

A Study of Customer Satisfaction and Future Innovation at High-end Smartphone Brands Based on Vietnamese Customer Reviews

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ABSTRACT

To evaluate how important position of innovation and buying mobile phone's affecting factors between iPhone, Samsung and Others brand (Oppo, Xiaomi, Huawei, etc.) to customer demands recently and future, a customer survey was created including two main parts question and was done by 330 participants. An ANOVA test was applied in the research in order to search out which factors make significant difference between three brands above are affecting not only the customers buying decision but also innovative proposals for next phone generation. For customer satisfaction aspect, the most significant 3 factors are Confidential Information, Image Brand, and Color affecting the customers' buying decision. For expected innovation aspect, most considerable five factors are Battery, Eye-catching, Finger Print, Screen and Face Detection which customer desire to ameliorate in the next generation. Following the Mean value, iPhone is expected to innovate its Battery, Finger print, and Face Detection functions. Whereas Samsung is supposed to innovate the Screen and Other brands is looked forward to innovating the Eye-catching.

Keyword: High-end Phone, Customer Satisfaction, Innovation Factors, ANOVA Test.

1. Introduction

In recent years, the cellphone companies have become one of the greatest companies in digital industry, which can be competitive with the Microsoft in this area. According to Business Insider research about the global competitive rankings of high-end brand phone for 2017-2018, Samsung and iPhone are two brands which are competitor on the market nowadays. However, among companies in the world, these products made by "Samsung", "iPhone", "Nokia", "Xiaomi", "OPPO" on the market are popular on the big market. The question is which factors could affect the popular of brands, and researcher would like to find out the answer by creating a questionnaire table to ask customers of individual brand. All of the articles demonstrated that each brand will has the particular approach to innovate their product. In addition, among the most significant Apple products is the iPhone. As in the computer space, though, Apple has not completely dominated the market. Samsung, a South Korean company producing both personal computers and smartphones, is a major competitor, particularly for the iPhone. The Samsung Galaxy and Note series have been responsible for reductions in iPhone sales for many years.

Thus, innovation issues in research focusing on two famous brands are Apple and Samsung. From searching on the customer's opinions, we created a survey including 30 questions to conduct the research. After running the statistic software, the key factor need to innovate will be show out in the result. Therefore, we could find the difference opinions of customers between two brands about demanding innovation function's product. This approach is able to increase the chances that companies will choose the most important factor need to be improved for new product in the future. Therefore, pointing out

factors from survey could help analyze the reason made the difference opinions in innovation between two brands.

2. Literature Review

2.1. Factors Relate to High-end Position of Mobile on Market.

After two decades of growth and development, mobile devices now bring the largest businesses, and their influence is only going to expand further and further. That's exactly the reason for Google's switch to mobile-first: to open new possibilities in the art of website optimization. There are a number of factors which make mobile website rank higher (or lower) in Google, and they can be safely divided into three major groups: technical, user experience and content. There's an additional group for a few other factors that can't be included into the previous three, but still deserve mention.

Technical Factors

i. (Site, Wi-Fi speed, and Phone) Speed

This will benefit your site because all customers like fast-loading web pages, data, and software from phone. However, users tend to show less patience than usual with handheld platforms. By the way, if the site does not load in 3 seconds, mobile users just close the browser's tab. According to a Mobile Ranking Factors study by Search metrics, the average loading time in the mobile top 10 is 1.10 seconds, and being only a tad slower (1.17 seconds on average) sends user further down in the top 30.

ii. AMP (Accelerated Mobile Pages) and Opened Multiple URLs at once.

AMP's secret is being light on their HTML and CSS code. It makes pages easily cacheable for browsers, and as a result, they load 30 times faster than regular pages – basically, almost as soon as you click on the link. Furthermore, mobile could open multiple URL is a tool that customer will spend more time to experience with phone. Users can either manually input the URLs or copy and paste them into the text box and with one click of the mouse all the URL's will open in separate tabs. With the tool, users will be happier and easier work on mobile if they need to search many type of information at the same time.

iii. Images, Voice.

A high-quality image and voice are content with the human eyes, felling. They are also easier to perceive and leave a stronger impression on the viewer than raw text. Visual media are trying creating an enjoyable site to attract more potential customers by advertising new camera technology of phone on the website.

Content Factors

i. **Word Count:** Recently, mobile sites normally have shorter texts, so it would be strange for user to have as many keywords and phrases while desktop sites remain ahead of mobile ones in terms of how many words per page they use. Mobile phone with unlimited word count is what user is looking for.

ii. **Social Signal:** Rich social engagement provides a ranking boost for a site regardless of the platform. Users browse social networks on mobile as well.

An average user spends about 30 minutes a day on Facebook alone. Over 77% of all content shared via mobile goes through messaging apps like Facebook Messenger and WhatsApp, making them an excellent platform for attracting visitors (through means such as newsletters, invitations or ad targeting). Social media's primary purpose is communication, and communication equals feedback.

iii. **Local Search Optimization:** Mobile devices can be taken anywhere with ease and thus are more often used for finding places. Putting these two facts together, mobile will give a stronger tool for business.

2.2. Position of Phone Brands on Vietnam's Market

Depending on the factors relate to high-end position of mobile on market above, the report from Euro monitor international 2017 report shows that Samsung is first brand using in Vietnam, Apple is getting the second position on the market. However, the real situation is that Apple has returned with another investment plan, this time to build a data center in Vietnam in 2019. This would be Apple's second project in Vietnam after it invested \$652,200 to establish Apple Vietnam LLC in Ho Chi Minh City in October 2015. Through this company, Apple can directly sell products in Vietnam as well as provide technology, warranty, and consulting services.

