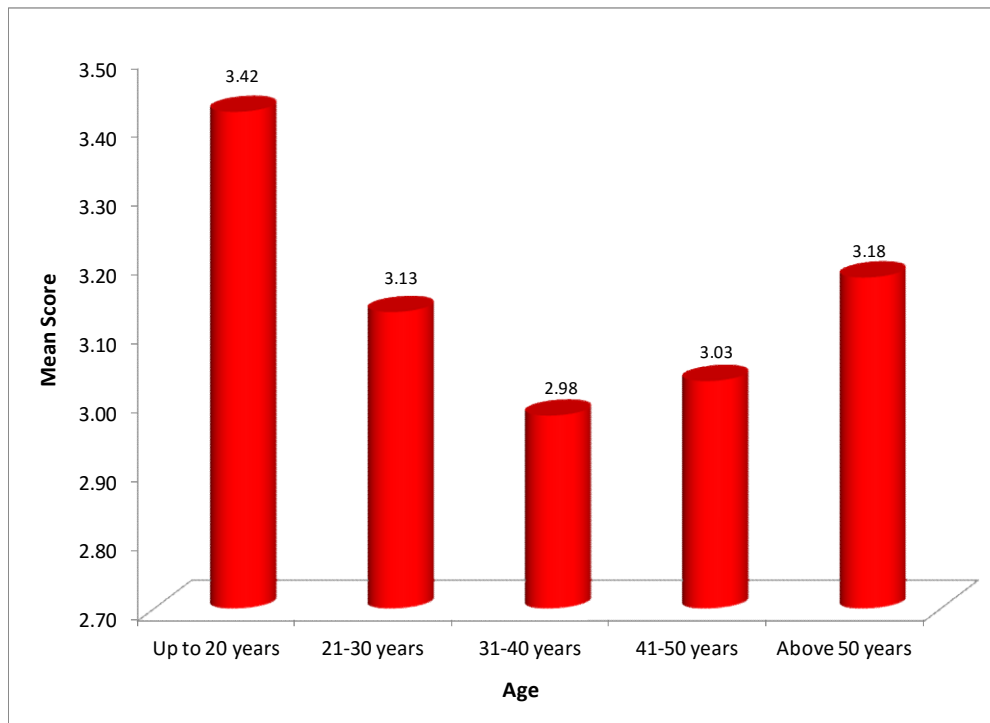


Fig.3.35 : Health, Environment and Safety Vs. Age

Test Results

One-way ANOVA was administered to statistically test whether a non-significant difference between concern for the factor *health, environment and safety* with regard to age exist. Test result given above shows that the F critical table value = 2.39 is greater than calculated F value (F=1.884, $p>0.05$). The ANOVA was non-significant allowing the *acceptance of the null hypothesis H0 5ae* indicating that there is no significant difference between concern for health, environment and safety with regard to age.

It can be noted from the table 3.48 that maximum concern for health, safety and environment as a decisive factor in cell phone purchase was made by customers aged up to 20 years followed by customers aged 21-30 years and then by those above 50 years and least priority was given to this factor by those aged 41-50 years and 31-40 years.

3.13.3 Factors and Education

In order to test whether a non-significant difference between the concern for factor with regard to education exist, null hypotheses were formulated and tested.

One-way analysis of variance (ANOVA) has been used to test the hypothesis and to determine if there exists any statistically significant difference between the means of two or more independent groups. In the present study one way ANOVA has been administered to find if there is a significant difference between concern for different factors while purchasing cell phone with regard to education.

3.13.3.1 Physical Attributes and Multimedia Vs. Education

In order to test non-significant difference in the concern for physical attributes and multimedia with regard to education, null hypothesis was formulated and tested.

H0 5ea : *There is a non-significant difference in the concern for physical attributes and multimedia features while purchasing cell phone with regard to education.*

Table 3.49 : Physical Attributes and Multimedia Vs. Education

Education	N	Mean	SD	F	Df	Result
Illiterate	28	2.47	0.83	7.589	5, 490	***
Less than Secondary	29	3.03	0.96			
Secondary/ Sr. Secondary	67	3.34	0.90			
Graduate	193	3.41	0.72			
Post Graduate	93	3.53	1.04			
Professional	86	3.39	0.92			

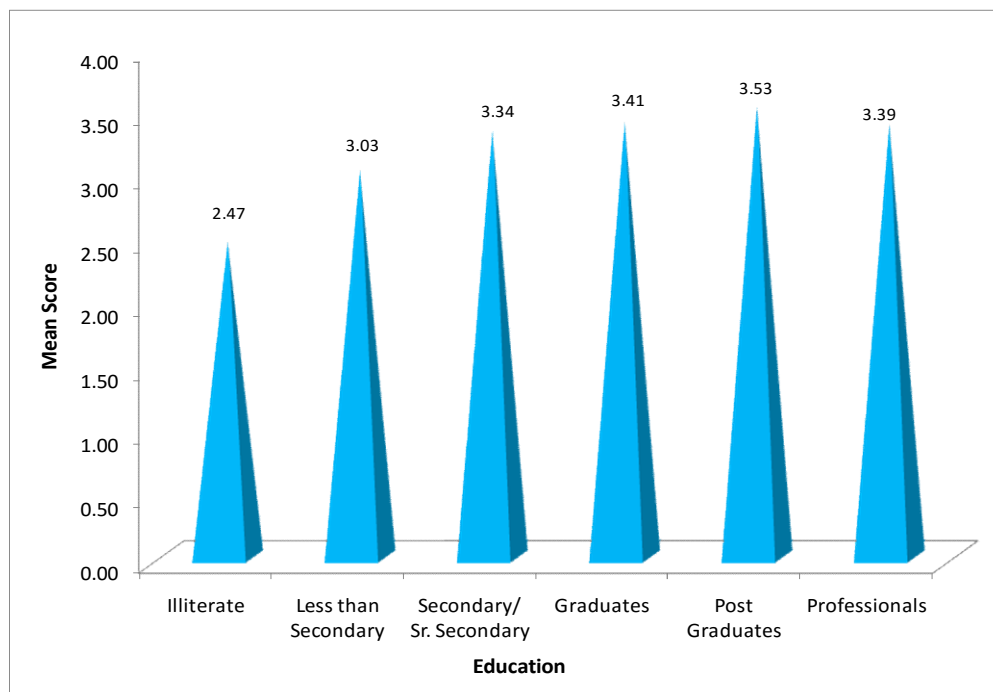


Fig. 3.36: Physical Attributes and Multimedia Vs. Education

Test Results

To find if a non-significant difference exists between concern for physical attributes/multimedia, as a factor influencing purchase decision for cell phone with regard to educational background, was tested statistically using one-way ANOVA. The test result reflects that the F critical table value = 4.18 at 0.1%

significance level is smaller than calculated F value ($F = 7.589$, $p < 0.001$). The ANOVA was highly significant allowing *rejection of null hypothesis H0 5ea*.

Thus there is a highly significant difference in the concern for physical attributes and multimedia as a factor influencing purchase decision of the respondents belonging to different educational background.

Table 3.49 shows the number of customers belonging to different distributions of education with corresponding means and it can be interpreted that maximum concern for physical attributes and multimedia in cell phone purchase decision was made by customers with post graduate education followed by graduates and professionals and then by those who were educated till secondary and senior secondary.

3.13.3.2 Mobile Technology and Connectivity and Education

In order to test non-significant difference in the concern for mobile technology & connectivity with regard to monthly income, null hypothesis was formulated and tested

H0 5eb : *There is non-significant difference in the concern for mobile technology and connectivity while purchasing cell phone with regards to education.*

Table 3.50 : Mobile Technology and Connectivity Vs. Education

Education	N	Mean	SD	F	Df	Result
Illiterate	28	1.72	0.57	26.428	5, 490	***
Less than Secondary	29	2.76	0.94			
Secondary/ Sr. Secondary	67	3.31	0.95			
Graduates	193	3.45	0.75			
Post Graduates	93	3.63	1.05			
Professionals	86	3.64	0.91			

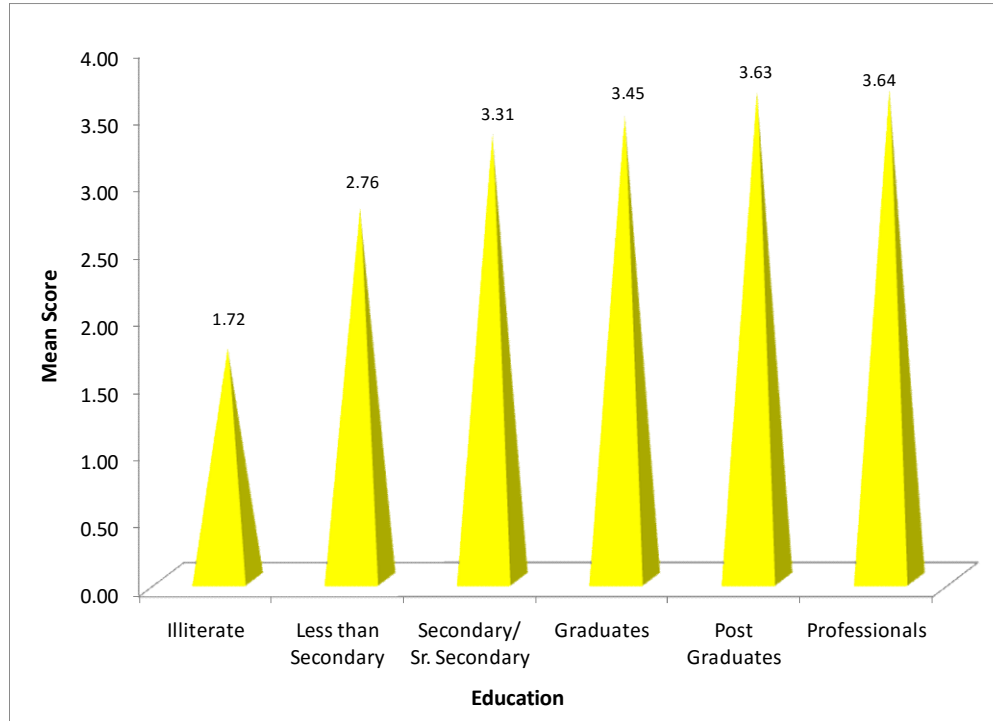


Fig. 3.37 : Mobile Technology and Connectivity Vs. Education

Test Results

On applying ANOVA test it was found that a highly significant difference in the preference given to factor 'mobile technology and connectivity' by the respondents belonging to different educational level exist since the F critical table value = 4.18 at 0.1% level of significance. is smaller than calculated F value ($F = 26.428, p < 0.001$). Hence *null hypothesis H0 5eb is rejected*. From the table 3.50 it can be clearly noted that for mobile technology and connectivity, respondents having professional education (3.64) were found to be more concerned as compared to respondents with post graduate education. It was noticed that with the decrease in educational level of customers the concern for these aspects also decreased gradually.

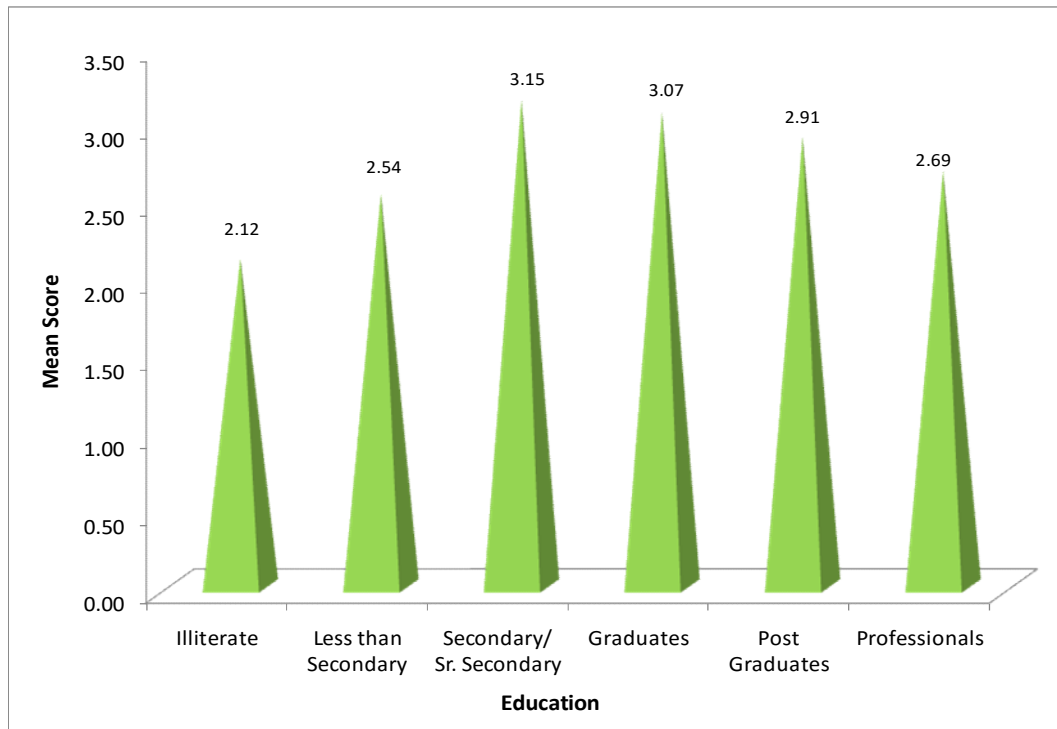
3.13.3.3 Price and Payment Terms Vs. Education

In order to test a non-significant difference between the concern for price & payment terms with regard to education, null hypothesis was formulated and tested.

H0 5ec : There is a non-significant difference in the concern for price and payment terms while purchasing cell phone with regard to education.

Table 3.51 : Price and Payment Terms Vs. Education

Education	N	Mean	SD	F	Df	Result
Illiterate	28	2.12	1.03	5.738	5, 490	***
Less than Secondary	29	2.54	1.11			
Secondary/ Sr. Secondary	67	3.15	1.07			
Graduates	193	3.07	0.94			
Post Graduates	93	2.91	1.29			
Professionals	86	2.69	1.21			



3.38 : Price and Payment Terms Vs. Education

Test Results

To test if a non-significant difference between price and payment terms, as a factor influencing purchase decision for cell phone and educational level of respondents exists, one-way ANOVA was applied. F critical table value = 4.18 at 0.1% level of significance is smaller than calculated F value ($F = 5.738$, $p < 0.001$). Thus ANOVA result was found highly significant; the effect size was strong, allowing *rejection of the null hypothesis H0 5ec*. It reflects that a statistically highly significant difference between concern for ‘price and payment terms’ with regard to education of customers exist.

Table 3.51 shows the number of customers belonging to different educational background. It can be interpreted from the corresponding value of mean that maximum concern for price and payment terms in cell phone purchase decision was made by customers with secondary or senior secondary education followed by graduate customers and then by post graduate and customers having professional education.

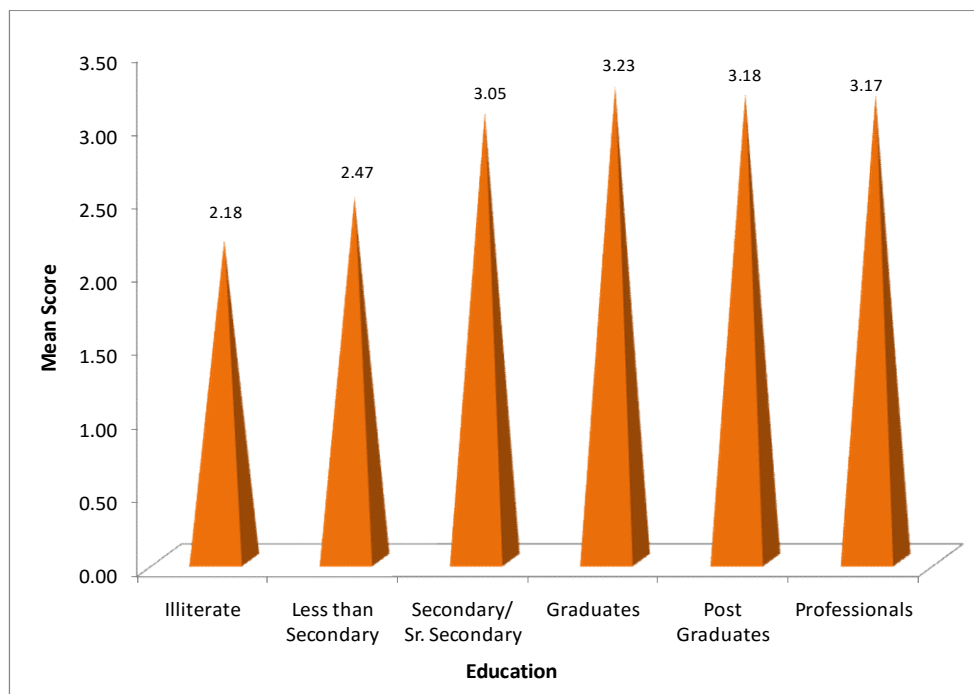
3.13.3.4 Brand Image and Applications Vs. Education

In order to test whether a non-significant difference between concern for brand image & applications (apps) with regard to education exists while purchasing cell phone, null hypothesis was formulated and tested.

H0 5ed : There is a non-significant difference in the concern for brand image & applications and while purchasing cell phone with regard to education.

Table 3.52 : Brand Image and Applications Vs. Education

Education	N	Mean	SD	F	Df	Result
Illiterate	28	2.18	0.68	9.147	5, 490	***
Less than Secondary	29	2.47	1.02			
Secondary/ Sr. Secondary	67	3.05	0.93			
Graduates	193	3.23	0.85			
Post Graduates	93	3.18	1.11			
Professionals	86	3.17	0.95			



3.39 : Brand Image and Applications Vs. Education

Test Results

Whether a non-significant difference between concern for 'Brand Image and Applications with regard to education level of customers exists was tested statistically using one-way ANOVA. The test results reflected that the critical table value = 4.18 at 0.1% is smaller than calculated F value ($F=9.147$, $p<0.001$) indicating that the ANOVA is highly significant allowing *rejection of the null hypothesis H0*. Thus it can be interpreted that a significant difference in the concern for 'Brand Image and Applications with regard to educational level of customers exist.

Table 3.52 represents the number of customers belonging to different educational background with their means representing concern for the factor brand Image and Applications. It can be interpreted from it that maximum concern for Brand Image and Applications in cell phone purchase decision is showed by graduate customers and then by post graduate customers closely followed by professionally educated customers and then by customers educated till Secondary/Sr. secondary.

3.13.3.5 Health, Environment and Safety Vs. Education

In order to test if a non-significant difference between concern for ‘health, environment & safety’ with regard to education exists while purchasing cell phone, null hypothesis was formulated and tested

H0 See: There is a non-significant difference in the concern for health, environment and safety while purchasing cell phone with regard to education.

Table 3.53 : Health, Environment and Safety Vs. Education

Education	N	Mean	SD	F	df	Result
Illiterate	28	2.00	0.61	9.355	5, 490	***
Less than Secondary	29	3.00	1.11			
Secondary/ Sr. Secondary	67	3.13	1.16			
Graduate	193	3.03	0.94			
Post Graduate	93	3.41	1.04			
Professional	86	3.28	1.01			

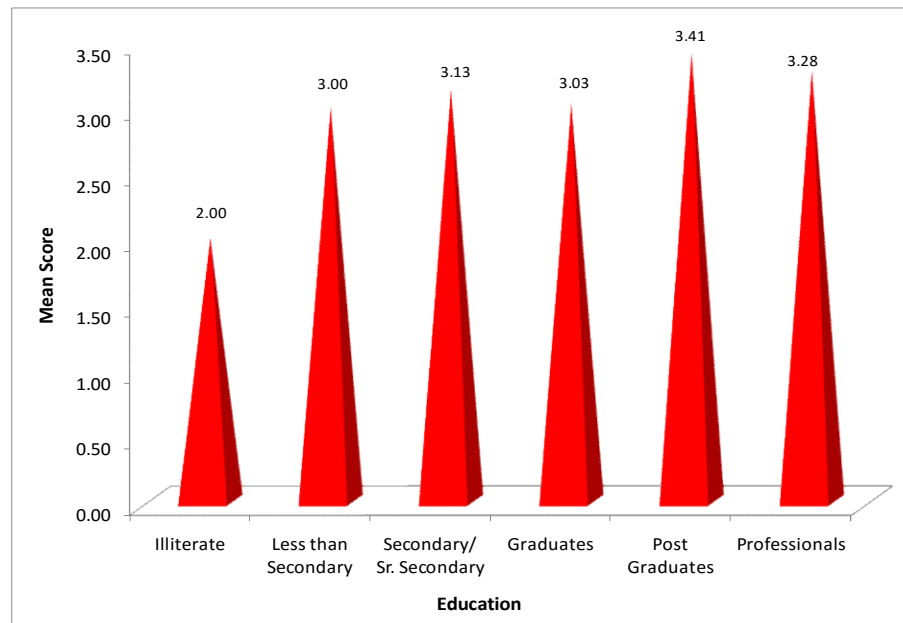


Fig. 3.40 : Health, Environment and Safety Vs. Education

Test Results

On applying ANOVA test, the result reflects that the F critical table value = 4.18 at 0,1% level of significance is smaller than calculated F value ($F = 9.355$, $p < 0.001$). Thus the *null hypothesis H0 5ee is rejected* interpreting that a highly significant difference exists in the concern given by respondents having different educational qualifications to the factor 'health, environment and safety' during cell phone purchase.

From the table 3.53 it can be clearly noted that concern for 'health, environment and safety' factors was found to be more among post graduate customers compared to professionally qualified ones. It can also be seen that they were closely followed by Secondary/Sr. secondary educated and graduate customers.

3.13.4 Factors and Occupation

In order to test if a non-significant difference between the concern for respective extracted factor and occupation exists while purchasing cell phone, null hypotheses were formulated and tested.

One-way analysis of variance (ANOVA) has been used to test the hypothesis and to determine if there exists any statistically significant difference between the means of two or more independent groups. In the present study one way ANOVA has been administered to find if there is a significant difference between concern for different factors while purchasing cell phone with regard to occupation.

