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# Influence Of Technological Innovations on Consumer Buying Behaviour

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## ABSTRACT

A combination of increased penetration of the Internet and the fast-paced growth of technology is changing the need and buying patterns of consumers (Karenhka, 2013). With over 50% of the population of India being under 25 years of age, and 65% being under 35 years of age (National Statistical Commission, 2017), the younger generation has grown up with technology. They are heavily influenced by the rapid penetration of the Internet, the availability of a large amount of data, and recent innovations in mobile devices (Han Wai, et al., 2016). They are adept at using the latest gadgets and web-based services, online 24x7 right through the year. This generation is very well connected in social circles through websites like Facebook, WhatsApp, and LinkedIn, parading and flaunting their opinions in their circle in real-time (Chaffey, et al., 2016).

Our research paper has explored how technological innovations have influenced the consumer buying process across need recognition, searching for information & alternatives, evaluation of alternatives, buying process, and post-purchase behaviours. Through extensive literature reviews, quality studies, and interviews with industry leaders, we have defined and validated the hypothesis across all the stages of consumer buying behaviour.

Based on our findings that technological innovations play a significant role in the consumer buying process, we have concluded how marketers should adapt the key disruptive technologies when

defining their marketing mix. The paper will be of interest to all research scholars and will be greatly helpful to companies that are on the cusp of investing in technologies for their marketing campaigns.

**Key Words**: Consumer Behaviour, Technological innovations, Consumer buying behaviour, Marketing Strategy, Structural Equation Modelling

## INTRODUCTION

Marshall McLuhan, who is universally considered the father of media studies and communications, and the prophet of the information age foresaw the formation of the Internet about 35 years before the Internet came into existence. In a book he published called *The Gutenberg Galaxy in 1962*, he said that the history of humans can be divided into four eras – the electronic age, the print age, the literary age, and the acoustic age. He predicted that the globe is entering the electronic age, wherein the population from across the world will be brought together by "technology". McLuhan called this time zone the "global age", where everyone across the globe will be able to access the same information, and all at the same time. In a subsequent book titled *Understanding Media*, McLuhan expanded his theory to show that the medium of communication will have the most influence in the electronic age rather than the information itself.

With the advancement in technology like mobile Internet on smartphones and tablets, consumers are becoming savvy in their buying habits. They can compare the prices across many stores in real-time, and shop for the latest product instead of solely relying on what the salesclerks recommend in a store. This way buying a product has become a very personal and intimate process for any consumer. While the traditional store concept continues to be of importance to give the consumers the "touch and feel" of a product, the stores are losing their relevance in recording the actual sales. People use their smartphones many a time in traditional stores to compare, only settling for that sweet spot of cost and functionality. The phones have made the layman across the street 'smart', and it has spawned a cycle of different eCommerce ventures trying to beat each other by offering the best deals. All this makes the customer feel cared for, and make them feel special. This, in turn, builds the loyalty of the consumer toward the brand.

### Technology

One of the major factors in the economic progress of any country is the development and adoption of Technology. The Cambridge dictionary outlines technology as using the state-of-the-art knowledge or scientific processes in manufacturing, business, or any wealth generation activity.". Technology can be regarded as a form of human interest that helps increase the competitive benefit by enhancing product performance and applying the principles of mechanics and science to solve problems.

Technology is applied in almost everything we do in our daily lives, from home entertainment, at work, during transportation, in manufacturing, improved healthcare, making purchase decisions, and more importantly in our communication process. The advancement in our communication technology, starting with a simple mobile feature phone, through smartphones that can cater to voice calls, data downloads and be a personal computing assistant, along with the increased penetration of high bandwidth data connections, and use of the cloud for all decision making is segueing the basic definition of communication. We are moving from an ancient era of physical communication to advanced

communications like video conferencing, Voice over IP (VOIP), and finally, innovative social media which keeps us connected in real-time barring geographic boundaries and language barriers.

While all the new technologies are making noise about being the "next big thing", McKinsey report (McKinsey, 2013) advocates that the technologies with the highest promise to drive significantly higher economic influence and disruption should have four common characteristics: the broad potential possibility of impact or influence, a higher rate of change, impact to large financial or economic value, and widespread potential for disruptive economic impact.

**Technological Innovations**

The business dictionary defines innovation as the process that generates value for which the customers are willing to pay by converting an idea or an innovation into a useful product or service. Innovation involves providing higher quality per unit price. Innovation involves applying knowledge, ability, technique, and different value-addition processes to produce new products or services that can significantly bring about a positive perception in consumers while in use.

In late the 1990s and early 2000s, companies like Amazon revolutionized the thinking of consumers in online shopping. e-commerce had started to grow, allowing consumers to do secured transactions on the web. Technology and convenience formed a very alluring combination for consumers to ignore. Despite the low market penetration of the Internet, Amazon drove a strategy to enable customers to order books without having to go to the bookstore. Orders were shipped for free and on priority, ensuring that the customers received their orders in less than 2 days anywhere in the US. Now portals like Amazon provide a full service from soup to nuts for all customer's requirements, from books and electronics down to footwear.

Following this was the advent of Smartphones. Businesses started providing applications that leveraged the smartphone boom, enabling them to foray into devices that are very personal to most people. For example, Inox offers a small client through which we can easily browse all the movies running across all Inox theatres, and with a couple of clicks book movie tickets, including selecting the choice of seats. Most banks have enabled online banking for mobile users. Emails, SMS, and real-time Chat applications became available, thereby allowing the consumers to be "connected" to their social network always. The entire ecosystem like high-resolution cameras, HD displays, and advanced communication technology evolved along with Smartphone innovation, while the cost continues to decline, thereby increasing the number of users of Smartphones as compared to the traditional feature phone.

Technology innovations are not limited to products (Madgavkar, et al., 2014). They have expanded heavily into services as well. A case in this point is the RedBus portal which provides a unique experience of booking a bus ticket sitting at home, by browsing through various bus service providers, evaluating the cost of luxury and semi-luxury alternatives for cost, choosing seats and pickup locations. BharathMatrimony is another example where there is extensive consumer traffic for finding brides/grooms, breaking the traditional concept of matchmaking through known sources.

**Consumer Behaviour**

Consumer behaviour is the study of how customers individually or in groups decide to purchase, buy, use, and dispose of products to satisfy their needs and wants (Wells & Prensky, 1996). Consumer behaviour refers to the actions or the conduct of consumers in the marketplace (Alba, et al., 2018) during the purchase process and the underlying causes for those actions. Consumer behaviour is

swayed by numerous factors like psychological factors, personal factors, economic factors, cultural factors, and technological factors (Tomer, 2017).

As marketers, it is vital to perceive why and how people settle on their utilization choices, Intending to maximize the experience of consumers. If marketers understand consumer behaviour, they can anticipate how consumers respond to different educational & natural signs and can shape their advertising systems accordingly (Schiffman & Kanuk, 2004). Without question, marketers who understand consumer behaviour have an incredible upper hand in the marketplace (Alba, et al., 2018).

**Consumer Decision-Making Process**

The "consumer decision-making process, also known as the buyer decision process, applies to the decision-making phases a consumer undergoes before, during, and after buying a product" (Zalani, 2018). John Dewey, a philosopher, and psychologist introduced a five-stage framework to illustrate the consumer's purchase decision process as shown in figure 1.

- Need or Problem recognition
- Information search
- Evaluate alternatives
- Purchase decision
- Post-purchase behaviour

**PROBLEM STATEMENT**

With the increasing penetration of the Internet, the market has seen a huge shift in consumer behaviour. The increased use of social media and live chats is bringing together the world as one big community. Consumers have access to product information in real-time They can review the feedback from other consumers across the world, compare multiple brands, check for prices, and place orders at their convenience, without having to walk into a retail store. They express their satisfaction with the product online once they make the purchase. Innovations in technology are happening at a rapid pace, connecting consumers across the globe even more. The need of the hour is to understand the gap that exists in the way technological innovations are impacting consumer behaviour. It is also important to understand how different consumers across various demographics react to technological innovations - how age, gender, income levels, education, and employment status influence the opinion toward technological innovations. Consumer expectations grown significantly for personalized product features and requirements.

Marketers and the company's leadership are facing an unending challenge in meeting consumer expectations due to technological innovations. Older ways of responding to consumer queries through emails, and telephone calls have become obsolete. While marketers are forced to continually innovate, the challenge is to decide on how much of the technology innovations they must embrace and at what pace. Being early innovators can sometimes be a mistake if the technology doesn't mature and a new technology spring up. However, they can't be late adopters as well, since the market may already be flooded with products that are innovative and offer better features and quality. Technological innovations are also forcing quicker introductions of new products and services, helping those in the industry who are agile and flexible to change their internal process to create new business models and provide compelling consumer experiences. The fundamentals of consumer buying behaviour are getting redefined, due to the influence of increased penetration of technology in the decision-making process.