Compared to other tech giants in the world like Samsung, LG or Microsoft, Apple's move to enhance presence in Vietnam was a bit late. Because Samsung has invested more than \$11.2 billion in Vietnam, with two billion-dollar electronics and electronic components manufacturing complexes in Thai Nguyen and Bac Ninh county. The Korean tech giant also runs a research and development (R&D) facility in Hanoi with about 1,450 Vietnamese engineers to support and develop applications and software for Samsung smartphones. Meanwhile, LG Electronics has also invested in a \$1.5 billion complex in Haiphong. Microsoft shifted its mobile phone manufacturing from China, Hungary, and Mexico to Bac Ninh, Vietnam since 2014.

According to the statistics of Counterpoint Research from the second quarter of 2017 to 2018, Apple retained five per cent in the Vietnamese smartphone market. Although iPhone is priced much higher in Vietnam than the income and of the majority of consumers, iPhone sales in Vietnam are still impressive. As the information above, Samsung and Apple will have strong competitions in next years.

2.3. Factors' Characteristic of Customer Survey.

There are eleven factors affect the decision of buying a new phone in these times and the innovation thinking of customers to each cell phone company.

Camera: A camera phone is a mobile phone which is able to capture photographs and often record video using one or more built-in digital cameras. Following page B7 of the New York edition with the headline: Smartphone's Future Is All About the Camera (Aug. 31, 2017).

Battery durability: battery life is more important than ever, thanks to the big screens, superfast processors and demanding apps we find on the latest phones. After all, what good is that advanced camera or high-resolution display if your handset is dead before the sun goes down? Here's a closer look at the phones that make the grade when it comes to all-day battery life. Following Coxworth, Ben (22 February 2017). "Silicon sawdust – coming soon to a battery near you?" Newatlas.com. Retrieved 26 February 2017.

Color: As the long-running debate about the color of a dress a couple of years ago proved, color is also something of a personal choice: most of us just get used to whatever display we're looking at, over time, accurate or not. Color spaces, and calibration are extra specs worth checking out before your next smartphone purchase—you're going to be spending a lot of time looking at the phone. Following Gannes, Liz; Paczkowski, John (October 18, 2012). "What's Really Going on With Color: A Small Apple Talent Acquisition". All Things D. Retrieved June 14, 2013, "No matter how deep you think on it, you would often end up buying a phone with the color you liked at 1st sight you will always regret your choice of buying a phone of particular color, whenever you see the same phone in the color you didn't choose." , Akshay wote.

Screen: Following Ruddock, David (September 1, 2016). "Exclusive: Google's new phones will be called the Pixel and Pixel XL". Android Police. Retrieved December 24, 2016, our findings do show that screen size matters. It matters for the typical everyday mobile users, since it can have an effect on their efficiency in many of their everyday information seeking

activities and it matters also for practitioners and researchers as it can influence their design decisions, as well as, the way they conduct mobile usability evaluations.

Ease of use: Following Silverstone (1994), ease of use involves putting effort into cleaning up the menu presented to the user and testing other aspects of the interface to make it natural for people to find the desired information and take intended actions. It also involves creating software that can be used without a manual and providing clear context-sensitive help anyway.

Guarantee product: Guarantee product could improve the perceived value of their products. Guarantee product not only sends a message that the product has enough confidence in its quality, reliability, and compliance. It also reduces the risk in the minds of potential customers that they will be stuck with a bad product. Some potential buyers may be more interested in warranty than product, depending on what product of company sells and what type of company's competition has. Guarantee product will take advantage with competitors, which sell a similar product at a similar price. Moor, Tom (2016). "Are Extended Warranties on Appliances Worth It?". Angies' List (published 2016-07-22) wrote.

Discount: The discounts will attract more customers, the brand will have more potential buyers for other items in store, as almost customers prefer looking around to see what seller offer before making a purchase. Therefore, a product that offers discounts to certain groups of people may improve its reputation. Because of offering good value for money from brand, customers are more likely to put their trust in the goods and services the brand provide. Banerjee, Sy, and Yancey Scott (2010).

Salesman: Help appeal to multiple senses – These displays should be visually stimulating and offer a tactile experience for the customer. After all, the sale man will let's product that customers choose spent a lot of time in their hands. Some stores' theft prevention techniques make it difficult for customers to interact with products. There are a variety of theft prevention options out there, but we recommend options that allow customers to get a feel for products while ensuring the devices stay in the store.

Wi-Fi speed: Mobile phones with high Wi-Fi speed are going to replace laptops anytime soon if the advanced cell phones that are being launched in the market frequently; there is hardly any feature that is now unavailable on these phones. Nowadays, it is even possible to pay your shopping bills through these phones, if your bank has a tie-up with the service provider. So, it seems virtually every service is now available on cell phones. So, it will not be a hyperbole if it is said that Wi-Fi connection need to be connected as fast as possible. Griffith, Eric (2009-10-14). "New 'Wi-Fi Direct' Spec Revamps Device Networks | News & Opinion".

Identified information: Although, having good identified information service cell phones certainly can be helpful for you in emergency situations. It helps us keep our document, pay online bills by bank cards, inform or contact to someone. We use many applications on mobile phone so that how to protect the information in phone plays important role than ever. "Management of Data Breaches Involving Sensitive Personal Information (SPI)". Va.gov. Washington, DC: Department OF Veterans Affairs. 6 January 2012.

2.4. Advantage of Factors' Characteristic for Brand in Industry

The objective of this research was to investigate the underlying factors that determine the decision to purchase mobile phone devices. According the period research results, price is the dominant factor affecting the decision to buy mobile phone. Secondly, the features incorporated in a mobile hand set are the most important factor which is considered by the consumers while purchasing the mobile phone. However, all features of mobile phones are not equally important. The other factors equally correlated and have moderate relationships with the decision to buy are brand name and durability of mobile phones. Both the factors are highly associated with the quality of mobile phone devices. The least correlated factors are after

sales service and social influences. This study used multiple regressions analysis to test the effects of six independent variables (price, social influence, durability, brand name, product feature and after sales service) on the decision to buy a mobile phone device. All the independent variables combined significantly influence the consumers buying decision of mobile phone devices such as camera, battery durability, color, ease of use, etc.

