

Internet of Things and Changing Consumer Behavior in Bottom of the Pyramid Segment for Technology Innovation

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Abstract

This qualitative research conducted under a hermeneutic inquiry framework interprets the expressed responses of the customers belonging to the bottom of the pyramid (BoP) for exploring the role of the Internet of Things (IoT) in their lives. IoT includes technologies and devices for ubiquitous connectivity. Many technologies and devices are available to consumers, but consumers have adopted mobile technology because of its cost and user-friendliness. It is interesting to interpret the utility of IoT for the BoP customers and understand how this technology influences their lifestyles and purchase decision-making process. Based on seven interviews and online focus group sessions, the study inferred that IoT has functional and symbolic utility for customers. IoT-induced lifestyles also affect the BoP segment. Although upper-income strata have adopted this lifestyle, understanding how BoP responds to it may bring more insight into the phenomenon. These products and technologies have a symbolic and hedonistic value for BoP customers. In a world of mediatized global consumers, the BoP segment is becoming more knowledgeable about the global trends through the internet and smartphones, and ultimately their insights can help marketers and entrepreneurs develop sustainable technological innovations.

Keywords: *Internet of Things (IoT), Changing Consumer Behavior, Bottom of the Pyramid (BoP), Technology Innovation, Hermeneutic Inquiry.*

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Introduction

The BoP Context

Major characteristics of the BoP market include unimpressive market infrastructure, low purchasing power of customers, and unmet basic needs (London, Anupindi & Sheth, 2010). Needs are states of felt deprivation, and a customer is motivated to satisfy his/her need (Kotler & Armstrong, 2016). Marketers tend to create offerings that satisfy the unmet or unsatisfied needs of the customers. However, the economic theory states that unmet needs do not constitute a market unless and until they become demand (Garrett & Kernani, 2010). Demand is backed by purchasing power; hence, a market will exist if the customer has the willingness and the ability to make a purchase (Kotler & Armstrong, 2016).

Researchers have estimated that nearly 60% of the global population constitute the invisible BoP (Chikweche & Fletcher, 2012). Its invisibility is because most of the BoP customers and suppliers are active in the informal sector. The lower tier of the socioeconomic pyramid is active in the illegal informal sector of the economy (London, Anupindi, & Sheth, 2010). Obtaining secondary data from the informal sector is quite challenging (Chikweche & Fletcher, 2012). Since the late 1990s, marketers have a fair idea about the BoP market's potential and size. Researchers have estimated BoP as a trillion-dollar market, with Asia having the largest share of this value. Asia constitutes more than 70% of the global BoP market (Guesalaga & Marshall, 2008). This market potential made economic sense to organizations that wanted to grow by tapping the economic potential of the BoP segment.

Many global technology giants found the developed countries' markets very competitive. Thus, they started focusing on emerging economies and low-income countries, targeting the BoP segment with many potentials (Baishya & Samalia, 2020). Research on consumers in the BoP segment of developing markets is relatively less established and mostly appears to be conceptual and qualitative (Howell, Sinha, Wagner, Doorn, & van-Beers, 2020). Thus, this paper integrates four domains of study and theoretically contributes to innovation and technology theories (in the context of IoT and innovations), consumer behavior theories, demand and consumption theories of economics, and BoP theory (used for entrepreneurial marketing and other disciplines) in the context of an emerging market of South Asia.

Understanding Internet of Things

Internet of Things (IoT) are devices that connect to the internet (Meola, 2016). As technology is advancing, the services of Broadband Internet are becoming widely

available. Consumers can connect devices with Wi-Fi and Bluetooth with the internet at an economical cost. Besides computers and smartphones, which are the traditional devices connected to the internet, the IoT will enable items such as but not limited to kitchen appliances, diagnostic tools and automobiles to be connected to the internet. Also, IoT enables an extension of connectivity of networks and computing ability of devices to machines and computers.

The IoT includes technologies and devices for ubiquitous connectivity (Meola, 2016). The diffusion of technology has made the world 'smarter' (Rose, Eldridge, & Chapin, 2015). IoT has revolutionized e-commerce and has made consumers' online shopping experience more meaningful (Fu et al., 2020). The security and privacy features of various gadgets have enhanced users' trust (Tewari & Gupta, 2020). Extant literature suggests that the literacy level, sound infrastructure are important to the adoption of modern technologies. The literacy rate of Pakistan's BoP segment is poor, and the fracture of Pakistan is not well developed. Thus, there is a need to investigate the factors that have motivated the lower economic segment of Pakistan to adopt digital technology. IoT has applications in all the fields of knowledge, including healthcare (Darwish, Hassanien, Elhoseny, Sangaiah, & Muhammad, 2019); agricultural supply chain (Luthra et al., 2018), and sustainable supply chain for industry (Manavalan & Jayakrishna, 2019; shaikh, 2017).