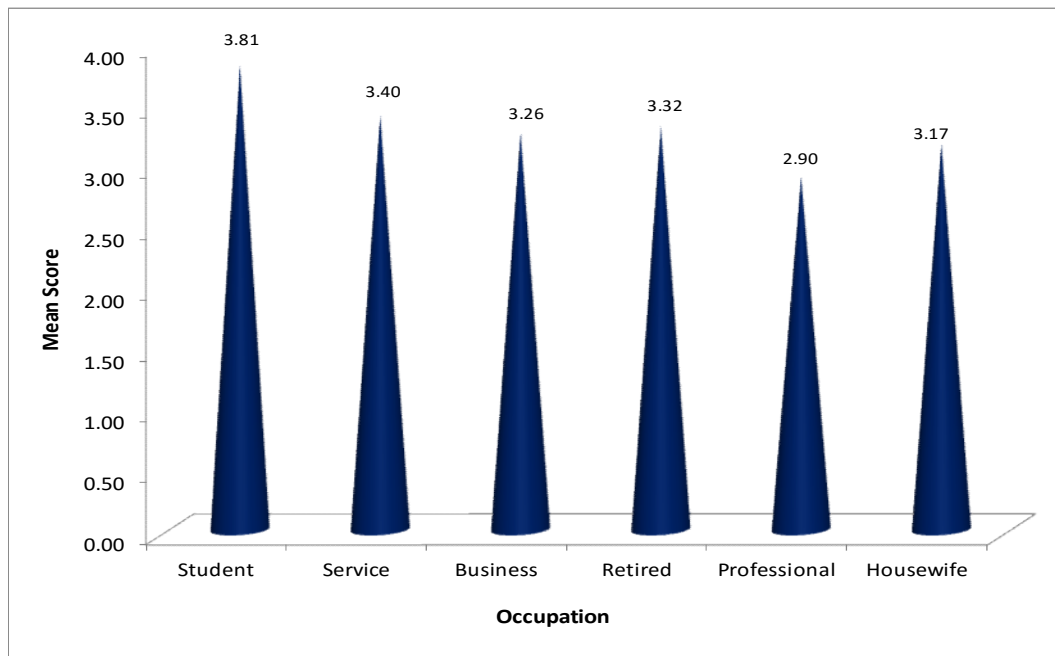
3.13.4.1 Physical Attributes and Multimedia Vs. Occupation

In order to test whether a non-significant difference between the concern for 'physical attributes and multimedia' with regard to occupation exists while purchasing cell phone exist, five set of null hypotheses were formulated and tested.

H0 5oa : There is non-significant difference in the concern for physical attributes and multimedia features while purchasing cell phone with regards to occupation

Table 3.54 : Physical Attributes and Multimedia Vs. Occupation

Occupation	N	Mean	SD	F	df	Result
Student	76	3.81	0.53	8.118	5, 493	***
Service	183	3.40	0.84			
Business	67	3.26	0.88			
Retired	15	3.32	1.38			
Professional	48	2.90	0.97			
Housewife	110	3.17	0.93			



3.41 : Physical Attributes and Multimedia Vs. Occupation

Test Results

To test if a significant difference between concern for 'Physical Attributes and Multimedia' with regard to occupation exists, one-way ANOVA was applied on

the data. The results show that the F critical table value = 4.18 at 0.1% level of significance is smaller than calculated F value (F=8.118, $p < 0.001$) allowing *rejection of the null hypothesis H0 5oa*. Thus it can be interpreted that there exists a highly significant difference between the concern for ‘Physical Attributes and Multimedia’ by the respondents engaged in different occupation.

It can be concluded from the table 3.54 that maximum concern for Physical Attributes and Multimedia in cell phone purchase decision was made by student customers followed by customers in service then by those who were retired closely followed by those engaged in business then by housewives and least by professionals.

3.3.4.2 Mobile Technology and Connectivity Vs. Occupation

In order to test whether a non-significant difference between the concern for mobile technology & connectivity with regard to occupation exists while purchasing cell phone, null hypothesis was formulated and tested.

H0 5ob : There is a non-significant difference in the concern for mobile Technology and connectivity and occupation while purchasing cell phone with regard to occupation.

Table 3.55 : Mobile Technology and Connectivity Vs. Occupation

Occupation	N	Mean	SD	F	df	Result
Student	76	3.88	0.55	8.454	5, 493	***
Service	183	3.42	0.96			
Business	67	3.23	0.91			
Retired	15	3.48	1.12			
Professional	48	3.15	1.03			
Housewife	110	3.02	1.05			

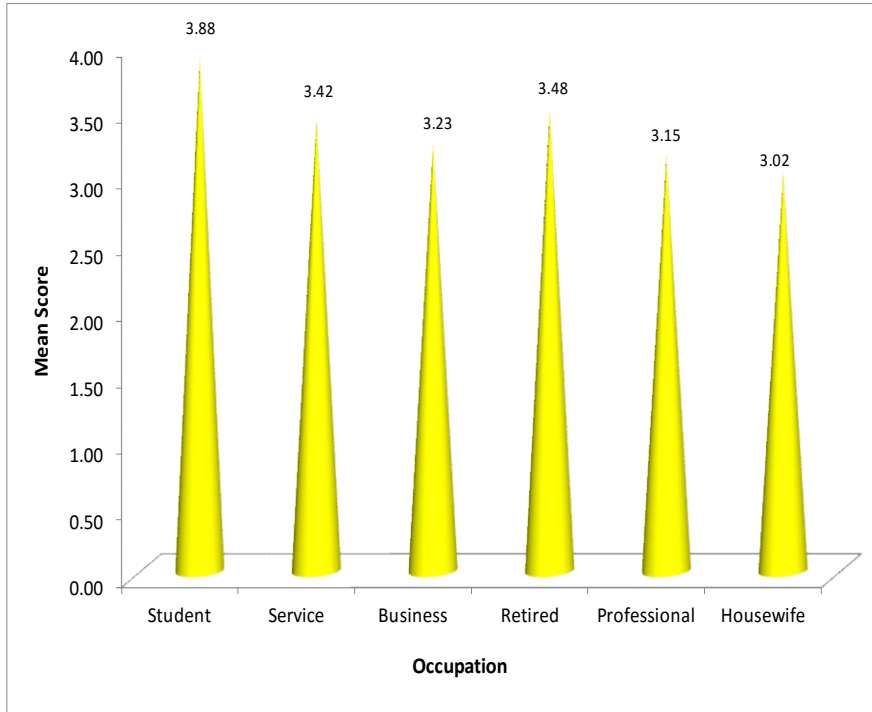


Fig. 3.42 : Mobile Technology and Connectivity Vs. Occupation

Test Results

On applying ANOVA test it was found that the F critical table value = 4.18 at 0.1%, is smaller than calculated F value ($F = 8.454$, $p < 0.001$) allowing *rejection of the null hypothesis*, **H0 5ob**. Further, indicating that there is a highly significant difference between concern for factor ‘mobile technology and connectivity’ with regard to occupation

From the table 3.55 it can be noticed that for mobile technology and connectivity, customers who were students came out to be more concerned as compared to respondents who were retired or engaged in service occupation. Housewives seem to be least concerned for this factor during purchase of cell phone. They were preceded by professionals.

3.13.4.3 Price and Payment Terms Vs. Occupation

In order to test a non-significant difference between the concern for ‘price & payment terms’ with regard to occupation while purchasing cell phone, null hypothesis was formulated and tested.

H0 5oc : There is a non-significant difference in the concern for price and payment terms while purchasing cell phone with regards to occupation.

Table 3.56 : Price and Payment Terms Vs. Occupation

Occupation	N	Mean	SD	F	df	Result
Student	76	3.36	0.87	6.977	5, 493	***
Service	183	2.90	1.05			
Business	67	3.09	1.06			
Retired	15	3.42	1.69			
Professional	48	2.57	1.18			
Housewife	110	2.55	1.15			

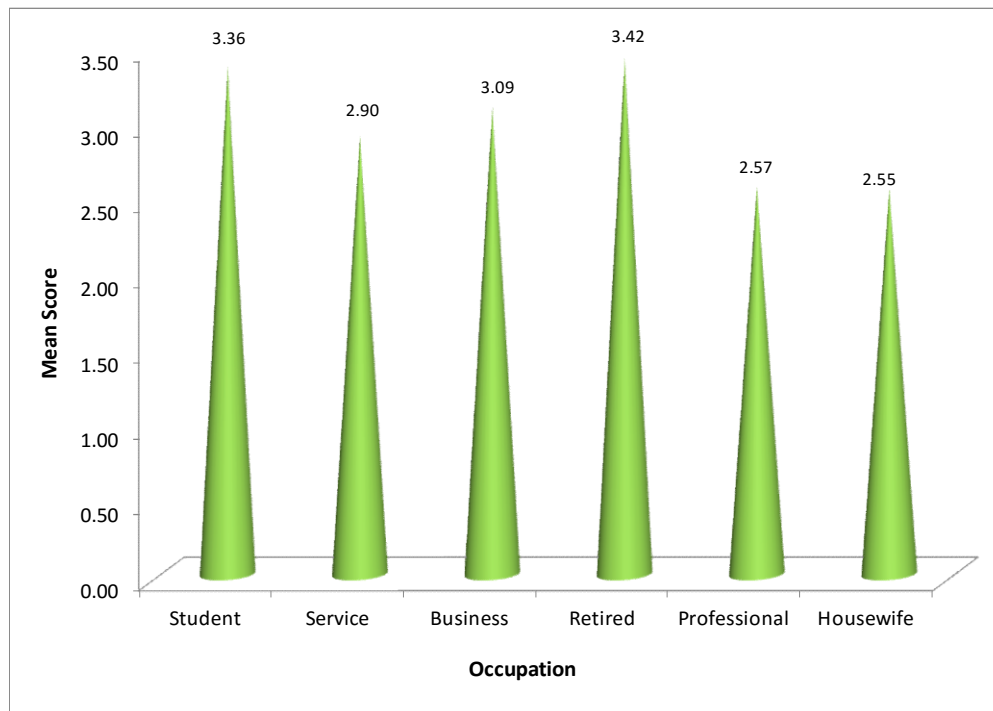


Fig.3.43: Brand Image and Applications Vs. Occupation

Test Results

To test if a non-significant difference between concern for ‘price and payment terms’ with regard to occupation exists, one-way ANOVA was applied on the data. The test result showed that the F critical value found in the ANOVA table value = 4.18 at 0.1% level of significance is smaller than calculated F value (F=6.977, $p < 0.001$). The ANOVA was highly significant allowing *rejection of the null hypothesis H0 5od*. It was interpreted that there is a highly significant difference between the concern for price and payment terms with regard to occupation.

It can be concluded from the table 3.56 that maximum concern for ‘price and payment terms’ in cell phone purchase decision was made by customers who were retired followed by students and then by those who were engaged in business closely followed by those engaged in service then by professionals and least by housewives.

3.13.4.4 Brand Image and Applications Vs. Occupation

In order to test a non-significant difference between concern for brand image & applications (apps) with regard to occupation while purchasing cell phone, null hypothesis was formulated and tested

H0 5od : There a is non-significant difference in the concern for Brand Image and applications and occupation while purchasing cell phone with regard to occupation.

Table 3.57 : Brand Image and Applications Vs. Occupation

Occupation	N	Mean	SD	F	df	Result
Student	76	3.38	0.63	7.162	5, 493	***
Service	183	3.17	0.95			
Business	67	3.21	0.96			
Retired	15	3.58	1.27			
Professional	48	2.74	0.94			
Housewife	110	2.73	1.04			

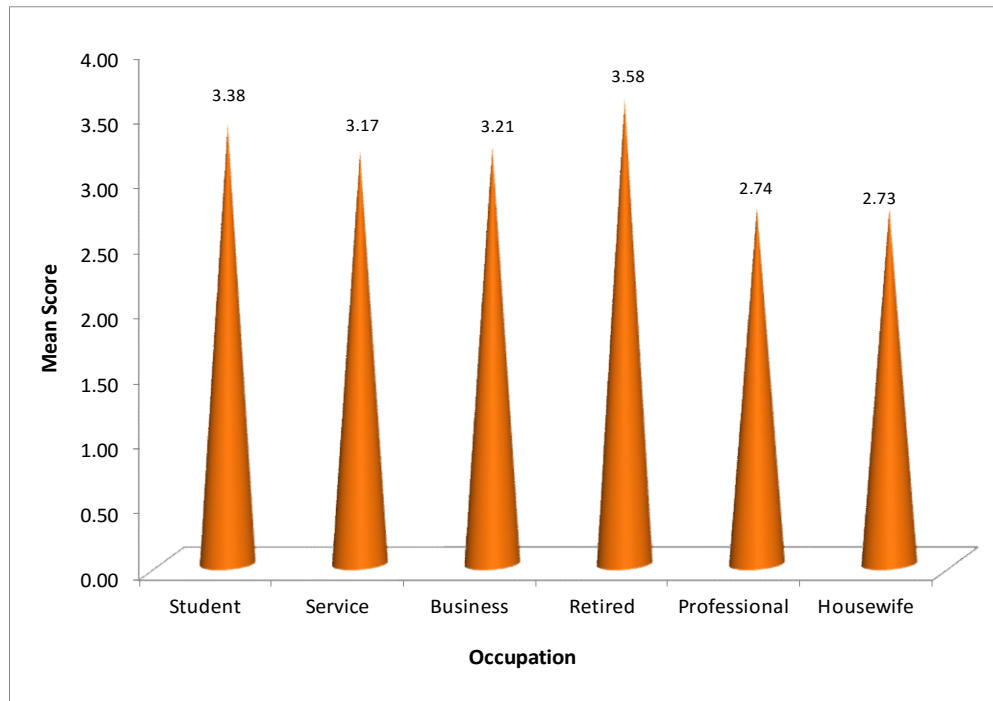


Fig 3.44: Brand Image and Applications Vs. Occupation

Test Results

To test if a non-significant difference lies between Brand Image and Applications was tested statistically by applying one-way ANOVA on data. As a result of ANOVA test the *null hypothesis H₀ 5od is rejected* since the F critical table value = 4.18 at 0.1% level of significance was smaller than calculated F value (F= 7.162, p<0.001) indicating a highly significant difference in the preference given to 'brand image and applications' with regard to occupation.

It is clearly noticeable from the table 3.57 that for factor 'Brand Image and Applications' influencing purchase decision of cell phone, retired respondents were found to be more concerned as compared to students and those engaged in service. This factor is given least priority by professionals and housewives.

3.13.4.5 Health, Environment and Safety Vs. Occupation

In order to test a non-significant difference between concern for health, environment & safety with regard to occupation while purchasing cell phone, null hypothesis was formulated and tested.

H0 5oe: *There is non-significant difference in the concern for health, environment and safety while purchasing cell phone with regard to occupation.*

Table 3.58 : Health, Environment and Safety Vs. Occupation

Occupation	N	Mean	SD	F	df	Result
Student	76	3.46	0.90	4.482	5,493	***
Service	183	3.12	0.94			
Business	67	3.14	1.02			
Retired	15	3.47	1.25			
Professional	48	2.96	1.11			
Housewife	110	2.79	1.15			

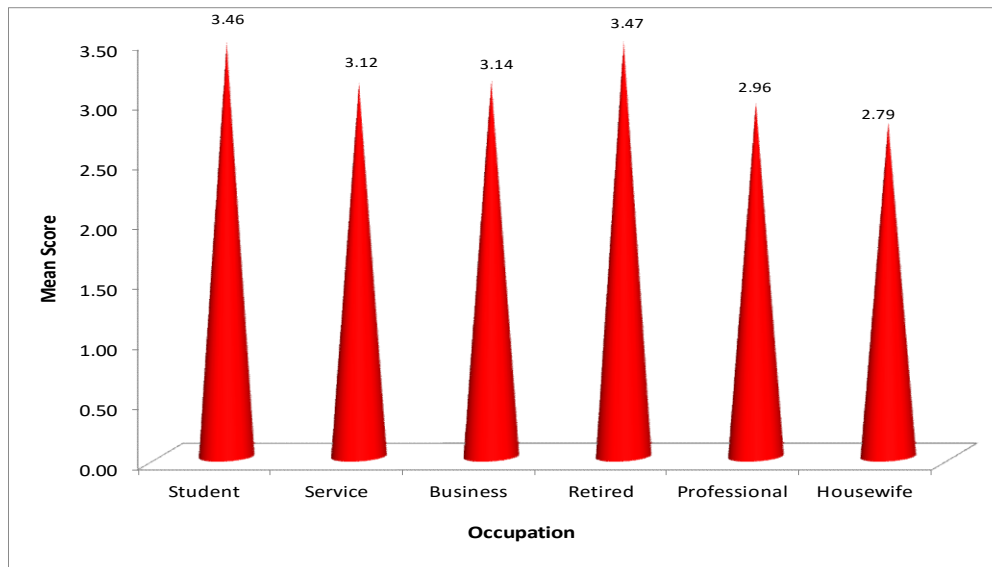


Fig. 3.45 : Health, Environment and Safety Vs. Occupation

Test Results

ANOVA test was applied to find if a non-significant difference between the factor health, environment and safety and occupation exists. The test result shows that the F critical value found in the ANOVA table = 4.18 at 0.1% level of significance is smaller than calculated F value ($F=4.482$, $p<0.001$). Thus the *rejection of null hypothesis H₀* was allowed, indicating a statistically significant difference between concern for 'health, environment and safety' with regard to occupation.

Table 3.58 shows the number of customers engaged in different occupation with corresponding mean for 'health, environment and safety'. It can be interpreted from it that maximum concern for health, environment and safety in cell phone purchase decision was almost equally made by retired customers and students. They were followed by customers engaged in business. and then engaged in service. Professional came out to be least concerned about this factor after housewives.

3.13.5 Factors and Monthly Income

In order to test a non-significant difference between the concern for respective extracted factors with regard to monthly income while purchasing cell phone, null hypotheses were formulated and tested.

One-way analysis of variance (ANOVA) has been used to determine if there exists any statistically significant difference between the means of two or more independent groups. In the present study one way ANOVA was administered to find if there is a significant difference between concern for different factors while purchasing cell phone with regard to monthly income.

3.13.5.1 Physical Features and Multimedia and Monthly Income

In order to test a non-significant difference between the concern for physical attributes and multimedia with regard to monthly income while purchasing cell phone null hypothesis was formulated and tested.

H0 5ia : There is a non-significant difference in the concern for physical features and multimedia while purchasing cell phone with regard to monthly income.

Table 3.59 : Physical Features and Multimedia Vs. Monthly Income

Income	N	Mean	SD	F	df	Result
Less than 15000	77	3.06	1.06	5.205	4, 486	***
15001-30000	138	3.25	0.87			
30001-45000	75	3.29	0.72			
45001-60000	74	3.37	0.84			
More than 60000	127	3.61	0.90			

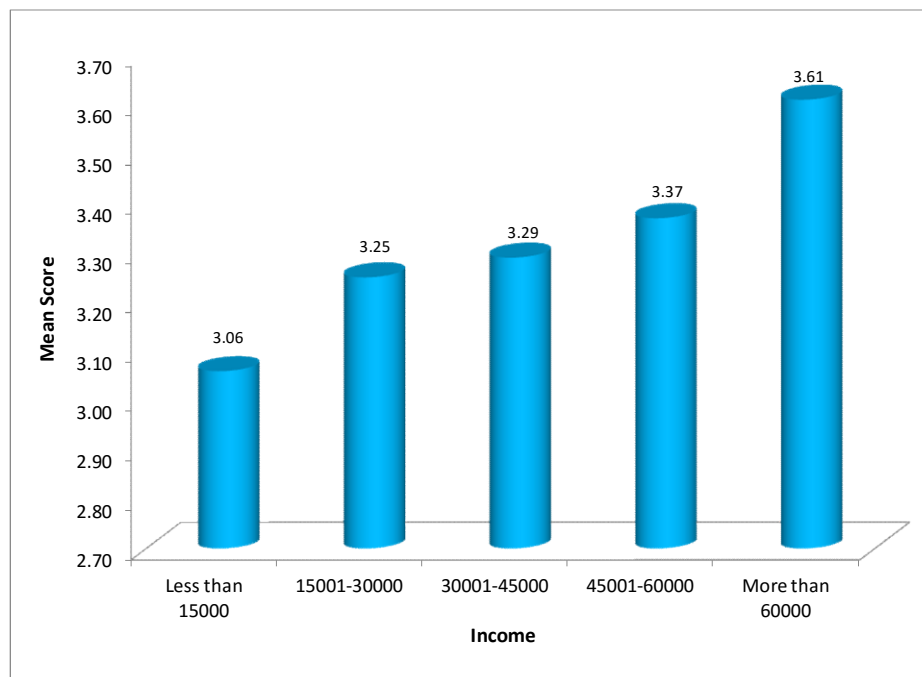


Fig. 3.46 : Physical Features and Multimedia Vs. Monthly Income

Test Result

Statistical tool one-way ANOVA was used to test if a non-significant difference between physical attributes/multimedia with regard to monthly income exists. The test result shows the F critical table value = 4.70 at 0.1% significance is smaller than calculated F value (F =5.205, $p < 0.001$), allowing *rejection of the null*

hypothesis, H0 5ia. Thus, it can be concluded that a significant difference between concern for physical attributes/multimedia with regard to monthly income exists.

Table 3.59 represents the number of customers belonging to different categories of monthly income with their corresponding means. It can be interpreted from it that maximum concern for physical attributes/multimedia in cell phone purchase decision is made by customers with monthly income more than Rs.60000 followed by customers having monthly income between Rs.45001 and Rs.60000. It was noted that as the monthly income of respondents declined so as the concern for this factor in purchase decision declines.

3.13.5.2 Mobile Technology and Connectivity Vs. Monthly Income

In order to test a non-significant difference between the concern for mobile technology & connectivity with regard to monthly income while purchasing cell phone, null hypothesis was formulated and tested

H0 5ib : *There is a non-significant difference in the concern for mobile technology and connectivity while purchasing cell phone with regard to monthly income.*

Table 3.60 : Mobile Technology and Connectivity Vs. Monthly Income

Income	N	Mean	SD	F	df	Result
Less than 15000	77	2.75	1.21	13.012	4, 486	***
15001-30000	138	3.29	0.90			
30001-45000	75	3.31	0.88			
45001-60000	74	3.50	0.78			
More than 60000	127	3.69	0.89			

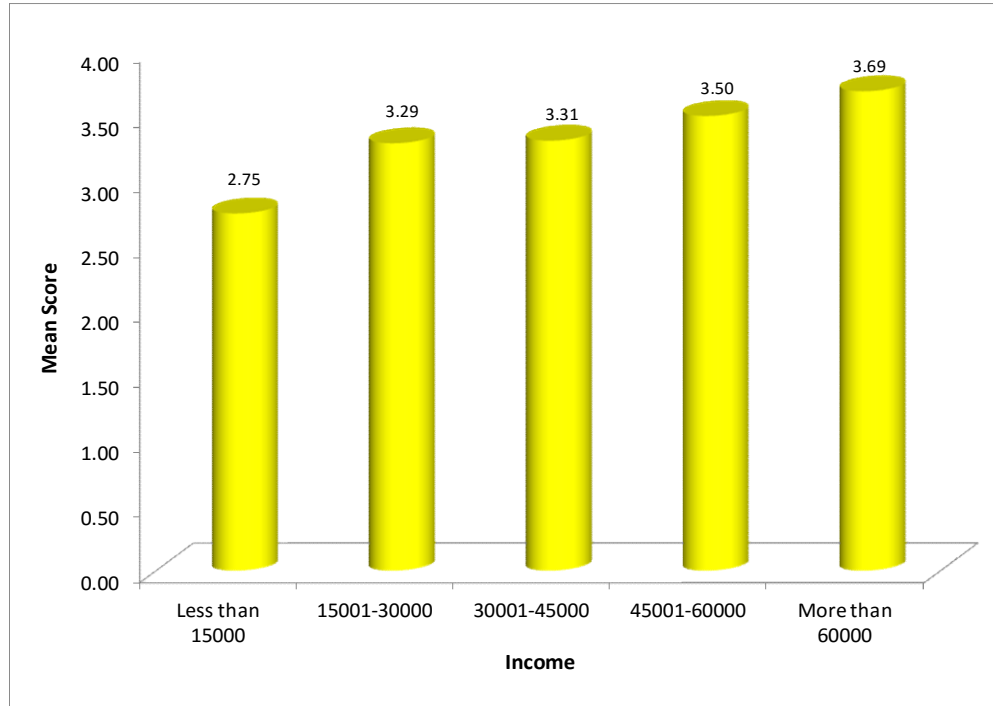


Fig. 3.47: Mobile Technology and Connectivity Vs. Monthly Income

Test Results

To test if a non-significant difference between ‘mobile technology and connectivity’ and income exists, statistical tool one-way ANOVA was applied.