Therefore, people attracted towards newer technology and will be able to shift from one mobile phone to another if it owns better technology. Mobile phone companies should carry out periodic survey to help in identifying these new technology features and decide which ones to add to its product. Moreover, by determining which combination of these features match the current trends and consumer needs would be cost effective to the mobile phone companies. In turn, product design is also very important in the success of the brand. Manufacturers of different mobile brands are improving on the durability and quality of the brand, they should also consider the price of selling it so as to make it affordable to all persons. It is recommended that companies concentrate more on developing quality and affordable mobile phones and spend more time on enhancing their products to offer it at lower prices which can be done by employing cost reduction measures.

Hence, finding out the key factor depending on a survey will help company have a view about innovation and marketing strategy in the future. The main purpose of this research that is to form a customer’s survey to figure out how important position of innovation and buying mobile phone’s affecting factors between iPhone, Samsung and Others brand in Vietnam market.

3 Methodology

3.1 Research Framework

Based on the purpose of this research and the literature review in the above section, the research framework was built up in which considered main part is to analyze customer survey. The research framework illustrated as Figure 3.1 below.

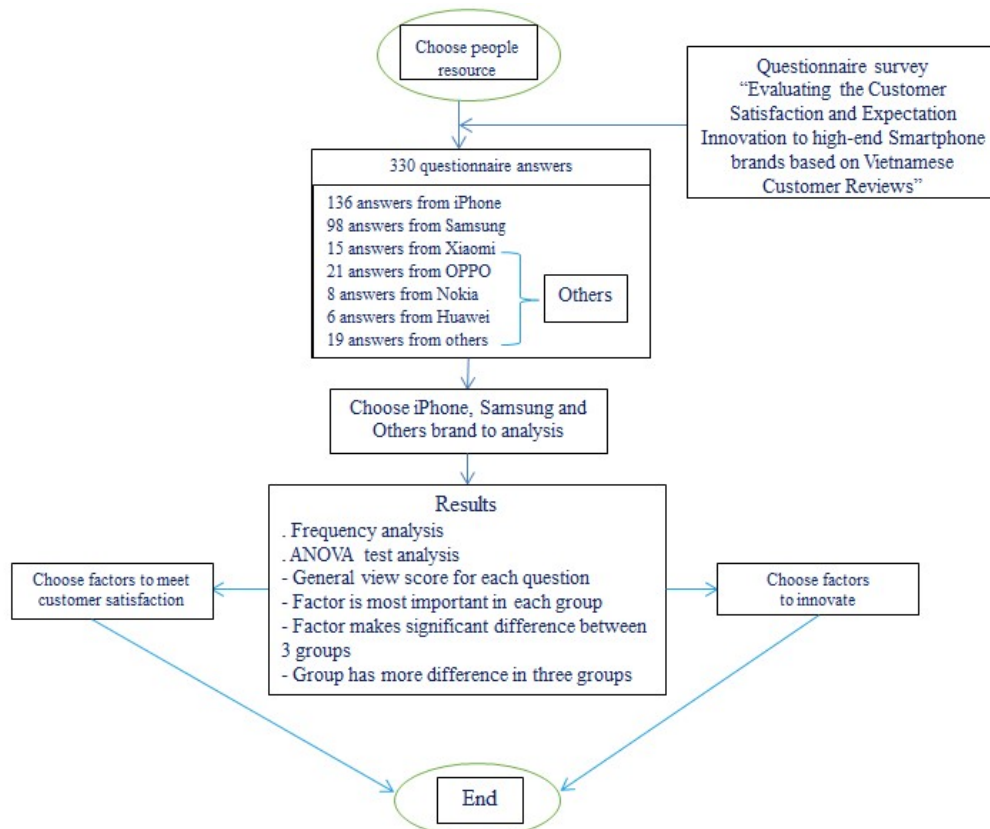


Figure 3.1 The structure of methodology in research

3.2 Data collection

3.2.1 Data Analysis Procedure

This process of the chapter includes two main steps: step one, selecting and collecting the data and step two is analysis data. The first step started with determining the objects of research before completing the questionnaire questions surveys. After that a research framework was created.

Following the framework, choosing sampling method, type of research, variables of input and outputs also selected. In step two, the data collected have been analysis under Frequency Distribution, and ANOVA test to give a general view of the customers of each brand in the phone industry recently, the most important factor for each group, the factors make significant difference thinking about factors between groups customers.

3.2.2 Data and Variables

Firstly, nominal data in research was known as categorical Samsung, iPhone and Others brand phone. Its value can be sorted by giving the name code group 1 and group 2 and group 3. Secondly, ordinal data was used to set the score of important scale in the research and find how difference between groups for each scale of the frequency. Example, having large difference between strongly important and unimportant scale in some factors each group. Thirdly, Interval/Ratio data was used in research as well. The most summary measures are Mean, Confident Interval. We found the mean for pointing out the factor most important for each stage and each group, which group made more difference than other group.

3.3 An ANOVA test

An ANOVA test is a way to find out if survey or experiment results are significant. The results help us to figure out if we need to reject the null hypothesis or accept the alternate hypothesis. The one-way ANOVA compares the means between the groups you are interested in and determines whether any of those means are statistically significantly different from each other. If the result large than 0.05, the difference is no significant. By contract, if the result smaller than 0.05, the difference is significant. The difference mean shows which group makes more different than another do. The mean of each group demonstrate which factor is most important for each brand. Specifically, it also tests the null hypothesis:

One-way ANOVA Null Hypothesis

where μ = group mean and k = number of groups. In our research, we have three groups with 11 factors for Customer Buying Decision and Innovation Ideas need to be checked whether make significant difference between three groups or not.