This research aims to explore how the advent of IoT is changing the lifestyles and decision-making of the BoP segment in the urban areas of Pakistan. What is the utility of IoT for BoP customers? How has the adoption of digital technology changed the decision-making of BoP customers? How is the IoT changing the lifestyle of BoP consumers? How BoP consumers' insights assist entrepreneurial marketers in improving the features and services of their products and developing sustainable competitive advantages through redefined or radically redesigned technological solutions?

Literature Review

The Influence of IoT on BoP Consumer Behavior

With the popularity of internet technology, many businesses are expanding their scope globally. Thus, customers worldwide can choose various products by making payments through internet options or cash-on-delivery models. Globalization created a world characterized by the homogeneity of product offerings and a ubiquitous presence of global goods (Belk, 2006). The internet is now accessible to consumers globally and has made the world smaller. Consumers' exposure to IoT has now significantly changed their lifestyles and desire for products and services available globally (Belk, Ger & Askegaard, 2003).

The economically deprived persons who had exposure to the internet either at work or other places are also experiencing transformations in their choices of products and services. Their desire to indulge in conspicuous consumption increased because of the greater exposure to global lifestyles through information gathered through the internet and digital technologies.

The Utility of IoT for BoP Customers

Information Search

The IoT comprises of various technologies, as discussed earlier. The technology that has reached the BoP market includes digital communications through smartphones (Deshwal, 2016). Smartphones have greatly facilitated the customers in searching for information at economical costs. Extant literature has originally studied this phenomenon in relatively affluent customer segments. But researchers are now also examining it in the BoP context. For example, De Silva, Ratnadiwakara, and Zainudeen (2011) found the BoP customer is also using smartphones to search for products and services at affordable prices.

Facilitating the BoP market

In rural areas, women in the handicrafts business now extensively use smartphones to connect with distant markets (Leavy, 2014). The mobile phone has revolutionized the way people interact and conduct business (Verma & Bhattacharyya, 2016). Communication has become faster, and its reach is longer. Marketers and customers efficiently exchange images of products through ICT. This exchange facilitates consumers in finalizing their purchase decisions (Verma & Bhattacharyya, 2016).

It has been researched in the BoP markets of India that the BoP supplier who is involved in the creation of value is making use of the internet technology to facilitate transactions (Tarafdar, Anekal, & Singh, 2012). ICT has positively influenced the development of BoP markets by making valuable, timely, and accurate information available to the BoP supplier and the customer (Tarafdar, Anekal, & Singh, 2012).

e-Choupal is a successful example of how ICT has transformed the lives of the rural farmers belonging to the BoP segment of India. It is a privately operated grains exchange (Tarafdar, Anekal, & Singh, 2012). It facilitates the farmers by making a virtual connection between them and the global farming world through the internet and computers. This connection helps farmers obtain the prices of crops and update themselves about the developments in farming technology (Bhatia & Ritchie, 2015).

Democratization of Knowledge and Skills

One important utility of the IoT in BoP is the democratization of knowledge distribution. With the advent of smartphones, the world of knowledge has opened its doors for all. Uneducated people can also benefit from free online courses developed in a language they can understand (Verma & Bhattacharyya, 2016). Similarly, consumers of entrepreneurial marketers take advantage of open-source technologies in information technology (IT). The analogous terms coined by different researchers include democratization of innovation and democratization of data (Marr, 2017).

Influence of IoT on BoP Customer Lifestyle

Social Shaping of Technology Theory

The theory of the social shaping of technology states that the design and use of technology is a social and cultural phenomenon. Therefore, products developed for the less economically developed world differ from those developed for the economically developed world (Arora, 2016). Product development is successful when it delivers providing customer value (Kotler & Armstrong, 2016). It is a misconception that economically challenged customers purchase necessities only. The needs of BoP customers are specific, yet they are not always for essentials (Angot & Plé, 2015). BoP customers purchase feature phones and smartphones, and they prefer to have useful features in mobile phones (Angot & Plé, 2015).

Novel Way to Experience Leisure

On the one hand, customers globally have been focusing on the value of entertainment and gratification from their purchases. On the other hand, marketers are trying to build hedonism in their value propositions (Kotler & Armstrong, 2016). Similarly, the customers spend their leisure time on social media, virtual gaming, building and maintaining virtual relationships (Deshwal, 2016). To cater to this lifestyle, marketers have marketed apps (applications). Communication, games, multi-media, travel, and utilities are being accessed and used through apps. These apps are not just limited to mobile apps. They are found in smartwatches, cars, and other items as well (Deshwal, 2016).

