

CUSTOMER PERCEPTION ON THE IMPACT OF 5G TECHNOLOGY BASED SMARTPHONES

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Abstract

There was a time when smartphone was a new piece of technology and now it is a necessity for everyone. The device is seen in every person's hand, from fruit vendor to a company's CEO. This smartphone helps in almost every daily activity. The Smartphone is useless without connectivity. The quality of connection is directly related to one's efficiency and productivity. With many generations in line, eventually 5G was introduced. It aims at increasing speed, better connection and lower latency, to name a few features. The purpose of this research is to identify the impact of 5G technology-based smartphones and how customers perceive it. In this study, 237 responses were gathered from the students of St. Xavier's College (Autonomous), Ahmedabad City. It takes into consideration respondents from multiple disciplines like Commerce, Arts, Science, BDA and BCA levels of study. An attempt is made to determine what consumers are experiencing and, expecting from the future devices. Various smartphone brands are taken into consideration to derive conclusion regarding preferences and purchasing power. It can serve as a guide to any smartphone manufacturer or network operator on which areas they can improve.

Keywords: 5G, Smartphone, Perception, Ahmedabad City, Chi-Square Analysis

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INTRODUCTION

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices. 5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra-low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Higher performance and improved efficiency empower new user experiences and connects new industries. 5G will bring wider bandwidths by expanding the usage of spectrum resources, from sub-3 GHz used in 4G to 100 GHz and beyond. In addition to making our smartphones better, 5G mobile technology can usher in new immersive experiences such as VR and AR with faster, more uniform data rates, lower latency, and lower cost-per-bit. 5G will expand the mobile ecosystem to new industries. This will contribute to cutting-edge user experiences such as boundless extreme reality (XR), seamless IoT capabilities, new enterprise applications, local interactive content and instant cloud access, to name a few. One needs to get a new smartphone that supports 5G if you want to be able to use the network. For example, smartphones powered by the Snapdragon 5G Mobile Platforms are 5G compatible.

LITERATURE REVIEW

Fettweis et.al. (2014) showcase that 5G will bring a drastic change that will affect wireless communications and various parts of the society and economy. The main concern stated by them is that 5G will require a layer design and also a good network architecture which will support the ecosystem. The author has also stated vision as well as challenges for the future of 5G and what it can offer beyond 4G.

Janaka Rumes Gamlath (2022) in the paper highlights the taste of youth in Anand City of India related to the purchase of smartphone. The information was gathered by surveying 130 youths up-to 30 years of age. This paper tells us that youth prefers to buy mobile phones online and they have a liking towards the brands like Samsung, Apple and OnePlus. This also tells us the factors influencing them for this smartphone purchase were things like discounts and ratings from other buyers. The main things sought by the youth were things like brand, price and camera.

V.P. Padma & Dr. T. Kannan (2022) tell us about the preference of consumers for brands, smartphones and gives insights for the companies in this sector by using primary and secondary data. It states that the factors which influence consumer behaviour and purchasing decisions are features, price and their peer group. Also brand image impacts the buying decision in a good manner. Customers want features like processing speed, camera quality and battery life over and above all other features.

Hong et.al. (2021) the mobile network operators of South Korea provide services based on whether you are a business or a consumer. The use of VR, online video games and mobile data has significantly improved due to the advent of 5G and it is more than the use of LTE. The government has also invested in Information and Communication Technology and it wants to achieve various goals with the help of 5G for which it has implemented various policies.

Yuying Zheng & Chien-Wei Chen (2023) this paper gives the reasons for customers' smartphone purchase taking into consideration the recency of their purchase. The data was collected in China where the sample size for testing their hypothesis was 470. The factors affecting decisions are needed for uniqueness, education level and anticipated regret. It gives us practical insights which highlights individual differences and gives contextual reference for optimising customer satisfaction.

Hu Yu & Guan Yuchen (2020) introduces us to the use of the 5G network in Beijing's Retail Industry. Here qualitative research methods are used to study the impact of technology on customer services. Also, it focuses on mobile commerce in the retail industry. To collect data semi-structured interviews were conducted. It helps us to know the connection between technology and customer services. It tells us how the advent of 5G has improved customer services with tools like AI and AR. The evolution of 5G from 1G and how it helps E-Commerce models like B2B B2C C2C etc. is highlighted in this paper.

Minh-Duy Le & Shirley Ou Yang (2021) in this paper show that 5G services have positive as well as negative effects which include factors like cyber-attacks and crypto jacking. To derive conclusions qualitative data was used and to analyse it mixed-method supply was used underneath the critical realism paradigm. While 5G smartphones can increase quality and user experience but it has many complexities hidden within it will obstruct purchase decisions. Things like social influence, product features, security, price and aesthetic values affect smartphone purchase decisions. Its findings were that security concerns negatively affected purchase intentions of consumers.