3.3.1 Customer satisfaction affecting factors

There are 11 factors affect to customer satisfaction in buying decision:



Figure 3.1: Eleven factors affect to customer satisfaction in buying decision

If, however, the one-way ANOVA returns a statistically significant result, we accept the alternative hypothesis (H_1), which is that there are at least two group means that are statistically significantly different from each other.

3.3.2 Expected Innovation affecting factors

On the other hand, for innovation ideas we also have 11 pairs of hypotheses from 11 factors:

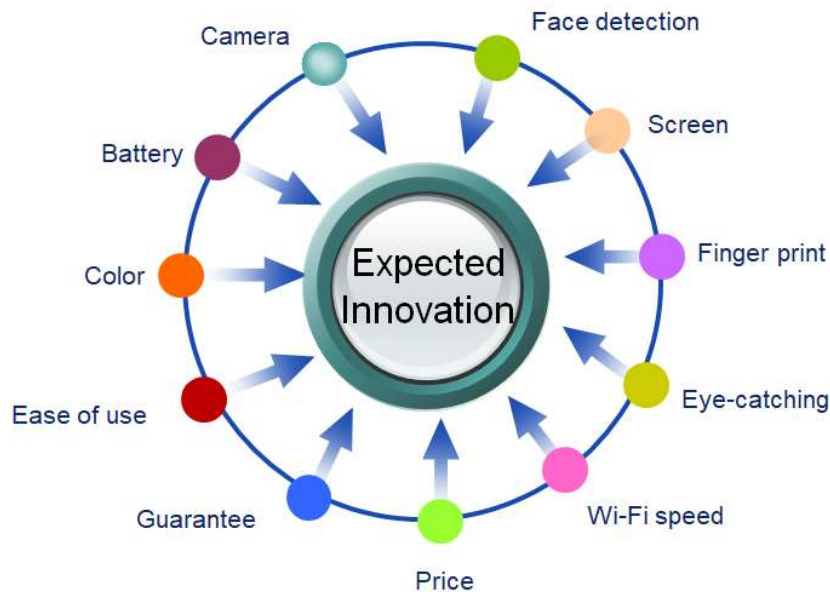


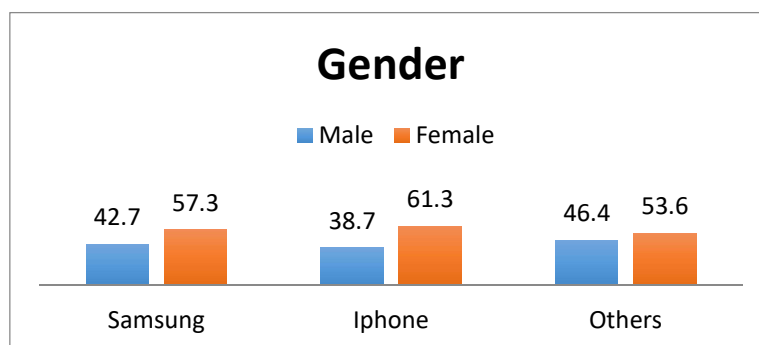
Figure 3.2: Eleven factors affect to expected innovation

If, however, the one-way ANOVA returns a statistically significant result, we accept the alternative hypothesis (H_1), which is that there are at least two group means that are statistically significantly different from each other. Collecting ideas from customers is the best way to consider new ideas for next generation of recent product. My research concentrate to two big questions that which factor are attracting customers before deciding to buy a new phone and how innovative factors make significant different between three famous brand phone on the market. Base on the original data, researcher divided data into three groups as Samsung, iPhone and Others to use ANOVA test for analyzing.

4.1.1. Characteristics of respondents.

This analysis is based on 330 responses of customers from Vietnam. A questionnaire survey has 30 questions, first 12 questions are general questions, and next 18 questions are specific questions. Last 18 questions, each question has score from 1 to 5 means unimportant to very important scale: 1 unimportant, 2 slightly important, 3 important, 4 fairly important, 5 very important

i. Gender



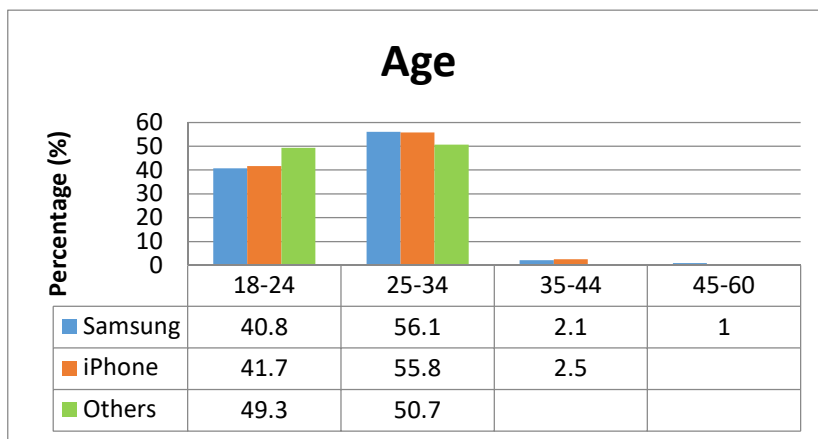
(Source: Researcher)

Figure 4.1 The chart of gender contribution of customer in high-end brand phone in Vietnam

Regarding the result of figure, the percentage of the male and female who are using Samsung are 42.7 % and 57.3 %, iPhone are 38.7% and 61.3%, Others are 46.4% and 53,6% . The data shows that the percentage of female customers more than male customers in all three groups.