It was concluded from the test results that the F critical table value = 4.70 at 0.1% is smaller than calculated F value ($F = 13.012$, $p < 0.001$) allowing *rejection of null hypothesis*, **H0 5ib** and indicating that a highly significant difference between physical attributes/multimedia and monthly income exists.

Table 3.60 represents the number of customers belonging to different income levels with their means. It can be interpreted from it that maximum concern for mobile technology and connectivity in cell phone purchase decision is made by customers with monthly income more than Rs.60000 followed by customers having monthly income between Rs.45001 and 60000. It can be noted that as the monthly income of respondents declines, so the concern for this factor in purchase decision declines.

3.13.5. 3 Price and Payment Terms Vs. Monthly Income

In order to test a non-significant difference between the concern for price & payment terms with regard to monthly income while purchasing cell phone, null hypothesis was formulated and tested.

H0 5ic : *There is a non-significant difference in the concern for price and payment terms while purchasing cell phone with regards to monthly income.*

Table 3.61 : Price and Payment Terms Vs. Monthly Income

Income	N	Mean	SD	F	df	Result
Less than 15000	77	2.49	1.15	3.973	4, 486	**
15001-30000	138	2.93	0.97			
30001-45000	75	2.88	1.01			
45001-60000	74	3.13	1.15			
More than 60000	127	3.05	1.23			

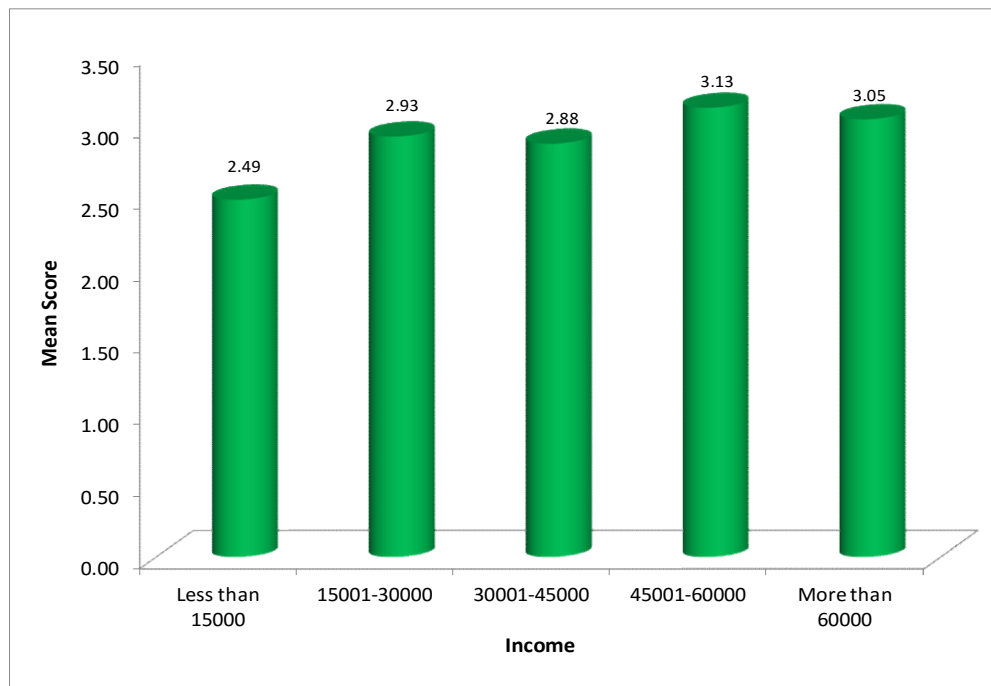


Fig. 3.48 : Price and Payment Terms Vs. Monthly Income

Test Results

To test if a non-significant difference between ‘price and payment terms’ and monthly income exists, one-way ANOVA was applied on the data. It can be interpreted from the test results that the F critical table value = 3.36 is smaller than the calculated F value (F=3.973, p<0.01). The ANOVA was significant allowing *rejection of the null hypothesis H0 5ic*. Thus, it can be concluded that there is a significant difference between concern for ‘price and payment terms’ with regard to monthly income.

It can be noted from the means in the table 3.61 that maximum concern for price and payment terms in cell phone purchase decision is made by customers having monthly income between Rs.45001 and 60000 followed by those having monthly income more than Rs. 60000.

3.13.5.4 Brand Image & Applications Vs. Monthly Income

In order to test a non-significant difference between concern for brand image & applications (apps) with regard to monthly income while purchasing cell phone, null hypothesis was formulated and tested.

H0 5id : There is a non-significant difference in the concern for brand image and applications while purchasing cell phone with regard to monthly income

Table 3.62 : Brand Image & Applications Vs. Monthly income

Income	N	Mean	SD	F	df	Result
Less than 15000	77	2.61	1.00	9.054	4, 486	***
15001-30000	138	3.10	0.82			
30001-45000	75	3.09	0.91			
45001-60000	74	3.02	0.96			
More than 60000	127	3.42	1.03			

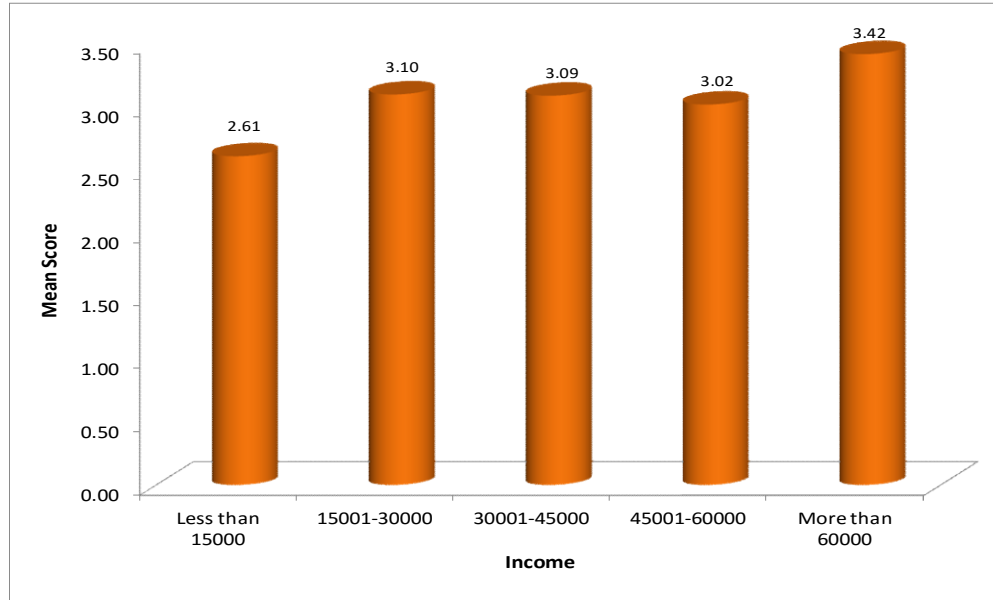


Fig. 3.49 : Brand Image & Applications Vs. Monthly income

Test Results

Statistical tool one-way ANOVA was used to test if a non-significant difference between brand, image & Applications as a factor influencing purchase decision for cell phone with regard to monthly income of customers exist. The test results represent that since the F critical table value = 4.70 at 0.1% level of significance is smaller than the calculated F value ($F = 9.054$, $p < 0.001$) hence, *null hypothesis, H₀ 5id is rejected*. Therefore, it can be interpreted that there is a non-significant difference between ‘Brand Image & Applications’ with regard to monthly income.

Table 3.62 shows the number of customers belonging to different categories of income with their corresponding means. It can be concluded that the maximum concern for Brand Image & Applications in cell phone purchase decision is made by customers with monthly income more than Rs.60000 followed by customers having monthly income between Rs.30001 and 45000.

3.13.5.5 Health, Environment and Safety Vs. Monthly Income

In order to test a non-significant difference between concern for brand image & applications (apps) with regard to monthly income while purchasing cell phone null hypothesis was formulated and tested.

H0 5ie : There is non-significant difference in the concern for health, environment & safety and monthly income while purchasing cell phone with regard to monthly income.

Table 3.63 : Health, Environment and Safety Vs. Monthly Income

Income	N	Mean	SD	F	df	Result
Less than 15000	77	2.65	1.11	5.496	4, 486	***
15001-30000	138	3.11	0.94			
30001-45000	75	3.04	1.00			
45001-60000	74	3.10	1.19			
More than 60000	127	3.33	0.95			

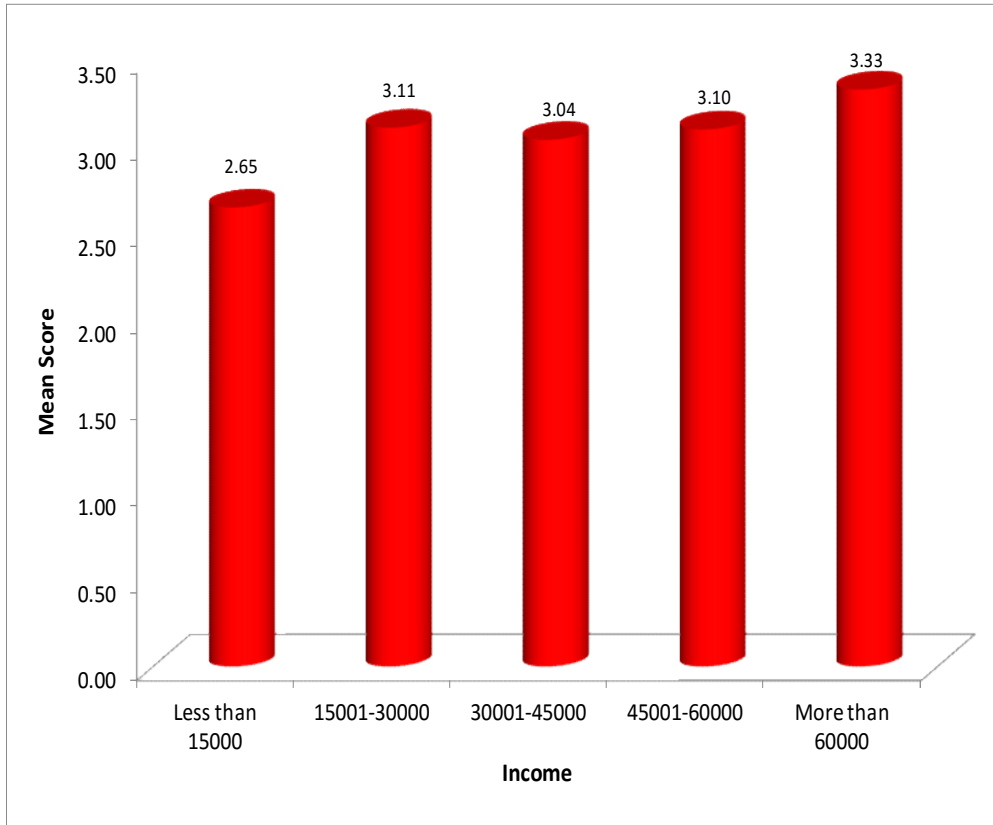


Fig. 3.50 : Health, Environment and Safety Vs. Monthly Income

Test Results

Statistical tool one-way ANOVA was used to test if a non-significant difference between concern for health, environment and safety and income exists. It was concluded from the test results that the F critical table value = 4.70 at 0.1% level of significance is smaller than calculated F value ($F = 5.496$, $p < 0.001$) allowing *rejection of the null hypothesis H₀ 5ie*. Thus it can be interpreted that there is a non-significant difference between concern for health, environment and safety with regard to monthly income.

Table 3.63 reflects the number of customers belonging to different categories of monthly income with their corresponding means. It can be interpreted from it that maximum concern for health, environment and safety in cell phone purchase decision is made by customers with monthly income more than Rs.60000 followed by customers having monthly income between Rs.15001 to 20000 and Rs. 45000 to Rs. 60000.

3.14 Conclusion

Customer behaviour of Hadoti region is unique in itself. The primary purpose of purchase of cell phone is communication. Friends and relatives followed by advertising in newspapers, television etc are preferential source of information for the customers. There are five major factors which influence the purchase decision of cell phone users - namely Physical Attributes/features and multimedia; Mobile Technology and Connectivity: Price and Payment terms; Brand Image and Applications (Apps); Health, Environment and Safety. Five clusters/segments have been explored based on the factors considered during purchase of cell phone. The clusters are namely- vogueish, abstemious, techno savvy, value conscious and charismatic. Charismatic segment is the largest of all. These clusters have their own respective characteristics and choice patterns that determine the purchase behaviour of its customers.

Chapter 4

EVALUATION OF HEALTH AND ENVIRONMENTAL CONSIDERATIONS AS DETERMINANT OF POST- PURCHASE BEHAVIOUR OF CELL PHONE USERS

Post-purchase behaviour is the last stage of the decision making process. Customer assesses whether he is satisfied with the purchase or not on the basis of his post-purchase experiences. A satisfied customer may share his feelings and experiences about the purchase with others and may influence their purchase decision or may induce them to purchase the same brand as his or vice versa. This chapter highlights the frequency of usage of functions and features of smart phones. It also examines the post purchase satisfaction of cell phone users. It attempts to assess the awareness for environmental and health issues related to cell phones and examines the method of disposal of discarded cell phone with future purchase motives for a eco-friendly cell phone.

4.1 Usage Frequency of Functions/Features of Smartphones

Only the respondents using/owning smartphones (324, 60.8%) were asked to rate the usage frequency of different functions and features of their Smart phones on a 5-point scale, where 5=Most often, 4= Often, 3=Sometimes, 2= Rarely and 1= Never. Exploratory Factor Analysis was administered on the responses to group the activities into factors.

4.1.1 Exploratory Factor Analysis

Exploratory Factor Analysis was administered on the data collected against the question asked to find the level of usage of different features and functions of smartphone by the users. The purpose behind administering factor analysis was to minimise the number variables (features/functions of smartphone) into groups/factors without compromising on the amount of information in the analyses. (Steward, 1981)

Thus, factor analysis aims to find the functional groups/factors by categorising related functions of smartphones. It has been found that some of these groups/factors drive the function usage greatly while others have comparatively low impact.

4.1.1.1 Validity Analysis

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy

To analyse the strength of association among variables the Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was applied. The KMO was computed to determine the suitability of using factor analysis. KMO measure of sampling adequacy shows that the sample is adequate for conducting factor analysis. The value of KMO varies from 0 to 1 and high values (close to 1.0) generally indicate that a factor analysis may be useful with the data. The calculated value of KMO in this research was 0.747 which is approximately equal to 0.800 and suitable for a behavioural or a social science research. According to Kaiser the KMO value equal to or greater than 0.800 is meritorious indicating that the sample was adequate to consider data normally distributed and suitable for factor analysis.

4.1.1.2 Bartlett's Test of Sphericity

Bartlett's test of Sphericity was conducted then to test multivariate normality of data and whether correlation matrix was an identity matrix. In the Bartlett's test the highly significant value ($p < 0.001$) of Chi Sqr (Chi=2550.087, df=276) shows that the data does not produce identity matrix and thus approximately multivariate normal and acceptable for factor analysis.

Table 4.1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.747
Bartlett's Test of Sphericity	Approx. Chi-Square	2550.087
	df	276
	Result	.000

After checking the validity of the data factor analysis using Principal Component Analysis (PCA) was applied to explore the underlying factors associated with 24 items/variables.

4.1.1.3 Communalities

Communality means common variance shared by a variable with all other variables. Thus if the communality of a variable is high, the extracted factors account for a big proportion of the variable's variance. This means that the particular variable is reflected well via the extracted factors, and hence that the factor analysis is reliable.

Table 4.2 : Communalities

Functions	Initial	Extraction
1. SMS	1.000	0.611
2. Videocalling / Conferencing	1.000	0.606
3. Music Player/FM Radio	1.000	0.644
4. Wi-Fi/ Hotspot	1.000	0.598
5. Video/Movies/TV-Watching/downloading	1.000	0.593
6. Photo/video shooting	1.000	0.596
7. Web Browsing (Google, Opera etc)	1.000	0.621
8. E-mail	1.000	0.526
9. Social Networking (Facebook, Twitter etc)	1.000	0.452
10. Instant Messaging (Whatsapp, viber, skypeetc)	1.000	0.607
11. Apps (Playstore, IRCTC, Paytmetc)	1.000	0.645
12. Documents Reading/Editing	1.000	0.723
13. Gaming	1.000	0.678
14. Voicemail via voice mail inbox	1.000	0.667
15. Call Recording	1.000	0.672
16. Maps/GPS (Searching Location)	1.000	0.575
17. Calendar	1.000	0.729
18. Calculator	1.000	0.772
19. Bluetooth/USB (Files/data transfer)	1.000	0.612
20. Mobile Banking	1.000	0.680
21. E-payments (mobikwik, Paytm etc.)	1.000	0.705
22. E-shopping (Myntra, Flipkart, Amazon etc.)	1.000	0.640
23. Speaker (For Music, Speakerphone)	1.000	0.746
24. Dictionary and Spell check	1.000	0.578

The initial communalities as well as communalities after extraction of all 24 items are shown in Table 4.2. The communalities in the present analysis ranged from 0.452 to 0.772 which was approximately equal (acceptable in psychological research) or much more than the minimum value of 0.5 (Stewart, 1981).

4.1.1.4 Total Variance Explained

Table 6.3 represents underlying factors/groups associated with 24 items generated by SPSS 24 on extraction with Principal Component Analysis (PCA) method. The table 4.3 shows 63.65% of variation in the functions/features of the cell phone used by the customers and explained by seven groups/factors extracted after 8 iterations. The total variance explained (63.65%) by these seven components exceeds the 60 percent threshold criterion commonly used in social science researches (Hair et al., 1995).

Table 4.3 : Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.37	22.36	22.36	3.09	12.89	12.89
2	2.79	11.62	33.98	2.65	11.06	23.95
3	1.92	8.00	41.98	2.29	9.53	33.47
4	1.53	6.39	48.37	2.00	8.32	41.79
5	1.38	5.74	54.10	1.91	7.95	49.74
6	1.22	5.06	59.17	1.73	7.20	56.94
7	1.08	4.48	63.65	1.61	6.71	63.65

Table 4.4 : Initial Eigen Values

Component	Initial Eigen values		
	Total	% of Variance	Cumulative %
1	5.37	22.36	22.36
2	2.79	11.62	33.98
3	1.92	8.00	41.98
4	1.53	6.39	48.37
5	1.38	5.74	54.10
6	1.22	5.06	59.17
7	1.08	4.48	63.65

Inclusion of a variable in a factor/group is dependent on its factor loading for that particular factor/group of functions which represents its correlation with that factor. This denotes strength of relationship of the item with the latent construct and predicts convergent and discriminant validity of the scales. (Hair et al., 2006)

Table 4.5 - Extracted Factor and Factor Loading

Factors	Items	Factor Loading
Web Browsing & Social Media	10. Instant Messaging (Whatsapp, viber, skype etc)	0.760
	6. Photo/video shooting	0.757
	7. Web Browsing (Google, Opera etc)	0.741
	9. Social Networking (Facebook, Twitter etc)	0.602
	4. Wi-Fi/ Hotspot	0.591
	5. Video/Movies/TV-Watching/downloading	0.508
e-Money	21. E-payments (mobikwik, Paytmetc)	0.818
	20. Mobile Banking	0.766
	22. E-shopping (Myntra, Flipkart, Amazon)	0.741
Utilities	18. Calculator	0.861
	17. Calendar	0.820
	24. Dictionary and Spell check	0.462
Miscellaneous	11. Apps (Playstore, IRCTC, Paytmetc)	0.735
	12. Documents Reading/ Editing	0.734
	8. E-mail	0.479
	16. Maps/GPS (Searching Location)	0.427
Communication & Sharing	1. SMS	0.760
	2. Videocalling/Conferencing	0.718
	19. Bluetooth/USB (Files/data transfer)	0.534
Voice Services & Gaming	13. Gaming	0.777
	14. Voicemail via voice mail inbox	0.639
	15. Call Recording	0.638
Music	23. Speaker (For Music, Speakerphone)	0.751
	3. Music Player/FM Radio	0.657

4.1.1.5 Names of Factor Extracted

On the basis of table 4.2 and 4.3 which shows the variance explained and table 4.5 which shows the loading of each variable on each of the extracted factors following conclusion can be drawn:

F1: Factor 1 is linear combination of 6 variables (4, 5, 6, 7, 9, and 10) with Eigen value of 5.37 it explains 22.36% of variance.

F2: Factor 2 is linear combination of 3 variables (20, 21, and 22) with Eigen value of 2.79 it explains 33.98% of variance.

F3: Factor 3 is linear combination of 3 variables (17, 18, 24) with Eigen value of 1.92 it explains 41.98% of variance.

F4: Factor 4 is linear combination of 4 variables (8, 11, 12, and 16) with Eigen value of 1.53. It explains 48.37% of variance.

F5: Factor 5 is linear combination of 3 variables (1, 2, and 19) with Eigen value of 1.38. It explains 54.10% of variance.

F6: Factor 6 is linear combination of 3 variables (13, 14, and 15) with Eigen value of 1.22. It explains 59.17% of variance.

F7: Factor 7 is linear combination of 3 variables (23, 3) with Eigen value of 1.08. It explains 63.65% of variance.

As shown in Table 4.5 seven factors were extracted after factor analysis. All these factors have been appropriately named according to the variables that have been loaded on each factor:

- **Factor 1 : Web Browsing and Social Media**

The first factor has been named as ‘Web Browsing and Social Media’ as almost all the 6 variables. (Instant Messaging, Photo/video shooting, Web browsing, Social Networking, Wi-Fi/Hotspot Video/Movies/TV-Watching/downloading) which have been loaded together to form this factor are mostly based on internet surfing/browsing downloads and social media functions of the cell phone.

- **Factor 2 : e-money**

Second factor clearly justified its name 'e-money' as all 3 loaded variables. E-payments, Mobile Banking. E-shopping involved online/electronic transfers and applications which are monetary in nature.

- **Factor 3 : Utilities**

Factor three is loaded with 3 variables – calculator, calendar and dictionary. Therefore, it has been named as 'utilities'. This explicitly justifies its name since all the 3 variables are of utility to cell phone users in making calculations, schedule planning or checking spellings and searching meanings of language words.