The current gap is in the understanding of how technological innovations influence consumer behaviour and their impact on the marketer's business model. Some of the research questions that need to be addressed in this context are noted below:

**Research Questions**

1. Is there a difference in consumer needs with or without technological innovations?
2. Does the use of technological innovations increase the consumer's knowledge about the product?
3. Does the use of technology influence the evaluation of choices, products, and brands?
4. How does the trend in technology influence the consumer buying process?
5. How does technology influence the post-purchase behaviour of consumers?
6. Do different demographic segments vary in technology adoption for purchasing?

## REVIEW OF LITERATURE AND RESEARCH GAP

### Literature Pertaining to the Study of Innovations in Technologies

#### In-store Technologies

The current development in the retail industry is to integrate the newer technological innovations with the already existing technologies in the store as a technique to appeal to new and existing consumers by providing a compelling in-store consumer experience (Jung & Dieck, 2018). As an example, the incorporation of self-service technologies (SST) with the price check and checkout process has gained huge popularity in saving time and enhancing convenience (Demoulin & Djelassi, 2016). Self-checkout kiosks enable self-scanning, where the consumers can scan the product labels themselves and complete the transaction by paying through cash, credit cards, or mobile devices. Self-checkouts have emerged as methods to substantially ease the retail checkout process, by reducing the time spent in queues and avoiding abandoning the shopping cart by consumers (Yarrow, 2014). Retailers are continuously adopting emergent technologies (Pantano & Priporas, 2013) to improve the consumer experience during in-store purchasing (Yarrow, 2014).

Moreover, the present-day payment alternatives available for example Apple pay, PayTM, Google pay, Samsung pay, and digital wallets, which give consistent association between mobile gadgets and consumer payment cards are projected for mass adoption (Taylor, 2016). The increased usage is supported well by the increasing quantity of worldwide mobile payment clients, estimated to be at 663.8 million by 2021 (Statista report, 2019; Lai & Chuah, 2014).

#### Retail 5.0 – Customer-Centric in the new Digital Economy

Retail will go through a massive transformation, with retailers focusing more on the customer than ever before (Kowalkiewicj, 2017). The customers can shop online, mobile, in-store with an option of getting the products shipped home, picked up from the store or delivered to a specific location. "Everywhere commerce" is taking prominence in the retail sector (Deloitte Report, 2018).

Retailers quickly need new strategies to allure purchasers to come back, by drawing in shoppers through the creation of intelligent and creative, personalized encounters that incorporate and blend mobile technologies with physical retail venues (Pantano, et al., 2016). To cater to the digitalized population, retailers must look at and plan using the upcoming technological innovations to attract customers to their stores. The latest advancements grabbing the attention of retailers are visual technologies like virtual and augmented realities.

**Disruptive Technologies**

From the literature survey, company websites, blogs, conference papers, Gartner & McKinsey studies, and conference presentations, the following are identified as the key disruptive technologies that are driving technological innovations.

**Mobile Technologies**

The mobile technologies provide opportunities for customers to get real-time data on the product online, evaluate alternatives, compare prices, evaluate product quality based on existing reviews, place purchase orders, and make payments from their mobile devices, from anywhere, anytime, and for any product (Piotrowicz & Cuthbertson, 2016). They freely share their opinions of the product online, and hence there is a global social community sharing information on a specific product that the customer is looking for. The customers can even ask questions, which will be answered by worldwide consumers of the product (Bagozzi, 2016).

The mobile revolution has changed the approach to the sales landscape from multi-channel to omnichannel (Jung & Dieck, 2018). This change has created a distinguished shift from the separation of online and in-store transactions to the free association among the mobile, physical, and online stores within a transaction (Piotrowicz & Cuthbertson, 2016). Some of the advantages of mobile devices comprise being omnipresent and supporting movability (Pantano & Priporas, 2013). Consumers are not dependent anymore on store operating hours due to the widespread acceptance of mobile devices, changing conventional time and space limitations (Bourkalis, et al., 2009). Online consumers have the flexibility to decide where, when, and in what way they determine the product choice and place the order for purchase (Niemeier, et al., 2013).

The rapid increase in the adoption of the Internet by consumers over the last 15 years has seen global Internet users grow from 2.8 billion in 2014 to projected growth of over 6.5 billion users in 2020 (Murthy & Bhimarao, 2015). This has driven a huge increase in the number of innovative applications being developed for mobile users. The spending on building software applications for mobile has grown from 4 billion US dollars to 35 billion US dollars between 2009 and 2015 globally (Statista report, 2019). Social media, blogs, and websites of retailers are accessible on consumers' mobile devices very easily and provide an ideal platform for promoting social interactions and openly sharing feedback on the product to a wider range of audience in real time. (Niemeier, et al., 2013).

**Machine Learning and Artificial Intelligence**

Machine learning (ML) is redefining how marketers use key performance indicators to drive their marketing performance, enhanced customer experience, and increase market share (Schrage, 2018). Marketers have started investing in ML and have started proactively using the data to engage with customers to provide a compelling personalized experience, be it in-store, online, or mobile. The data collected from consumers' behavioural patterns in the past will be analyzed using machine learning techniques and the outcome will help gain a new understanding of the behaviour of the consumers and help enhance the marketing team's performance (Cui, et al, 2006). The output of ML has a significant improvement in the conversation rates over the present well-known marketing strategies. It is seen from an Asian mobile network operator that the conversion rate has increased from 37% to over 98% (Sundsøy, et al., 2014)

**Internet of Things and Fifth Generation (5G) Technologies**

Jara, et al., 2014 in their evaluation of the influence on marketing from the Internet of Things (IoT) have observed that while social media and IoT have a major impact on consumer behaviour towards a

product, participative marketing, which is an extension of the social media combined with the technological innovations enabled through IoT are empowering consumers with product knowledge from other similar consumers. Participative marketing extends social media by enabling the customers to review and gain additional product information from the experiences, likes & dislikes, and opinions of already existing customers of the product. The information is available from worldwide customers, who compare the features, quality, reliability, and openly share their perceived value of the product with the open community. This allows the existing customers to validate the claims and promises made of the products as related to reality. Wenjie, 2016 in the publication on the capability of the Internet of Things as a tool for marketing has projected that over 51% of global marketers across the world will use IoT to transform marketing strategy by 2020.

Prasad, et al., 2017 in their research on how 5G will enable new verticals and markets, have described that the enablement of the highspeed bandwidth will enable marketers to deploy cloud-based solutions for an effective supply chain management solution. They have also discussed how the new 5G connectivity will support marketers to provide tailored services and applications to customers in a much faster and more efficient way. The increased bandwidth combined with IoT will enable marketers to deploy products and services that can provide a holistic shopping experience at their fingertips.

**Virtual and Augmented Reality**

Marked as a disruptive technology, like the disruptions generated by the inventions of smartphones, cellular networking, and the Internet, Virtual Reality (VR) considers another mode of innovative correspondence through Head Mounted Displays (HMD) (Rosedale, 2017). While the buyer market mandates products with increased quality, for example, high-resolution displays, high computing capabilities needed for gaming, increased performance, high battery capabilities, and lower costs (Rosedale, 2017)

In retail stores, Augmented Reality (AR) provides immersive encounters of the product brands to the consumers. Advanced intuitive advertising campaigns and innovative product feature experiences for buyers can be successfully deployed within the stores using AR technologies (Scholz & Smith, 2016). For instance, Lego in all its stores is utilizing AR to extend an enlivened variant of the finished Lego product in a crate before buying, which is helping build brand commitment and increase consumer loyalty (Kipper and Rampolla, 2013). Businesses can use AR to influence consumers to make purchases when they are in the "I-want-to-buy moment" as described in Think with Google (Salunkhe, et al., 2022). The market for augmented reality is estimated to produce $90 billion in income by 2020 (Statista report, 2019).

**Literature Review Pertaining to the Study of Consumer Behaviour**

1. The organized retail sector is making inroads in the Indian market (Rokade & Rashid, 2015). Given the predominantly younger population of India under 25 years of age, who are growing up with technology, organized retail is already taking over substantial market share from the unorganized sector. Rokade & Rashid, (2015) have concluded that the unorganized sectors must upgrade themselves to compete with the organized retail sectors for their survival.
2. Mooij, (2019) in the book describing the consequences or impact of consumer culture and behaviour on the company's Global Marketing and Advertising has described that in the last 15 years, people's lives across the globe have embraced the Internet and there is a difference in the usage of the Internet across geographies for making purchase decisions. With the increasing middle class, disposable income increases, and people's values towards products vary across cultures. The author explains

that culture plays a key part in consumer behaviour, the mental processes such as learning, perception, demographics, and information processing vary across cultures.