RESEARCH METHODOLOGY

Research Objectives

- 1 To understand the preferences of consumers, their satisfaction levels regarding the performance and overall user experience of their current smartphones.
- 2 To assess the awareness and perception of consumers' regarding smartphones based on 5G technology.
- 3 To evaluate consumers' purchase intent and brand preference for smartphones-based on 5G technology.
- 4 To examine the user experience of 5G technology and its perceived value among consumers.
- 5 To identify the barriers hindering the adoption of 5G smartphones among consumers.

Research Design

This study is based mainly upon Descriptive and Causal Research Designs.

Sampling Design

- This study is based on primary data collected from 237 respondents (aged between 17 and 25 years) at St. Xavier's College (Autonomous) in Ahmedabad City, in the year 2024.
- The selection of the respondents is based on purposive sampling, drawn from graduation and post-graduation students of St. Xavier's College (Autonomous) in Ahmedabad City, comprising responses from Arts, Commerce, Computer Applications and Science.
- The data is collected through a structured Google Form questionnaire.

Tools and Techniques

The collected questionnaires were carefully examined as they were received, and a coding system was created for each question to quantify the qualitative elements. The present study employs the following tools to collect and analyse the data

- Microsoft Office Excel 2017
- IBM SPSS Statistics 25
- Google forms

The techniques employed to analyse the data collected are as follows

- Descriptive Statistics
- Chi Square Test for Independence of Attributes

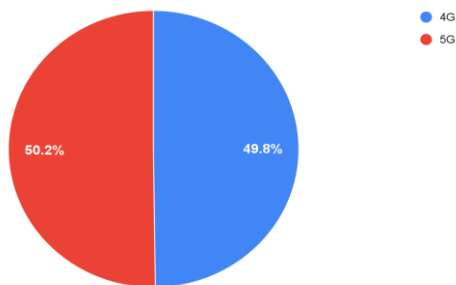
DATA ANALYSIS

The table below summarizes the sample composition with regards to various demographic features of the sample respondents.

Demographic Information		
Gender	Male	115
	Female	122
Education	Graduation	227
	Post Graduation	10
Monthly family income	Below 15000	19
	15001-25000	21
	25001-35000	25
	35001-45000	27
	45001-55000	27
	Above 55001	118
Department	Commerce	67
	Arts	69
	Science	41
	BCA/BDA/CS	60
Age	17	6
	18	42
	19	58
	20	89
	21	27
	22	10
	23	2
	24	1
	25	2

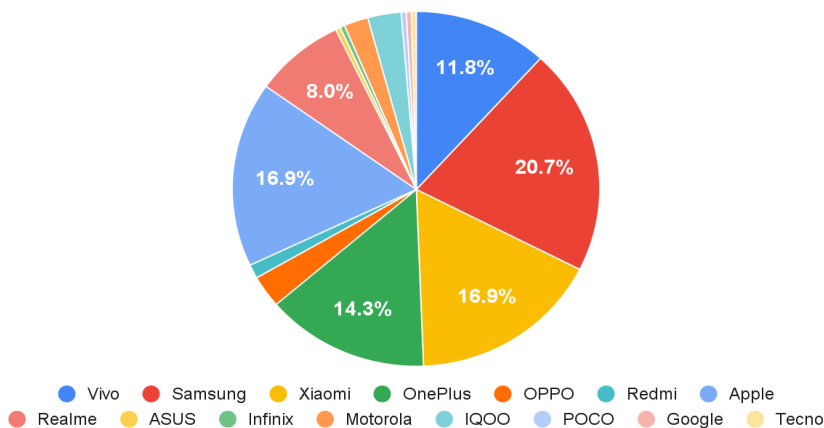
In order to understand the preferences of consumers', their satisfaction levels regarding the performance and overall user experience of their current smartphones.

Chart 1 showing type of technology the respondents are using currently



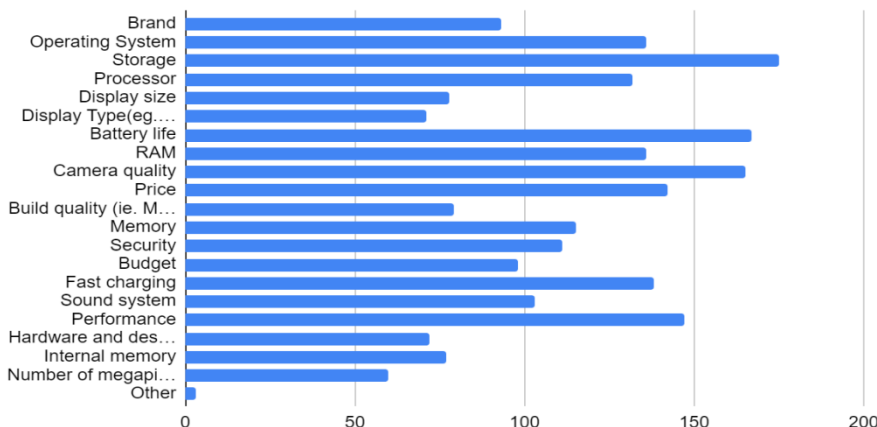
Interpretation: From the above diagram it can be interpreted that half of the respondents have already adopted 5G technology which amounts to 50.2% while the other half i.e. 49.8% is still using 4G technology. It can be inferred that 4G smartphone’s market share is reduced but still it has maintained its position, it is not obsolete.