That means female gender has been potential and main customers for each brand phone. The companies belonging to three groups need to consider more about what female need in their next product.

ii. Age



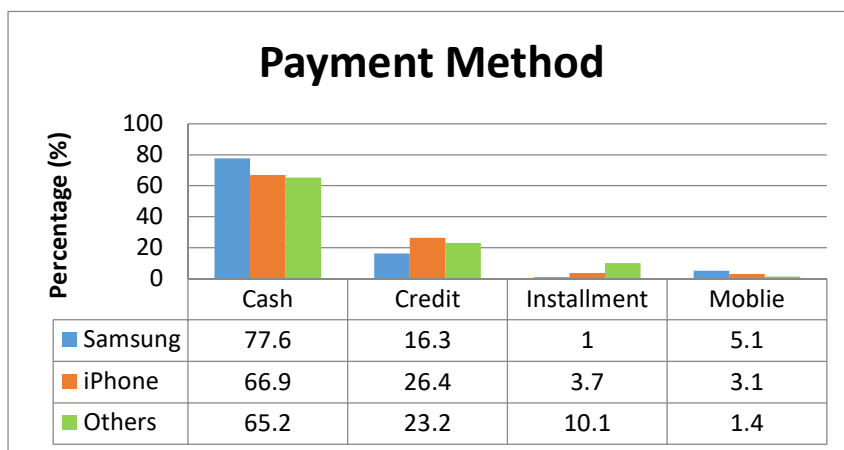
(Source: Researcher)

Figure 4.2 The diagram of age contribution of customer in high-end brand phone in Vietnam

The chart shows how the size of the Vietnamese ageing distribution is likely to change from 18 to over 60 years old period in three high-end brands phone.

We can see that in 25- 34 years old period had the biggest percentage on marking share for each brand, 56.1% of total customer for Samsung, 55.8% of total customers for iPhone and 50.7% customers of total for Others . Standing in 2nd and 3rd rank respectively are the 18-24 years old period and 35-44 years old period. Finally, 45-60 years old period had the lowest percentage in market share for each brand, at 1% for Samsung, 0% for both iPhone and Others brand.

iii. Payment method:



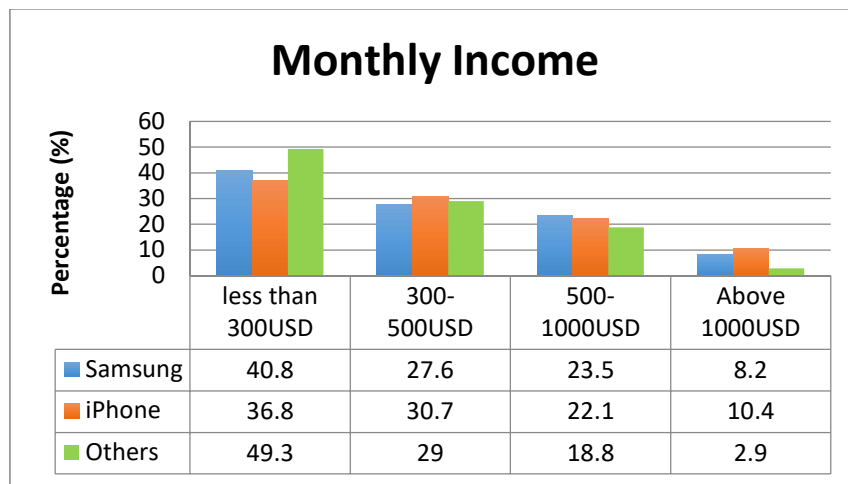
(Source: Researcher)

Figure 4.3 The diagram of payment method contribution of customer in high-end brand phone in Vietnam

The chart shows how the sizes of the payment methods affect Vietnamese buying habits these time period in three high-end brands phone recently. We can see that the cash method had the biggest percentage for each brand, 65.2% of total

customer for Samsung, 66.9% of total customers for iPhone and 77.6% customers of total for Others brand . The credit card followed by second rank and standing in third place was installment method. Then, the lowest percentage at 5.1% is for Samsung, 3.1% for iPhone and 1.4% for Others brand through mobile paying method.

iv. Monthly income



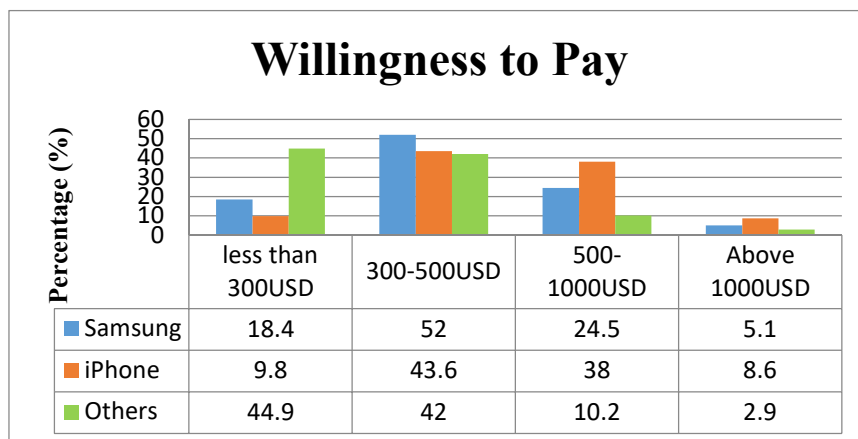
(Source: Researcher)

Figure 4.4 The chart of monthly income contribution of customer in high-end brand phone in Vietnam

The chart shows how monthly income affects Vietnamese buying mobile phone habits these time period in three high-end brands phone recently. We can see that the income less than 300USD per month group had the biggest percentage in three brands, at 40.8% of total customer using Samsung, 36.8% customers using iPhone and 49.3% customers of total using Others brand .