3. Janaki & Shanthi (2013) in a publication on the stimuli of purchasing behaviour of durable goods like home appliances based on the perspectives of consumers, reveal that the strategies adopted by marketing teams are the game plan that firms must maneuver to beat the competition and achieve the desired objectives. Consumers' choice of products depends on their need and their buying power. The research evaluated the purchase decision behaviour of consumers as related to home appliances and analyzed their responses to the motivations for durable goods like home appliances through their marketing strategies. They conducted their research using a random sampling technique within Coimbatore, a city in Tamilnadu state in India. They collected the data from 200 respondents through a structured interview process and analyzed the data using ANOVA. They concluded that income and education are the two predominant variables that influence the consumers of durable goods across all stages of the purchase process.
4. Christopher, et al. (2007) analyzed the association between buying intention, satisfaction, and customer loyalty as exhibited by Spanish consumers. They developed their research design based on reviews of the relevant literature regarding the agribusiness and marketing of food products. Since it was a regression model across multiple variables, a structural equation model (SEM) was used to analyze the association across consumer buying intention, satisfaction, and loyalty. The results showed that loyalty and potential to buy were higher in customers who had higher satisfaction levels (Barlow & Møller, 2018).
5. Stoica, et al. (2017) in their publication on the association between consumer behaviour and marketing strategies explain that sometimes consumers change their minds about purchasing a product at the last minute for no obvious reasons. The decision-making process considers the information a consumer has on a product, the type of goods, and appearances. Sometimes consumers prefer to buy from a local store, the type of promotions offered in the store, and can also depend on the looks of the store itself in terms of its width and depth or the way products are displayed within the store. The marketing strategy of any company should comprehend the consumer demographics to estimate market size, the newness of the product, the advertising strategy, and the marketing mix.
6. Nagarajan & Kumar, (2013) in a study on how consumers react towards the utility of washing machines in their daily lives have explained that the recent technological advancements support simplifying the daily lives of people and at the same time reducing the amount of manual work they do. Many household appliances like washing machines then become indispensable gadgets in their homes. The gadgets not only simplify their daily chores but also produce high-quality output. The quality of washes using a washing machine is consistently higher as compared to manual wash. The attitude of the consumers regarding the utility and quality of using washing machines is very important for the manufacturers.
7. Godey, et al. (2016) in their work investigating the relationships of brand value, social media, and consumer behaviour by studying leading luxury-sector brands have concluded that there is little evidence in the way social media marketing practices affect the development of brand value and the attitudes of customers towards a brand. A survey was done with about 845 luxury brand customers, who are following the five social media brands surveyed, the research used a structural equation model to resolve discrepancies in prior literature on the branding of social media. In particular, the model shows the connections between marketing strategies and the consequences of social media (brand choice, loyalty, and price). The model analyses the marketing strategies of brands using social media as a holistic framework integrating five aspects of engagement,

entertainment, creativity, future trends, and word of mouth). One other feedback from the analysis is that it finds that SMMEs have a major positive impact on brand equity, brand identity, and brand recognition.

**Literature Review Pertaining to the Study of Technology Influences on Consumer Behaviour**

Consumer behaviour is often influenced by external and internal factors (Chung, et al., 2014). External factors have originated from environmental situations, while internal factors are typically from within the consumer's experiences. There are numerous components that can impact consumer's behaviour. As indicated by Warner, the external influences can be classified based on segments like demographics, economics, innovation, public policy, culture and sub-culture, reference gatherings, and showcasing. The internal factors are an assortment of psychological procedures, which incorporate mentalities, learning, recognition, motivation, self-image, and semiotics (Peter, et al., 2004). Notwithstanding these, Sheth, et al. (2013) additionally stated that consumer motives while shopping can be in two forms and can be classified as functional and non-functional motives. The functional motives are generally about when to buy, the location or store to buy from, and the needs of the consumers themselves, which can resemble one-stop shopping to spare time. The environment of shopping spots like free parking, lower cost of items, and access to look over a wide scope of items are important to the customers as well. The non-functional motives are progressively identified with the thoughts or experiences of the customers like the brand name, store appearance, and ease of use of websites.

The increased usage of the Internet has provided shoppers with a higher level of convenience as found by many research studies and is accepted by researchers and consumers (Wolhandler, 2013). The use of the Internet allows consumers to shop online at any time and from anywhere, providing them the convenience of 24x7 shopping from home or office, thereby attracting time-starved shoppers to prefer online shopping as compared to a visit to the retail store. Also, the Internet offers a competitive environment for cost and time savings. Online shopping offers consumers a highly enjoyable shopping experience (Wolhandler, 2013), (GVU's WWW 10th User Surveys, 1998).

**Need for this Research**

In the extensive literature review of this subject, as detailed in the "literature review" section, it is found that the current studies are more focused on evaluating how specific technologies like mobile technology, In-store technology, emerging technologies like augmented and virtual reality, and Information technology have impacted consumer behaviour. The current studies are not specifically addressing how the changing technological innovations are by themselves influencing consumer behaviour. The technological innovations are not only enabling consumers with a huge amount of information to help them make their purchase decisions but are also supporting marketers to introduce compelling business models to provide an immersive experience of the product to their consumers (Scholz & Smith, 2016). Innovations play a major role in changing behaviour, purchasing habits, and improving the living standard of customers (Awan & Zahra, 2014). Consumers now have access to a large amount of data from across the world, compare and contrast the product with other similar products, seek opinions from others through personal circles or crowdsourcing, and can potentially create a huge impact on social media (Narula, 2015).

This research is intended to accomplish a systematic study of the key upcoming technological innovations that can have a profound influence on the way consumers make purchasing decisions. The research focuses on evaluating the impact that the technologies play in all the phases of consumer purchasing processes.

The second purpose of this research is to help the top management of companies and marketers understand the various evolving technologies, evaluate how they can provide a compelling experience of their products to their customers using these innovations, and more importantly decide on when and how much to invest in these technological innovations to stay ahead in the competition. Technologies are changing at a fast pace. Newer technologies are coming up, thereby creating opportunities for introducing newer business models to attract customers. The challenge that the top management has is to identify at what point in time is a technology "good enough" that they should start investing. Most management is afraid that if they go too far with one technology, and when there is a competitive technology that emerges soon, their business models will be outdated. This research focuses on evaluating how the technology providers and companies that offer innovative solutions using these technologies must prepare themselves for the continued changes to be competitive.

The objectives of the research are defined considering the influence of technological innovations on both marketers and consumers. The research will also potentially spur future research on this topic that can have a larger impact on rules defining the business today.

## OBJECTIVES OF THE PROPOSED RESEARCH

### Research Objectives:

The main research objective of the study is "To study the implications of Technological Innovations on Consumer's Buying Behaviours".

### Objectives pertaining to Consumer Buying Behaviour:

1. To analyze the influence of technological innovations over the need awareness of consumers in purchasing
2. The study of the role of technological innovations that helps consumers in their information research of products for purchasing
3. To study the role of technological innovations in supporting consumers to evaluate choices, products, and brands
4. To evaluate how technological innovations support the buying process
5. To evaluate how technological innovations support consumers through post-purchase behaviours.
6. To assess the technological adaption across different demographic segments

### 1.1 Research Hypothesis

**Hypothesis 1**

H0: There is no significant influence of technological innovations on consumer need identification in the purchase process.

H1: There is a significant influence of technological innovations on consumer need identification in the purchase process.

**Hypothesis 2**

H0: There is no significant influence of technological innovations on supporting consumers with the required information or recommendations needed to gain a more understanding of the product.

H1: There is a significant influence of technological innovations on supporting consumers with additional information or recommendations needed to gain a more understanding of the product.

**Hypothesis 3**

H0: There is no significant influence of technological innovations on the evaluation of alternate choices, products, or brands in the consumer purchase process.

H1: There is a significant influence of technological innovations on the evaluation of alternate choices, products, or brands in the consumer purchase process.

**Hypothesis 4**

H0: There is no significant influence of technological innovations on consumer buying decisions.

H1: There is a significant influence of technological innovations on consumer buying decisions.

**Hypothesis 5**

H0: There is no significant influence of technological innovations on consumers' post-purchase behaviour in the purchase process.

H1: There is a significant influence of technological innovations on consumers' post-purchase behaviour in the purchase process.