- **Factor 4 : Miscellaneous**

The fourth factor emerged from 4 statements which were loaded together (Apps, Document Reading/Editing, E-mail, Maps/GPS) and named 'Miscellaneous' as each was concerned with independent and unique activity and served miscellaneous functions of the cell phone users.

- **Factor 5 : Communication and Sharing**

Factor five has been named 'Communication and Sharing' since all the 3 variables (SMS, videocalling/conferencing, Bluetooth/USB) in this factor serve the smart phone users' purposes of communication other than live chat through sending/receiving/sharing of text, voice or visuals.

- **Factor 6 : Voice Services and Gaming**

Factor five was named 'Voice Services and Gaming'. Out of the three variables included first two variables i.e. call recording and voicemail are concerned with voice services while the third variable is related with pastime playing games. Hence the name of the factor truly justifies the inclusion of variables.

- **Factor 7 : Music**

Seventh factor clearly justified its name 'Music' as the 2 variables namely Speaker (Speaker phone, Music Player) and Music player/FM Radio were directly associated with the music.

4.1.1.6 Scree Plot

A scree plot represents the eigen values of variables on the y-axis and the number of factors on the x-axis. It is always in the form of downward curve. The point where the slope of the curve is clearly turns or levels off (also known as the ‘elbow’) indicates the total number of factors that should be generated by the analysis. The scree plot shown in Figure 4.1 also supports 7 groups/factors of cell phone functions/features used by the customers hence supports the obtained results.

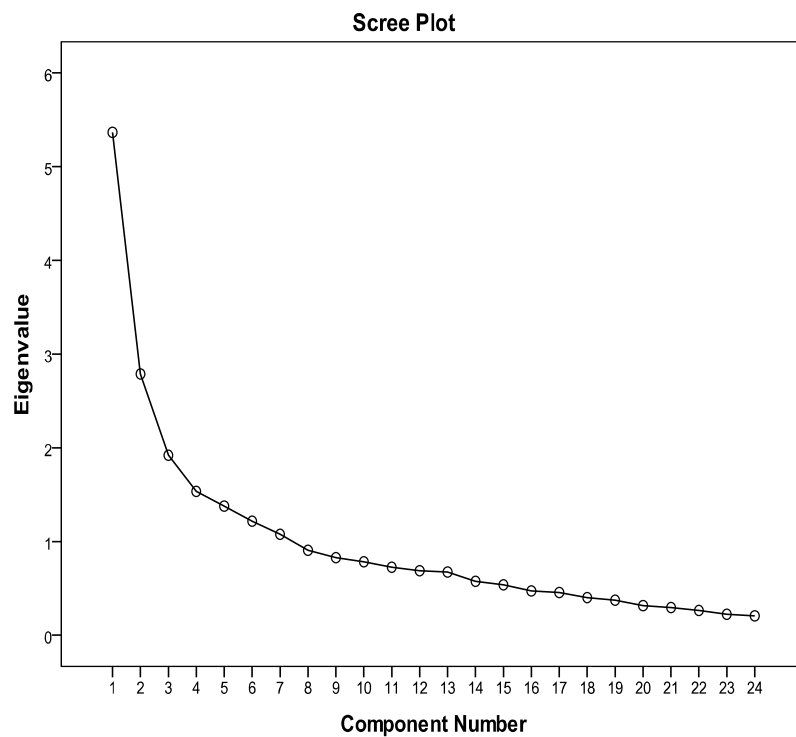


Fig 4.1 : Scree Plot

4.1.2 Mean Score and Ranking

Mean score for each functional group/factor was calculated on the basis of which the extent of use of each functional group was ranked. Table 4.6 and corresponding Figure 4.2 .represents the results

Table 4.6 – Ranking order of Functional Categories

Factor	Score	Rank
Web Browsing & Social Media	4.02	1
e-Money	3.68	2
Miscellaneous	3.63	3
Music	3.54	4
Utilities	3.33	5
Communication and Sharing	3.27	6
Voice Services and Gaming	3.18	7

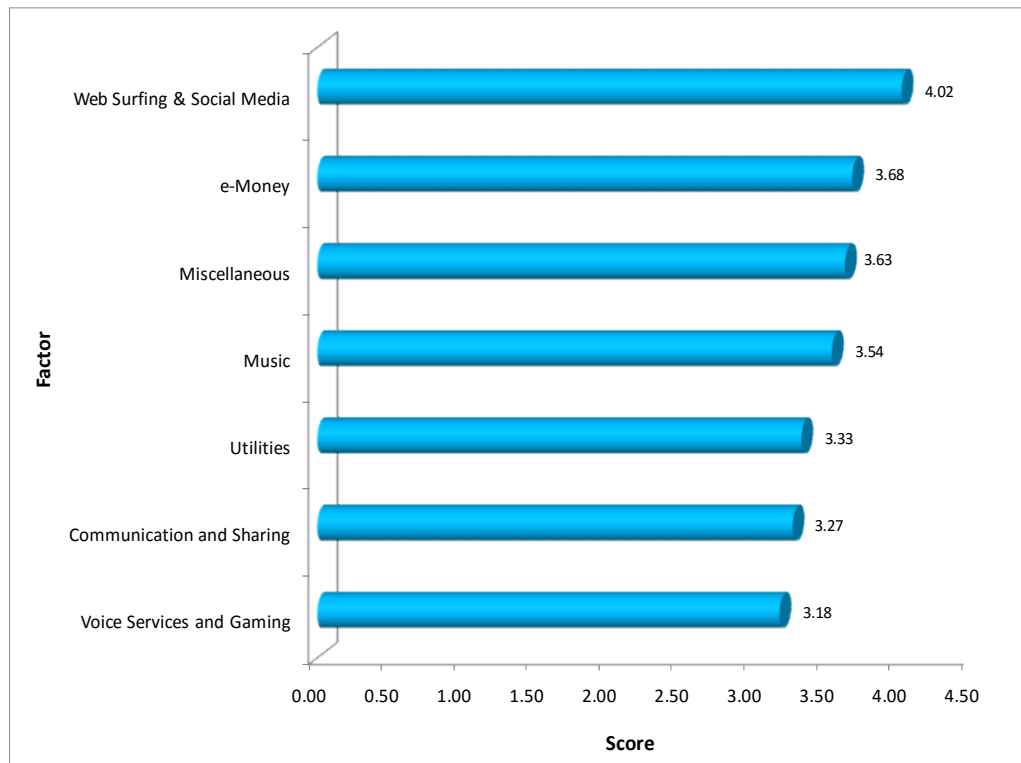


Fig 4.2 : Ranking order of Functional Categories

On the basis of mean scores, factor ‘Web Browsing and Social Media’ which included the variables - Instant Messaging, Photo/video shooting, and Web surfing, Social Networking, Wi-Fi /Hotspot, Video/Movies/TV-Watching/downloading was ranked first. It implies that cell phone users are more

habitual of using the above mentioned functions and applications on their smart phones rather than functions included in any other factor. Factor 'e-money' was ranked 2nd indicating that e-payment, mobile banking and e-shopping are the activities and functions which are carried out by the cell phone users from their smart phone to a great extent. It was followed by factor 'Miscellaneous' that was ranked 3rd and included functions and applications like apps, documents reading/editing, e-mail, Maps/GPS. Next factor, 'Music' was ranked 4th on the basis of mean score that includes speaker and music player. Fifth rank was allotted to 'Utilities'. As the name suggests this factor include functions like calculator, calendar (schedule organiser) and dictionary/spell check. Sixth rank was given to 'Communication and Sharing' that club functions which provide an ease in message transfer like SMS, videocalling/conferencing, Bluetooth/USB. It shows that with development of instant messaging apps like Whatsapp, skype, hi5 etc., cell phone users use these sharing functions with considerably less frequency. Last or seventh rank was allotted to 'Voice Services and Gaming' making voicemail, call recording and gaming the most unpopular activities among smart phone users.

Thus it can be interpreted that in today's time smart phone users prefer functions that provide ease in communication or sending messages in any form like text, voice or picture, those that help in money transfers, sending email, location identification, or provide entertainment. They prefer functions that not only save time but are also helpful in establishing internet connectivity and web browsing/surfing. Smart phones have rapidly emerged as pastimes with social networking, instant messaging apps that have gradually replaced gaming, music playing functions, once been popular activities of pastime among cell phone users.

4.2 Post-purchase Satisfaction on Different Parameters

Respondents were asked to rate the post purchase satisfaction for their cell phone on different parameters. A 5-point Likert Scale was used as a rating scale, where 5= Strongly Agree, 4 =Agree, 3= Neutral or partially agree, 2= Disagree and 1= Strongly Disagree. Table 4.7 shows the results.

Table 4.7 : Post-purchase Satisfaction on Different Parameters

Parameters	Strongly Agree	Agree	Neutral	Partially Agree	Disagree	Strongly Disagree
1. My mobile phone fulfill my needs effectively	136 (27.2)	177 (35.4)	112 (22.4)	52 (10.4)	23 (4.6)	
2. My mobile phone matches with my social status	94 (18.8)	144 (28.8)	164 (32.8)	55 (11.0)	41 (8.2)	
3. My mobile phone matches with my personality	115 (23.0)	151 (30.2)	126 (25.2)	73 (14.6)	33 (6.6)	
4. My mobile phone fits with my habit of use	126 (25.2)	158 (31.6)	117 (23.4)	61 (12.2)	38 (7.6)	
5. My mobile phone is aesthetically pleasing	89 (17.8)	156 (31.2)	134 (26.8)	77 (15.4)	44 (8.8)	
6. My mobile phone conform to claimed quality standards	95 (19.0)	160 (32.0)	150 (30.0)	67 (13.4)	24 (4.8)	
7. My mobile phone gives me value for money	104 (20.8)	139 (27.8)	164 (32.8)	48 (9.6)	42 (8.4)	
8. My mobile phone provides me functional/operational ease	123 (24.6)	151 (30.2)	123 (24.6)	45 (9.0)	58 (11.6)	
9. My mobile phone accessories are easily available	98 (19.6)	154 (30.8)	128 (25.6)	63 (12.6)	57 (11.4)	
10. My mobile phone brand provides satisfactory after sales service	112 (22.4)	123 (24.6)	140 (28.0)	72 (14.4)	50 (10.0)	

Table 4.7 shows the responses corresponding to the post purchase satisfaction parameters. It is evident from the table that a large number of respondents (177) agreed that their cell phone fulfill their needs effectively. Maximum respondents (164) had neutral opinion that their cell phone matches with their social status. Many consumers agreed that their cell phones match with their personality (151), fits with their habit of use (158), are aesthetically pleasing (156), conform to its

claimed quality standards, provides operational/functional ease and its accessories are easily available. Majority of the respondents have neutral opinion that their cell phone gives them value for money and their cell phone brand provides satisfactory after sales service.

Table 4.8: Parameters of Satisfaction

My mobile phone....	Score	Rank
fulfill my needs effectively	3.70	1
fits with my habit of use	3.55	2
matches with my personality	3.49	3
conform to claimed quality standards	3.47	4
provides me functional/operational ease	3.47	5
gives me value for money	3.43	6
matches with my social status	3.39	7
brand provides satisfactory after sales service	3.35	8
accessories are easily available	3.35	9
aesthetics are pleasing	3.34	10

Mean score was calculated for the responses (ranks) marked by the cell phone users on the 5-point Likert Scale indicating their satisfaction for the currently owned cell phone for different aspects/parameters. Overall ranks were allotted to these different satisfaction parameters based on these mean scores. Table 4.8 and figure 4.3 shows that parameter 1 i.e. 'my cell phone fulfills my needs effectively' achieved rank 1st with mean score 3.70 followed by parameter 4 (my cell phone fits with my habit of use' which had the mean score 3.55 and parameter 3 'my cell phone matches with my personality' with mean score 3.49 held 2nd and 3rd rank respectively.

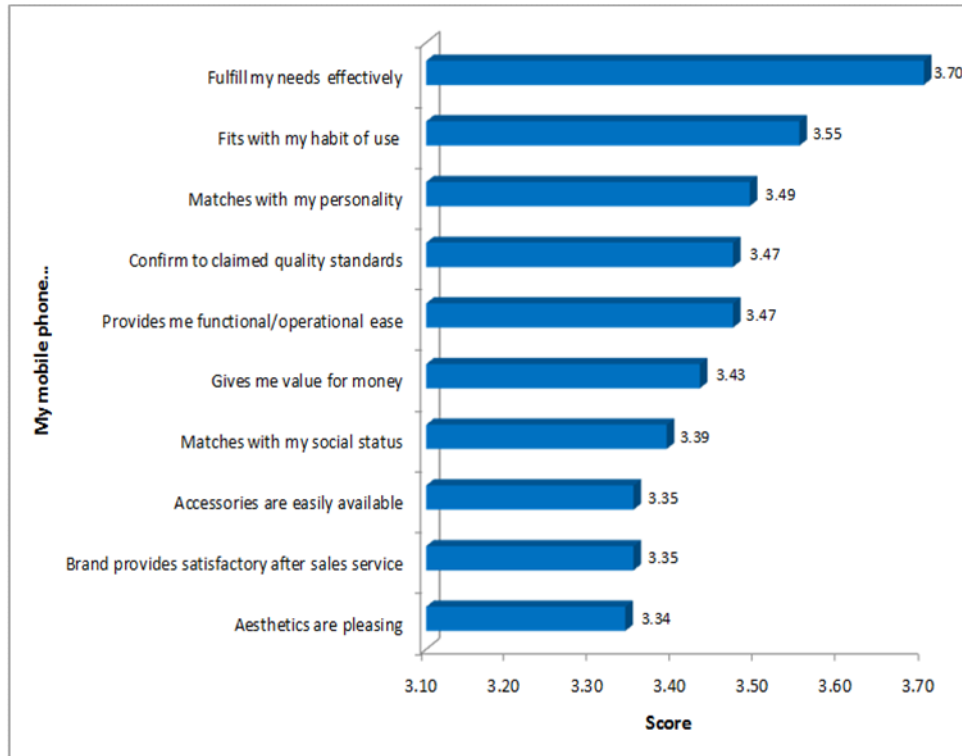


Fig 4.3 : Parameters of Satisfaction

4.3 Disposal of Previously Owned Cell Phone

4.3.1 Previous Cell Phone Discarded/Disposed Off

Respondents were asked if they have disposed off (discontinued use of) any of their previously owned cell phone.

Table 4.9 : Disposal of Previous Cell Phone

Response	N	%
Yes	242	48.40
No	258	51.60
Total	500	100.00

About 48.5% respondents gave affirmative response while 51.5% gave negative response to this question

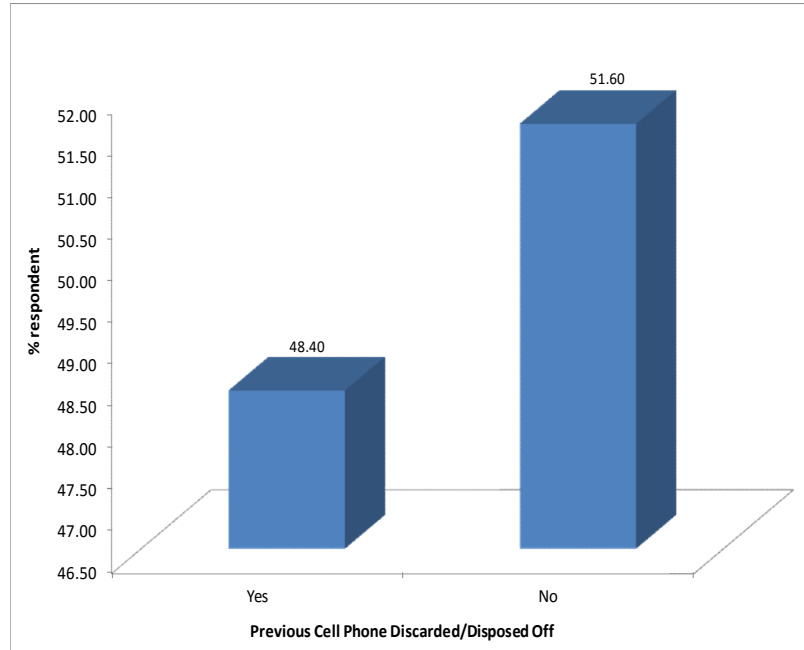


Fig 4.4 : Disposal of Previously owned Cell Phone

4.3.2 Method of Disposal of Previously Owned Cell Phone

The respondents (242, 48.4% respondents) who agreed that they have discontinued the use of previously owned cell phone were asked that how did they dispose it off their previously owned cell phone.

Table 4.10 : Method of Disposal of Previously Owned Cell Phone

Method of Disposal	N	%
Sold/Exchanged	53	21.90
Laying Idle with me	65	26.86
Gave to someone	74	30.58
Dropped at company collection point	8	3.31
Lost	26	10.74
Threw it in dustbin/garbage box	15	6.20
No Response	1	0.41
Total	242	100.00

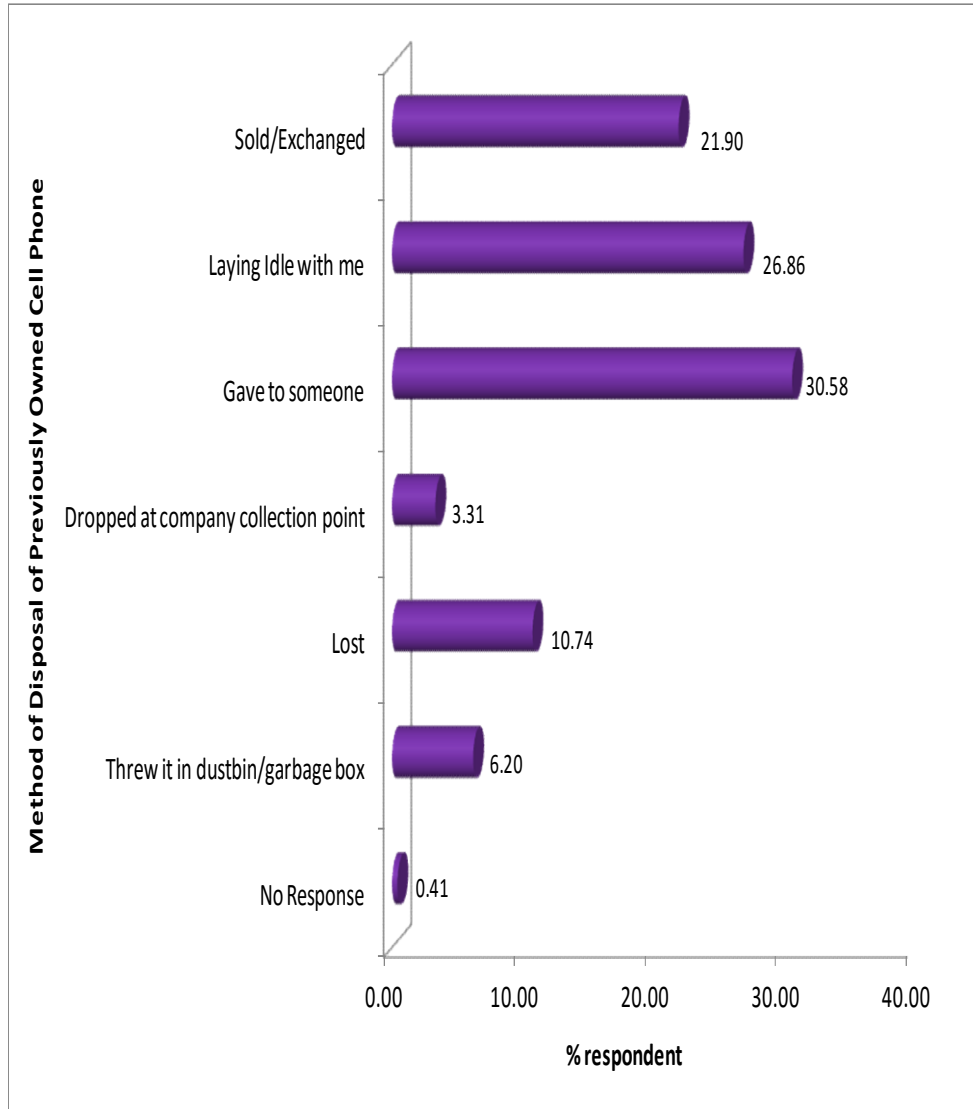


Fig 4.5 : Method of Disposal of Previously Owned Cell Phone

About 30.5% respondents stated that they have passed on their previously owned cell phones to someone. Second majority of respondents (about 27%) said that their discarded cell phone are lying idle with them while 22% participants confirmed that they either sold or exchanged their old cell phones for a new one. Few respondents (10.7%) reported to have lost their old cell phone. About 6% participants had discarded their previous cell phone in the garbage box. Only 3.3% respondents said that they had dropped their old cell phone at company collection point.