The income 300-500 USD per month group followed by standing in 2nd rank. Lower percentage occupied 3rd rank is for 500-1000 USD per month. Then, the lowest percentage for income above 1000 USD are 8.2% is for Samsung, 10.4% for iPhone and 2.9% for Others brand.

v. Willingness to pay



(Source: Researcher)

Figure 4.5 The willing to pay contribution of customer in high-end brand phone in Vietnam

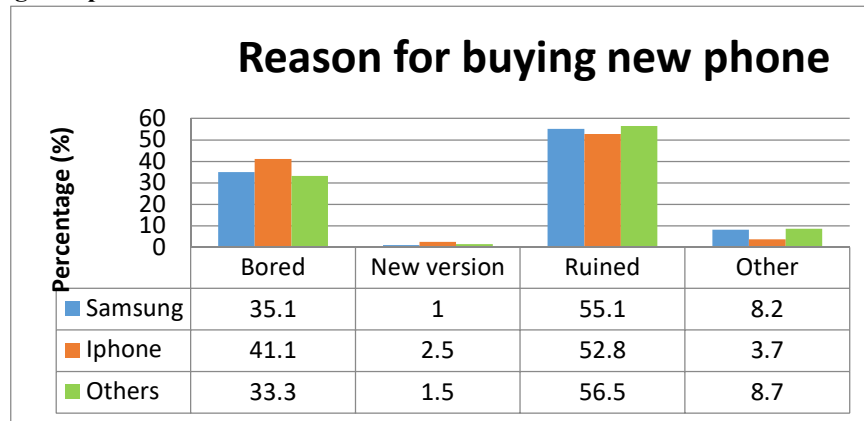
The chart shows how expected mobile phone price of customers effect on mobile phone brand in three high-end brands phone in Vietnam recently. We can see that Samsung had the biggest percentage at 52% in 300-500 USD per product. The 500-1,000 USD per product group followed, with 24.5% customers. Lower percentage for less than 300 USD per product

at 18.4% .Then, the lowest percentage at 5.1% was found in above 1,000 USD per product.

Similarly, iPhone had the biggest percentage at 43.6% in 300-500USD per product, standing in 2nd and 3rd rank were group 500-1,000USD and less than 300USD then lowest percentage was at 8.6% for above 1000 USD per product.

Furthermore, Others brand had the biggest percentage at 44.9% in less than 300 USD per product of total its group’s customer. Standing in 2nd and 3d rank were the group 300-500USD and 500-1,000 USD per product. Then, the lowest percentage was at 2.9% for above 1,000 USD per product group.

vi. Reason for buying new phone



(Source: Researcher)

Figure 4.6 The diagram of reason for buying new phone in high-end brand phone in Vietnam

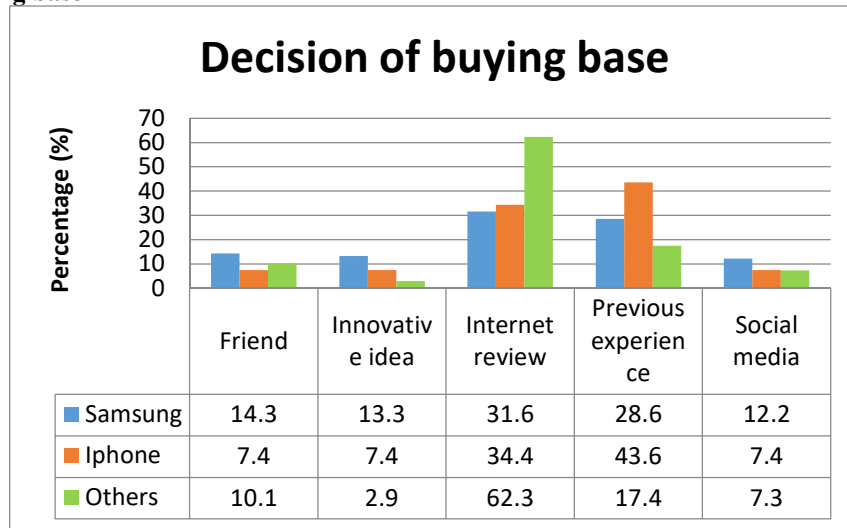
The chart shows when Vietnamese customers would like to buy a new mobile phone these times in three high-end brands phone in Vietnam recently.

We can see that Samsung had the biggest percentage at 55.1% for ruined group of total its groups. The bored group followed, with 35.1% customers. Lower percentage for others group at 8.2% . Then, the lowest percentage at 1 % was found in new version group.

Similarly, iPhone had the biggest percentage at 52.8% for ruined group of total its groups. The bored group followed, with 41.1% customers. Lower percentage for others group at 3.7% . Then, the lowest percentage at 2.51 % was found in new version group.

Furthermore, Others brand had the biggest percentage at 56.5% for ruined group of total its groups. The bored group followed, with 33.3% customers. Lower percentage for others group at 8.7% . Then, the lowest percentage at 1.5 % was found in new version group.

vii. Decision of buying base



(Source: Researcher)

Figure 4.7 The diagram of decision of buying base in high-end brand phone in Vietnam

The chart shows what is making decision of buying a mobile phone of Vietnamese customers these times in three high-end brands phone in Vietnam recently. We can see that Samsung had the biggest percentage at 31.6% for internet recommends group of total its groups. The previous experience group followed, with 28.6% customers. Lower percentage for friend’s recommend group at 14.3% and 13.3%. Following innovative ideas group is others and updates group at 13.3%. Then, the lowest percentage at 12.2 % was found in social media’s views group.

Similarly, iPhone had the biggest percentage at 43.6% for previous group. Then, the lowest percentage at 7.4 % was found in friend’s recommends, innovative ideas and social media group.

Furthermore, Others brand had the biggest percentage at 62.3% for internet review group of total its groups. The previous experience group followed, with 17.4%. Lower percentage in turn was found in friend’s recommends and social media group at 10.1% and 7.3%. Then, the lowest percentage was at 2.9 % for innovative ideas group.

4.2. Customer Satisfaction Affecting Factors Analysis

Purpose of this part is finding out the factors satisfy customer most belong to which brand and the factors make the significant difference between three phone brands group.