Chart 2 showing current smartphone preference of respondents



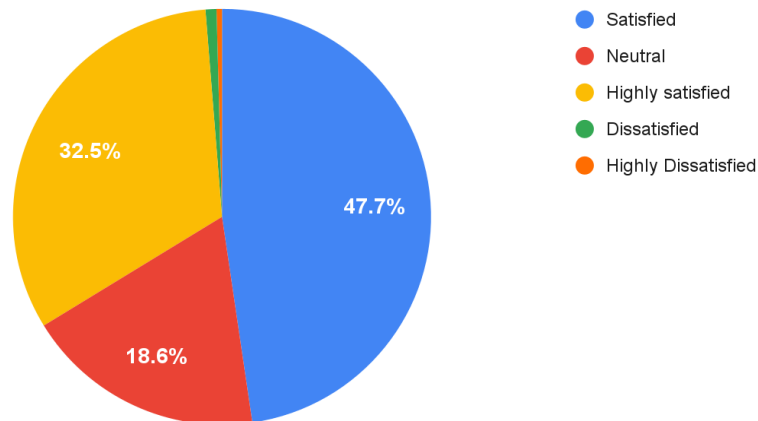
Interpretation: From the above diagram it can be seen that Samsung brand is preferred by the students having a share of 20.7% out of the total responses. It is followed by the wide usage of Apple devices among college youth, getting 16.9% share in the above diagram. Techno, Google, Nothing, ASUS, Redmi, Motorola, IQOO, Oppo hold the least share as seen in the above diagram. The other majority of share is taken by companies like OnePlus, Vivo and Xiaomi having 14.3% 11.8% and 16.9% share respectively. It can be inferred that Samsung, Apple and OnePlus are the top 3 players in the market.

Chart 3 showing the qualities sought by respondents in their smartphone



Interpretation: From the above chart it can be seen that operating system, battery life and camera quality are the most sought needs of college students in a smartphone. They focus less on features like display size, display type, build quality, hardware and design which are the external parts of a smartphone. Some of the factors which are less important to them are budget/price, operating system, processor, ram, sound system and performance.

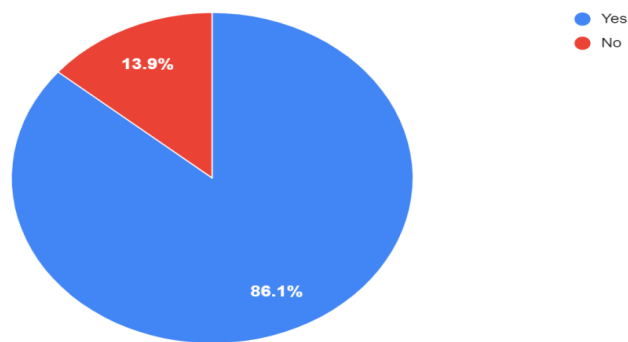
Chart 4 showing satisfaction level of respondents with the performance and overall experience in their current smartphone.



Interpretation: From the above chart it can be seen that 47.7% of the respondents are satisfied with their current devices but only 32.5% are fully satisfied with their devices. It can also be seen that the percentage of dissatisfaction is near to 1%, while 18.6% of respondents are neither in the favour of both.

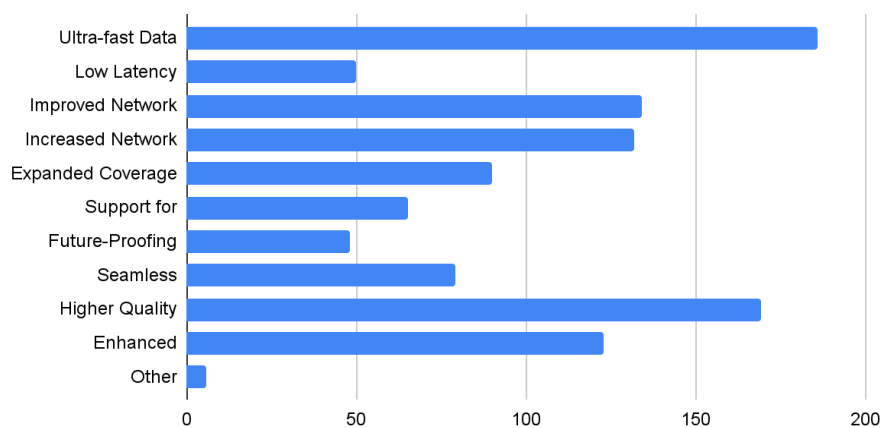
In order to assess the awareness and perception of consumers' regarding smartphones based on 5G technology.