**Hypothesis 6**

H0: There is no significant difference in the opinion among different consumer demographic categories on the influence of technological innovations in their buying process.

H1: There is a significant difference in the opinion among different consumer demographic categories on the influence of technological innovations in their buying process.

This hypothesis is further classified based on the demographics data as follows:

**Hypothesis 6.1**

H0: There is no significant difference in the opinion among different genders on the influence of technological innovations in their buying process.

H1: There is a significant difference in the opinion among different genders on the influence of technological innovations in their buying process.

**Hypothesis 6.2**

H0: There is no significant difference in the opinion among consumers of different age groups on the influence of technological innovations in their buying process.

H1: There is a significant difference in the opinion among consumers of different age groups on the influence of technological innovations in their buying process.

**Hypothesis 6.3**

H0: There is no significant difference in the opinion among consumers with different qualification levels on the influence of technological innovations in their buying process.

H1: There is a significant difference in the opinion among consumers with different qualification levels on the influence of technological innovations in their buying process.

**Hypothesis 6.4**

H0: There is no significant difference in the opinion among consumers with different employment categories on the influence of technological innovations in their buying process.

H1: There is a significant difference in the opinion among consumers with different employment categories on the influence of technological innovations in their buying process.

**Hypothesis 6.5**

H0: There is no significant difference in the opinion among consumers of different income groups on the influence of technological innovations in their buying process.

H1: There is a significant difference in the opinion among consumers of different income groups on the influence of technological innovations in their buying process.

## METHODOLOGY FOLLOWED

A combination of descriptive and inferential research is used in this study, wherein the data is collected through surveys and fact-finding inquiries. A qualitative study (pilot survey) was carried out among ten selected industry leaders to determine the factors that technological innovations influence consumer behaviour. The industry leaders were selected based on judgemental sampling based on the current organizations they work for or leading innovative product & services development for consumer durable products.

The response from the qualitative survey helped determine the methodology used in this research. The definition of research objectives, and hypotheses, and finalizing the research instrument was the outcome of the feedback from this qualitative survey.

### Variables

### Independent Variable

Technological Innovations are the independent variable that is identified based on the responses from the pilot survey and the recommendations from eminent industry leaders.

### Dependent Variables

The following dependent variables are identified in this research:

### Consumers Need Recognition

The purchase process starts with the problem or needs recognition stage when the consumer starts feeling the need for a product or a service (Kim, et al., 2002). The need implies that there is a gap between the current state of the consumers and their desired end state. The strength of the need drives the decision process. The consumers will then start looking for information on how to satisfy their needs.

### Gain More Understanding of the Product

The consumers will use their existing knowledge from prior experience, and/or look for additional information from outside (Jiang & Izak, 2007). Some of the recent technological innovations are becoming more popular amongst consumers to gather information. Social media like blogs, WhatsApp, and online product reviews help consumers collect the information needed to decide.

**Evaluation of Alternate Choices**

During the buying process, consumers use the information they have gathered on the products using technological innovations and start evaluating alternative brands, and features, comparing prices. The evaluation of choices of alternate products leads to the consumer zeroing in on the right choice of product to buy (Jisana, 2014).

**Consumer Buying Process**

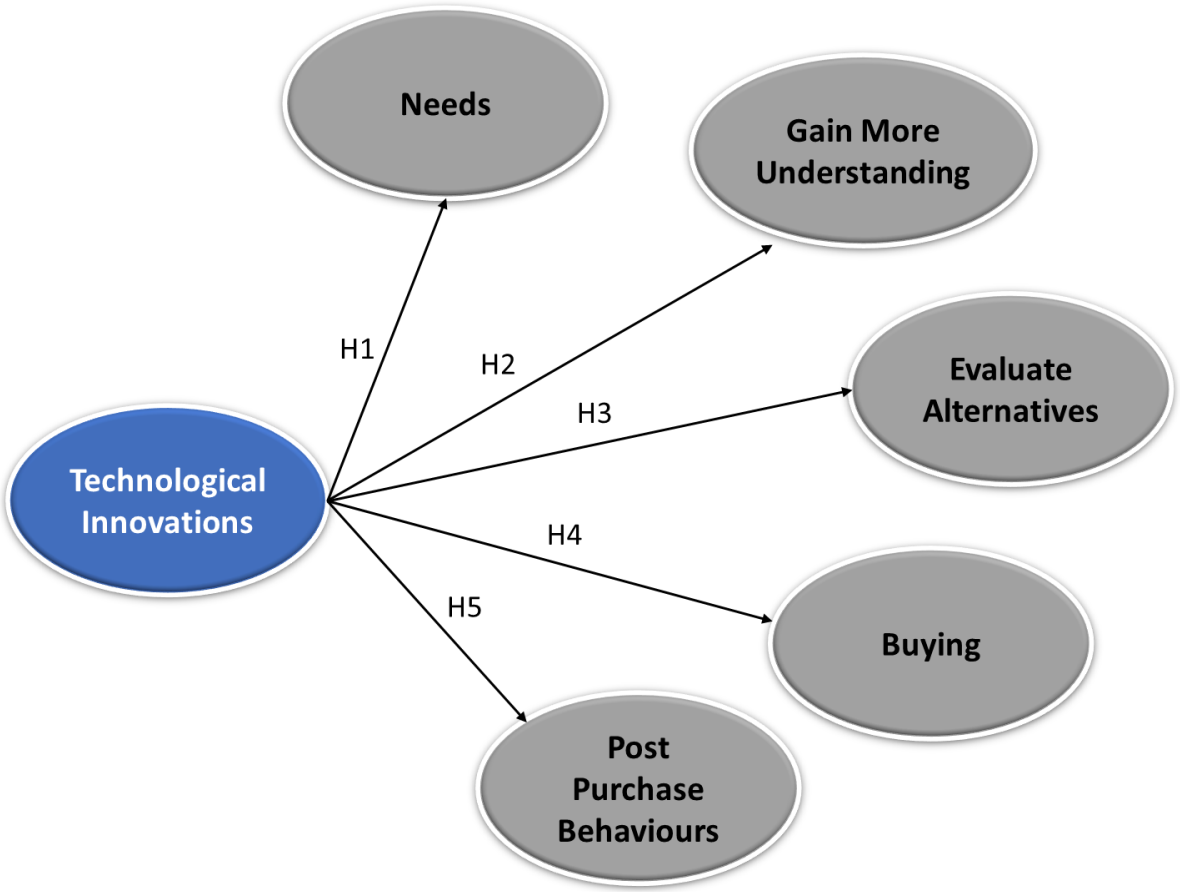
The consumers are ready to make the purchase when they have reached this stage in the consumer buying process. The consumers decide on the type of purchase process like in-store or online (Ronald & Meryl, 1987). The consumers also decide on how the product will be received, the payment method, and any terms or conditions involved in the purchase.

**Post-Purchase Behaviour**

The experience or the overall feedback of the product once the consumers start using the product is called post-purchase behaviour (Ronald & Meryl, 1987). The evaluation of the product may be conscious or unconscious. Either way, the post-purchase behaviour determines the attachment or loyalty of the consumers to the products, their brand, quality, and usage.

**Research Model**

Figure 1: Research Model for Consumers




Source: Self Drawn

**Operational Definitions of the constructs: Consumer**

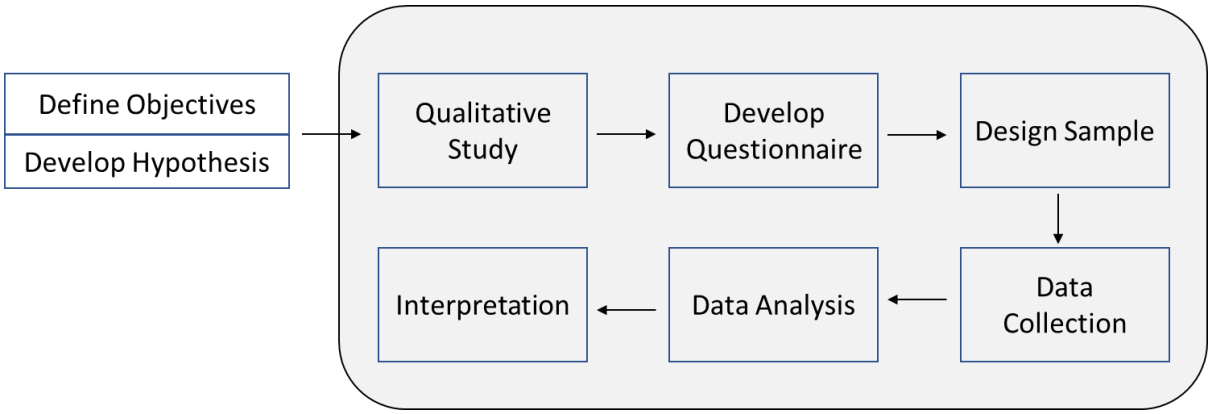
Table 1: Operational definitions of the constructs: Consumer

| | | |
|---|---|---|
| Consumer Needs | Consumer's desire for a specific product. The need implies a gap between the current state of the consumers and their desired end state | (Kim, et al., 2002) |
| Gain more understanding | Consumers will use their existing knowledge from prior experience, and/or look for additional information from outside | (Jiang & Izak, 2007) |
| Evaluation of Alternate Choices | Consumers evaluate alternate brands depending on the consumer’s need for the product | (Jisana, 2014) |
| Buying Process | Consumers placing the order for the purchase of a product | (Ronald & Meryl, 1987) |
| Post Purchase behaviour | Consumers assessing the satisfaction levels of the purchase | (Ronald & Meryl, 1987) |