4.4 Awareness for Environment and Health Issues of Cell Phone

Respondents were asked to respond to the statements related to their awareness for environment and health issues with concern to cell phone

Table 4.11: Awareness for Environmental and health issues of Cell Phone

Environment/Health Issues and Facts	N	%
Mobile phone emits electromagnetic radiations even when not being used in switched ON position	332	66.40
Mobile phone emits very high level of electromagnetic radiations when connecting call with someone	304	60.80
Mobile phone should not be used when its battery is being charged as it emits high level of radiations	322	64.40
Mobile phone should not be used when its battery power is below critical point as it emit high level of radiations	303	60.60
Use of Hands free while talking helps to avoid the radiations emitted from the mobile phone	324	64.80
Mobile phone should be handled/kept away from the body parts to avoid radiations	381	76.20
Discarded mobile phones contain toxic materials like Lead and Mercury that are hazardous to both people and environment.	283	56.60
Discarded mobile phone can be disposed- off at collection bins of company in Brand Stores	282	56.40
Discarded mobile phones add to e-waste if not disposed-off properly	294	58.80
Parts of Mobile phone are recyclable	288	57.60
Mobile phone contain precious metals like silver copper etc. which can recovered and could be reused in manufacturing new mobile phones or elsewhere	252	50.40
If cell phone used for more than 10 minutes continuously during conversation releases burst of radiations and energy to keep link with the strongest base station	277	55.40

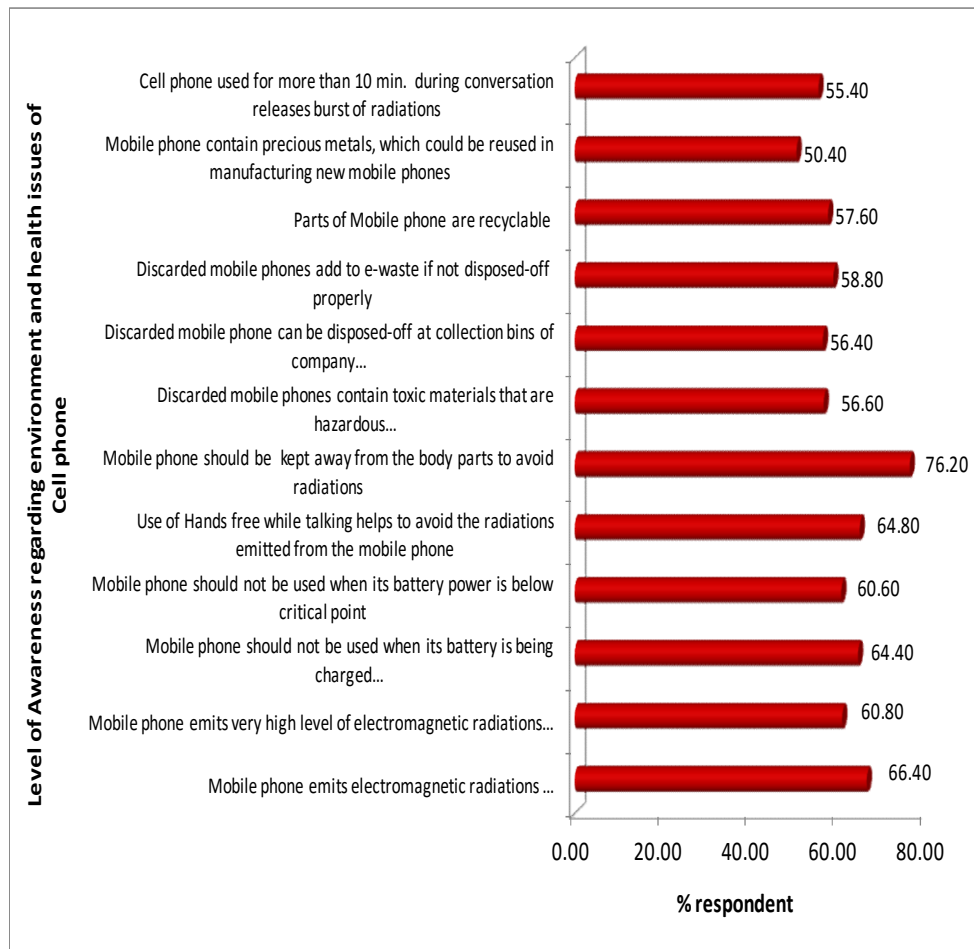


Fig 4.6 : Awareness for Environmental and Health Issues of Cell phone

About 66.4% respondents were aware that their cell phone emits radiation when not in use in switched ON mode. The cell phone emits high level of radiations while connecting call was known to 60.8% respondents. A high proportion of respondents (64.4%) were aware that a cell phone should not be used when its battery is being charged while 60.6% respondents were aware that it should not be used when its battery is below critical point.

4.4.1 Level of Awareness for Environmental and Health Issues of Cell phone

The responses of the cell phone users indicate their awareness for various environmental and health issues the overall awareness of the users was calculated and is represented in the table 6.13.

Table 4.12 : Awareness for Environmental and Health Issues of Cell phone

Awareness Score	N	%
0-25%	81	16.20
25% - 50%	120	24.00
50% - 75%	146	29.20
75% - 100%	153	30.60
Total	500	100.00

About 16% respondents have 0-25% awareness for environmental and health issues related to cell phone whereas 24% respondents have 25%-50% awareness, about 29% respondents have 50%-75% awareness while remaining 31% have 75%-100% awareness.

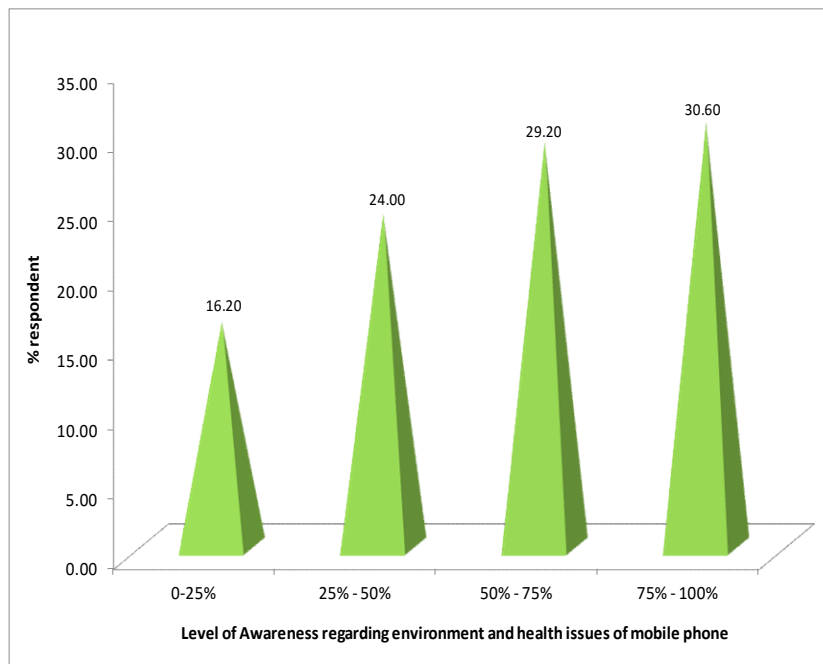


Fig. 4.7: Awareness for Environment and Health Issues of Cell phone

4.5 Purchase Intention for Green / Eco-Friendly Cell Phone

In order to examine the purchase intention for green cell phone respondents were asked if they would prefer to purchase an eco-friendly (green) cell phone in future

Table 4.13: Purchase Intention for Green Cell phone

Response	N	%
Definitely Yes	238	47.60
May Be	150	30.00
Can't Say	60	12.00
Less Likely	27	5.40
Never	22	4.40
No Response	3	0.60
Total	500	100.00

Table 4.13 shows that majority of the respondents (47.6%) said that they would definitely purchase an eco friendly cell phone while 30% said they may purchase. Few respondents (12%) said that can't say as they would decide when the product would be offered while rest either said they would never purchase or did not respond.

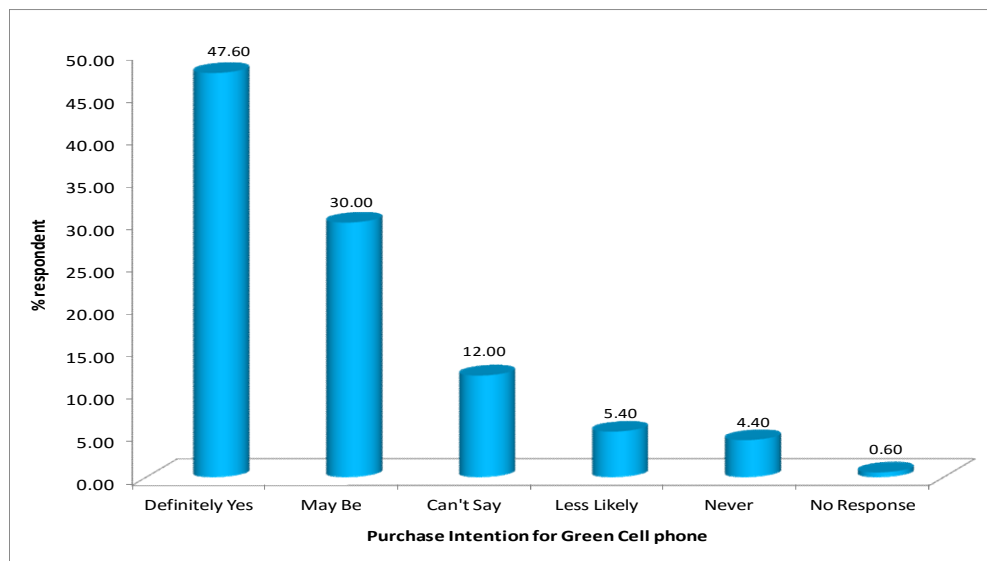


Fig 4.8:Purchase Intention for Green Cell phone

4.5.1 Choice of Brand

Respondents who agreed that they would definitely purchase eco-friendly cell phone were then asked to state the brand they would prefer to purchase as eco-

friendly cell phone. Table 4.14 indicates the brand that they would prefer to purchase as an eco-friendly cell phone.

Table 4.14 : Choice of Brand as an Eco-friendly Cell Phone

To	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	Apple	Others
From	N	N	N	N	N	N	N	N
Samsung	42	6	9	1	0	6	9	3
Micromax	6	10	3	2	1	2	1	6
Lenovo	5	0	7	3	0	1	5	3
Redmi	3	1	3	2	0	2	2	3
Intex	2	1	1	1	1	1	0	0
Oppo	1	0	1	0	0	4	1	4
Apple	7	0	1	0	0	0	16	2
Others	13	2	2	6	0	5	4	15
Total	79	20	27	15	2	21	38	36
Gain/Loss	+3	-11	+3	-1	-5	+10	+12	-11
Gain/Loss %	3.94	-35.48	12.5	-6.25	-71.4	90	46	-23.4


When the responses of the currently owned brand of users (Annexure 2) were compared with the brand of eco-friendly cell phone intended to be purchased in future by the respondents who would definitely purchase an eco-friendly phone, the gain and loss percentage of respondents for a particular brand was identified. The table 4.14 shows the brand of eco-friendly cell phone preferred by respondents and the number of probable loyal customers and the number of probable switchers with gain/loss for each brand. The gain percent is highest for Oppo followed by iPhone.

Loss percent is highest for Micromax.


It can be observed that loyal customers for different brands are 97 in total. But $97 - 15 = 82$ (excluding 15 who are loyal to 'other brands' only) respondents would be loyal to their present specific brand. Therefore, the percentage of the Brand Loyal Customers = $(82/223)*100 = 36.7 \%$. The percentage of the Brand Switchers = $(141/223)*100 = 63.3 \%$.

Table 4.15: Table of Transition Probabilities

Brands	Samsung	Micromax	Lenovo	Redmi	Intex	Oppo	Apple	Others
Samsung	.55	.07	.11	.01	0	.07	.11	.03
Micromax	.19	.32	.09	.06	.03	.06	.03	.19
Lenovo	.20	0	.29	.02	0	.04	.20	.12
Redmi/	.18	.06	.01	.02	0	.12	.12	.18
Intex	.02	.01	.01	.04	.14	.14	0	0
Oppo	.09	0	.09	0	0	.36	.09	.36
Apple	.26	0	.03	0	0	0	.61	.07
Others	.27	.04	.04	.02	0	.10	.08	.31



Probability of Losing to other Brands



Probability of Gaining from other Brand

In the above table horizontal axis represents the probability of losing to other brands while vertical axis represents the probability of gaining from other brands. Among those who agreed that they would definitely purchase an eco-friendly cell phone if offered, about 55% respondents of the existing customers of Samsung said that they would prefer it to purchase as a Samsung brand again. Therefore there is .55 probability of retaining the Samsung customers. The horizontal axis corresponding to a brand in the table represents the probability of losing customers to a corresponding brand. Samsung has .07 probability of losing its customers to Micromax. Similarly, there is .11 probability of losing customers to Lenovo and about .01 probability of losing to Redmi.

About 32.25% of existing consumers of Micromax said they would repurchase an eco-friendly cell phone as Micromax brand. Hence, it has .32 probability of retaining its customers. It has .19 and .09 probability of losing its customers to Samsung and Lenovo respectively.

29% respondents said that they would again prefer to purchase Lenovo brand as an eco-friendly cell phone. Hence, it has .29 probability of retaining its customers.

It has .20 and 0 probability of losing its customers to Samsung and Micromax respectively.

Only 12.5% of existing consumers of Redmi said they would repurchase the same brand as eco-friendly cell phone. About 14.28% customers of Intex said that they would be loyal towards same brand if it offers an eco-friendly phone for sale. About 61.53% of iphone consumers were enthusiastic to own an eco-friendly iphone while about 32% consumers of other brands preferred to purchase either the same brand or some other brand.

4.5.2 Hypothesis Testing

Test of significant relationship between intention to purchase eco-friendly cell phone and level of awareness. The null hypothesis is as follows:

H0 6: *There is a non-significant relationship between intention to purchase an eco-friendly cell phone and level of awareness for environmental and health issues of cell phone.*

One-way analysis of variance (ANOVA) has been used test the hypothesis and to determine if there exists any statistically significant difference between the means of two or more independent groups. In the present study one way ANOVA has been administered to find if there is a significant difference between intention to purchase an eco-friendly cell phone and level of awareness for environmental and health issues of cell phone.

Table 4.16: Intention to Purchase Eco-friendly Cell phone

Response	N	Mean	SD	F	Df	Result
Definitely Yes	238	65.23	26.00	9.47	4, 492	***
May Be	150	64.11	31.80			
Can't Say	60	50.42	30.63			
Less Likely	27	42.90	33.15			
Never	22	39.77	21.51			

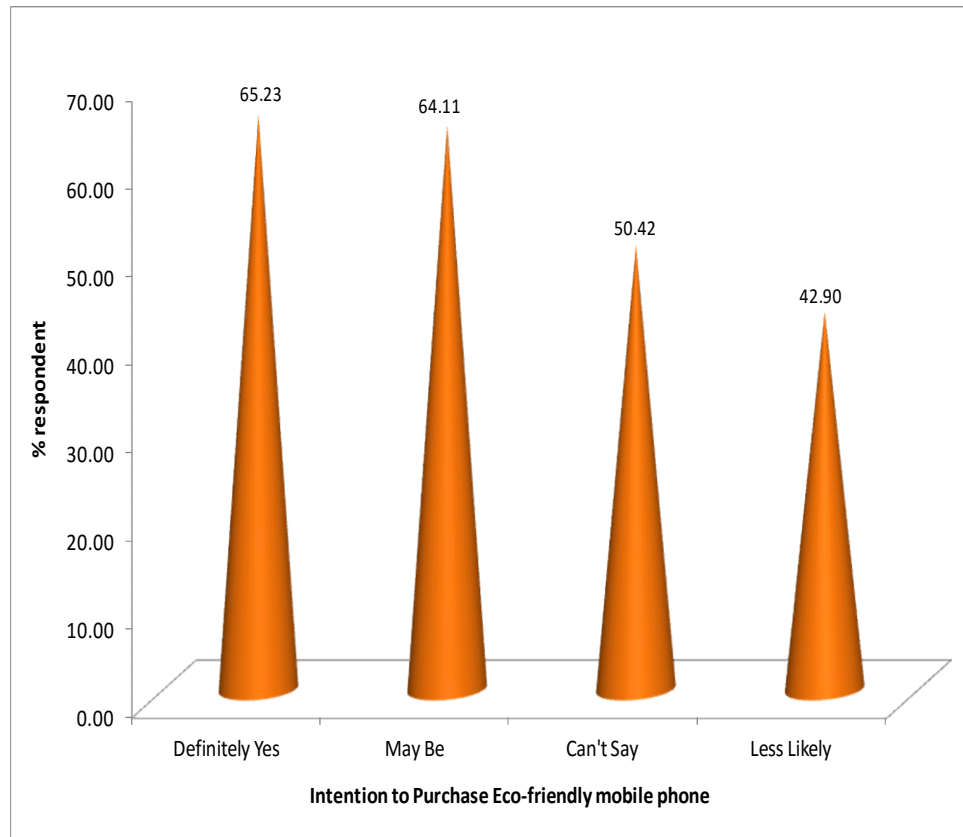


Fig 4.9 : Intention to Purchase Eco-friendly Cell phone

Above test result shows relationship between intention to purchase eco-friendly cell phone and level of awareness for environment and health related issues of a cell phone. The F critical value in table = 4.69 at 0.1% level of significance is smaller than calculated F value ($F=9.47$, $p<0.001$) allowing rejection of the null hypothesis, **H0 6**.

Tests result show that there is a highly significant difference in the level of awareness for 'health, environment and safety' related issues of cell phone and intention to purchase eco-friendly cell phone. It was found that those mobile users who are more aware of environmental and health issues of cell phone had more positive intention to purchase eco-friendly cell phone as compared to those users whose knowledge for environmental and health issues of cell phone was less.

4.6 Price Willing To Pay For an Eco-Friendly Cell Phone

Respondents who said that they would definitely purchase or they may purchase (238, 47.60%) were further asked to state the price they would be willing to pay.

Table 4.17: Price Willing to Pay for an Eco-friendly Cell phone

Price	N	%
Less Than Rs. 10,000	124	52.10
Rs. 10,000 - Rs. 15,000	58	24.37
Rs. 15,001 - Rs. 20,000	30	12.61
Rs. 20,001 - Rs. 25,000	9	3.78
Above Rs. 25,000	17	7.14
Total	238	100.00

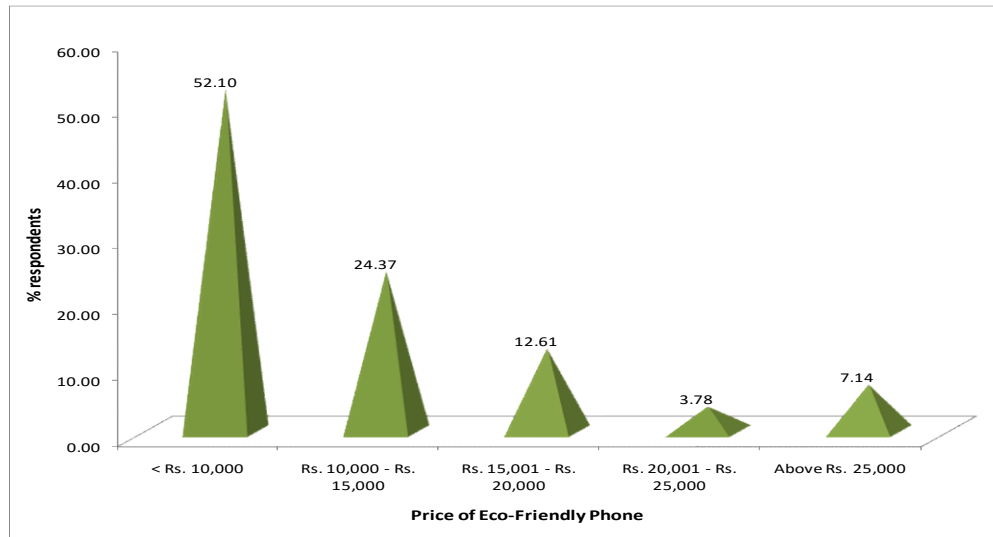


Fig 4.10: Price Willing to Pay for an Eco-friendly Cell Phone

Most of the respondents (52.10%) adopted a conservative approach for purchasing an eco friendly cell phone and were willing to purchase at a price less than Rs. 10000 whereas 24.37% respondents were ready to pay Rs. 10,000 –Rs. 15,000 for an eco – friendly cell phone. Few respondents (12.61%) were ready to pay Rs. 15,001- Rs 20,000 a small number of respondents (3.78%) were ready to pay 20,001 – Rs 25000. Remaining (7.14%) consumers were ready to pay above 25,000 for an eco-friendly phone.

4.7 Conclusion

The study of post-purchase behaviour of the cell phone users of the Hadoti region reveal that the usage level of the different features and functions of smartphones by the users, 'web browsing and social media' followed by 'e-money' appeared to be the most preferred usage activity of smartphone users. 'My cell phone fulfills my needs' followed by my cell phone fits with my habit of use was ranked as the first and second parameters of satisfaction respectively. Majority of the respondents have highly positive intention of purchasing eco-friendly cell phones and many of them prefer to purchase it at a price upto Rs. 10000.

Chapter 5

FINDINGS, CONCLUSIONS AND SUGGESTIONS

Based on the study undertaken by the researcher related to customer behaviour of cell phone users, the key findings of research study evident at different stages of the research process are compiled as under. The findings and conclusion also focus on the contributions made by this study in filling the knowledge gap and widening the horizon of marketing constructs with regards to cell phone.

Few words about limitations, some humble suggestions and implications for future research have been mentioned at the end.

Before highlighting the main findings in response to the research objectives, a short account of demographic details of customers is presented. This chapter includes three parts -Conclusions, Suggestions and Future implications.

5a. FINDINGS

5.1 Demographic Profile

The cell phone users belonging to different age, gender, educational level, occupation and monthly income were included in the sample. The demographic profile of the respondents is as follows:

- The sample included about 62% male cell phone users and about 38% female cell phone users.
- About 32 % of the respondents were in the age group of 21-30 years while 30.8% and about 17.8% respondents were in the age group of 31-40 years and 41-50 years respectively.
- Majority (38.6%) of the respondents were Graduate, 17.2% were professionally qualified. 13.4% of the respondents were Secondary/Sr. Secondary passed. While 5.6% and 5.8% of the respondents included uneducated and less than secondary educated respectively.

- Majority of the participants (36.6%) of the survey were rendering their services at offices both public and private, shops, households, educational institutions, hospitals etc. However, around 22% of respondents were housewives. About 15.2% were students. Around 13% were engaged in their own businesses or trade whereas 9.6% were professionals. Only 3% of the sample participants included retired personnel.
- Majority of the participants of the survey i.e. about 27.6% belonged to the monthly income distribution of Rs.15,000-30,000. Around 25% were in the distribution of monthly income of more than Rs.60000 whereas about 9% belonged to the group of monthly income less than Rs. 10, 000. Monthly income group less than Rs. 15,000, Rs.30,000-45,000 and Rs.45,000 - 60,000 per month included 15% respondents each.

5.2 Cell Phone Usage Profile

Consumer behaviour is the study that discusses how consumers buy, what they buy, when they buy and why they buy. It attempts to understand the customer purchase behaviour and aims at collecting an accurate information about consumers, emphasizing both quantitative and qualitative dimensions.

This section discusses the major findings related to usage profile of the cell phone users.

Objective 1 : To compile the cell phone usage profile of Hadoti region

5.2.1 Number of years of Using Cell phone

- 31.4% of the respondents were using cell phone for the last 3 years whereas about 29% respondents were using it for 4-6 years. About 16% of the sample participants have been using it for 7-9 years and 15.4% of the respondents have been using it for 10-12 years while only 8% have been using it for more than 12 years.

5.2.2 Number of Cell Phone Purchases Made in Last Five years

- 26.2% of the respondents have made two purchases of cell phone and 22.4% respondents have made more than four purchases of cell phone in last five years.

5.2.3 Brand Purchased

- About 29% of the respondents had purchased **Samsung** as their latest cell phone brand and 13.6% respondents had lately purchased **Micromax** brand of cell phone. About 12% participants have purchased **Lenovo** brand while about 8% participants have purchased Apple/iphone. About 7%, 5% and 5% have purchased **Redmi**, **Intex** and **Oppo** respectively.
- Majority of the male (30.09%) owned Samsung brand. Similarly 27.54% female owned Samsung brand. Micromax brand is owned by 14.88% male and 11.51% female. Samsung brand is the most popular among respondents up to 20 years (37.5%) and 21-30 years (34.16%) age groups. In the age group of 41-50 years, 20.22% respondents owned Micromax brand. Samsung is most popular brand among graduates (34.72%), post graduates (26.88%), below secondary level (20.69%) and professionally educated customers (32.56%). 21.24% graduates owned Lenovo brand of cell phone while 4.66% graduates possessed Redmi brand and 6.2% graduates owned Oppo brand. Micromax is the most popular brand among Secondary/Sr. Secondary educated respondents (26.87%) 9.84% of the respondents rendering their services preferred Lenovo brand. Redmi is a popular brand (18.75%) among professionals. Samsung is the most patronised brand among all the categories of occupation Samsung is the most patronised brand among all the categories of monthly income (except one i.e. Upto Rs.15000). Apple iPhone, it is a very popular brand in the monthly income distribution of 'More than Rs. 60000'

5.2.4 Duration of Using Current Cell phone

- Most of the respondents (59%) stated that they were using their current cell phone for the last one year while 21% respondents were using it for 1-2

years. Only 10% and 7% have been using their present cell phone for 2-3 years and 3-4 years respectively.