Chart 5 showing familiarity of respondents with the smartphones that utilize 5G technology



Interpretation: It can be seen that 86.1% of the students are already aware of 5G technology enabled smartphones and they may be using it already. Only 13.9% of the students are unaware about it. Enhancing public awareness on this issue can be achieved through a combination of impactful advertising campaigns and the integration of advanced features in smartphones.

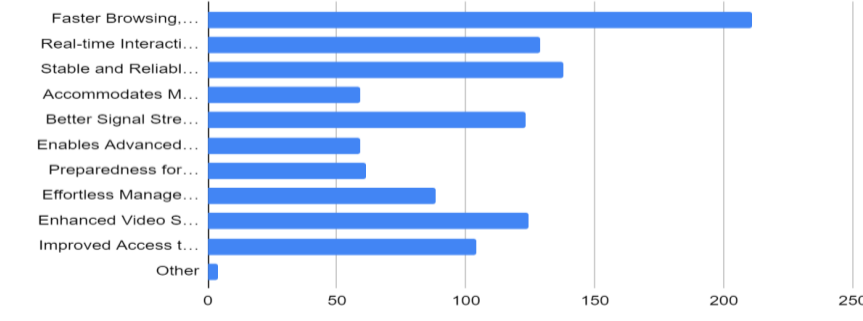
Chart 6 showing satisfaction features of 5G smartphone which consumers are aware about



Interpretation: Looking at the above chart it can be derived that higher quality streaming & ultra-fast data speeds are the most sought features of a 5G smartphone. The other aspects like latency, support for emerging technologies, multitasking and future proofing do not

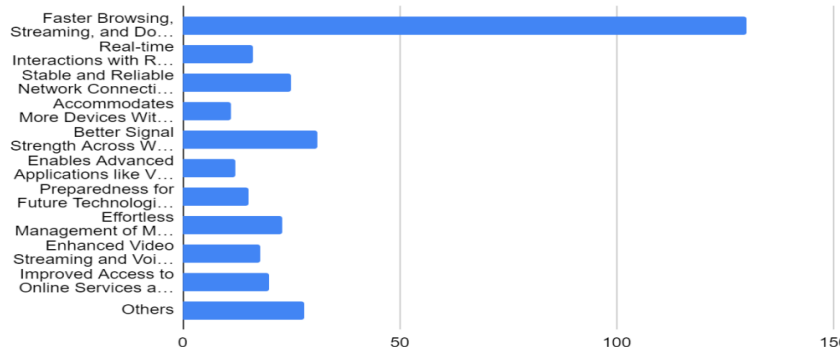
play a significant role here. It can be viewed that customers value improved network performance and enhanced connectivity as crucial features.

Chart 7 showing satisfaction benefits of 5G smartphone which consumers are aware about



Interpretation: This chart shows us that, according to the respondents, the main benefit of a 5G enabled smartphone is fast browsing. Other things like AR, VR, IoT and other future technologies are not much known to respondents. Features like connectivity, stability and coverage are known mostly by everyone. As a result, the majority of people are familiar with the various features of 5G technology.

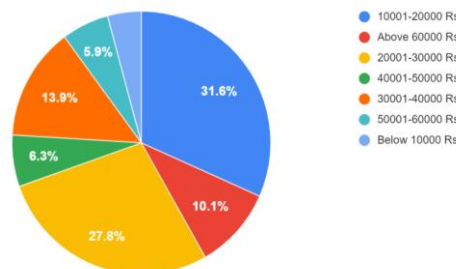
Chart 8 showing benefits of 5G smartphone which consumers prefer the most



Interpretation: The above chart depicts that the most sought out benefit of 5G smartphones is faster browsing, streaming and downloading. This is the by-product of the 5G network which later enables these benefits. All other benefits like enabling advanced applications like VR, AR, and IoT, effortless management of multiple tasks, preparedness for future technological advancements, accommodating more devices without slowdowns are less known to the respondents.

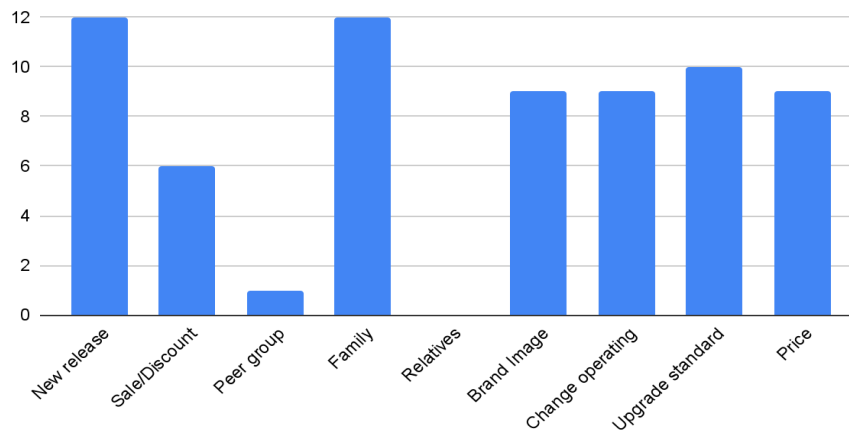
With the intention of evaluating consumers' purchase intent and brand preference for smartphones -based on 5G technology.