**The Research Instrument**

After deciding on the questions that are relevant to the research, the primary data collection methodology used a five-point Likert Scale (from 1-highly disagree to 5-highly agree). The questions were closed-ended except for the comments, which were plain text. A high-level summary of the research objective, the amount of time needed to respond to the survey, and the confidentiality clauses of the responses were highlighted at the beginning of the questionnaire. Figure 2 shows a holistic view of the steps involved in developing the instrument.

Figure 2: Steps involved in designing the instrument




Source: Self Drawn

**1.2 Sources of Data**

This study uses quantitative and qualitative data for analyzing the objectives of the study. The primary and secondary type data collection methods adapted have been briefly explained below:

**Primary Data Collection - Consumers:**

The primary source of data is collected using a structured questionnaire and soliciting responses from consumers using the online survey. For this research, the consumers were classified into three groups - those being 41+, 31 – 40 years, and 21 – 30 years of age. The range has been so chosen based on the pattern of the respondents in the pilot study.

**Secondary Data Collection**

Secondary Source data, consisting of structured and unstructured data are gathered from organizations like NASSCOM, Government publications, literature reviews, journal publications, conference papers, seminars, and organizations of repute. The research has ensured that the data obtained is from reliable sources. All sources of data are appropriately cited.

**Sampling Techniques and Sample Size**

The stratified sampling method is used to sample data for consumers.

**Sample Size Estimation**

**Consumers**

For a stratified sampling of consumers, the consumers are classified into three categories, those being in the range of 21-30 years, 31-40 years, and 41+ years. According to the World Bank Projections (2017), the population of India in 2021 is expected to reach 1.4 billion, with the distribution by age and sex. Luckstead, et al. (2017) have applied lognormal distribution to estimate a standard deviation of 1.33 for the population distribution in India. With the Significance Level E = 0.5, and Confidence Probability Boundary $Z_{a/2}$ = 1.96, the sample size calculated is 27. However, the structured questionnaire was sent out to over 500 consumers. 267 responses were received, out of which 240 responses were used for this survey. The rest of the feedback in the survey was rejected due to incompleteness.

### 1.3 Methodology for Analysis

The data was analyzed using Structural Equation Modelling – Partial Least Square (PLS) methods. Since there are multiple measurements for the dependent and independent variable scores, the PLS technique is used to maximize the covariance between these scores.

The demographic data are analyzed using a combination of ANOVA and independent sample t-test.

## OUTCOME OF THE RESEARCH

**Descriptive Statistics:**

**Age**

Table 2: Age of the respondents

| Age | Counts | Percentage (%) |
|---|---|---|
| <20 Years | 60 | 25 |
| 20-30 Years | 129 | 53 |
| 30-40 Years | 45 | 19 |
| 40+ Years | 6 | 3 |
| **Total** | **240** | **100** |

**Qualification**

Table 3: Age of the respondents

| Qualification | Counts | Percentage (%) |
|---|---|---|
| Diploma | 51 | 21 |
| Undergraduate | 12 | 5 |
| Postgraduate | 171 | 71 |

| | | |
|---|---|---|
| Doctoral + | 6 | 3 |
| **Total** | **240** | **100** |

**Gender**

Table 4: Gender of the respondents

| Levels | Counts | Percentage (%) |
|---|---|---|
| Male | 197 | 82 |
| Female | 43 | 18 |
| **Total** | **240** | **100** |

**Occupation**

Table 5: Occupation of the respondents

| Occupation | Counts | Percentage (%) |
|---|---|---|
| Homemaker | 54 | 22 |
| Working fulltime | 162 | 68 |
| Working part-time | 24 | 10 |
| **Total** | **240** | **100** |

**Monthly Salary**

Table 6: Salary of the respondents

| Monthly Salary | Counts | Percentage (%) |
|---|---|---|
| 20000-50000 | 18 | 8 |
| 50000-100000 | 84 | 35 |
| 100000+ | 138 | 57 |
| **Total** | **240** | **100** |

**Preference towards buying different types of products using technology**

**Consumables**

Table 7: Preference of the respondents to buy consumables

| Response | Counts | Percentage (%) |
|---|---|---|
| Yes | 141 | 59 |
| No | 99 | 41 |
| **Total** | **240** | **100** |

**Consumer Durables**

Table 8: Preference of the respondents to buy consumer durables

| Response | Count | Percentage |
|---|---|---|
| Yes | 240 | 100% |
| **Total** | **240** | **100%** |

**Descriptive Statistics of Constructs**

Table 9: Descriptive statistics of various constructs under study: Consumers

| Construct | Mean | SD | Min | Max |
|---|---|---|---|---|
| **Technological innovation** | **4.42** | **0.64** | **1** | **5** |
| T1 | 4.50 | .672 | 3 | 5 |
| T2 | 4.30 | .642 | 3 | 5 |
| T3 | 4.50 | .672 | 3 | 5 |
| T4 | 4.40 | .665 | 3 | 5 |
| T5 | 4.60 | .665 | 3 | 5 |
| T6 | 4.40 | .665 | 3 | 5 |
| T7 | 4.30 | .642 | 3 | 5 |
| T8 | 4.38 | .534 | 3 | 5 |
| **Needs** | **4.23** | **0.65** | **1** | **5** |
| N1 | 4.49 | .776 | 1 | 5 |
| N2 | 4.25 | .582 | 3 | 5 |
| N3 | 4.29 | .553 | 3 | 5 |
| N4 | 4.40 | .584 | 3 | 5 |
| N5 | 4.26 | .543 | 3 | 5 |
| N6 | 3.86 | .686 | 2 | 5 |
| N7 | 4.08 | .820 | 1 | 5 |
| **Understanding products** | **4.23** | **0.68** | **1** | **5** |
| U1 | 4.49 | .776 | 3 | 5 |
| U2 | 4.34 | .613 | 3 | 5 |
| U3 | 4.16 | .662 | 3 | 5 |
| U4 | 4.26 | .543 | 2 | 5 |

| | | | | |
|---|---|---|---|---|
| U5 | 3.86 | .686 | 1 | 5 |
| U6 | 4.08 | .820 | 3 | 5 |
| U7 | 4.40 | .665 | 1 | 5 |
| **Alternate choices** | **4.24** | **0.71** | **1** | **5** |
| AC1 | 4.49 | .776 | 1 | 5 |
| AC2 | 4.34 | .613 | 3 | 5 |
| AC3 | 4.16 | .662 | 3 | 5 |
| AC4 | 4.26 | .543 | 3 | 5 |
| AC5 | 3.86 | .686 | 2 | 5 |
| AC6 | 4.08 | .820 | 1 | 5 |
| AC7 | 4.30 | .902 | 1 | 5 |
| AC8 | 4.40 | .665 | 3 | 5 |
| **Buying** | **4.31** | **0.71** | **1** | **5** |
| B1 | 4.19 | .840 | 1 | 5 |
| B2 | 4.28 | .882 | 1 | 5 |
| B3 | 4.30 | .874 | 3 | 5 |
| B4 | 4.34 | .613 | 3 | 5 |
| B5 | 4.16 | .662 | 3 | 5 |
| B6 | 4.26 | .543 | 3 | 5 |
| B7 | 4.31 | .645 | 1 | 5 |
| B8 | 4.30 | .902 | 3 | 5 |
| B9 | 4.40 | .665 | 3 | 5 |
| B10 | 4.20 | .642 | 3 | 5 |
| B11 | 4.50 | .593 | 3 | 5 |
| B12 | 4.45 | .707 | 1 | 5 |
| **Post Purchase Behaviour** | **4.35** | **0.76** | **1** | **5** |
| PPB1 | 4.30 | .874 | 1 | 5 |
| PPB2 | 4.14 | .879 | 1 | 5 |
| PPB3 | 4.50 | .593 | 3 | 5 |
| PPB4 | 4.45 | .707 | 3 | 5 |

**Technological Innovation – Independent Variable (IV)**

Technological innovation was one of the constructs under the study which was measured with the help of the Likert scale. Eight items were measured with the help of a Likert scale. From Table 27, we understand that the ratings given by the respondents range from 4.30 (±0.64) to 4.60 (±0.66). The average ratings of these items were taken and found to be 4.42 (±0.64). The results give a clear picture that on average the respondents agreed with the statements regarding technological innovations.