5.2.5 Possession of Smartphone

Secondary Objective 1 : To examine the association between demographic characteristics and possession of Smartphone.

- About 65% respondents owned a smart phone
- Chi Square-test was applied to test whether there is a non-significant association between gender and possession of smartphone. Thus *null hypothesis H0 1a* ($\chi^2 = 0.285$, $p > 0.05$) *is accepted*. This shows that possession of cell phone is not determined by gender.
- It was found possession a smart phone is more in younger age group (up to the age of 30 years) whereas percentage of people possessing smart phone was less in the age group of above 30 years. On testing hypothesis by applying Chi Square-test it was found there exists a highly significant association between age and possession of smartphone allowing *rejection of null hypothesis H0 1b* ($\chi^2 = 13.428$, $p < 0.01$).
- Smart phone possession is dependent on literacy of the respondent as it can be seen that no illiterate person was found possessing a smart phone. Graduate (77%) followed by postgraduate (70%) and professional (69%) are more inclined towards owning a smart phone. Statistical Testing using Chi Square-test reveals that a significant association between level of education and possession of cell phone exists.

Thus the null hypothesis H0 1c ($\chi^2 = 79.225$, $p < 0.001$) *is rejected*.

- Respondents engaged in service were inclined the most (37.77%) towards owning a smart phone whereas the percentage of possession of smartphone was least among retired respondents (2.79%) . Since *the null hypothesis H0 1d* ($\chi^2 = 21.614$, $p < 0.001$) *is rejected* using Chi Square-test, hence there exists a highly significant association between occupation and possession of smartphone.

- Possession of smart phone is highest (31.43%) among people having income more than Rs.60000. People possessing smart phone are more in income group 15000 to 30000 (27.3%) than among people in income group 30,000-45, 000 (15.56%) and 45,000-60,000 (17.78%). the *null hypothesis H0 1e* ($\chi^2 = 48.653$, $p < 0.001$) *is rejected* using Chi Square Test. Thus there is a highly significant association between monthly income and possession of smartphone.

5.2.6 Platform Used by Smartphone owners

- About 84% of the respondents stated that they were using Android Operating System followed by iOS platform users (12%) rest used windows or blackberry.

5.2.7 Price of Cell phone Owned

- Most of the respondents (33%) use cell phone priced up to Rs. 5000. About 32% respondents have purchased cell phone priced between Rs. 5000-10000. Only 14% and 7.4% participants have been using cell phone priced for Rs.10000-15000 and Rs.15000-20000 respectively.

Pre Purchase Behaviour

Objective 2 : To study the purpose of purchase of cell phone and sources of information collection by the cell phone users before purchase.

5.3.1 Sources of Information

‘Friends and relatives’ were the major source of pre-purchase information followed by advertisement (newspaper and television respectively then by websites, seller’s opinion, customers’ review and other sources respectively. *Friedman Test* was applied to find relation between preferences for sources of information. The *null hypothesis H0 2* ($\chi^2 = 604.96$, $p < 0.001$) *is rejected* showing that there exists a significant difference in the preference given to different sources of information where pre-purchase information is sought.

5.3.2 Purpose of Purchase

The most pervasive purpose of purchase of cell phone is communication (calling/receiving phone calls), followed by multimedia (camera/video), then by social networking/instant messaging, music/entertainment, internet search. Similarly, sixth and seventh purposes were business, commerce and e-commerce respectively. *Friedman test* was applied to find relation between preferences of purpose. The *null hypothesis H0 3 was rejected* showing that there exists a significant difference in the preference given to different purposes of purchasing cell phone by users.

5.4 Purchase Behaviour

- Majority of the respondents (41%) took only 1-2 weeks to decide upon the brand of cell phone which 23.6% participants took such decision instantly. Approximately 18% took 2-4 weeks and while more than 15% took a month respectively.
- Maximum customers (32.8%) purchased their current cell phone from the dealers. About 28.4% respondents purchased their cell phones from online shopping sites and 16.8% from Brand Store (Samsung etc.). Least purchases were made from Retail Chain Stores (9.4%). There is only one retail chain store in Hadoti selling cell phones. Hence, the percentage of purchase was least from it.

5.4.1 Factors Influencing Purchase Behaviour of Cell phone Users

Objective 3 : To examine and analyse the factors influencing purchase decision

After administering factor analysis on 32 variables that were assumed to be considered during purchase of cell phone by the customers 5 factors were extracted. This structure suggest the model of 5 factors that influence the purchase decision of cell phone which are namely - *Physical Attributes/features and multimedia; Mobile Technology and Connectivity; Price and Payment terms; Brand Image and Applications (Apps); Health, Safety and Environment.*

5.4.2 Factors and Demographics

5.4.2.1 Factors and Gender

- To find significant relationship between gender of customers with regard to different factors. *Z-test* was applied to test the hypothesis. On testing hypotheses it was found that the null hypothesis **H0 5ga** ($Z= 1.24, p>.05$), **H0 5gc** ($Z=0.70, p>.05$), **H0 5gd** ($Z= 1.52, p>0.05$) and **H0 5ge** ($Z=1.15, p>.05$) are accepted.

Hence there is a non-significant relationship between gender towards 'physical attributes & multimedia', 'price and payment terms', 'brand image and applications' and 'health, environment and safety'.

- But the null hypothesis **H0 5gb** ($Z=2.38, p<.05$) is rejected. Hence, there is a significant difference between gender towards 'Mobile Technology and Connectivity' factor, one the important determinant influencing purchase decision for cell phone.

5.4.2.2 Factors and Age

- Maximum concern for 'Physical Attributes and Multimedia' in cell phone purchase decision was made by customers aged up to 20 years followed by customers aged 21-30 years, above 50 years of age and in last by those aged 41-50 years. Hypothesis was tested using one way ANOVA. The null hypothesis **H0 5aa** ($F = 4.855, p<0.001$) is rejected.

Hence, there is a highly significant difference among customers in the concern for 'physical attributes and multimedia' as a factor influencing purchase decision for cell phone because of differences in their age groups.

- Maximum concern for 'Mobile Technology and Connectivity' in cell phone purchase decision was made by customers with age up to 20 years followed by customers aged 21-30 years and then by those above 50 years and in last by those aged 41-50 years and 31-40 years. One-way ANOVA was applied to test hypothesis. The null hypothesis **H0 5ab** ($F =4.269, p<0.01$) is rejected Hence there exists a highly significant difference among customers in the

concern for 'Mobile Technology and Connectivity' as a factor influencing purchase decision for cell phone because of differences in their age groups.

- Maximum concern for 'Price and Payment Terms' in cell phone purchase decision was made by customers with age up to 20 years followed by customers aged 21-30 years and then by those aged 31-40 years and in last by those above 50 years and 41-50 years. On applying ANOVA *the null hypothesis H0 5ac* ($F = 6.990, p < 0.001$) *is rejected*. Hence, there is a statistically highly significant difference among customers towards 'price and payment terms' during purchase of cell phone because of differences in their age groups.
- Maximum concern for 'Brand image and applications' in cell phone purchase decision was made by customers with age up to 20 years followed by the customers aged 21-30 years and then by those aged 31-40 years and in least by those aged 41-50 years and above 50 years. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5ad* ($F = 2.598, p < 0.05$) *is rejected*. There exists a significant difference between among customers in the concern for 'brand image and applications' due to differences in their age groups.
- Maximum concern for 'health, safety and environment' as a decisive factor in cell phone purchase was made by customers aged up to 20 years followed by customers aged 21-30 years and then by those above 50 years and least priority was given to this factor by those aged 41-50 years and 31-40 years. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5ae* ($F = 1.884, p > 0.05$) *is accepted*. There is non significant difference between the customers during purchase in the concern for health, environment and safety, as factor influencing purchase decision for cell phone. Hence the concern for this factor is not affected by age of the customers.

5.4.2.3 Factors and Education

- Maximum concern for 'physical attributes and multimedia' in cell phone purchase decision was made by customers with post graduate education

followed by graduates and professionals and then by those who were educated till secondary and senior secondary level. Hypothesis was tested using one way ANOVA *The null hypothesis H0 5ea* ($F = 7.589, p < 0.001$) *is rejected*. Hence, there is a highly significant difference among customers in the concern for ‘physical attributes and multimedia’ as a factor influencing purchase decision for cell phone because of differences in their education.

- Respondents having professional education were found to be more concerned for ‘mobile technology and connectivity’ as compared to respondents with post graduate education. It was noticed that with a decrease in educational level of customers the concern for these aspects also decreased gradually. One-way ANOVA was applied to test the hypothesis. *The null hypothesis H0 5eb* ($F = 26.428, p < 0.001$) *is rejected*. Hence there exists a highly significant difference among customers in the concern for ‘Mobile Technology and Connectivity’ as a factor influencing purchase decision for cell phone because of differences in their education.
- Maximum concern for ‘mobile technology and connectivity’ in cell phone purchase decision was made by customers with secondary or senior secondary education followed by graduate customers and then by post graduate and customers having the professional education. One-way ANOVA was applied to test the hypothesis. *The null hypothesis H0 5ec* ($F = 5.738, p < 0.001$) *is rejected* Hence, there is a statistically highly significant difference among customers towards ‘price and payment terms’ during purchase of cell phone because of differences in their education.
- Maximum concern for brand image and applications in cell phone purchase decision was made by graduate customers and then by post graduate customers closely followed by professionally educated customers and then by education till Secondary/Sr. secondary. Hypothesis was tested using one way ANOVA *The null hypothesis H0 5ed* ($F = 9.147, p < 0.001$) *is rejected*. Hence, there exists a highly significant difference between among customers in the concern for ‘brand image and applications’ due to differences in their education.

- Concern for health, environment and safety factors were found to be more among post graduate customers compared to professionally qualified ones. It can also be seen that they were closely followed by Secondary/Sr. secondary educated and graduate customers. a highly significant difference in the purchase preference is given to the factor health, environment and safety by respondents having different educational qualifications. One-way ANOVA was applied to test the hypothesis. *The null hypothesis H0 5ee* (F = 9.355, $p < 0.001$) *is rejected*. Hence, there exists a highly significant difference between among customers in the concern for health, environment and safety due to differences in their education.

5.4.2.4 Factors and Occupation

- Maximum concern for Physical Attributes and Multimedia in the cell phone purchase decision was made by student customers followed by customers in service and then by those who were retired closely followed by those engaged in the business and then by housewives and least by professionals. Hypothesis was tested using one way ANOVA *The null hypothesis H0 5oa* (F=8.118, $p < 0.001$) *is rejected*. Hence, there is a highly significant difference among customers in the concern for 'physical attributes and multimedia' as a factor influencing purchase decision for cell phone because of differences in their occupation.
- Student customers were more concerned for mobile technology and connectivity as compared to respondents who were retired or engaged in the service occupation. Housewives were least concerned about this factor during the purchase of cell phone. They were preceded by professionals. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5ob* (F = 8.454, $p < 0.001$) *is rejected*. Hence there exists a highly significant difference among customers in the concern for 'Mobile Technology and Connectivity' as a factor influencing purchase decision for cell phone because of differences in their occupation.

- Maximum concern for 'price and payment terms' in cell phone purchase decision was made by customers who were retired followed students then by those who were engaged in business closely followed by those engaged in service then by professionals and least by housewives. Hypothesis was tested using one way ANOVA *The null hypothesis H0 5oc* (F=6.977, p<0.001) *is rejected*. There exists a highly significant difference between among customers in the concern for 'brand image and applications' due to differences in their occupation.
- For factor 'brand image and applications' influencing purchase decision of cell phone, retired respondents were found to be more concerned as compared to students and those engaged in service. This factor was given least priority by professionals and housewives. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5od* (F= 7.162, p<0.001) *is rejected*. There exists a significant difference between among customers in the concern for 'brand image and applications' due to differences in their occupation.
- Concern for health, environment and safety in cell phone purchase decision is almost equally made by retired customers and students. They were followed by customers engaged in business and then by those engaged in service. Professionals came out to be least concerned about this factor after housewives. There is a statistically significant difference between 'health, environment and safety' and occupation. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5oe* (F=4.482, p<0.001) *is rejected*. Hence, there exists a highly significant difference between among customers in the concern for health, environment and safety due to differences in their occupation.

5.4.2.5 Factors and Monthly Income

- Maximum concern for physical attributes/multimedia in cell phone purchase decision was made by customers whose monthly income was more than Rs.60000 followed by customers having monthly income was between

Rs.45001 and 60000. It was noted that as the monthly income of respondents declined so did the concern for this factor in purchase decision declined. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5ia* ($F = 5.205, p < 0.001$) *is rejected*. Hence, there is a highly significant difference among customers in the concern for ‘physical attributes and multimedia’ as a factor influencing their purchase decision for cell phone because of differences in their monthly income.

- Maximum concern for mobile technology and connectivity in cell phone purchase decision was made by customers with a monthly income more than Rs.60000 followed by customers having monthly income between Rs.45001 and 60000. It was noted that as the monthly income of respondents declined, so the concern for this factor in purchase decision declined. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5ib* ($F = 13.012, p < 0.001$) *is rejected*. Hence there exists a highly significant difference among customers in the concern for ‘Mobile Technology and Connectivity’ as a factor influencing purchase decision for cell phone because of differences in their monthly income.
- Maximum concern for price and payment terms in cell phone purchase decision was made by customers having a monthly income between Rs.45001 and 60000 followed by those having monthly income more than Rs. 60000. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5ic* ($F = 3.973, p < 0.01$) *is rejected*. Hence, there is a statistically highly significant difference among customers towards ‘price and payment terms’ during purchase of cell phone because of differences in their monthly income.
- Maximum concern for brand image and applications in cell phone purchase decision was made by customers with monthly income more than Rs.60000 followed by customers having monthly income between Rs.30001 and 45000. Hypothesis was tested using one way ANOVA. *The null hypothesis H0 5id* ($F = 9.054, p < 0.001$) *is rejected*. There exists a significant difference

between among customers in the concern for 'brand image and applications' due to differences in their monthly income.

- Maximum concern for health, environment and safety in cell phone purchase decision was made by customers with monthly income more than Rs.60000 followed by customers having monthly income between Rs.15000 and 20000. It was found that there exists a significant difference between 'health, environment and safety' factor and income. Hypothesis was tested using one way ANOVA. *The null hypothesis H₀ 5ie (F =5.496, p<0.001) is rejected.* Hence, there exists a highly significant difference between among customers in the concern for health, environment and safety due to differences in their monthly income.

5.4.3 Behavioural Segmentation

Objective 4 : To appraise different behavioural segments of cell phone users.

Dimensions and variables were reduced to factors by using factor analysis. These factors were further subjected to *cluster analysis* whereby a model of clusters/segments profiles was developed. Thus customer base of hadoti region was segmented into 5 distinct groups. These five factors formed the bases of segmentation. The names of segments are as follows –

- **Voguish segment** - A male dominated segment with majority of the customers being graduates in age group of 21 to 30 years, income level of 15001- 30000 and engaged in service. They give preference to physical attributes, mobile technology and brand image of cell phone. They give importance to price and health concerns but relatively lesser than other factors.
- **Abstemious segment** - A female dominated segment with majority of the customers being graduates, housewives in age group of 31 to 40 years income level of 15001- 30000. This customer segment attaches moderate level of importance to physical attributes, multimedia feature or mobile technology.

- **Techno Savvy segment** - A male dominated segment with majority of the customers being postgraduates and professionals in the age group of 41 to 50 years, in the income level of more than Rs. 60000 and engaged in service. Techno savvy and put strong emphasis on physical attributes, multimedia features, mobile technology and have high concern for health and environment and low concern for price
- **Value Conscious segment** - A male dominated segment with majority of the customers being graduates in age group of 31 to 40 years, income level of 15001- 30000 and engaged in service. The most significant characteristic of this customer group is the fact that they attach almost medium importance to all the five factors. Although price and payment terms criteria has slightly more significant role to play in decision making.
- **Charismatic segment** - A male dominated segment which is largest of all segments with majority of the customers being graduates in the age group of 21 to 30 years and 31-40 years, in the income level of more than Rs. 60000 and engaged in service. This cluster attaches a highest level of importance to almost all of the decision making criteria among all other segments. This segment has the *want-it-all* kind of customers.

The null hypotheses **H0 4** to test whether a non-significant difference exists between the customer segments and factors extracted was tested using ANOVA was rejected. Hence, there exists a significant difference between different segments with respect to different factors.

5.5 Post Purchase Behaviour

Objective 5 : To examine usage level of different features, functions and applications of smart phone.

5.5.1 Usage level of Functions/Features and Applications of Smart phone

- The usage level of smartphone features and functions has been grouped into seven categories which are appropriately named as Net Surfing and Social Media, e-money, utilities, miscellaneous, communication and sharing, voice

services and gaming, music. 'Net Surfing & Social Media' emerged as the activity group used the most by the respondents followed by e-Money and Utilities.

5.5.2 Post-Purchase Satisfaction of Cell Phone

- Most of the respondents stated that 'their cell phone fulfils their needs' as the major determinant of their post purchase satisfaction with strong affirmation. It was followed by statement 'my cell phone matches with my social status.'

5.5.2.1 Disposal of Last Owned Cell phone

- About 48.5% respondents gave affirmative response that they have disposed off any of their previously owned cell phone while 51.5% gave negative response
- The respondents who agreed that they have discontinued the use of previously owned cell phone, out of those respondents about majority (30%) stated that they have passed on their previously owned cell phones to someone. Second majority of respondents (about 27%) said that their discarded cell phone are lying idle with them while 22% participants confirmed that they either sold or exchanged their old cell phones for a new one. Few respondents (10.7%) reported to have lost their old cell phone. About 6% participants had discarded their previous cell phone in the garbage box. Only 3.3% respondents said that they had dropped their old cell phone at company collection point.

5.5.2.2 Awareness of Environmental and Health Issues

Objective 6: To examine the awareness and cognition of users towards environmental, health and safety issues related to cell phone.

- About 16% respondents had 0 -25% awareness of environmental and health issues related to cell phone whereas 24% respondents had 25%-50% awareness, about 29% respondents had 50%-75% awareness while 31% had 75%-100% awareness.

5.5.2.3 Purchase Intention for Eco-friendly Cell phones

Secondary Objective 2: To identify the future purchase motives of the users for eco-friendly cell phones.

- Majority of the respondents said that they would definitely purchase an eco friendly cell phone while 30% said they may purchase. Few (12%) said that can't say as they would decide when the product would be offered/launched while rest said they would never purchase or did not respond.
- Among those who agreed that they would definitely purchase an eco-friendly cell phone if offered, about 55% respondents said that they would prefer it to purchase as a Samsung brand again. About 32.25% of existing consumers of Micromax said they would repurchase it. 29% respondents said that they would again prefer to purchase Lenovo brand as an eco-friendly cell phone. Only 12.5% of existing consumers of Redmi said they would repurchase the same brand for it. About 14.28% customers of Intex said that they would be loyal towards same brand if it offers an eco-friendly phone for sale. About 61.53% of iphone consumers were enthusiastic to own an eco-friendly iphone while about 32% consumers of other brands preferred to purchase either the same brand or some other brand.
- Most of the respondents have adopted a conservative approach (52.10%) for purchasing an eco friendly cell phone and are willing to purchase at a price less than Rs. 10000 whereas 24.37% respondents are ready to pay Rs. 10,000 –Rs. 15,000 for an eco – friendly cell phone. A moderate number of respondents (12.61%) are ready to pay Rs. 15,001- Rs 20,000 rest are ready to pay 20,001 – Rs 25000 or more.
- Null hypothesis that there is a non-significant difference in the level of awareness about 'health, environment and safety' related issues of cell phone and intention to purchase eco-friendly cell phone was tested using ANOVA statistics. *The null hypothesis H0 6 (F=9.47, p<0.001) is rejected.* It was found that those cell phone users who are more aware about environment and health issues of mobile phone have more positive intention

to purchase eco-friendly cell phone as compared to those users whose knowledge about environment and health issues of cell phone is less.

5b. CONCLUSIONS

Conclusions have been derived from the findings analysed with the help of SPSS, statistical software which helped in justifying evaluative statements based on identified dimensions of customer behaviour.

- Cell phone usage in Hadoti region is dominated by male. It can be interpreted from the findings that users mostly use their cell phone for a year and discard them after one year of use. About 1/3 rd of the respondents have been using their cell phones for more than 7 years or more. This shows that cell phone has always been a necessity for the people of Hadoti region and it was a popular means of communication and widely used even a decade back.
- Majority of the male owned Samsung brand. Samsung brand is the most popular among respondents up to 20 years and 21-30 years age distribution. In the age distribution of 41-50 years, majority owned Micromax brand. Samsung is the most popular brand among graduates, post graduates, below secondary level and professionally educated customers.
- A substantial number of people own Smartphone. Hence it can be concluded that people are interested in purchasing smart gadgets. Young generation aged up to 30 years is more inclined towards possessing smartphone. Cell phones are mostly owned by graduates, many of them are having monthly income more than Rs. 60,000.
- Null hypothesis **H0 1a** that there is a non-significant association between gender and possession of smartphone has been accepted using Chi square test. This shows that possession of cell phone is not determined by gender.
- There exists a highly significant association between age and possession of smartphone by the customer. This shows that purchase of cell phone is affected by age.

- A significant association between level of education and possession of smart phone was found. Hence it may be concluded that owning a smartphone is affected by level of education of consumer. Findings show that smartphones were only owned by literate respondents.
- There exists a highly significant association between occupation and possession of smartphone. Hence it may be concluded that owning a smartphone is affected by the occupation the person is in.
- On testing null hypothesis it was found that there is a highly significant association between monthly income and possession of smartphone. It may be concluded that customer purchases a smartphone taking into consideration his monthly income.
- Android is the most favoured operating system. Majority of the people prefer to purchase a cell phone priced up to Rs. 5000.
- A customer seeks pre-purchase information regarding the cell phone from different sources. On administering Friedman test null hypothesis **H0 2** was rejected and it can be concluded that there exists a significant difference in the preference given by the customers to different sources of information where pre-purchase information is sought. Therefore, the choice of source of seeking pre purchase information differs among cell phone customers.
- Null hypothesis **H0 3** *was rejected* showing that there exists a significant difference in the preference given to different purpose of purchasing cell phone by users. Hence, it may be concluded that the purpose of purchase of cell phone differs among customers. Majority of the customers purchase cell phone for communication followed by multimedia including camera with advanced features/functions.
- Most of the purchases of cell phone take place at dealer's shop. The decision to purchase particular brand is decided almost within 1-2 weeks.
- To find significant relationship between gender of the customers with regard to different factors null hypotheses were accepted. Hence there is a non-

significant relationship between gender towards 'physical attributes & multimedia', 'price and payment terms', 'brand image and applications' and 'health, environment and safety'

But the null hypothesis to find significant relationship between gender of customers with regard to 'Mobile Technology and Connectivity' factor was rejected. Hence, it may be concluded that there is a significant difference between gender towards 'Mobile Technology and Connectivity' factor, one the important determinant influencing purchase decision for cell phone.