Chart 9 showing price range the respondents prefer to buy a smartphone



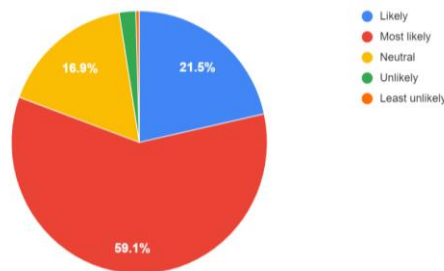
Interpretation: The students mostly prefer to purchase a smartphone within the range of 10000 to 20000 Rs and it can extend to the limit of 20000 to 30000 Rs, depending on their budget. It has also been depicted that, only 10.1% out of the total students are willing to pay 60000 Rs or more to purchase a smartphone while most of the students ranging from 5% to 6% would prefer buying it within the range of 40000 to 60000 Rs. It has been noted that only 4.2% of the students prefer to buy a smartphone below 10000 Rs. It is evident that some of the features and benefits found in smartphones within the same price range are limited.

Chart 10 showing factors which influence respondent's purchase decision



Interpretation: From the above bar chart, it can be depicted that the important factor for influencing Purchase Decision of the students is sale or discount which also leads us to another factor which is price. Also brand image and date of release of the device matters to the respondents. It can be seen that peer groups and relatives have the least amount of influence on them, while family and the desire to upgrade their standard of living affects them more. Sometimes, people choose to switch their operating system, which can influence their decision-making when it comes to smartphone features.

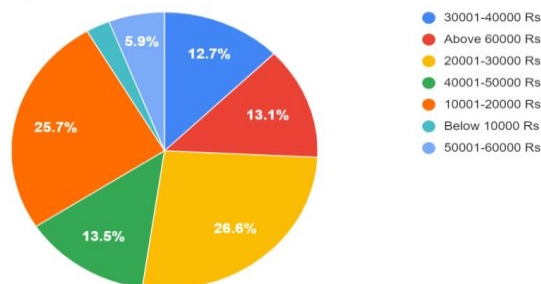
Chart 11 showing probability that the 5G enabled smartphone will be the respondent's choice in their next purchase



Interpretation: It can be seen that 59.1% of the respondents most likely purchase a 5G smartphone and 21.5% are likely to purchase it while 16.9% of the respondents are not in favour of either. Around 2% of the respondents are unlikely or least likely to purchase a 5G smartphone in the future. It seems that most students have embraced 5G, while a minority remain somewhat skeptical or uncertain about its benefits.

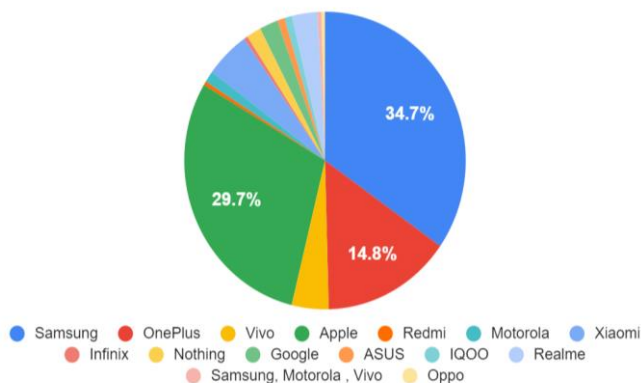
Chart 12 showing price range which the respondents are willing to pay for a 5G enabled smartphone

What is the price range you are willing to pay for a 5G-enabled smartphone?



Interpretation: In the context of 5G, 52.8% of the respondents are willing to pay between the amount of 10000 to 30000 Rs. It can be seen that only 2% of respondents want to purchase a smartphone below the range of 10000 Rs. Also, it should be noted that only 12% of respondents are willing to pay above the amount of 60000 Rs. The situation appears similar for individuals seeking to purchase a smartphone priced between 30,000 to 40,000 Rs. A collective of 19.6% of respondents want to purchase a smartphone ranging from 40000 to 60000 Rs. This trend can be attributed to brands consistently offering high-quality smartphones within this price range.