**Needs – Dependent Variable (DV)**

Needs was the next construct under the studied which was measured with the help of a Likert scale. Seven items was measured with the help of a Likert scale. From Table 27, we understand that the ratings

given by the respondents range from 4.08 (±0.82) to 4.49 (±0.46). The average ratings of these items were taken and found to be 4.23 (±0.65). The results give a clear picture that on average the respondents agreed upon the statements regarding needs.

**Gain more Understanding of the Products – Dependent Variable (DV)**

Gain more understanding of the products was one of the constructs under the studied which were measured with the help of a Likert scale. Seven items were measured with the help of a Likert scale. From Table 27, we understand that the ratings given by the respondents range from 3.86 (±0.68) to 4.49 (±0. 76). The average ratings of these items were taken and found to be 4.23 (±0.68). The results give a clear picture that on average the respondents agreed upon the statements regarding understanding products.

**Evaluate Alternate Choices – Dependent Variable (DV)**

Evaluating Alternate Choices was one of the constructs under the studied which was measured with the help of Likert scale. There were eight items which were measured with the help of a Likert scale. From Table 27, we understand that the ratings given by the respondents range from 4.16 (±0.66) to 4.49 (±0.76). The average ratings of these items were taken and found to be 4.24 (±0.71). The results give a clear picture that on average the respondents agreed upon the statements regarding alternatives.

**Buying Process – Dependent Variable (DV)**

Buying was one of the constructs under the studied that was measured with the help of a Likert scale. Twelve items were measured with the help of a Likert scale. From Table 27, we understand that the ratings given by the respondents range from 4.16 (±0.62) to 4.50 (±0.59). The average ratings of these items were taken and found to be 4.31 (±0.71). The results give a clear picture that on average the respondents agreed upon the statements regarding buying.

**Post-Purchase Behaviour – Dependent Variable (DV)**

Post-purchase behaviour was one of the constructs under the studied that was measured with the help of a Likert scale. Four items were measured with the help of a Likert scale. From Table 27, we understand that the ratings given by the respondents range from 4.14 (±0. 87) to 4.50 (±0.59). The average ratings of these items were taken and found to be 4.35 (±0.76). The results give a clear picture that on average the respondents agreed upon the statements regarding post-purchase behaviour.

Table 10: Variables under study

| **Construct** | **No. of Items** | **Variable** |
|---|---|---|
| Technological innovation | 8 | IV |
| Needs | 7 | DV |
| Understanding | 7 | DV |
| Alternative choices | 8 | DV |
| Buying | 12 | DV |
| Post Purchase behaviour | 4 | DV |

**Outer model: Technological Innovation on Dependent Variables: Consumers**

Table 11: Outer loadings of the variables under the study

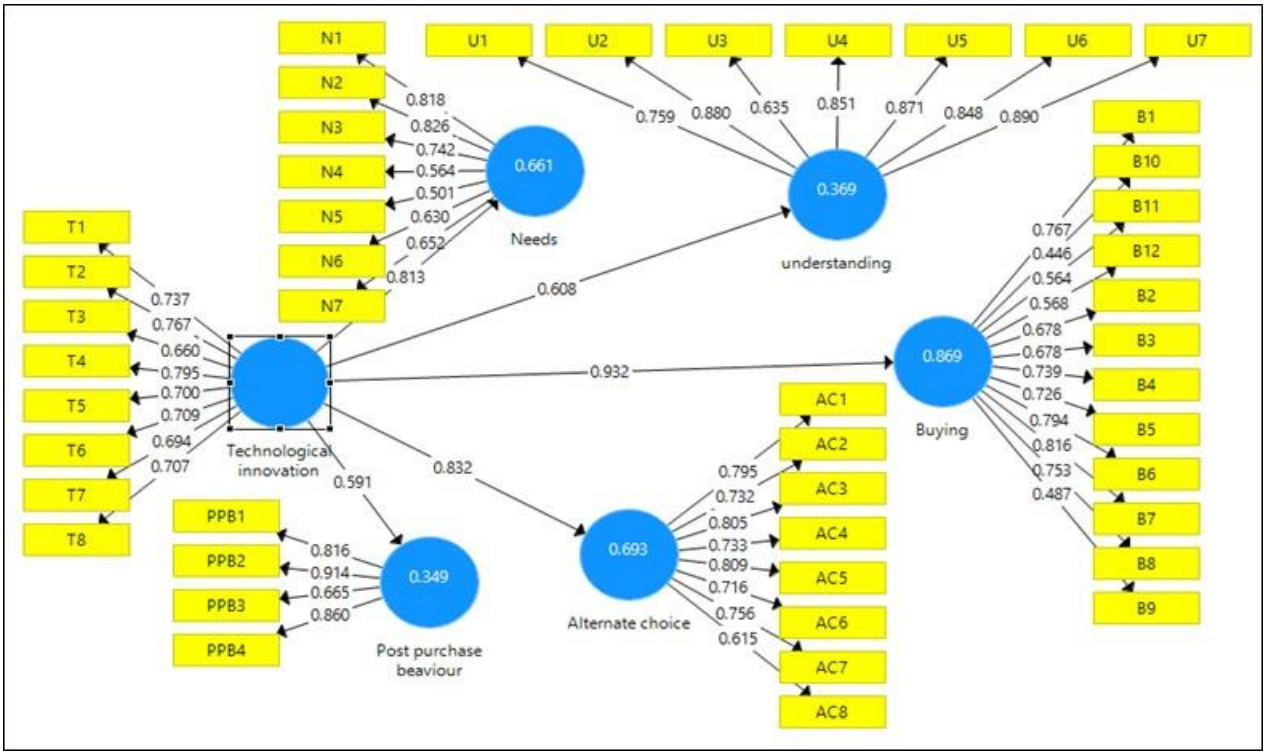
| | Alternate choice | Buying | Needs | Post-purchase behaviour | Technological innovation | Understanding |
|---|---|---|---|---|---|---|
| AC1 | 0.795 | | | | | |
| AC2 | 0.732 | | | | | |
| AC3 | 0.805 | | | | | |
| AC4 | 0.733 | | | | | |
| AC5 | 0.809 | | | | | |
| AC6 | 0.716 | | | | | |
| AC7 | 0.756 | | | | | |
| AC8 | 0.615 | | | | | |
| B1 | | 0.767 | | | | |
| B10 | | 0.446 | | | | |
| B11 | | 0.564 | | | | |
| B12 | | 0.568 | | | | |
| B2 | | 0.678 | | | | |
| B3 | | 0.678 | | | | |
| B4 | | 0.739 | | | | |
| B5 | | 0.726 | | | | |
| B6 | | 0.794 | | | | |
| B7 | | 0.816 | | | | |
| B8 | | 0.753 | | | | |
| B9 | | 0.487 | | | | |
| N1 | | | 0.818 | | | |
| N2 | | | 0.826 | | | |
| N3 | | | 0.742 | | | |
| N4 | | | 0.564 | | | |
| N5 | | | 0.501 | | | |
| N6 | | | 0.630 | | | |
| N7 | | | 0.652 | | | |
| PPB1 | | | | 0.816 | | |
| PPB2 | | | | 0.914 | | |
| PPB3 | | | | 0.665 | | |
| PPB4 | | | | 0.860 | | |
| T1 | | | | | 0.737 | |
| T2 | | | | | 0.767 | |
| T3 | | | | | 0.660 | |
| T4 | | | | | 0.795 | |
| T5 | | | | | 0.700 | |
| T6 | | | | | 0.709 | |
| T7 | | | | | 0.694 | |
| T8 | | | | | 0.707 | |
| U1 | | | | | | 0.759 |
| U2 | | | | | | 0.880 |
| U3 | | | | | | 0.635 |

| | | | | | | |
|---|---|---|---|---|---|---|
| U4 | | | | | | 0.851 |
| U5 | | | | | | 0.871 |
| U6 | | | | | | 0.848 |
| U7 | | | | | | 0.890 |

To test the significant influence of technological influence on the consumer purchase process, there were six constructs under the study which were measured with the help of measurement items. 7 items measured the construct "Alternate Choices", 12 items measured the variable "Buying", 7 items measured "Need" recognition, 4 items measured "Post-Purchase Behaviour", 8 items measuring "Technological Innovations" and 7 items measuring the usefulness of technology for gaining "Understanding" of the products. The outer loadings of the measurement model were considered for analysis, and it was found that almost all the items had good factor loadings of 0.5 and above except two items in the construct buying. It was removed and tested. Since there was no significant difference in the improvements of the loadings, they were retained for the study. hence the constructs were considered for further analysis.