- A highly significant difference was found among customers for 'physical attributes and multimedia', 'Mobile Technology and Connectivity', 'Price and Payment Terms' and Brand image and applications' as factors influencing their purchase decision for cell phone. This difference may be credited to differences in their age groups. Thus it may be concluded that customers' concern for these factors is dependent on their age.
- A non-significant difference was found among customers for 'health, environment and safety'. Hence it may be concluded that all the customers irrespective of their age group are concerned for their health and environment around them and may consider them at the time of purchase. They may prefer cell phones with low SAR value, longer battery life, recyclable material etc.
- A highly significant difference was found among customers for 'physical attributes and multimedia', 'Mobile Technology and Connectivity', 'Price and Payment Terms' 'Brand image and applications' and 'health, environment and safety' as factors influencing their purchase decision for the cell phone. This difference may be credited to differences in their education level. Thus it may be concluded that customers' concern for these factors during purchase is dependent on their education level. The choice and features related to physical attributes like screen size, camera etc., mobile technology like generations of cell phone, operating systems, price and payment terms like EMI, discounts/offers through online purchases etc..

Brand image and choice of apps etc. and concerns related to health and environment like SAR value, battery life etc considered are dependent and varies with educational level of the customers.

- The null hypotheses to test whether a non-significant difference exist among customers for ‘physical attributes and multimedia’, ‘Mobile Technology and Connectivity’, ‘Price and Payment Terms’ ‘Brand image and applications’ and ‘health, environment and safety’ were rejected using one way ANOVA. Hence, there is a significant difference between the customers in the concern for factors influencing their purchase decision for the cell phone. These differences may be credited to the varied nature of occupation of the respondents. Therefore, it can be concluded that customers’ selection of desired features, attributes etc. is varies according to occupation and job he is pursuing. Cell phone should offer technology/features in the cell phone considering the requirements of customers as per their occupation.
- Different factors of concern in the cell phone purchase - ‘physical attributes and multimedia’, ‘Mobile Technology and Connectivity’, ‘Price and Payment Terms’ ‘Brand image and applications’ and ‘health, environment and safety’ have a significant relationship with the monthly income of the customers. Monthly income often determines the spending power of the customers. Consideration for the features, technology, physical attributes, price consideration, sensitivity towards brand image of the cell phone are influenced by the monthly income of the respondents to a great extent.
- The “smartness” of smartphone is not yet fully exploited by the consumers. Most functions or usages are instant messaging, Internet browsing, and email. But other functions like voicemail, videoconferencing, data sharing through Bluetooth/USB, dictionary/spellcheck are not commonly utilised.
- Web browsing, followed by e-money transfers are the major usages of smartphone in Hadoti region. ‘Cell phone (of the respondents) fulfills my needs’ was the major criterion of satisfaction of the respondents. It was

followed by 'my cell phone fulfills my needs'. and 'my cell phone matches with my personality.'

- Majority of the respondents said that they would definitely purchase an eco friendly cell phone while 30% said they may purchase Majority of the respondents were interested in purchasing an eco-friendly cell phone priced up to Rs. 10000.
- Only 1/3rd of the respondents have meritorious (75%-100%) awareness for health and environment concerns of cell phone.
- Majority of the respondents said that they would definitely purchase an eco friendly cell phone while 30% said they may purchase Majority of the respondents were interested in purchasing an eco-friendly cell phone priced up to Rs. 10000.
- The probable percentage of the Brand Loyal Customers in case of the purchase of eco friendly cell phone in future is 36.7 %. Iphone and Samsung have highest probability of brand loyalty. There is 0.55 probability of retaining the Samsung customers. Micromax has 0.32 and Lenovo has 0.29 probabilities of retaining customers.
- Null hypothesis H0 6 was rejected and it can be concluded that those cell phone users who are more aware about environment and health issues of cell phone have more positive intention to purchase eco-friendly cell phone as compared to those users whose knowledge about environment and health issues of cell phone is less.

5c. SUGGESTIONS

Suggestions have been classified into two categories as follows:

Suggestions Based on findings

- A highly significant relation was found between possession of smartphone and demographic characteristics like age, education and occupation. Kota is a coaching city. About 2 lakh students from every nuke and corner of the

country come here to pursue coaching every year out of which about 50% are girls. With an increase in the incidents of eve teasing or molestation cell phone companies should introduce cell phones with SOS button which could be used in emergency by the girls.

- Many elderly people in Hadoti are leading a life in solitude due to the concept of 'empty nest' wherein parents stay alone when their children migrate to other cities for job or to gain education. Cell phones should be developed specially for the elderly people with a button which when pressed would either call (playing recorded message "I am in TROUBLE") or send SMS (texting "I am in TROUBLE") to a beloved one (number of one or two recipients could be fed in advance). It is also helpful for those elderly people who at some instance are away from their homes or nears and dears.
- Maximum number of cell phone users have lately purchased Samsung, followed by Micromax and then by Lenovo. Companies should cater to the specific needs of the customers belonging to respective market segment by offering product bundled with justified attributes which appeal to the respective customers' needs.
- Advertising is one of the important sources of pre purchase information which helps the customers to gain information about cell phones. Therefore, advertising should be strategically planned according to the user status (related to awareness, cognition and action).
- Communication emerged as the most pervasive purpose of purchasing a cell phone. Nowadays cell phones have transformed into high resolution camera phones hence camera/photo clicking is second most preferred purpose of purchase.
- Cell phones should be technologically developed so that they can work effectively even when network signals are weak.
- The "smartness" of smartphone is not yet fully exploited by the consumers. Most of the users are not acquainted with many of the features of the cell

phone owned. So a user manual of cell phone listing various features and functions of cell phone with their procedure of use should be provided in product package. It should be bilingual (both Hindi and English).

- User training-cum-contact program should be organised at regular intervals by the cell phone companies at offices, educational institutions, respective service centres etc. as part of promotional programs wherein the users could be trained to use features/functions of cell phone of respective brand. Personal grievances could also be handled simultaneously.
- According to the present study *Charismatic* is the largest segment in Hadoti region. Therefore it is suggested that the cell phone manufacturers should develop affordable, innovative and sophisticated and eco-friendly handsets to cater charismatic consumers. The affordable cell phone will also attract the **value conscious** segment. Marketing communications should also be commensurate with product and price and create conviction in mind of the customers on all the five dimensions of cell phone including environment, health and safety and social value. Now the marketer should position its product on 'greenness' along with focusing other attributes in order to break the competitive clutter.

Marketing mix aimed at *abstemious* segment (female dominated) should focus on practical features catering to basic needs of the customers whereas *techno savvy* consumers must be offered cell phone based on latest green technology without any concern for price. The marketer should attract *Voguish* customers by offering aesthetic and multi functional multimedia features at the economical price. They are brand conscious but not care much for environment, health and safety.

- Cell phone technology has a very short lifespan. Upgraded or advanced model of their preceding models are introduced within few months of its launch as a result of which the model of cell phone owned by a user becomes outdated with the launch of this upgraded model. Option of up

gradation should be provided to old customers so that their models do not get outdated.

- Health, environment and safety (SAR value, IMEI No. and battery life) is least considered factor during the purchase. Awareness should be created through promotion among the users that SAR value of the cell phone could be checked by dialing *#07# and IMEI number could be checked by dialing *#06#.
- There were reports of blast even in a highly sophisticated cell phone like Galaxy S7. Such incidents could cause human causality too. Hence the safety aspects of the cell phone must not be ignored by the vendor. Quality standards should be minutely monitored. There should be provisions of 'Health Check-up of cell phone' at the respective service centre so that proper functioning and health of cell phone could be monitored.
- Symbols indicating the SAR value compliance or levels of EMF radiations emission should be created by cellular regulatory bodies which could be marked on package, looking at which the customers could identify that the cell phone complies with Indian standards of SAR value or emits even lesser level of electromagnetic radiations.
- Most of the respondents have less than 50% awareness for environmental, health and safety issues related with cell phones. There is a need to insert a separate manual in the package indicating the 'cell phone usage healthy habits' that could save the users from electromagnetic radiation exposure.
- User awakening programs for the user guiding the best ways of using cell phone and avoiding radiations should be organized on regular basis at suitable places.
- Most of the respondents wish to use a cell phone which is safe enough to avoid radiations. Therefore eco-friendly cell phones should be developed bearing a chip that restricts the electromagnetic radiations emitted from it.

- Most of the cell phones are not water resistant. Water leaches into the cell phone when it accidentally comes in contact with water or gets drenched in rain. Therefore waterproof cell phones should be developed. Marketers should offer free waterproof cases and covers with the cell phone.
- Accessories like case, gorilla glass, covers etc add to the weight of cell phone. So it is recommended that smart phone should have unbreakable and scratch resistant screens so that there is no requirement of accessories to protect screen which add unnecessary weight to cell phone and make it heavy and look weird.
- Battery size should be reduced that would lessen the cell phone weight.
- Towards the concept of eco-friendliness, battery life of cell phone should be improved so that usage time could be increased and electricity consumption could be reduced. Cell phones with solar batteries should be developed
- Cell phones are prone to theft, breakage and damage or loss incidents. Hence, option of getting cell phone insured at point of sales should be offered.
- Cell phone should have sensors based on biometric identification which would start ringing as soon as some unauthorized person other than user touches the cell phone. It will help to control cases of cell phone theft.
- Cell phone users stated that they do not come to know when they have gone out of network connectivity. Hence sensor with alarm should be added as a feature which would give an indication to the user as soon as his cell phone gets out of network connectivity.
- Selfie stick is not bundled with the cell phone so it is to be purchased externally. These selfie sticks are mostly unstandardised and non-branded. Hence there is a fear in mind of customers that it might cause damage to their cell phones. Therefore, it is recommended that cell phone should have inbuilt folding selfie stick or a standardized selfie stick be provided with the product.

- Reports show that cell phone is the most unhygienic device a customer uses. So cell phone companies should offer or recommend a cleaning substance (gel/fluid etc) which could make cell phone externally germ-free.
- Customers do not come to know when their cell phone gets fully charged. Overfilled charging damages the battery and leads to electricity wastage. Moreover some incidents of blast have also been reported when the cell phone was being charged. A Sensor and buzzer should be added which would ring as soon as the cell phone is fully charged.
- Many users stated that they face the problem of battery discharge when they are mobile and sometimes they have no alternative except to carry uncharged cell phone. Multimedia activities also consume high level of battery power as a result of which battery gets discharged very fast Powerbanks that are purchased externally as an accessory are mostly 'Made of China'. They have no warranty and are unsafe to use. A portable powerbank should be provided with the cell phone to avoid such instances of inconvenience.
- There is no smart phone which a blind person could use. Smart phones should be developed specially for the blind.
- There is a problem of 'breach of privacy'. Anyone can access any type of information as soon as the phone is unlocked. Moreover the children can also undertake some mischievous activity unknowingly like deletion of some important contact number or document. Therefore functional category-wise locking facility should be provided
- Incidents of data hacking are increasing. Protection and prevention system of cell phones should be made stronger against intrusion of hackers and attack of viruses etc.
- Online shopping is very popular nowadays. But online cell phone purchases are encountered with problems like warranty by seller and not by brand, delivery of damaged/ non functional product or different product, duplicate

product, delivery of empty package etc. Such incidents should be checked and controlled by marketer and online seller as the goodwill of both the online site and cell phone brand is diminished by such incidents

- A proper grievance handling system should be generated where those complaints might be lodged which could not be settled by the service centre.
- Hadoti or Kota division is one of the fastest developing regions of Rajasthan. Recently Kota has been selected as the Smart city by Govt. of India. There are provisions for developing eco-friendly, safe and convenient set up in smart cities where citizens could access or receive messages related to their city like traffic congestion, next bus arrival time and other similar proactive messages that can alert citizens and mitigate future damages and losses. But on the other hand, they are also expected to make city cleaner and greener. This has created a need for '*smart phone inclusion*' at the bottom of pyramid, leaving ample opportunities for the cell phone manufacturers to provide a smart phone that all can afford.

Suggestions for cell phone users

Marketers can convey these suggestions to cell phone users through appropriate promotional methods.

- To ensure the safety of cell phone, a proper bill should be obtained from seller indicating correct IMEI Number and SAR value. Bill should be kept safe till the cell phone is in use. IMEI number (by dialing *#06#) and SAR value (by dialing *#07#) mentioned on the cell phone package should be matched with that mentioned of the product.
- Manual of cell phone should be properly read. Instructions of use given in user manual should be strictly followed to ensure proper functioning and long life of cell phone.
- Customers should approach the nearest service centre in case of any trouble/malfunctioning of cell phone instead of getting it repaired from any unauthorised shop/person.

- Children enjoy playing games on cell phone in course of time they become an addict of it. As a result of which they develop apathy towards playing games with friends and other activities. Prolonged usage of cell phone leads to exposure to high levels of EMR. This exposure is far more hazardous to them than adults. Therefore, children should be kept away from cell phone.
- Cell phone calls should be of short durations. Cell phones should not be used for more than 10 minutes at a time as the level of EMR increases thereafter.. Excessive use of cell phone has not only led to ill effects on health but has also resulted in social breakups and strained relationships.
- Incidents of battery blasts have been reported. One should not use cell phone when it is charging. Cell phone should be kept away from head when connecting call to someone. Speakerphone mode should be selected.
- Call should be disconnected when the signals are poor.
- Cell phones emit radiations every 30-40 seconds hence cell phones should be kept away from body parts. Wired hands-free, headphones and speakerphone should be used while communicating on cell phone.
- One should avoid using cell phones at petrol pumps.
- Cell phones should not be used while driving. As the probability of occurrence of accidents increases. Only wired handsets should be used.

5d. FUTURE IMPLICATIONS

In this work, a model for finding cell phone users' clusters has been provided. However, it would be important to see how well the clusters identified in the research generalise to other user populations. It is planned to explore this through future data collections. In addition, a series of the implications of the existence of different clusters were described, a set of changes to both research and professional practice have been proposed. In future, an attempt will be made to carry out these changes and explore what impact they have on the user experience. It is planned to recruit and screen for a particular user group, and apply the

proposed changes (suggestions, adaptations,etc.) to their cell phones, and evaluate the satisfaction level of the users.

There is also scope for conducting empirical studies related to pre-purchase behaviour, post-purchase satisfaction of cell phone users, environmental and health issues of the cell phone covering larger geographical area. A larger sample size sample could be varied to include both urban and rural population of Rajasthan and beyond.

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**CUSTOMER BEHAVIOUR OF CELL PHONE USERS – A CRITICAL
STUDY OF HADOTI REGION**

SECTION – A: Personal Details

Q. 1. Name (Optional)Mobile
No.....

Q. 2. City.....

Q. 3. Age (years)

Q. 4. Gender

1. Male		2. Female	
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Q. 5. Education

1. Uneducated/Illiterate		2. Less than Secondary	
3. Secondary / Sr. Secondary		4. Graduate	
5. Post Graduate		6. Professional	

Q. 6. Occupation

1. Student		2. Service	
3. Business		4. Retired	
5. Professional		6. Housewife	

Q. 7. Monthly income in Rs.(Family income in case of dependent)

1. Less Than15,000		2. 15,000-30,000	
3. 30,000-45,000		4. 45,000-60,000	
5. More Than 60,000			

SECTION – B

Q. 8. For how long have you been using a cell phone?years

Q. 9. How many cell phone purchases have you made till now?

.....

Q. 10. What brand of cell phone are you currently using?

1. Samsung		2. Micromax		3. Lenovo	
4. Redmi/Xiaomi		5. Intex		6. Oppo	
7. Apple/ iPhone		Other (pls. mention brand) -----			

Q. 11. How long have you been using the **CURRENT** cell phone? (Write duration and tick in Day/Month/Years option)

Duration -					
1. Day		2. Month		3. Year	

Q12. Is your cell phone, a **SMARTPHONE**?

1. Yes		2. No	
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Q 13. If it is **SMARTPHONE** then which platform do you use?

1. Windows		2. Android		3. iPhone/IOS	
4. Blackberry		5. Others (mention)		6. Don't Know	
Other platform					

Q14. Price of Mobile phone **currently owned**
Rs.....

SECTION - C

Q15. Rank the following source of information on which/whom you rely for getting information about mobile brand before purchasing. Please rank the options from 1 to 7 where Rank 1 being for the most preferred option (Highest) and – Rank 7 being the least preferred option (Lowest). **Give unique rank to each source.**

Entities	Rank
1. Friends and Relatives	
2. Advertisement/Publicity (<i>Newspaper/Magazines</i>)	
3. Advertisement/Publicity (<i>Television</i>)	
4. Website of desired mobile phone brand	
5. Customer Reviews/Feedback on websites	
6. Seller's Opinion	
7. Others (Fairs, Catalogues, Kiosks, Events)	

Q16. Rank the following mobile activities in the order of merit that influenced in selecting the present brand (From 1 to 7, where 1 being Highest and 7 being Lowest).

Mobile Activity	Rank
1. Communication (Calling/Receiving Calls)	
2. Social Networking/Instant Messaging (Facebook, Twitter, WhatsApp etc.)	
3. E-commerce (e-banking, paying bills, e-shopping)	
4. Business applications (emails, text editing, voice-mail)	
5. Internet Search	
6. Camera Resolution (Camera /Video)	
7. Entertainment (MP3/MP4/FM Radio/TV)	

SECTION - D

Q17. From where did you purchase your **current cell phone**?

1. Brand Store (Samsung, Oppo, Vivo etc.)		2. Online Shop (Flipkart, ebay, Amazon etc)	
3. Dealer		4. Retail Chain Store (Brand Stores, Reliance Digital, etc)	
5. Others (Second Hand Mobile Shop, B2B Store, Friend)			

Q 18. How long did it take to decide the brand of cell phone (time between idea of purchasing phone and actually purchase of new cell phone)?

1. Instantly		2. 1-2 week	
3. 2-4 weeks (around a month)		4. More than a month	

Q 19. Rate the following statements in concern to your purchase decision for the present brand of cellphone on 5-Point Likert Scale (Tick single rate as your response)

Ratings: (5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree)						
	Statements	5	4	3	2	1
1.	Friends/Reference groups/Family influenced my choice					
2.	Advertising provided me enough information to make final choice					
3.	Celebrity Preference/Brand Ambassador whom advertisements show using the cell phone attracted me to buy particular brand/ model.					
4.	Screen Display type (LED/LCD/AMOLED etc) was a concern					
5.	Presence of Service Centre in my city or neighboring city in Hadoti region was a concern to me					
6.	Audio and video Functions influenced my choice					
7.	Screen Size was a major criteria in making final choice					
8.	I preferred loud Speaker, ringtone volume/good Sound Quality					
9.	Internet /Wi-Fi Connectivity was important to me					
10.	Availability of colors gave options of choice to me					
11.	Aesthetics (Shape, Sleekness & Style) appealed to me					
12.	Terms of Payment (EMI etc) are an attraction to me					
13.	SAR value compliance (Electromagnetic radiations) with Indian standards and presence of IMEI No. was checked					
14.	Battery Backup was a consideration					
15.	Number of SIM usage was an important concern					
16.	Exchange/discount offers of mobile phone influenced my choice					
17.	Country of Origin or make influenced my purchase for particular brand					
18.	Operating System is a parameter of my choice set					

19.	Availability/presence of drop box of the brand for dropping discarded mobile phone (for recycling) in my city or neighboring city in Hadoti region was checked					
20.	Physical Durability was important to me					
21.	Processor & Generation(2G/3G/4G) is important to me					
22.	I preferred Torch and a camera with flash					
23.	Brand Image influenced my choice					
24.	Inbuilt Apps attracted me					
25.	Availability of Bluetooth & Infrared was a concern					
26.	Price of mobile phone influenced my final choice					
27.	Memory size (Internal/Extendable) influenced my choice					
28.	I looked for Camera Functions/Resolution in my choice					
29.	Light Weight of Cellphone influenced my final choice					
30.	Accessories offered with phone influenced my choice					
31.	FM/Radio and MP3/MP4 influenced my choice					
32.	Authorisation of Dealer was important to me					

Q20. What level do you use the following functions on your cell phone? The ratings are as follows - (5=Most often, 4= Often, 3=Sometimes, 2= Rarely and 1= Never)

Ratings : (5=Most often, 4= Often, 3=Sometimes, 2= Rarely and 1= Never)						
Functions		5	4	3	2	1
1.	SMS					
2.	Videocalling/Conferencing					
3.	Music Player/FM Radio					
4.	Wi-Fi/ Hotspot					

Ratings : (5=Most often, 4= Often, 3=Sometimes, 2= Rarely and 1= Never)						
Functions		5	4	3	2	1
5.	Video/Movies/TV-Watching/downloading					
6.	Photo/video shooting					
7.	Web Browsing (Google, Opera etc)					
8.	E-mail					
9.	Social Networking (Facebook, Twitter etc)					
10.	Instant Messaging (Whatsapp, viber, skype etc)					
11.	Apps (Playstore, IRCTC, Paytm etc)					
12.	Documents Reading/ Editing					
13.	Gaming					
14.	Voicemail via voice mail inbox					
15.	Call Recording					
16.	Maps/GPS (Searching Location)					
17.	Calendar					
18.	Calculator					
19.	Bluetooth/USB (Files/data transfer)					
20.	Mobile Banking					
21.	E-payments (mobikwik, Paytm etc)					
22.	E-shopping (Myntra, Flipkart, Amazon)					
23.	Speaker (For Music, Speakerphone)					
24.	Dictionary and Spell check					

Q21. Rate the following statements to indicate level of Post Purchase satisfaction where - (5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree)

Statements		5	4	3	2	1
1.	My Mobile phone fulfill my needs effectively					
2.	My mobile phone matches with my social status					
3.	My mobile phone matches with my personality					
4.	My mobile phone fits with my habit of use					
5.	My mobile phone aesthetics are pleasing					
6.	My mobile phone conform to claimed quality standards					
7.	My mobile phone gives me value for money					
8.	My mobile phone provides me functional/operational ease					
9.	My mobile phone accessories are easily available					
10.	My mobile phone brand provides satisfactory after sales service					

Q22. Are you aware about environment/health related issues of mobile phone?

