

PURCHASE INTENTION AND BRAND SWITCHING BEHAVIOUR WITH RESPECT TO ECO-FRIENDLY MOBILE PHONE

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ABSTRACT

Mobile 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 mobile phones are also called cellphone. There is rising concern for environment and health on account of mobile phone. Mobile phone emits electromagnetic magnetic radiations (EMR) when in use. These EMR have been categorized as 2B (ie carcinogenic) by WHO. With respect to a mobile phone these EMR are measured in terms of SAR (Specific Absorption Rate) value. E-waste being created from not in use or discarded mobile phones is also of great concern as mobile phone e-waste contains harmful minerals like lead and mercury which is harmful for both health and environment when land filled or incinerated. So there is need for the customers to purchase eco-friendly and green mobile phones and support green marketing of manufacturers. In exploring the green behaviour of consumers towards mobile phone, focus of marketing research also involves examining their green purchase intention and brand switching behaviour. This research paper aims to evaluate the purchase intention of customers for eco-friendly mobile phones and examine the brand switching behaviour.

Keywords: 4Generations, WHO, Specific Absorption Rate, EMR, E-waste.

Introduction

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. Huisman et al. (2007) suggested that the most frequently sold appliances into households are mobile phones. With 7.6 billion mobile subscriptions worldwide till January 2017 telecommunication industry is growing at a rapid rate. There were over 1,162.20 million wireless subscribers at the end of Nov-2017 (TRAI) which accounts for 85% of the Indian population and about 15% of the world's online population. 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.

India is divided into 22 telecom circles and Rajasthan where the study was conducted is the 9th largest wireless telecom circle in India accounting for about 6% of the total subscribers in India. (TRAI, Nov 2017). IDC Quarterly Mobile Phone Tracker Report states 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. Falling call rates and unit prices of handsets, need to upgrade to smartphones with 4G LTE capability and desire to own a phone with 'better memory, storage or battery capacity.' are driving demand for mobile phones in India. This amazing mobile transmission technology characterized by rapid technological change has not only made life very fast but has resulted into frequent replacement of old ones with new technology based cell phones by the users. It has led to shortening of lifespan of cell phones. The average life of a cell phone in India has reduced to 17 months. As a result of this remarkable growth in the use of mobile phones, large quantities of electronic waste or e-waste are generated at their end-of-life (EoL).

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It is noticed in India that old but functional cell phones are kept as back-ups, sold or handed over to others or exchanged for a discount on a new cell phone. But non-functional mobile phones are stockpiled at their end of life either for the sake of emotional attachment of the consumers or due to absence of post-Consumer Waste Recycling and Optimal Production mechanism for disposed of cell phones.

Recyclable or renewable material of cell phone can be put back into circulation, reducing the health risks to the community. One mobile phone contains more than 30 elements precious metals like gold, cobalt, palladium, and rhodium (Schmidt, 2006). Cell phones are made up of toxic chemicals that contain lead, mercury, nickel, bromine, chlorine, phthalates. Headphone contains PVC with phthalates over 1-5% by weight. Mobile phone release dangerous toxins into air when incinerated improperly. On the other hand mobile phone also contains precious metals like gold, cobalt, palladium, and rhodium (Schmidt, 2006). Such materials 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 and thus reducing landfills. Shredding includes recovery of metals and minerals that may be utilized in future.

The biggest obstacle in recycling is the lack of consumer awareness and indifference towards firms adopting green marketing and offering eco friendly products, leading to low collection amounts for recycling. Without returning products for recycling the next phases, technical recycling processes, cannot take place. Like any other technology its excessive use and absurd usage habits are also likely to cause harm. It is for this reason that cell phones are often referred as a '**health time bomb**', which while communicating with the cellular network emits low level of radio waves (also known as Radio Frequency or 'RF' energy or EMR). Hence, one gets exposed to these EMR (Electro Magnetic Radiations) or MPR (Mobile Phone Radiations) which may be dangerous and become a serious health risk.

Mobile phone market is characterized by rapid technological change as a result of which the dependence on the cell phone is also increasing exponentially. Although there is consensus among researchers on the concern that radiations emitted by cell 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. A significant number of individual, epidemiological and experimental research studies also suggest inconclusive causative relationship between exposure to cell phones and harmful biological effects in humans. However, 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 was preferred for cell phone use."

Green Marketing

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 minimising 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.

A model of a green marketing-mix of an 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. 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 utilises 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 utilised 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 minimised 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 – These cell phone are fitted with solar rechargeable battery. Power is generated through solar battery. Standardised 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.

Review of Literature

Cell phone based on information and communication technology has become indispensable part of life and has proved to be a panacea over the years. But at the same time studies show that it may cause harm to both health and environment. Some studies associate cell phone usage and purchase

intention. Purchase intention for eco-friendly mobile phone indicates the cognition among respondents for the risks associated with cell phone due to its electromagnetic fields (EMF). Similarly, method of disposal of mobile phones in the context of sustainable electrical and electronic equipment waste management with respect to a mobile phone is also reflected.

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. Panda et al. (2010) administered a study at PGIMER, Chandigarh, which recommended following two ways 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.
- 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 (Specific Absorption Rate). According to the results of survey very little awareness exist about SAR value and about 88% of the respondents were not aware of what SAR means in terms of MPR.