Table 4.1 Group's analysis of ANOVA test for customer satisfaction survey

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Confidential Information	Between Groups	13.82	2	6.91	4.45	.012*
	Within Groups	507.18	327	1.55		
Brand Image	Between Groups	21.91	2	10.95	7.95	.00*
	Within Groups	450.407	327	1.37		
Camera	Between Groups	1.96	2	0.98	0.73	0.48
	Within Groups	438.38	327	1.34		
Battery	Between Groups	0.02	2	0.01	0.01	0.98
	Within Groups	306.23	327	0.94		
Color	Between Groups	12.55	2	6.27	4.27	.015*
	Within Groups	480.44	327	1.47		
Screen	Between Groups	0.31	2	0.16	0.12	0.88
	Within Groups	427.67	327	1.31		
Ease of Use	Between Groups	0.63	2	0.31	0.26	0.77
	Within Groups	390.37	327	1.19		
Guarantee	Between Groups	1.34	2	0.67	0.49	0.61
	Within Groups	445.83	327	1.36		
Discount	Between Groups	1.965	2	0.983	0.558	0.573
	Within Groups	576.159	327	1.762		
Real sample	Between Groups	6.991	2	3.496	2.227	0.109
	Within Groups	513.263	327	1.57		
Salesman hospitality	Between Groups	1.929	2	0.965	0.648	0.524
	Within Groups	486.568	327	1.488		

(Note: *- p-value < α -value = 0.05)

An ANOVA one way test was conducted to determine if a statistically significant difference existed between three mobile phone brand groups named Samsung, iPhone and Others base on 11 key factors. By analyzing 330 customers survey (N = 330) including 11 questions, there was a statistically significant difference among three groups.

The table 4.1 showed the result of ANOVA test of each factor

In Confidential information factor: $F_2 = 4.45$, $p = 0.012 < 0.05 \Rightarrow$ Accept H1 (Significant difference)

In Brand image factor $F_2 = 7.95$, $p = 0.00 < 0.05 \Rightarrow$ Accept H1 (Significant difference)

In Camera factor $F_2 = 0.73$, $p = 0.48 > 0.05 \Rightarrow$ Accept Ho (No significant difference)

In Battery factor $F_2 = 0.01$, $p = 0.98 > 0.05 \Rightarrow$ Accept Ho (No significant difference)

In Color factor $F_2 = 4.27$, $p = 0.015 < 0.05 \Rightarrow$ Accept H1 (Significant difference)

In Screen factor $F_2 = 0.12$, $p = 0.08 > 0.05 \Rightarrow$ Accept Ho (No significant difference)

In Ease of use factor $F_2 = 0.26$, $p = 0.76 > 0.05 \Rightarrow$ Accept Ho (No significant difference)

In Guarantee factor $F_2 = 0.49$, $p = 0.61 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)

In Discount factor $F_2 = 0.56$, $p = 0.57 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)

In Real sample factor $F_2 = 2.23$, $p = 0.11 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)

In Salesman hospitality factor $F_2 = 0.65$, $p = 0.52 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)

Table 4.2 Descriptive groups of three significant factors for customer satisfaction aspect

Descriptive							
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Confidential Information	Samsung	98	3.62	1.180	.119	3.39	3.86
	iPhone	163	3.85	1.174	.092	3.67	4.03
	Others	69	3.32	1.480	.178	2.96	3.67
Brand Image	Samsung	98	3.03	1.205	.122	2.79	3.27
	iPhone	163	3.25	1.096	.086	3.08	3.42
	Others	69	2.58	1.299	.156	2.27	2.89
Color	Samsung	98	2.55	1.309	.132	2.29	2.81
	iPhone	163	2.10	1.134	.089	1.92	2.27
	Others	69	2.28	1.247	.150	1.98	2.57

If table 4.1 above showed out three significant factors: Confidential Information, Brand Image and Color affecting to customer satisfaction, in table 4.2, Mean value and Confidence intervals are used to determine whether the mean difference between specific pairs of groups are statistically significant and to estimate by how much they are different. The Confidence intervals that do not contain zero indicate a mean difference that is statistically significant. Concurrently, which brand has biggest Mean value would be the best brand that meet customer satisfaction in making buying decision.

The table 4.2 showed that in the Confidential Information factor, iPhone brand (Mean = 3.851, CI = 3,67 – 4.03) had the biggest mean among three brands. Samsung brand (Mean=3.62, CI = 3.39 – 3.86) is followed the value of mean. Then, Others brand had the smallest mean value with (Mean=3.32, CI = 2.96 – 3.67). It means customer will make a decision to buy the phone from iPhone in shortest time than other brands if they are considering about Brand Image. It also means, customers most satisfied with iPhone’s brand image. In the Brand Image factor, iPhone brand (Mean = 3.25, CI = 3.08 – 3.42) had the biggest mean among three brands. Samsung brand (Mean=3.03, CI = 2.79 – 3.27) is followed the value of mean. Then, Others brand had the smallest mean value with (Mean=2.58, CI = 2.27 – 2.89). The result shows that among three brands, iPhone is having the best brand image in evaluation of customers.

In the Color factor, Samsung brand (Mean = 2.55, CI = 2.29 – 2.81) had the biggest mean among three brands. Others brand (Mean = 2.28, CI = 1.98 – 2.57) is followed the value of mean. Then, iPhone brand had the smallest mean value with (Mean=2.10, CI = 1.92 – 2.27). The result shows that among three brands, Samsung is holding the vivid color panel for their phones, which is able to push customer make a decision to buy the phone in shortest time compared to other brands.