Relationship Maintenance

One empirical study conducted on the BoP segments in Bangladesh, Pakistan, India, Sri Lanka, Philippines and Thailand found that young males with secondary education own mobile phones. They perceive that these phones have an impact on the social and economic aspects of their lives. They can communicate in case of emergencies (De Silva, Ratnadiwakara, & Zainudeen, 2011). Consumers in the BoP segments of Bangladesh, India, Pakistan, Philippines and Thailand purchase mobile phones mainly due to peer

pressure. De Silva, Ratnadiwakara, and Zainudeen (2011) stress that consumers have special groups and friends with whom they interact frequently. To cater to these consumers' needs, mobile service providers have successfully marketed special group packages for families and friends.

Research Gap

The adoption of internet technology depends upon literacy, computer skills, and financial resources. Earlier researches have concluded that the emerging Asian telecom users are different from telecom users in developed countries, and these differences are not just limited to BoP segments but all across the socioeconomic pyramid (Zainudeen, Iqbal, & Samarajiva, 2010). While technological advancement is trickling down in developing countries, there is much to be explored on how these technologies influence the lives of BoP customers (Verma & Bhattacharyya, 2016). The IoT revolution has deeply impacted e-commerce and consumers' online shopping behavior (Fu et al., 2020). IoT gadgets' security and privacy elements create users' trust (Tewari & Gupta, 2020). Due to stiff competition in developed markets, global tech giants are determined to develop new markets in developing economies, especially the BoP segment (Baishya & Samalia, 2020). There seems to be a research gap about consumers in the BoP segment of the developing markets, which mostly appears to be conceptual and qualitative (Howell et al., 2020).

Thus, the findings may bring further insight for understanding the BoP's decision-making process and their lifestyles. Such findings may also help marketers to develop appropriate market strategies for this largest segment.

Research Methodology

The research philosophy of this qualitative research is interpretivism, which assumes that access to reality is only possible through social constructions such as language, consciousness, shared meanings and instruments (Myers, 2008). This research's philosophical underpinnings align with ontology, which assumes that reality is subjective and multiple (Creswell, 1998). Ontology is the study of the structure of reality (Crotty, 1998). Hence, this research aims to discover reality from the perspective of the participants.

The qualitative inquiry framework of this qualitative research is hermeneutics which examines how a researcher reads, understands, and handles texts, especially those that belong to a different context than his own (Patton, 2015). Hermeneutic inquiry provides a theoretical framework for interpretative understanding with special attention to context and can analyze any narrative data and text (Porter & Robinson, 2011). Without

understanding the context, an understanding of the text is not possible (Patton, 2015).

The population of Karachi is 17.636 million, according to the latest population census of 2017 (World Population Review, 2017). According to Jamal (2017), the gender ratio of males to females is approximately 54: 46. The percentage of people living below the poverty line in Pakistan is 29.5%, out of which 18.2% are in urban areas, and 35.6% are in rural areas (Jamal, 2017). Out of this estimated total population of Karachi, males and females in the age group of 18 to 55 years belonging to the urban BoP and the rural BoP residing in urban areas of Karachi, are the segments of BoP from where the researchers have collected the data for analysis.

The study has used the snowball sampling technique to select the respondents. Since mutual trust is necessary for collecting qualitative data, the researchers ensured to develop the same environment with the seven interviewees. Subsequently, we arranged an online focus group session with forty respondents selected through snowball sampling (Parker, Scott, & Geddes, 2020). The use of the Whatsapp platform enabled the participants to respond to every specific question at their convenience. The researchers steered the flow of discussions and spurred everyone to contribute. The session went on for ten days. The researchers initially approached the respondents who were easily accessible and collected their additional relevant contacts. We kept interviewing the respondents till we reached the saturation information point. In the interview and focus group, we followed the predetermined themes. But, in the in-depth interview, we aimed to identify new themes.

The researchers have used thematic analysis and template analysis was employed for analyzing the qualitative data. The analysis included coding and sorting information into categories. The researchers also used research questions to classify information (Waring & Wainwright, 2008). The purpose of mixing two qualitative methodologies, conducted at two different stages, was to gain robust insights for meaningful analysis. Such techniques and matching them with substantive literature review allow authenticity, credibility, and triangulation to ensure whether the findings support and complement each other or deviate at some points (Bashir, Syed, & Qureshi, 2017).

Due consideration to ethical issues is given in this research to ensure that the process of research and the outcomes do not cause harm to the informants and the researchers (Miles, Huberman, & Saldana, 2014). Participants were informed about the confidentiality and anonymity of the data to give as much information as required.