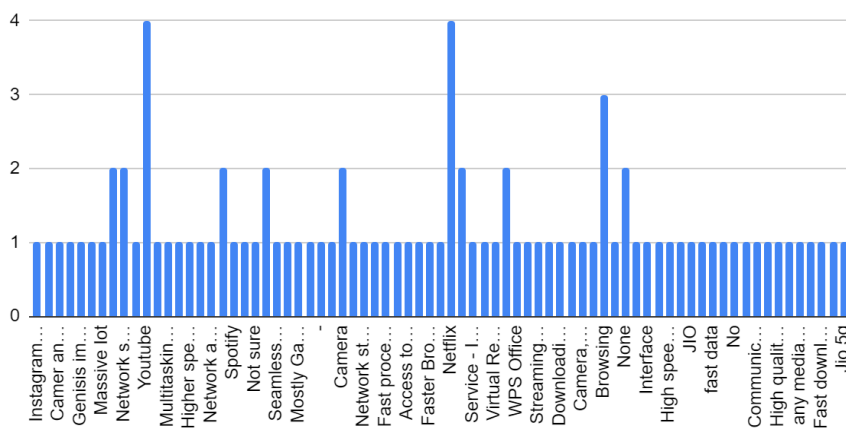
Chart 13 showing brand preference for purchase of 5G smartphone in future



Interpretation: It can be seen that the majority of the consumers are preferring to purchase Samsung brand's smartphone in the future which is followed by demand for Apple brand's smartphone. Third on the list is OnePlus which has a share of 14.8% out of the total responses. Vivo and Xiaomi acquire some percentage (around 9%) of the share in the graph while Infinix, Nothing, Google, Asus, IQOO, Oppo, Realme and Redmi have very less percentage of contribution in the above chart.

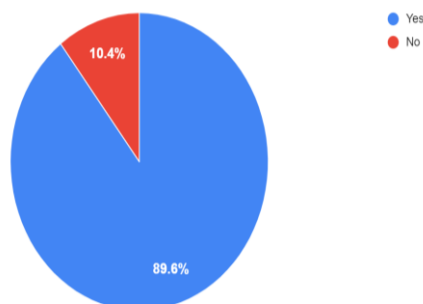
To examine the user experience of 5G technology and its perceived value among consumers.

Chart 14 showing excitement for using a particular application or service in 5G enabled smartphone



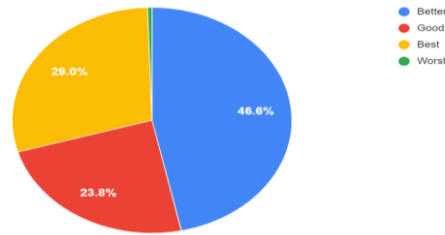
Interpretation: From the above chart, it's evident that 5G will significantly improve people's experiences with faster downloading, streaming, and uploading speeds. Additionally, some respondents seem to associate this enhancement specifically with Jio. From this, it can be inferred that they perceive 5G service and the provider as synonymous.

Chart 15 showing opinions of respondents in difference in download and upload speed between 5G and 4G



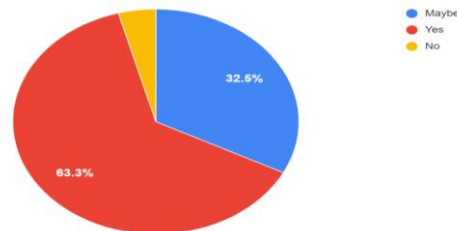
Interpretation: 89.6% of the respondents (assuming that half of them are 5G users) feel that there is a difference in downloading and uploading speed due to 5G while 10.4% the users do not feel so. This may be due to network issues or smartphone compatibility issues.

Chart 16 showing the respondent's experience with 5G enabled smartphone



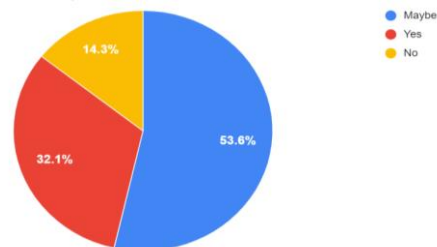
Interpretation: 46.6% of the respondents feel that the 5G experience is better than the previous 4G experience while 23.8% feel that it is better than the previous but not that great of an experience. It can also be seen that 29% of the respondents feel very positive about their 5G experience. Here, only 0.6% of share is taken by the respondent who had the worst experience due to 5G. Overall consumers are satisfied by their 5G experience.

Chart 17 showing opinion of respondents with respect to 5G smartphone form an investment perspective



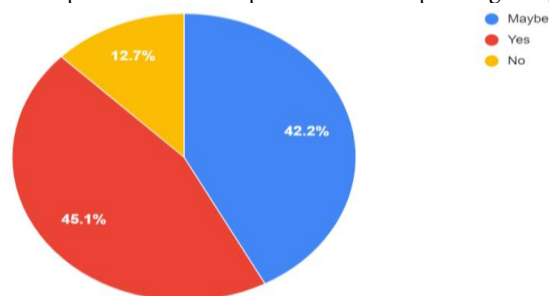
Interpretation: It is depicted that 63.3% of the respondents believe 5G is a worthwhile investment, while only 4.2% disagree. However, 32.5% appear uncertain. This uncertainty might stem from lack of experience with 5G or technical difficulties they've encountered.