**Construct Reliability and Validity**

Figure 3: Measurement model of the constructs under study: Consumer




Source: SmartPLS tool

Table 12: Reliability and validity results of the constructs under study: Consumers

| | **Cronbach's Alpha** | **Composite Reliability** | **Average Variance Extracted (AVE)** |
|---|---|---|---|
| Alternate choice | 0.887 | 0.910 | 0.558 |
| Buying | 0.891 | 0.908 | 0.560 |
| Needs | 0.815 | 0.858 | 0.571 |
| Post-purchase behaviour | 0.834 | 0.890 | 0.671 |
| Technological innovation | 0.869 | 0.897 | 0.522 |
| Understanding | 0.919 | 0.936 | 0.678 |

One of the essential criteria under PLS-SEM is to record and check the value of Cronbach's alpha, composite reliability. According to Hair, et al. (2014) these values should be above 0.7, to indicate that there is reliability in the construct measured. The validity test is confirmed with the help of AVE (Average Variance Explained) which must be above 0.5 according to the criteria. This value is considered to measure the convergent validity which tells that the items with factor loadings converge and measures the construct to be measured. From Table 30, we understand that the criteria of reliability and validity are met. Hence the study can be further carried out.

**Discriminant Validity**

**Fornell-Larcker Criterion**

Table 13: Discriminant validity: Consumers

| | **Alternate choice** | **Buying** | **Needs** | **Post-purchase behaviour** | **Technological innovation** | **understanding** |
|---|---|---|---|---|---|---|
| Alternate choice | 0.832 | | | | | |
| Buying | 0.772 | 0.950 | | | | |
| Needs | 0.746 | 0.678 | 0.813 | | | |
| Post-purchase behaviour | 0.663 | 0.658 | 0.668 | 0.961 | | |
| Technological innovation | 0.747 | 0.932 | 0.686 | 0.591 | 0.722 | |
| Understanding | 0.709 | 0.673 | 0.687 | 0.819 | 0.608 | 0.823 |

The next criteria to be met for further analysis using PLS-SEM was discriminant validity. This is a measure that confirms that there is enough difference among the constructs under the study and there are no cross-loadings. This test is carried out using the criterion given by Fornell and Larcker. Accordingly, the square root of AVE must be higher than the inter-construct correlation of the variables. From Table 31, we can see that the square root of AVE represented in the diagonal cell of the above matrix is higher than the inter construct correlation of the other variables under the study. Hence, we

can conclude that there is discriminant validity among the constructs measured in the study. This tells that the constructs are different from each other and can be used for further analysis.

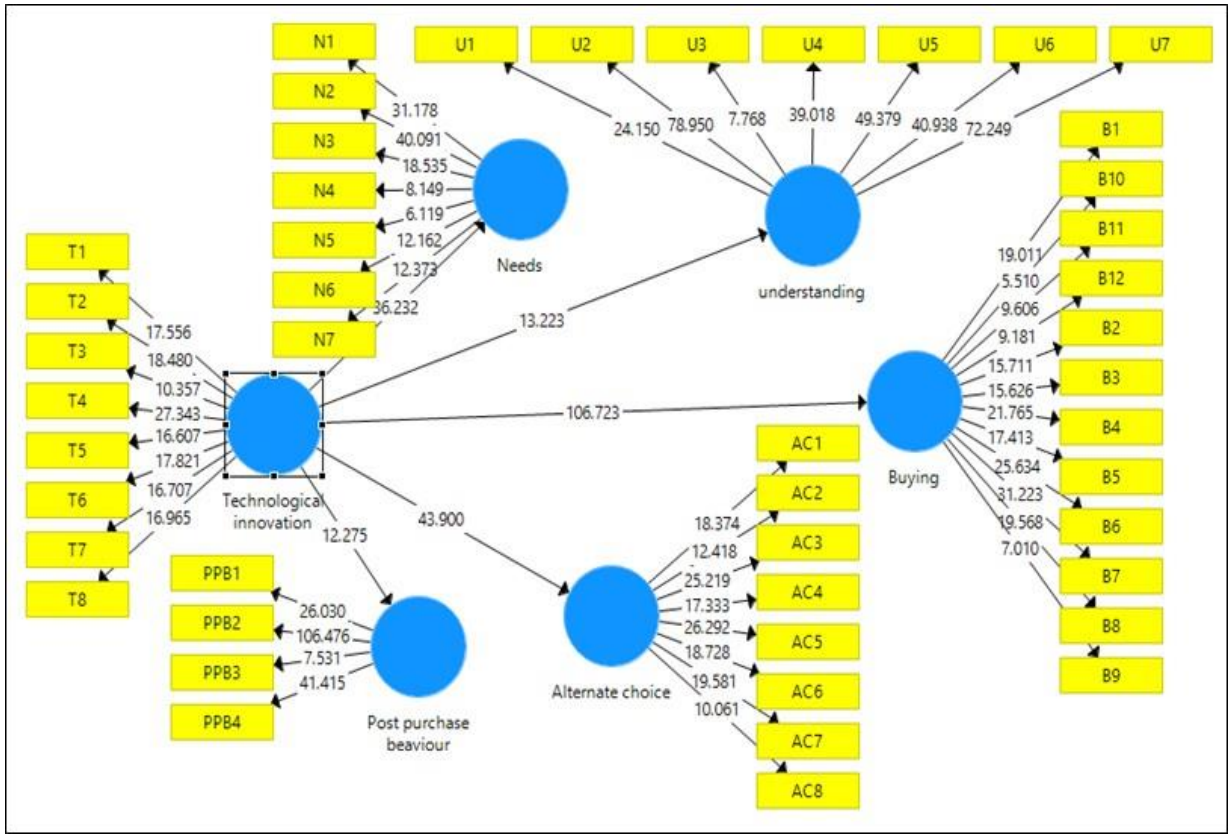
**R Square**

Table 14: R square values: Consumers

| | **R Square** | **R Square Adjusted** |
|---|---|---|
| Alternate choice | 0.693 | 0.691 |
| Buying | 0.869 | 0.868 |
| Needs | 0.661 | 0.659 |
| Post-purchase behaviour | 0.349 | 0.346 |
| Understanding | 0.369 | 0.367 |

R square values are explanatory power values. This value says to what extent the outcome variable (dependent variable) is explained by the explanatory variable (independent variable). It can be observed that, construct Alternate choice was explained by technological innovations to an extent of 69%, Buying (86%), needs (66%), post-purchase behaviour (34%), and understanding to an extent of (36%). The independent variable technological innovation had good explanatory power on different purchase process activities.

Figure 4: Bootstrapping results of the outer model




Source: SmartPLS tool

**Path Coefficients**

Table 15: Path coefficients of the constructs

| | **Original Sample** | **Sample Mean** | **Standard Deviation** | **T Statistics** | **P Values** | **Conclusion** |
|---|---|---|---|---|---|---|
| Technological innovation -> Alternate choice | 0.832 | 0.834 | 0.019 | 43.900 | **0.000**** | Reject Null Hypothesis |
| Technological innovation -> Buying | 0.932 | 0.933 | 0.009 | 106.723 | **0.000**** | Reject Null Hypothesis |
| Technological innovation -> Needs | 0.813 | 0.815 | 0.022 | 36.232 | **0.000**** | Reject Null Hypothesis |
| Technological innovation -> Post purchase behaviour | 0.591 | 0.594 | 0.048 | 12.275 | **0.000**** | Reject Null Hypothesis |
| Technological innovation -> understanding | 0.608 | 0.612 | 0.046 | 13.223 | **0.000**** | |

***p<0.05, Significant*

**Testing of Hypothesis - Demographics**

**Hypothesis 6.1 - Gender**

Table 16: Independent sample T-test for analysing gender's opinion on technological innovations

| **Independent Samples Test** |
|---|

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| TI | Equal variances assumed | .742 | .390 | 3.055 | 232 | **.003**** | 1.10606 | .36203 | .39277 | 1.81936 |
| | Equal variances not assumed | | | 2.992 | 47.764 | .004 | 1.10606 | .36966 | .36272 | 1.84940 |

***p<0.05, significant*

**Analysis and interpretation:**

From Table 16, we can see that the p-value or significance value is 0.003, which is less than 0.05 at a 5% level of significance. This signifies that the null hypothesis must be rejected and alternative accepted.