Trustworthiness of Data

Guba's model of trustworthiness was applied to ensure the trustworthiness of the findings of this research report. The following table shows the credibility, applicability, neutrality, and consistency of the outcomes (Patton, 2015).

Table 1. Guba's Model of Trustworthiness

Strategy	Criteria	Establishing the criteria in this research study
Credibility	Prolonged and varied field experience	Adequate time was spent in data collection from varied cases to ensure that findings are congruent with the reality.
	Reflexivity	The researchers wrote down their reflective commentary on BoP customers' behavior and the influence of IoT on their lifestyles before collecting the data.
	Triangulation: • Data triangulation	<ul style="list-style-type: none"> • The study included different types of cases, such as urban BoP customers, diluted urban BoP customers, and rural BoP based in urban areas. Thus, we collected information from different perspectives. • The authors of the current study have used researches of different schools of thought for data triangulation.
	Referential adequacy	We have cited the articles published in reputable and renowned journals
	Adoption of well-established research method	Templating and clustering techniques were adopted (London, Anupindi, & Sheth, 2010). Waring and Wainwright (2008) also applied such methods.
Dependability	Thick description	For the transparency purpose, the study has summarized respondents response time frame and the philosophical, economic, and marketing background of the researcher.
	Dependable audit	In qualitative research synthesis, the evolution in the BoP is traced by quoting references, describing the changes that were taking place in philosophical fronts, how emerging methods were borrowing from interdisciplinary knowledge to understand how BoP behaves as a customer.
	Dense description of research methods	The study has described the hermeneutic cycle in detail.
Confirmability	Triangulation	As discussed above, we achieved it through data triangulation
	Reflexivity	As mentioned above, the reflexive note made preconceptions explicit.

Source: Patton (2015)

Thematic Analysis (of Hermeneutic Interpretations of Responses of Customers)

All the respondents except one had a smartphone in their household. This phone was a family possession rather than an individual possession. Most of the respondents did not carry the smartphone to their place of work. The law-and-order situation of Karachi city was one common factor cited by all the respondents for not carrying the smartphone to work.

Most respondents stated that they leave their smartphones at home so that the family members can communicate with them in case of emergencies. One respondent said, "My wife suffers from high blood pressure, so she keeps the phone when my sons and I leave for work. At least she can call us when she is not well." One of the respondents remarked that her children play with their father's mobile when he is away, but she highly discourages this because they broke it once, and it was expensive to repair it."

A young male respondent employed in a manufacturing concern shared that he was obsessed with purchasing a smartphone. He saved money from his daily expense for food and the bonus sharing that the company gave to its employees to buy a smartphone that cost twice his salary at that time. While explaining the utility the smartphone has for him, he stated that it keeps him updated on news and happenings worldwide. Before the smartphone, he used to purchase a daily newspaper. Thus, many respondents believe that smartphones help in accessing updated news and developments. Another employee stated his employer terminated him and his other coworkers in the involvement of union activities. However, with his smartphone, he raised the issue on social media and other forums, due to which the firm reinstated him.

The responses above show that the respondent has used smartphones constructively to gather information from the internet. It also helped him in increasing awareness about labor rights. The respondent also believed that the smartphone empowered him to contact social media and the parent company of that organization. We probed a respondent to explain how the exposure to the internet and digital technologies had brought a change in his lifestyle. He explained that with the possession of the mobile phone, "he felt at par with the world." He did not feel like being left behind in the competitive world. He remarked that technology had fueled conspicuous consumption.

While commenting on how he and his friend use IoT, he stated, "The choice for a customer has increased manifold nowadays. Social media has helped him and his friend with innovative products. For example, we found that the mobile charger is now wireless. Also, with the help of Bluetooth, you can listen to the latest songs." This remark shows the level of awareness that exists even at BoP levels about the latest technological products

has increased significantly. The interest in such gadgets is a function of age, gender, and even family lifecycle stage. Moreover, it was an insight to know that such information is perceived and understood by people who have acquired little formal education.

One respondent remarked that the smartphone is helping his son in earning a living as a tailor. He said that his son works as a tailor for a lady who exports stitched clothes. She forwards the pictures of the dresses to his son through WhatsApp to replicate the same style and design. It facilitates him in his tailoring business. Talking about the experiential utility of smartphone, a respondent said that people would starve to purchase a smartphone and make irrational decisions. This respondent also remarked about the importance of social inclusion that BoP customers try to achieve by purchasing discretionary items like smartphones. He remarked, "People say that someone has this mobile, and I don't. In social company, it brings them to shame if they do not own the same things as their friends."