Chart 18 showing opinion of respondents with respect to 5G smartphone form a sustainable development perspective



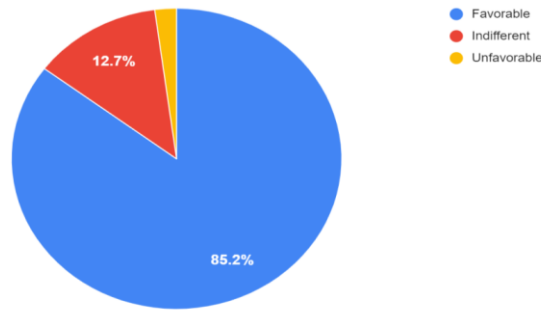
Interpretation: Majority i.e. 53.6% of the respondents are ambiguous about the environmental effects of 5G while 14.3% of the respondents are sure that it will be adverse for sustainable development. It can be noted that more than a quarter of respondents are in favour of 5G contributing to sustainable development.

Chart 19 showing opinion of respondents with respect to 5G smartphone getting replaced by 6G



Interpretation: About half of the respondents anticipate that 5G will eventually be replaced by 6G or similar advancements, while the other half remain uncertain about this possibility. However, a small portion (12.7%) express confidence that 5G will not be supplanted by 6G in the near future.

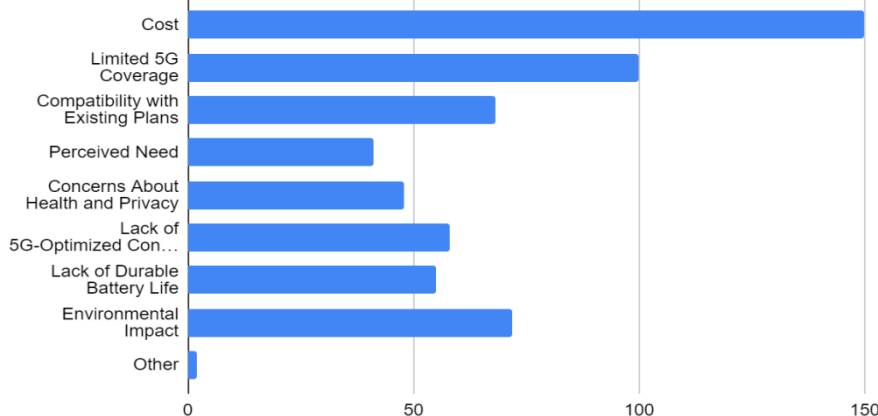
Chart 20 showing opinion of respondents with respect to 5G smartphone's future



Interpretation: Only 2.1% of respondents feel that 5G's future will not be bright whereas 85.2% of the respondents affirm that its future is bright. It can be seen that 12.7% of respondents are unable to pick a side. It can be because 4G is not completely outdated in the country.

To identify the barriers hindering the adoption of 5G smartphones among consumers.

Chart 21 showing barriers faced by respondents in upgrading to a 5G smartphone



Interpretation: The main barrier affecting students/consumers is the cost of the smartphone. Also, people are not getting 5G coverage as per their need. An interesting point to note is that many of the respondents feel obliged to the environment and thus avoid purchasing 5G enabled smartphones. One of the facts highlighted by the data is the need of 5G smartphones is also a factor transforming into a barrier. Other factors like 5G plans, Privacy, Durable Battery and lack of 5G Optimised Content are acting as barricades for consumers to purchase a 5G enabled smartphone.

In order to examine the influence if various demographic factors including gender, age, education, and annual family income on smartphone purchase activities, an approximation of the Pearson Chi Square Test has been used in this study.

Chi Square Test on Demographic Variables

Table 4.1 showing relation between Demographic Variables and Brand Willingness

Statements	Chi-Square Value (χ^2)	P-value (α)	Decision for Null Hypothesis
Age*Brand Willingness H ₀ : Age does not affect the brand inclination H ₁ : Age affects the brand inclination	50.290	1.000	Failed to reject
Gender*Brand Willingness H ₀ : Gender does not affect the brand inclination H ₁ : Gender affects the brand inclination	4.454	0.974	Failed to reject

<p>Income*Brand Willingness H₀: Income does not affect the brand inclination H₁: Income affects the brand inclination</p>	51.804	0.765	Failed to reject
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Interpretation: The above table indicates that, demographic factors such as age, gender, and income show no significant association with the inclination to purchase a smartphone from a specific brand.

Table 4.2 showing relation between Demographic Variables and Price Willingness

Statements	Chi - Square Value (x ²)	P-value (α)	Decision for Null Hypothesis
<p>Age*Price Willingness H₀: Age does not affect the price preference H₁: Age affects the price preference</p>	66.844	0.037	Rejected
<p>Gender*Price Willingness H₀: Gender does not affect the price preference H₁: Gender affects the price preference</p>	10.710	0.098	Failed to reject
<p>Income*Price Willingness H₀: Income does not affect the price preference H₁: Income affects the price preference</p>	46.973	0.025	Rejected

Interpretation: The table suggests that demographic factors like age and income are significantly associated with the willingness to pay for preferred smartphone, while gender shows no significant association with price preferences.