Statements		Aware	Unaware
1.	Mobile phone emits electromagnetic radiations even when not being used in switched ON position		
2.	Mobile phone emits very high level of electromagnetic radiations when connecting call with someone		
3.	Mobile phone should not be used when its battery is being charged as it emits high level of radiations		
4.	Mobile phone should not be used when its battery power is below critical point as it emit high level of radiations		
5.	Use of Hands free while talking helps to avoid the radiations emitted from the mobile phone		

Statements		Aware	Unaware
6.	Mobile phone should be handled/kept away from the body parts to avoid radiations		
7.	Discarded mobile phones contain toxic materials like Lead and Mercury that are hazardous to both people and environment.		
8.	Discarded mobile phone can be disposed- off at collection bins of company in Brand Stores		
9.	Discarded mobile phones add to e-waste if not disposed-off properly		
10.	Parts of Mobile phone are recyclable		
11.	Mobile phone contain precious metals like silver copper etc. which can recovered and could be reused in manufacturing new mobile phones or elsewhere		
12.	If cell phone used for more than 10 minutes continuously during conversation releases burst of radiations and energy to keep link with the strongest base station.		

Q23. Have you disposed off/discarded any of your last/previously owned cell phone?

1. Yes		2. No	
--------	--	-------	--

Q24. If yes, then how did you dispose off your previously owned cell phone?

1. Sold/Exchanged		2. Lying with me idle	
3. Gave to someone		4. Dropped at Company Collection Point	
5. Lost		6. Threw if off in dustbin	

Q 25. Will you prefer to purchase an eco friendly mobile phone in future?

1. Definitely Yes		2. May Be	
3. Can't Say		4. Less Likely	
5. Never			

Q26. If definitely yes, then state the brand?- -----

Q27. If you prefer, what price (Rs.) will you be willing to purchase it for?

1. Less than Rs. 10,000		2. Rs. 10,000 – Rs. 15,000	
3. Rs. 15,001 – Rs. 20,000		4. Rs. 20,001 – Rs. 25,000	
5. Above Rs. 25,000			

Problems.....
.....
.....
.....

Suggestions.....
.....

Thanks for Your Co-operation

Annexure 2 - Choice of Brand if Eco-friendly Cell phone Purchased

Intention to Purchase Eco-friendly phone	Samsung		Micromax		Lenovo		Redmi/xiaomi		Intex		Oppo		Apple/iphone		Others	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Definitely Yes	76	31.93	31	13.02	24	10.08	16	6.72	7	2.94	11	4.62	26	10.9	47	19.74
May Be	43	28.66	17	11.33	19	12.66	7	4.66	13	8.66	9	6.00	11	7.33	31	20.66
Can't Say	18	30.00	13	21.66	6	10.00	3	5.00	4	6.66	4	6.66	2	3.33	10	16.66
Less Likely	7	25.92	3	11.11	5	18.51	4	14.81	0	0.00	0	0.00	0	0.00	8	29.63
Never	1	4.54	4	18.18	2	9.09	4	18.18	1	4.54	0	0.00	0	0.00	10	45.45

A Study of Factors Affecting Awareness of SAR Value of Mobile Phone

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Abstract

Mobile /Cell phone is an inevitable part of ones life. Once been luxury has now become necessity. But while using cell phone for talking or being connected to someone the user gets exposed to harmful Electro Magnetic Radiations. The exposure rate to these radiations vary from handset to handset. This exposure is measured as SAR value of handset or the amount of Radio frequency energy absorbed by the human body while connected on cellular network.

The Research paper aims to measure the awareness of SAR value of handset in Kota city and the factors that influence awareness of SAR value.

Keywords: EMR, DoT, SAR value, awareness.

1. Introduction

Mobile phones often referred as a **'health time bomb'** are a part of our lives to such an extent that they are not merely restricted to the elite but is also one of the most common gadget owned by almost every individual. The voice function is only one of the enticing features and but features like texting, voice calls, internet browsing, music playback, multimedia features and a host of other user friendly options embedded in the handset which adds to the reasons of its acceptability. Besides, camcorders, ring tones, games, FM radio, push to talk (PTT), infrared and Bluetooth connectivity are the features that add to their rising popularity and acceptability

To communicate with the cellular network, mobile phones emit low levels of radiowaves (also known as Radio Frequency or 'RF' energy) when being used. While

using mobile phone we are getting exposed to EMR (Electro Magnetic Radiations), which are dangerous and becoming a serious health risk Governments around the world have adopted comprehensive international safety guidelines, developed by independent scientific organizations, governing the exposure to RF energy. Mobile phones have to be designed to operate within these stringent limits as per international safety guidelines. Every mobile phone model is tested for radio wave emissions. A measurement is made using an internationally agreed method that meets government and regulatory standards. This gives the SAR value, a mobile phone's Specific Absorption Rate which is a measure of the amount of Radio Frequency (RF) energy absorbed by the body when using the mobile phone handset. It is a measure of the maximum energy absorbed by a unit of mass of exposed tissue of a person using a mobile phone, over a given time or more simply the power absorbed per unit mass of human tissue. SAR values are usually expressed in units of watts per kilogram (W/kg) measured in either 1g or 10g of tissue. While there may be differences in SAR levels among mobile phone models, all of them must meet RF exposure guidelines.

2. International Exposure limits for RF fields (1800 MHz)

12 W/m ²	USA, Canada and Japan
9 W/m ²	Australia
2.4 W/m ²	Belgium
1.0 W/m ²	Israel
0.5 W/m ²	New Zealand
0.45 W/m ²	Germany
0.4 W/m ²	China
0.2 W/m ²	Bulgaria
0.1 W/m ²	Poland, france, hungary
0.095 W/m ²	Switzerland, italy

3. Studies Being Conducted in India related to EMR-

1. Indian Council of Medical Research (ICMR) supported an animal study (2005-08) entitled "Microwave radiations effects on reproductive systems of male rats" under Prof. J. Behari, School of Environmental Sciences, Jawaharlal Nehru University, NewDelhi. Ante oxidative changes were noticed in reproductive pattern of male rates and increase in the level of CAT activity The result obtained showed that the chronic exposure to these radiations cause double strand DNA breaks in sperm cells. This study also shows that the microwave radiation exposure can cause statistically significant decrease in the sperm count and testes weight
2. To study the adverse effects of cell phone the ICMR has initiated (June, 2010) a study in Delhi to examine whether use of cell phone create risk of

neurological disorders and reproductive dysfunctions. Measurement of specific absorption rate (SAR) from various types of cell phones and power density, wave length and frequency of RFR emitted from cell phone towers is also under study. These physical characteristics of RFR will be correlated with the clinical & laboratory findings.

3. Studies conducted in Guru Nanak Dev University, Amritsar has found correlation between mobile phone use (exposure to radio frequency radiations) and DNA and chromosomal damage in lymphocytes of individuals using mobile phones which may have long-term consequences in terms of neoplasia and/or age-related changes (Gandhi & Anita, 2007)⁸⁰. Exposure to radiofrequency radiations has been reported to affect physiological, neurological, cognitive and behavioral changes. (Gandhi et al. 2005).
4. **PGIMER, Chandigarh**, has conducted a study (Panda et al., 2010) and recommended following criteria's for the release of harmful rays from mobile phones.

- Mobile phones should not be used continuously for more than one hour in a day.
- Hands free technology to be used where excessive use of the mobile phone is unavoidable. This includes use of microphones and Bluetooth so that the handset remains away from the ear and thus avoids the direct impact of harmful electromagnetic radiations on the ear and the brain.
- People to avoid long talks and discussions on mobile phones as far as possible.
- On January 25, 2012, all indigenous manufacturers of handset were instructed by the Department of Telecommunications of India to make necessary changes in the design, software and packaging of their respective handsets. in compliance with these instructions by September 1, 2013. To regulate indigenous as well as imported mobile phones, the Bureau of Indian Standard (BIS) has been asked to frame standards for all mobile phones under the BIS Act 1986. All cellphone handsets sold in India will comply with relevant Bureau of Indian Standard's (BIS) benchmark, handsets will be covered by BIS standards and the DoT needs to approach them; however there are no provisions for such compliance under the Indian Telegraph Act.

It has therefore been decided that suitable amendments in the Indian Telegraph Rules under the Indian Telegraph Act 1885, shall be enacted so that government can enforce mandatory certification of SAR limit on mobile handsets. The DoT (Department Of Telecommunications) has also set a deadline that after September 1, 2013, only handsets with revised SAR value of 1.6 watt/kg averaged over 1 gram tissue would be permitted to be manufactured or imported. Compliance with the new norms will make Indian telecom regulations 10 times more rigid than they are in over the 90% of the countries across the globe.

Because of the everyday reliance on cell phones for business and lifestyle – people are unlikely to give up the use of their cell phones in the immediate future. Some important findings are:

- Nearly 4 new mobile phone subscribers added every second
- Mobile Phone sales to hit 206 million units by 2014
- There are 13 million cell phones sold every month in India
- India is World's Fastest Growing Mobile Phone Market: IDC Report
- Mobile Handset sales in India could top 322 million by 2015 –Technology Researcher, Gartner

The only alternative to avoid exposure to EMR is – The use of a scientifically-proven device that effectively neutralizes the effects of harmful radiation.

4. Literature Review

A survey with questions about SAR concern, SAR knowledge, importance to purchase decisions and ways to reduce exposure was developed and surveyed by commercial survey company (Circle Research, London, UK). In Australia, Brazil, Chile, France, Germany, India, Japan, Switzerland and the USA survey was conducted in order to provide a wide geographic spread and to include countries with recent interest related to expanded consumer access to SAR information (France, India, USA) and countries with existing voluntary initiatives related to SAR information (Germany, Switzerland). Results showed that consumers do not understand the SAR concept and it was the lowest ranked factor in purchase decisions. The most important factors in purchase decisions were network quality, phone experience and cost. For the small proportion of persons interested in SAR information almost half would seek this information from Internet searches, handset manufacturer websites or manuals and less than 20% would look for the information in retail outlets. Given the low understanding of SAR and low awareness of measures available to individuals to reduce their exposure, provision of information via websites and handset manuals, where supporting explanatory information can be supplied, are likely to provide the most effective consumer communication channels. (Jack Rowley, Chris Althaus, Michael Milligan)

5. Objectives Of Study

The Present study aims at analyzing the consumer awareness level as regards to the Specific Absorption Rate (SAR) of mobile phone users in Rajasthan. It will also help in understanding the influence of SAR values during purchase of mobile phone. The main objectives of study are as follows:

- To study Specific Absorption Rate (SAR) and its awareness among mobile phone users.
- To study the factors that influence mobile phone purchase behavior.

6. Research Methodology

The study is based on primary survey of 200 respondents belonging to kota city, using a structured questionnaire. The questionnaire was designed to record the responses on awareness of SAR values.. The socio-demographic profiles of the respondents were also recorded on the parameters such as gender, age, education level, occupation and monthly income. Simple data analysis techniques were adopted such as descriptive statistics; cross tabulation and chi-square test using SPSS 15.0. The Regression Model has been used to analyze the factors influencing the awareness level of consumers on SAR value.

7. Hypotheses

Gender has significant difference in awareness of SAR (Specific Absorption Rate) of mobile phones.

Occupation has significant difference in awareness of SAR (Specific Absorption Rate) of mobile phones.

Education has significant difference in awareness of SAR (Specific Absorption Rate) of mobile phones.

Age has significant difference in awareness of SAR (Specific Absorption Rate) of mobile phones.

Monthly Income has significant difference in awareness of SAR (Specific Absorption Rate) of mobile phones.

8. Discussion

8.1 Socio-Demographic Profile of Samples

Table 2 provides awareness of SAR value across socio-demographics of sample respondents. Of the total 200 respondents surveyed, 62 respondents had awareness of SAR values of mobile phone i.e. 31.% of total respondents. Males are comparatively more aware than females. This could certainly be interpreted by higher male literacy as compared to female literacy in the studied area. The majority of the respondents who were aware of SAR values were in the age below 45 years

Table 1: Demographics of Respondents.

Demographics	Frequency	Percentage %
<u>Gender</u>		
Male	121	60.5
Female	79	39.5

<u>Occupation</u>		
Students	42	21
Service	71	35.1
Business/trade	63	32.5
Housewife	14	7
Retired	10	5
<u>Education</u>		
< Secondary	2	1
Secondary/HigherSecondary	31	15.5
Graduated	76	38.0
Post graduate	64	32.0
Professional Study	27	13.5
<u>Age</u>		
<25	48	24
25-35	52	26
35-45	50	25
45-55	29	14.5
>55	21	10.5
<u>Monthly Income</u>		
<10,000	47	23.5
10,000 – 20,000	74	37
20,000 – 30,000	51	25.5
30,000 – 40,000	19	19.5
>40,000	7	3.5

Table 2: Awareness of SAR value.

<u>Demographics</u>	Awareness		Chi Square
	Aware	Unaware	
<u>Gender</u>			
Male	39	82	8.252
Female	23	56	Accepted

<u>Occupation</u>			
Students	20	22	24.641 Accepted
	30	41	
Service	9	54	
Business/trade	2	12	
Housewife	1	9	
Retired			
<u>Education</u>			
< Secondary	0	2	39.542 Accepted
	5	26	
Secondary/HigherSecondary	22	54	
Graduated	20	44	
Post graduate	15	12	
Professional Study			
<u>Age</u>			
<25	13	35	20.353 Accepted
25-35	22	30	
	18	32	
35-45	10	9	
45-55	9	12	
>55			
<u>Monthly Income</u>			
<10,000	5	42	13.865 accepted
10,000 – 20,000	25	49	
20,000 – 30,000	25	26	
30,000 – 40,000	5	14	
>40,000	2	5	

9. Discussion

Education plays important role to enhance awareness among people. The results of chi-square tests revealed significant difference in education levels between those aware of SAR value and non-aware ($=39.542$, $p<0.10$), which implies that educated people are

comparatively more aware of SAR. It is also evident that about 11 percent respondents, with awareness on SAR values, were educated upto graduate level education. As for as occupations & income level of the consumers are concerned, majority of the respondents belong to service class and higher income levels and had higher level of awareness of SAR values

Table 3: Factors influencing Purchase of handset.

Factors	Very Important%	Important %	Can't Say%	Not Important %	Not at all Important %
Cost of handset	50	35	0	13	2
Battery Life	4	12	10	45	29
Handset Brand Reputation/ Goodwill	44	32	5	15	4
Screen Size	9	29	23	32	7
Ease of Use of handset	54	33	2	11	0
Specifications of camera	44	25	19	7	5
Applications	36	24	18	20	2
Handset Appearance	30	30	4	21	15
Ability of Internet Access	24	29	15	24	8
SAR Value/ Radiation Info.	5	4	80	11	0
Previous Experience of brand	45	54	0	1	0

10. Discussion

SAR value as a factor to influence purchase decision had very scarce % of respondents. 99% of the respondents gave due consideration to their previous experience of brand followed by 85% respondents who said that they give they consider cost of handset while purchase of handset, while only 9% .

On applying paired correlation highest positive correlation was found between cost of handset and previous experience of Brand while highest negative correlation was found between SAR value and previous experience of Brand.

Table 4: Regression Model Factors affecting consumer's awareness on SAR values.

	Beta	Standard error	Exp Beta	Sig.
Gender	0.698	.422	0.098	0.098
Occupation	0.514	.408	.205	0.205
Education	1.397	.426	4.043	.001
Age	0.580	.494	1.786	.240
Monthly Income	0.713	.413	2.040	.084
Constant	-3.092	0.633	0.045	0.0

The purpose of this nine country study was to assess

Factors Affecting Consumers' Awareness of SAR values of mobile phones

The Regression Model has been used to analyse the factors affecting consumer's awareness on SAR values. This model estimates the relationship between socio-demographic profiles of the consumers and SAR value concerns. Findings of regression analysis indicate that gender, education level, monthly income level were important socio-demographic factors affecting the awareness level of the consumers. Result indicates that male are more likely to be aware than female. Education of the consumers have significant role to play on awareness level. Consumer with monthly income of more than Rs. 10.000 to 30.000 are two-times more likely to have awareness on SAR values.

R- square was 0.524. Chi square was 98.6

11. Conclusions and Suggestions

From September 1, 2013 onwards it will be mandatory for every mobile phone brand to disclose the SAR value of respective handset which could not be more than 1.6W/Kg. Hence as the study suggest there is a need to create awareness about it. The SAR value information of the mobile handset should be available on the manufacturer's website and in the handset manual. The information on SAR values shall also be made available to mobile subscribers at the handset point of sale.

Further, all mobile handsets manufactured and sold in India or imported from international destinations shall be checked for compliance of the SAR limit.

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A Study of Awareness of Eco-friendly Aspects of Cell phone

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Abstract— Cell phone or mobile phone is the buzz word of young generation of today's world. Manufacturers and marketers must take into account customers' awareness and appreciation of the benefits of green/eco-friendly aspects of cell phone which often influences their purchase. Marketer can adopt green marketing strategies and may gain competitive advantage. The purpose of this paper is to examine the awareness of eco-friendly aspects of cell among college students. Design/methodology/approach – Based on a review of literature, particularly cell phone the green aspects of cell phone were collected and organised in form of a self administered questionnaire. The data was collected from 100 cell phone users who were management students. The sample was selected on the basis of random sampling. Findings – Customers' green values should be well understood while planning marketing strategy for a cell phone. Green marketing arguments should be communicated to customers in a coherent, to avoid customer skepticism or disbelief.

Key words: Mobile Phone, Environment and Health Concern, Awareness

I. INTRODUCTION

Today, “green” is used to refer to new technology and new products that have a sustainable impact on nature (Henri Simula, Tuula and Jari Salo, 2009). A research in U.S. reveals when it comes to social cause and the environment, the environment remains prime concern for the customer laying enormous opportunities of gaining competitive advantage for a marketer.

This paper takes green perspective of cell phone and examines the awareness of eco-friendly and health aspects of cell phone among college going cell phone users. The overall purpose of this paper is to determine the “green awareness” among them.

II. HEALTH & ENVIRONMENTAL ISSUES OF CELL PHONE

Marketing is in charge of collecting market data but is also responsible for disseminating information about the impact of products on the environment and society (UNEP, 2007).

A. Health impact

- The effect of mobile phone radiation on human health is the subject of recent interest and study. Mobile phones use electromagnetic radiation in the microwave range 800 – 1800 Mhz.. Other digital wireless systems, such as data communication networks, produce similar radiation.
- The WHO has classified mobile phone radiation on the IARC scale into Group 2B - possibly carcinogenic. That means that there "could be some risk" of carcinogenicity,
- Exposure to toxic substances like lead, copper, arsenic, zinc, cadmium, PVC while handling

B. Environmental impact

- Conventional cell phone utilizes non renewable resources like nickel, lead, zinc, cadmium, mercury, poly vinyl chloride (PVC), brominated flame retardants etc.and precious metals like silver.PVC is burnt to recover copper from wires which release harmful gases in environment.
- Incineration of disassembled part releases highly volatile matter in air.
- The e-waste contains toxic materials such as Lead and mercury that are hazardous to both people and our environment. When these toxic elements mix with the soil and water, they affect the health of Humans, Animals and Trees. Cell phone waste is trashed, land filled which results in loss of precious metals. More than 150 million mobile phones are scrapped every year and only 20 percent of these mobile phones are recycled. So assume the amount of e waste that is generated and added to already existing pool of e waste. The more critical state is that this e-waste lies unattended.
- There is problem of mixing toxic minerals with soil and water through leachate.

C. Green cell phone

A green cell phone includes:

1) *Recyclable or renewable material of cell phone* –

Recyclable materials can be put back into circulation, reducing the health risks to the community. The materials that are contained in old cell phones can often be recycled and reused to make a variety of other products. Recycling may include disassembly and shredding. Disassembly is disassembly of packages and plastics that may be incinerated. Shredding includes recovery of metals and minerals that may be utilized in future. Sometimes cell phone companies assign recyclable job to another company that qualifies to recycle them by collecting used cell phone from customers, rather than customers wrestling with disposal guidelines themselves, it is often much easier to just sell or donate old cell phones to company so assigned

2) *Design Process*

Considerations during material choice stage of design process for enhancing recyclability and disassembly of cell phone during end of life stage; striving for minimized material and energy usage at all stages of the life

3) *Use of non-toxic chemicals*

several researches reveal that conventional cell phone are made of toxic chemicals that contain lead, nickel, bromine, chlorine, phthalates. Antenna of cell phone contains highest bromine which is 10% by weight. Headphone contains PVC with phthalates over 1-5% by weight. Material usage decisions focus on elimination or reduction of use lead and other toxic chemicals to their lowest levels.

4) *Low Power Chargers* –

Most cell phones don't even come close to being green — their chargers are energy inefficient, they contain hazardous chemicals, and they are not designed for upgrading or easy recycling. Low power chargers consume less power in charging a mobile phone thereby saving energy. That signifies they do not require to be charged as considerably, so chargers are not left on for so prolonged thus wasting energy.

5) *Solar powered cell phone* –

These cell phone are fitted with solar rechargeable battery. Power is generated through solar battery

III. RESEARCH METHODOLOGY

Based on a review of literature, the green aspects of cell phone were collected and organised in form of a self-administered questionnaire.

A. *Sample Size and Sampling Techniques*

The data was collected from 100 cell phone users who were management students. The sample was selected on the basis of random sampling.

B. *Findings*

The table given below shows the demographic profile of the respondents.

Gender	%
Male	59
Female	41

Table 1: Demographic Profile

Table 1 shows 59% of the respondents were male and 41% respondents were female

Fact	%
Mobile phone emits electromagnetic radiations even when not in use	66
Mobile phone emits higher range of electromagnetic radiations when connecting call with someone	59
Mobile phones emit high level of radiations when its battery is being charged.	64
Mobile phone emit high level of radiations when its battery power is below critical point	53
Radiations emitted from the mobile phone can be avoided while communicating with someone with use of Hands free	48
Mobile phone should be handled/kept away from the body organs to avoid radiations	76
Discarded mobile phones contain toxic materials like Lead and Mercury that are hazardous to both people and environment.	56
Discarded mobile phone can be disposed- off at collection bins of company in Brand Stores	24
Discarded mobile phones add to e-waste	65
Mobile phones are recyclable	56
Mobile phone contain precious metals like silver copper etc. which can be recovered and reused	33
If cell phone used for more than 10 minutes as thereafter it releases burst of radiations	47

Table 2: Level of Awareness regarding environment and health issues of mobile phone

Calculating mean of total awareness $647/12*100=53.9$

The total average awareness for different environment and health issues concerned with mobile phone is 53.9%.

Table 2 shows that 66% of the respondents are aware that mobile phone emit radiations. Only 48% of the respondents were aware that hands free should be used. About 47.5 % respondents said that they are aware that mobile phone should not be used for more than 10 minutes.

The average awareness for environment and eco friendly concern among users shows that there is lack of awakening among users and in order to create a healthy environment there is a need to disseminate the pattern of healthy mobile phone use among the consumers.

IV. CONCLUSION

Mobile phone has nowadays become necessary evil as it has taken place of several other gadgets with only one gadget. But at the same time while utilizing its benefits one should also be aware of its darker side and try to curb it from becoming a curse. The marketers should assess the awareness of users for eco-friendly and health issues of the cell phone so that the marketing strategies could be designed as per the target market and healthy way of using cell phone could be created.

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