Commenting on the effect of IoT on BoP customers' lives, an elderly respondent remarked as follows. "There is too much attraction in a mobile. You dial randomly, connect a wrong number, and fall for the attraction of the unknown caller. This is the wrong type of attraction, the wrong type of entertainment. Many scammers use the internet to scam people." A respondent shared that his neighbors, unlike him, are laborers. They send their spouses to work as housemaids. These housemaids, seeing the expensive smartphones, also want to possess one. And for which many housemaids get involved in the theft and other immoral activities. The respondent also pointed out that he knows families whose members got murdered because of inappropriate use of smartphones. When asked what promotes the purchase and use of smartphones and facilities like 3G and 4G services, he remarked that the "poor want to emulate the rich and will go to any limit to purchase products like smartphones." Mobile service affordability is a factor that has helped in the adoption of mobile phones by the BoP customer. For a respondent, a Jazz balance of Rs. 120/- lasts for about a week. It is even less than what many BoP's customers spend on purchasing cigarettes.

One respondent with a feature phone wants to own a smartphone shared a very interesting justification for his desire for a smartphone. He said, "the smartphone will solve my transport problem." He elaborated that by downloading the apps like Careem or Uber, he could avail these services to commute with family members. Conversely, it is highly inconvenient to wait at the bus stops and use public transport.

Another respondent shared that she had recently disconnected the internet cable connection that she had at her home. She cited that while she was away for work, her

young children were using the internet to access unsuitable content. Thus, to protect them from unsuitable content, she remarked, "I will not get an internet connection at home because no matter what you open, pop-ups are there. She further stated that my "children are very curious about the game Blue Whale. They can play games that even IT people find difficult to play. So when the computer at home broke down, I did not get it repaired." She also remarked that her young children know about the latest trends through their family and friend's circle and the media. She believes that family and school environments and social media inspire our children to learn about the latest fashion. At the same time, my children know a lot about cars and their parts. So the media is giving all this information.

Expressing the emotional utility of smartphones and ubiquitous connectivity, she said that her children complain that they were not happy "because we do not have a smartphone." She thinks her children are angry because they feel that we are not keeping pace with the world and belong to an ancient era by not possessing a smartphone. She also stated that to project a sophisticated image, people conspicuously use these items. "Most people in our society believe that owning smartphones or tablets has become a symbol of the educated strata." Commenting on the impact of IoT on people's lifestyles, she shared that now the children are not synthesizing the collected information. They are randomly accessing information. The comments highlight that despite the availability of a larger amount of information, the mental skills of the young generation to synthesize, deduce and relate things together has diminished. Similarly, the larger the choice set a customer has, the greater is his/her dissatisfaction. An economically challenged person who compares the large array of goods with his/her small purchasing power becomes dissatisfied.

One respondent remarked that the children force their parents to purchase a smartphone for them. Due to social norms, she thinks that children pester their parents to buy a smartphone for them. The smartphone is an "in-thing". "If you do not have it, people do not give you respect." This statement again explains that the purchase of smartphones is not its functional utility as it is for its symbolic utility. The interviews revealed that BoP customers purchase products and services related to the internet, Wi-Fi, and on-the-go connectivity to associate themselves with the segment who are well-versed digitally and belong to the upper strata of society.

A respondent who is a blue collar worker shared that children belonging to diversified socio-economic classes study at that institution. Children belonging to the lower-income strata want to possess brands that children from the upper-income strata use. This behavior shows how the internet and digital technologies have influenced the

life of consumers. With greater exposure to foreign lifestyles and branded products, customers want to transform their lifestyles to reflect their modernity. It has led to a global consumer society (Yurdakal, Atik, & Dholakia, 2017). However, this phenomenon is not just prevalent in middle or upper socio-economic classes. It is found in the BoP segment also. Exposure to media through the internet informs the consumer about latest trends. After gaining this information, consumers purchase similar products from markets such as Madina Market in Karachi, as one of the respondents stated.

One respondent also stated that exposure to the western culture through social media had affected children's social norms and values. They have no concept of '*Mehram*' and *Na- Mahram* (i.e., the Islamic concepts about the persons with whom a girl or woman can marry or not, she has to wear those clothes that cover her entire body, and has not to develop intimate relations with anyone except her husband). The respondent added that young girls belonging to conservative backgrounds and lower tiers of the socioeconomic segment have also changed the way they dress, and this transformation is also a result of the exposure to different cultures through the internet and media.

Discussion

Functional Utility to meet Safety and Security Needs

Most of the respondents stated that due to Karachi's law-and-order situation, they own mobile phones. It helps them contact their family in times of emergency. This finding is concurrent with earlier literature suggesting that social and economic circumstances significantly contribute to the consumption of products and services (Yurdakal et al., 2017). Had the law-and-order situation been better and the general sense of safety existed in the city of Karachi, the BoP customers might not have adopted this product so quickly. The lower economic segment of Pakistan, India, and China, since the last few years, have grown by 70% (Zainudeen et al., 2010).