Janet Speake & Leopoul Nchawa Yangke surveyed 250 people in Liverpool UK using mixed methods quantitative and qualitative approach to investigate their attitudes and perspectives towards use and disposal of mobile phones. Most people change their phones every one to two years. However, despite asserting that mobile phones should be recycled, repaired or reused, and demonstrating awareness of the hazards and toxicity of mobile phones, 86% of people store their 'retired' phones, with almost half, having three to four phones stockpiled. The small size and light weight of mobile phones make stockpiling an easy option and create obstacles for 'take-back' and other more formal ways of reuse or recycling.

Li, Yang, Song and Lu (2012) conducted an online survey among university students in China to identify the disposal behaviour and awareness of sustainable management of retired mobile phones. The results showed that about 22% of the respondents replaced their mobile phones annually, while most respondents replace their phones in 2-3 years. The most common reason for mobile phones replacement was physical broken. 64% of the respondents stockpile their most recently retired phones mainly due to lack of formal management system. The survey results on mobile phones consumers' environmental awareness also can help improve the policy-making. Nearly 50% of the respondents believe the recycling cost of the retired phones should be shared by all the stakeholders.

Yin, Gao & Xu conducted a questionnaire survey was performed in China to explore consumers' behaviours, attitudes and willingness to pay (WTP) for recycling waste mobile phones. The responses of 1035 respondents were analysed using principal component analysis and multinomial logistic regression analysis. The results reflected that the actual service life of cell phones in China is generally shorter than three years. Due to the current level of economic development and the traditional concept, only 47.9% of consumers agreed to pay for waste mobile phone recycling, and most consumers' WTP was 0-5% of the recycling costs. The main factors affecting the consumers' WTP were region, education level and monthly income. Need for improving public environmental awareness, it may be possible for consumers to afford recycling fees

Ongando F.O., Williams I.D (2011) conducted a survey of students at 5 UK universities to assess their behaviour with regard to their use and disposal of mobile phones. The findings indicate that many students replace their phones at least once a year; replacing broken phones, getting upgrades from network operators, remaining "fashionable" and a desire to have a handset with a longer battery life are the main reasons for such rapid replacement. Almost 60% of replaced phones are not sent to reuse or recycling operations but are stockpiled by students mainly as spare/backup phones.

An increase in brand choice and purchase intention has enabled mobile firms to innovate new features and include eco-friendly aspects in mobile phones. In this context multiple companies have introduced new smartphones, thereby gaining customer satisfaction and loyalty (Ganesan and Sridhar, 2014). According to Nowlis and Simonson (1996) product features get more customer attention and this leads to offering them greater choice in the product selection. Keaveney (1995) uses a generalized model to examine consumer-switching behavior across a broad spectrum of service providers. The Keaveney's (1995) model includes eight factors influencing service switching: pricing, inconvenience,

core service failure, response to service failure, service encounter failure, competition, ethics, and automatic switching. Agha, Haider, Kakakhel, & Murtaza (2012) studied the brand switching behavior of mobile phone customers. The study revealed that technology advancement is the major factor to switch the brand and model among students and professionals. Thus a gap was identified to study brand switching behavior with respect to green marketing.

Objectives of the Study

- To investigate the purchase intentions of customers for eco-friendly cell phones.
- To study the brand switching behaviour of cell phone users during purchase of eco friendly mobile phone

Methodology

The study was conducted in the state of Rajasthan. A self structured questionnaire was used to ask the purchase intention for eco friendly mobile phone. 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 with respects to purchase intention.

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. A 1-5 scale ranging from definitely yes to never was used to measure the purchase intention. The meaning of eco-friendly phone explained to them before asking the questions.

Table 1 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.

Table 1: 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

ANOVA has been administered to find if there is a significant difference between intention to purchase an eco-friendly cell phone within different groups.

Table 2: 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			

The F critical value in table = 4.69 at 0.1% level of significance is smaller than calculated F value (F=9.47, $p < 0.001$) which shows failure to accept *null hypothesis*. Therefore the test result shows a significant difference in the intention to purchase eco-friendly cell phone between the groups.

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 mobile phone. Table 3 indicates the brand that they would prefer to purchase as an eco-friendly mobile phone.

Table 3: Choice of Brand as an Eco-friendly Cell Phone

To	Samsung	Realme	Lenovo	Redmi	Vivo	Oppo	Apple	Others
From	N	N	N	N	N	N	N	N
Samsung	42	6	9	1	0	6	9	3
Realme	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
Vivo	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 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 table3 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 Realme.

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: Table of Transition Probabilities

Brands	Samsung	Realme	Lenovo	Redmi	Vivo	Oppo	Apple	Others	Probability of Gaining from other Brand
Samsung	.55	.07	.11	.01	0	.07	.11	.03	
Realme	.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	
Vivo	.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	

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Probability of Losing to other Brands

In the above table 4 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 0.55 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 0.07 probability of losing its customers to Realme. Similarly, there is 0.11 probability of losing customers to Lenovo and about .01 probability of losing to Redmi.

About 32.25% of existing consumers of Realme said they would repurchase an eco-friendly cell phone as Realme brand. Hence, it has 0.32 probability of retaining its customers. It has 0.19 and 0.09 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 0.29 probability of retaining its customers. It has 0.20 and 0 probability of losing its customers to Samsung and Realme 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 Vivo 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.

Discussion

The study established that majority of the consumers were largely ignorant about the environmental and human risks associated with mobile phone e-waste hence the casual approach in the disposal of retired handsets. Similarly, the level of education and awareness on the wasted opportunities associated with lack of mobile phone e-waste recycling was quite low and needs to be addressed through increased green marketing by manufacturers. Test result shows that there is a highly significant difference in intention to purchase eco-friendly cell phone among different groups. 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.

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