FINDINGS OF THE STUDY

- Majority of the market share is captured by Samsung brand in both the technologies i.e. smartphones with 5G and smartphones with 4G.
- Apple is trying to keep up to the competition as it has the second highest market share after Samsung.
- Factors like storage, battery life and camera quality matter most to the selected sample.
- Satisfaction level of the sample for 4G as well as 5G smartphones are nearly the same. We can also see that the dissatisfaction level is the same too. This means that smartphone manufacturers are doing a good job in manufacturing mobiles.
- The optimum price range for the respondents out of the data can be traced to a range of 10000-20000 Rs. Maximum respondents feel the need to buy smartphones in this range not only for current use but also for future use i.e. 5G smartphone. Also, the respondents who want to purchase a device above 60000 Rs are very less.
- 5G will benefit the people in areas like streaming, downloading & uploading, faster connectivity and other 5G enabled applications like AR & VR.
- More than half of the respondents feel that 5G enabled devices are worth the money. This is because of the features they bring along with them like lower latency, increased efficiency due to multitasking, increased network speed and coverage etc.
- Majority of people are unsure about the impact of 5G on the environment because of aspects like radiation, increase in manufacturing of infrastructure, increased carbon footprint and many more. This also acts as one of the barriers in purchasing it. But they are very positive that the future of 5G will be favourable.
- One of the main barriers towards upgrading to a 5G smartphone is its cost and thus consumers prefer to buy them in a specified range which will not exceed their budgets. Also, we need to consider coverage as a barrier too as only two service providers namely Jio and Bharti Airtel cater this technology to the people.
- Brand loyalty (i.e. brand inclination) is affected by none of the demographic factors like Age, Gender & Income.
- Demographics like Age & Income affect the price factor while purchasing a smartphone. But the price willingness is unaffected by the demographic factor of Gender. Thus, we can see companies catering and influencing both genders equally.

SUGGESTIONS

- Smartphone companies should prioritize advertising the features and benefits of 5G smartphones to encourage swift adoption and phase out the use of 4G devices. To facilitate this transition, it's crucial that companies produce 5G devices priced between 5,000 to 20,000 Rs. This price range aligns with the preferences of most Indian consumers, who typically upgrade their smartphones every 2 to 3 years due to ongoing technological advancements. While some consumers may be willing to invest more in high-end smartphones, focusing on affordability will drive mass adoption of 5G technology.
- To encourage sales of expensive smartphones, companies should prioritize offering convenient EMI (Equated Monthly Installment) options, as a significant portion of these purchases are made on credit. By ensuring a smooth and favourable EMI process, companies can persuade consumers to invest in higher-priced smartphones. This approach can lead to increased sales in the higher price category, provided that consumers are convinced of the value proposition and affordability offered through EMI options.
- Companies must prioritize sustainability in the development of 5G technology by conducting thorough research and development in this area and promptly implementing sustainable practices. They should also ensure that consumers are aware of their sustainability initiatives to foster greater brand loyalty. On the hardware side, particular attention should be given to designing batteries that have extended longevity while operating on the 5G network. By prioritizing consumer satisfaction, companies can pave the way for the eventual transition to 6G technology, mirroring the current shift from 4G to 5G.
- Telecom providers should prioritize resolving network issues and expanding coverage to match the standards set by 4G. By ensuring consistent and reliable coverage, consumers will be more inclined to adopt 5G technology swiftly.
- Brands should intensify their efforts to cultivate brand loyalty, as this investment will prove invaluable during periods of adversity or stagnation. By fostering strong brand loyalty, companies can anticipate sustained or increased sales, even during challenging market conditions.

LIMITATIONS OF THE STUDY

- This research solely focuses on a specific area, St Xavier's College (Autonomous), Ahmedabad, thus overlooking other schools and colleges in Ahmedabad. Moreover, its scope is limited to Ahmedabad, whereas it could have encompassed various districts or even considered the entire state of Gujarat.
- The age group for identifying taste, preferences, awareness and opinions comprises individuals below 17 and above 25 of age. Consequently, the research neglects the majority of the working-class age group.
- This research excludes technical aspects of the 5G network, as its primary focus lies on consumer preferences.

CONCLUSION

5G represents a significant advancement over its predecessor, 4G, offering faster speeds and improved performance that has the potential to revolutionize various sectors including communications, health, infrastructure, security, and transportation. Looking ahead, the future of 5G appears promising, laying the groundwork for subsequent advancements like 6G. Demographic factors such as age and income play a pivotal role in shaping consumers' purchasing decisions, particularly regarding smartphones, where price is a significant consideration. Therefore, companies should focus on producing high-quality smartphones that prioritize customer satisfaction, with key features like camera quality, storage capacity, and battery life. Moreover, it's essential for brands to educate consumers still using 4G about the benefits of upgrading to 5G, emphasizing the enhanced speed, efficiency, and capabilities it offers. This proactive approach can facilitate faster adoption and drive sales growth in the 5G market segment.

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