Digital Convenience in Professions

The availability of Whatsapp, Wi-Fi connectivity, 3G and 4G has made communication convenient for different professions of BoP market. One respondent stated that with the internet and WhatsApp, it is possible to exchange images with ease. Thus, tailors and customers exchange dress images which help tailors to understand the need of customers. At the same time, consumers can communicate with tailors about the style of dresses they want. This finding is consistent with the literature suggesting that technology diffusion would change the way businesses would be conducted in the future. Small entrepreneurs in the BoP segment can benefit from the convergence of technologies (Leavy, 2014). It also allows marketers to offer products and services to the

mass market at affordable prices.

Hedonistic Objectives of Adopting Mobile and Internet Technology

The BoP segment has also adopted the growing trend of enjoying leisure hours through the internet, Wi-Fi, and digital technology. Most of the respondents stated that they watch movies and dramas through smartphones. Most of them also feel elevated by owning technology and supporting devices. This finding is consistent with extant literature suggesting such gadgets and technology allows the customer to express their emotion leading towards happiness and gratification (Jaiswal & Gupta, 2015).

Purchase Decision-Making by BoP Customers using IoT

We have inferred from the interviews that BoP customers are experiencing a greater exposure to goods and services through digitized media. This exposure allows them to buy a variety of products from the market globally. At the same time, online markets like “khazanay.pk” make original items accessible and affordable to the BoP consumers. BoP customers, due to digitized mediums, are now fully aware of new trends in the market. They now have access to marketplaces from where they can fulfill their need and wants at affordable prices.

These findings relate to the earlier research suggesting that consumer societies' mediatization has allowed BoP customers to be specific in their needs and buy those products that may distinguish them from the extremely poor (Barki & Parente, 2010). It is also deducted from the interviews that the information available to the customer through these technologies creates powerful desires for certain products. These desires are so powerful that they may take precedence over basic needs. One interviewee highlighted that he cut down on the necessary expenses to purchase the object of his desire. This finding relates to the earlier studies suggesting that the BoP customers will purchase luxury items even if they cannot afford them. BoP consumers make such purchases for the experiential worth and the symbolic utility of that product (Petrescu & Bhatli, 2013). BoP customers believe that these gadgets and technology can help them associate with the upper strata of society (Leavy, 2014). The same was concluded earlier by researchers that the non-monetary form of poverty motivates a BoP customer to purchase objects of desire rather than objects of necessity (Yurdakal et al., 2017).

IoT-induced Lifestyle Changes in BoP Customers

Yurdakal et al. (2017) believe that BoP customers relate poverty with failure to acquire those capabilities that help them associate with society's respected members. For such a person, the evident consequence of social exclusion and experiencing poverty is a feeling of shame and embarrassment (Yurdakal, et al., 2017). BoP customers exhibit a

compensatory purchase behavior by purchasing items of conspicuous consumption and bridging their gap of self-dignity through that purchase (Barki & Parente, 2010). The interviewees' opinion aligns with earlier studies. They believe that because of the exposure to IoT products and services, BoP consumers feel that they need to purchase smartphones to improve their self-worth and self-dignity.

Creating Linguistic Skills

It is also interesting to note that in Pakistan, the literacy rate is low, and the bulk of BoP customers cannot read or write the English language, but they adapt to messaging and texting through their cell phones. This finding corroborates the earlier researches that with the advent of IoT, especially mobile technology, the BoP customers are becoming trilingual. They are learning to identify alphabets and use this knowledge for texting in roman Urdu or other dialects (Bhatia & Ritchie, 2015).

Conclusion

This research provided a good opportunity to study the influence of IoT on the BoP segment of Pakistan. The respondents belonging to different segments within the BoP market in Pakistan are more familiar with smartphones, Wi-Fi, on-the-go connectivity, and Bluetooth technology than other products and services related to IoT. Like earlier studies, we have also concluded that the simplicity of mobile technology and the ubiquitous connectivity available through 3G and 4G services have promoted smartphones in the BoP segment (Zainudeen et al., 2010).

The utility that the BoP customers find in the use of IoT is functional and symbolic. Most importantly, the BoP customer perceives that these products and services help them associate with the higher socio-economic circle. This is a major motivating factor for BoP customers to buy smartphones and technologically innovative products. The IoT-induced lifestyles has also positively affected and improved the BoP segment (Baishya & Samalia, 2020; Fu et al., 2020; Howell, Sinha, Wagner, Doorn, & van-Beers, 2020; Tewari & Gupta, 2020). Such transformation is more common in the upper strata of society. For economically challenged people, we found that they have to sacrifice necessities to obtain objects of symbolic utility. The entrepreneurs belonging to BoP find it convenient to conduct their business by using WhatsApp. However, none of the interviewees mentioned facilities like Easypaisa. These electronic funds transfer platforms are convenient for small businesses operating in the BoP context. This inquiry addressed a significant research gap in an emerging market of South Asia.