**Hypothesis 6.2 - Age**

Table 17: ANOVA for analysing the variance between age and technological innovations

| ANOVA | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 86.536 | 3 | 28.845 | 7.418 | **.000**** |
| Within Groups | 917.714 | 236 | 3.889 | | |
| Total | 1004.250 | 239 | | | |

***p<0.05, significant*

**Analysis and interpretation:**

From Table 17, we can see that the p-value or significance value is 0.003, which is less than 0.05 at a 5% level of significance. This signifies that the null hypothesis must be rejected and alternative accepted.

**Hypothesis 6.3 - Qualification**

Table 18: ANOVA for analysing the variance between qualification and technological innovations

**ANOVA**

| | um of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 135.150 | 3 | 45.050 | 12.233 | .000 |

| | | | | | |
|---|---|---|---|---|---|
| Within Groups | 869.100 | 236 | 3.683 | | |
| Total | 1004.250 | 239 | | | |

***p<0.05, significant*

**Analysis and interpretation:**

From Table 18, we can see that the p-value or significance value is 0.000, which is less than 0.05 at a 5% level of significance. This signifies that the null hypothesis must be rejected and alternative accepted.

**Hypothesis 6.4 - Employment**

Table 18: ANOVA for analysing the variance between employment and technological innovations

**ANOVA**

| | um of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 14.014 | 2 | 7.007 | 1.677 | .189 |
| Within Groups | 990.236 | 237 | 4.178 | | |
| Total | 1004.250 | 239 | | | |

***p<0.05, significant*

**Analysis and interpretation:**

From Table 18, we can see that the p-value or significance value is 0.189, which is more than 0.05 at a 5% level of significance. This signifies that the null hypothesis can't be rejected.

**Hypothesis 6.5**

Table 19: ANOVA for analysing the variance between age and technological innovations

**ANOVA**

| | um of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 73.151 | 2 | 36.575 | 9.310 | .000 |
| Within Groups | 931.099 | 237 | 3.929 | | |
| Total | 1004.250 | 239 | | | |

***p<0.05, significant*

**Analysis and interpretation:**

From Table 19, we can see that the p-value or significance value is 0.000, which is less than 0.05 at a 5% level of significance. This signifies that the null hypothesis must be rejected and alternative accepted. Summary of Findings

Table 20: Summary of the findings of the hypotheses

| **Sl. No.** | **Hypothesis** | **Result** |
|---|---|---|
| H1 | H0: There is no significant influence of technological innovations on customer needs in the purchase process.<br>H1: There is a significant influence of technological innovations on customer needs in the purchase process. | Null Rejected<br>Alternate Retained |

| | | |
|---|---|---|
| H2 | H0: There is no significant influence of technological innovations on supporting consumers with the required information or recommendations needed to gain a more understanding of the product.<br>H1: There is a significant influence of technological innovations on supporting consumers with the required information or recommendations needed to gain a more understanding of the product. | Null Rejected<br>Alternate Retained |
| H3 | H0: There is no significant influence of technological innovations on the evaluation of alternate choices, products, or brands in the consumer purchase process.<br>H1: There is a significant influence of technological innovations on the evaluation of alternate choices, products, or brands in the consumer purchase process. | Null Rejected<br>Alternate Retained |
| H4 | H0: There is no significant influence of technological innovations on consumer buying decisions.<br>H1: There is a significant influence of technological innovations on consumer buying decisions. | Null Rejected<br>Alternate Retained |
| H5 | H0: There is no significant influence of technological innovations on consumer's post-purchase behaviour in the purchase process.<br>H1: There is a significant influence of technological innovations on consumer's post-purchase behaviour in the purchase process. | Null Rejected<br>Alternate Retained |
| H 6.1 | H0: There is no significant difference in the opinion among different genders on the influence of technological innovations in their buying process.<br>H1: There is a significant difference in the opinion among different genders on the influence of technological innovations in their buying process. | Null Rejected<br>Alternate Retained |
| H 6.2 | H0: There is no significant difference in the opinion among consumers of different age groups on the influence of technological innovations in their buying process.<br>H1: There is a significant difference in the opinion among consumers of different age groups on the influence of technological innovations in their buying process | Null Rejected<br>Alternate Retained |
| H 6.3 | H0: There is no significant difference in the opinion among consumers with different qualification levels on the influence of technological innovations in their buying process. | Null Rejected<br>Alternate Retained |

| | | |
|---|---|---|
| | H1: There is a significant difference in the opinion among consumers with different qualification levels on the influence of technological innovations in their buying process. | |
| H 6.4 | H0: There is no significant difference in the opinion among consumers with different employment categories on the influence of technological innovations in their buying process.<br>H1: There is a significant difference in the opinion among consumers with different employment categories on the influence of technological innovations in their buying process. | Null Retained<br>Alternate Rejected |
| H 6.5 | H0: There is no significant difference in the opinion among consumers of different income groups on the influence of technological innovations in their buying process.<br>H1: There is a significant difference in the opinion among consumers of different income groups on the influence of technological innovations in their buying process. | Null Rejected<br>Alternate Retained |

## CONCLUSIONS

### Theoretical Contributions to the Study

The current research contributed to the existing knowledge and studies done in understanding how the current technological advances are influencing consumer behaviour in a consumer durable market. While several studies have focused on the emerging technologies, how these technologies can be by the marketers to enhance user experience and hence provide differentiated products to consumers, the focus on how these technologies are leading to innovative business models that are fundamentally changing the way consumers go through the purchase process is the value add from this research.

The research focuses on understanding how the technological innovations affect all the five stages of the purchase process, starting from need generation, gaining more knowledge of the product, evaluating alternate choices, actual buying process, to post-purchase behaviours. This research also focused on consumer demographics' opinions on technological innovations. Age, gender, employment, income, and qualifications of the consumers were studied for their influence and opinions towards the changing technological innovations. The demographic factors also revealed that there exist some differences among consumer demographics, which is in line with the previous research as seen in the literature review. The evaluation of demographics data was done using a combination of independent t-test and ANOVA.

### Implications for the Marketers

This research provided valuable inference to the marketers on how the changing technological innovations are impacting their marketing strategies and the organization's business model. It is seen from the analysis that technological innovations have a significant influence on the marketing value proposition. This implies that the constantly evolving innovations due to technology play a significant role in fulfilling the delivery promise that the company has made to its consumers. The study also reveals that the impact of competition due to the changes in business models using technologies is significant. Competition is constantly inventing new ways to compel consumers to buy their products.

Marketers must be always looking for innovative ways to solve consumer problems using upcoming technologies. This is a double-edged sword since it is always a challenge for the marketers to decide if they must be the innovators for an early market entry or be the late entrants in a mature market. The study also confirmed that technological innovations are pushing companies and marketers to constantly evaluate their current products and plan on introducing new products to meet changing consumer behaviour. Consumer behaviour is constantly changing with new business models, products, and services being available because of changes in technologies. Finally, the study indicated that to remain competitive, the companies must constantly change their internal processes, increase agility and flexibility, and respond to competition in a very short time. Technology advancements are putting pressure on product cost, so companies must invest in the upcoming technologies to benefit on cost reduction of the products and services

**Implications for Consumers**

This research provided important data on how technological innovations are impacting the behaviour of consumers in the buying process. The study revealed that all the five stages of purchase – need generation, gathering additional information, evaluating alternatives, actual purchase process, and post-purchase behaviours are being influenced by the changes in technological innovations. Technological innovations, through social media and other online advertisements are creating a need for consumers. Technologies are supporting the creating of innovative products that are enticing consumers to plan for the purchase. Technological innovations are also supporting consumers to get additional information on the product. With the extensive penetration of the Internet and social media, consumers have information about the product and of the competing brands at their fingertips. The information is also available in realtime in easy to comprehend way. Consumers are also becoming adept at using emerging technologies in their buying process.

**Directions for Future Research**

The current research is focused on evaluating the influence of technological innovations on key parameters that define consumer behaviours. The research can be further enhanced by adding additional key parameters like technology trends, innovation trends, and choosing specific consumer demographics. While technology is changing at a rapid pace, some companies like Google are encouraging innovations of technologies to meet the next generation demand. They are coming out with compelling innovations using these technologies to gain consumers. These trends in technologies and the corresponding innovations offered impact consumers in their behaviour towards the purchasing process. Different consumer demographics are impacted differently, and this provides opportunities for future research.

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