The study intellectually integrated four domains of study and theoretically contributes to innovation and technology theories, consumer behavior theories, demand and

consumption theories of economics, and BoP theory. It unveils which IoT products domestic BoP consumers mostly use, how they process information, which products they buy, and how the IoT influences the BoP customers in their purchase decisions and lifestyles.

Recommendations and Future Direction of Research

This study aims to understand how IoT influences the BoP customer. It highlighted that the BoP segment uses the technology for searching information and making more informed decisions that are the hallmark of a rational consumer behaving under dire financial constraints. However, we also found the paradoxical behavior of BoP customers since many customers purchase expensive items by sacrificing their necessities. The IoT had also exposed them to a global consumer society and induced desires in them. This research suggests more studies are needed to measure the impact of BOP consumers' decision-making process and lifestyles. BoP data is hard to obtain. Therefore, marketers, entrepreneurs, and practitioners can use this research to improve existing products and services and design sustainable technological innovations. Furthermore, future studies can empirically test the themes we have identified in the study.

References

- Angot, J., & Plé, L. (2015). Serving poor people in rich countries: the bottom-of-the-pyramid business model solution. *Journal of Business Strategy*, 36(2), 3-15.
- Arora, P. (2016). Bottom of the data pyramid: Big data and the global south. *International Journal of Communication*, 10, 1681–1699.
- Baishya, K., & Samalia, H. V. (2020). Factors influencing smartphone adoption: A study in the Indian bottom of the pyramid context. *Global Business Review*, 21(6), 1387-1405.
- Barki, E., & Parente, J. (2010). Consumer Behaviour of the Base of the Pyramid Market in Brazil. *Greener Management International*, (56), 11-23.
- Bashir, S., Syed, S., & Qureshi, J. A. (2017). Philosophical and methodological aspects of a mixed-methods research: A review of the academic literature. *Journal of Independent Studies and Research*, 15(1), 32-50.
- Belk, R. (2006). Out of Sight and Out of Our Minds. In B. R., J. N. Sheth, & R. S. Sisodia (Eds.), *Does Marketing Need Reform?: Fresh Perspectives on the Future* (p. 209). New York: M. E. Sharpe Inc.
- Belk, R., Ger, G., & Askegaard, S. (2003). The fire of desire: A multisited inquiry into consumer passion. *Journal of Consumer Research*, 30(3), 326-351.
- Bhatia, T. K., & Ritchie, W. C. (2015). Emerging trilingual literacies in rural India: Linguistic, marketing, and developmental aspects. *International Journal of Bilingual Education and Bilingualism*, 19(2), 202-215.
- Chikweche, T., & Fletcher, R. (2012). Undertaking research at the bottom of the pyramid using qualitative methods: From theoretical considerations to practical realities. *Qualitative Market Research: An International Journal*, 15(3), 242-267.
- Cresswell, J. W. (1998). *Qualitative Inquiry and Research Design*. London: Sage Publications.
- Crotty, M. (1998). *The foundations of Social Research: Meaning and Perspective in the Research Process*. London: Sage Publications.
- Darwish, A., Hassanien, A. E., Elhoseny, M., Sangaiah, A. K., & Muhammad, K. (2019). The impact of the hybrid platform of internet of things and cloud computing on healthcare systems: opportunities, challenges, and open problems. *Journal of Ambient Intelligence and Humanized Computing*, 10(10), 4151-4166.
- De Silva, H., Ratnadiwakara, D., & Zainudeen, A. (2011). Social influence in mobile phone adoption: Evidence from the bottom of pyramid in emerging Asia. *Mobile Telephony* 7(3), 1-22.
- Deshwal, P. (2016). Impact Of Mobile Marketing Applications In The Current Indian Scenario. *International Journal of Advanced Research in IT and Engineering*, 5(1), 26-38.

- Fu, H., Manogaran, G., Wu, K., Cao, M., Jiang, S., & Yang, A. (2020). Intelligent decision-making of online shopping behavior based on internet of things. *International Journal of Information Management*, 50, 515-525.
- Garrett, B., & Kernani, A. (2010). Challenges in marketing socially useful goods to the poor. *California Management Review*, 52(4), 29-47.
- Guesalaga, R., & Marshall, P. (2008). Purchasing power at the bottom of the pyramid: differences across geographic regions and income tiers. *Journal of Consumer Marketing*, 25(7), 413-418.
- Howell, R., Sinha, K. M., Wagner, N., Doorn, N., & Van-Beers, C. (2020). Consumption of Bottled Water at the Bottom of the Pyramid: Who Purchases First?. *Journal of Macromarketing*, 40(1), 31-50.
- Jaiswal, A. K., & Gupta, S. (2015). The influence of marketing on consumption behavior at the bottom of the pyramid. *Journal of Consumer Marketing*, 32(2), 113-124.
- Jamal, H. (2017). Poverty and vulnerability estimates: Pakistan, 2016. In: *Social Policy and Development Centre (SPDC)*, Karachi, Pakistan, Research Report no. 99, May 2017. Retrieved from <https://spdc.org.pk/Data/Publication/PDF/RR-99.pdf>.
- Kotler, P., & Armstrong, G. (2016). *Principles of Marketing*. England: Pearson Education Limited.
- Leavy, B. (2014). Venkat Ramaswamy—how value co-creation with stakeholders is transformative for producers, consumers and society. *Strategy & Leadership*, 42(1), 9-16.
- London, T., Anupindi, R., & Sheth, S. (2010). Creating mutual value: Lessons learned from ventures serving base of the pyramid producers. *Journal of Business Research*, 63(6), 582-594.
- Luthra, S., Mangla, S. K., Shankar, R., Prakash Garg, C., & Jakhar, S. (2018). Modelling critical success factors for sustainability initiatives in supply chains in Indian context using Grey-DEMATEL. *Production Planning & Control*, 29(9), 705-728.
- Manavalan, E., & Jayakrishna, K. (2019). A review of Internet of Things (IoT) embedded sustainable supply chain for industry 4.0 requirements. *Computers & Industrial Engineering*, 127, 925-953.
- Marr, B. (2017). What is data democratization? A super simple explanation and the key pros and cons. *Forbes*. Retrieved from <https://www.forbes.com/sites/bernardmarr/2017/07/24/what-is-data-democratization-a-super-simple-explanation-and-the-key-pros-and-cons/?sh=631e0ce46013>.
- Meola, A. (2016, December 19). *Tech Insider*. Retrieved from <http://www.businessinsider.com/what-is-the-internet-of-things-definition-2016-8>.

- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis A Methods Sourcebook*. London: Sage Publications.
- Myers, M. D. (2008). *Qualitative Research in Business and Mangement*. London: Sage Publications.
- Parker, C., Scott, S., & Geddes, A. (2020). *Snowball Sampling*. London: Sage Publications.
- Patton, M. Q. (2015). *Qualitative Research and Evaluation Methods*. London: Sage Publications.
- Petrescu, M., & Bhatli, D. (2013). Consumer behavior in flea markets and marketing to the Bottom of the Pyramid. *Journal of Management Research*, 13(1), 55-63.
- Porter, S. E., & Robinson, J. C. (2011). *Hermeneutics: An Introduction to Interpretive Theory*. United Kingdom: Wm. B. Eerdmans Publishing.
- Rose, K., Eldridge, S., & Chapin, L. (2015). The internet of things: An overview. *Internet Society*, 80, 1-50.
- Shaikh, A. (2017, Sept 6). Rethinking digital. *Aurora*, Retrieved from <https://aurora.dawn.com/news/1142113>.
- Tarafdar, M., Anekal, P., & Singh, R. (2012). Market development at the bottom of the pyramid: examining the role of information and communication technologies. *Information Technology for Development*, 18(4), 311-331.
- Tewari, A., & Gupta, B. B. (2020). Security, privacy and trust of different layers in Internet-of-Things (IoTs) framework. *Future Generation Computer Systems*, 108, 909-920.
- Verma, S., & Bhattacharyya, S. S. (2016). Micro-foundation strategies of IOT, BDA, Cloud Computing: Do they really matter in bottom of pyramid?. *Strategic Direction*, 32(8), 36-38.
- Waring, T., & Wainwright, D. (2008). Issues and challenges in the use of template analysis: Two comparative case studies from the field. *Electronic Journal of Business Research Methods*, 6(1), 85-94.
- World Population Review (2017). *World Population Review*. Retrieved from <http://worldpopulationreview.com/world-cities/karachi-population/>
- Yurdakal, D., Atik, D., & Dholakia, N. (2017). Redefining the bottom of the pyramid from a marketing perspective. *Marketing Theory*, 17(3), 289-303.
- Zainudeen, A., Iqbal, T., & Samarajiva, R. (2010). Who's got the phone? Gender and the use of the telephone at the bottom of the pyramid. *New Media & Society*, 12(4), 549-566.