4.3 Expected Innovation Affecting Factors Analysis

Table 4.3 ANOVA test for eleven innovation factors of customer survey

		Sum of Squares	df	Mean Square	F	Sig.
Camera	Between Groups	.48	2	.24	.25	.78
	Within Groups	323.10	327	.98		
Battery	Between Groups	3.87	2	1.94	3.54	.03*
	Within Groups	178.55	327	.55		
Color	Between Groups	5.16	2	2.58	1.87	.16
	Within Groups	451.19	327	1.38		
Ease of use	Between Groups	2.84	2	1.42	1.41	.24
	Within Groups	329.28	327	1.01		
Guarantee	Between Groups	1.90	2	.95	.93	.39
	Within Groups	336.08	327	1.03		
Price	Between Groups	1.86	2	.93	1.08	.34
	Within Groups	282.62	327	.86		
Wi-Fi speed	Between Groups	5.52	2	2.76	2.46	.08
	Within Groups	366.28	327	1.12		
Eye-catching	Between Groups	164.45	2	82.22		*
	Within Groups	0.00	327	0.00		
Fingerprint	Between Groups	20.49	2	10.25	8.81	.00*
	Within Groups	380.36	327	1.16		
Screen	Between Groups	14.11	2	7.06	4.68	.01*
	Within Groups	493.54	327	1.51		
Face detection	Between Groups	12.18	2	6.09	4.03	.02*
	Within Groups	494.43	327	1.51		

(Note: * - p-value $< \alpha$ -value = 0.05)

An ANOVA one way test was conducted to determine if a statistically significant difference existed between three mobile phone brand groups named Samsung, iPhone and Others base on 11 key factors. By analyzing 330 customers survey (N = 330) including 11 questions, there was a statistically significant difference thinking among three groups.

- **In Camera factor:** $F_2 = 0.245$, $p = 0.783 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)
- **In Battery factor:** $F_2 = 3.543$, $p = 0.03 < 0.05 \Rightarrow$ Accept H_1 (Significant difference)
- **In the Color factor:** $F_2 = 0.732$, $p = 0.156 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)
- **In Ease of use factor:** $F_2 = 1.41$, $p = 0.246 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)
- **In Guarantee factor:** $F_2 = 0.926$, $p = 0.397 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)
- **In Price factor:** $F_2 = 1.08$, $p = 0.341 > 0.05 \Rightarrow$ Accept H_0 (No significant difference)
- **In Wi-Fi speed factor:** $F_2 = 2.465$, $p = 0.087 > 0.05 \Rightarrow$ Accept H_0 (No significant difference).
- **In Eye-catching factor:** $F_2 = 0.00$, $p = 0.00 < 0.05 \Rightarrow$ Accept H_1 (Significant difference)

- **In Finger print identify factor:** $F_2 = 8.808$, $p = 0.00 < 0.05 \Rightarrow$ Accept H1 (Significant difference)
- **In Screen factor:** $F_2 = 4.677$, $p = 0.01 < 0.05 \Rightarrow$ Accept H1 (Significant difference)
- **In Face detection factor:** showed the result of ANOVA test showed $F_2 = 4.028$, $p = 0.019 < 0.05 \Rightarrow$ Accept H1 (Significant difference)

Table 4.4 Descriptive groups of five significant factors for expected innovation aspect

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Battery	Samsung	98	4.5102	.77652	.07844	4.3545	4.6659
	iPhone	163	4.6012	.61403	.04809	4.5063	4.6962
	Others	69	4.3188	.93136	.11212	4.0951	4.5426
Eye-catching	Samsung	98	1.0000	0.00000	0.00000	1.0000	1.0000
	iPhone	163	2.0000	0.00000	0.00000	2.0000	2.0000
	Others	69	3.0000	0.00000	0.00000	3.0000	3.0000
Fingerprint	Samsung	98	3.7041	1.15061	.11623	3.4734	3.9348
	iPhone	163	4.0000	1.00615	.07881	3.8444	4.1556
	Others	69	3.3623	1.13722	.13690	3.0891	3.6355
Screen	Samsung	98	3.5000	1.23731	.12499	3.2519	3.7481
	iPhone	163	3.4049	1.17399	.09195	3.2233	3.5865
	Others	69	2.9420	1.33817	.16110	2.6206	3.2635
Face detection	Samsung	98	3.3163	1.22346	.12359	3.0710	3.5616
	iPhone	163	3.3742	1.23271	.09655	3.1836	3.5649
	Others	69	2.8841	1.23117	.14822	2.5883	3.1798

In table 4.4, Mean value and Confidence intervals are used to determine whether the mean difference between specific pairs of groups are statistically significant and to estimate by how much they are different. The Confidence intervals that do not contain zero indicate a mean difference that is statistically significant. Concurrently, which brand has biggest Mean value would be the best brand that meet customer satisfaction in making buying decision.

In the Battery factor, iPhone brand (Mean = 4.60, CI = 4.50 – 4.69) had the biggest mean among three brands. Samsung brand (Mean=4.51, CI = 4.35 – 4.66) is followed the value of mean. Then, Others brand had the smallest mean value with (Mean=4.31, CI = 4.09 – 4.54). The result shows that among three brands, iPhone is strongly expected a longer life battery, bigger battery capacity with small size by its customers. It also means, customers will be more satisfied with iPhone if the brand updates the battery technology.

In the Eye-catching factor, Others brand (Mean = 3.00, CI = 3.0) had the biggest mean among three brands. iPhone brand (Mean=2.00, CI = 2.0) is followed the value of mean. Then, Samsung brand had the smallest mean value with (Mean=1.00, CI = 1.0). The result shows that among three brands, Others brand is strongly expected by customers with eye-catching factor case. It also means, customers will be more satisfied with Others brand if these brands try to innovate the quality of eye-catching.

In the Fingerprint identify factor, iPhone brand (Mean = 4.00, CI = 3.84 - 4.15) had the biggest mean among three

brands. Samsung brand (Mean=3.704, CI = 3.47 - 3.93) is followed the value of mean. Then, Others brand had the smallest mean value with (Mean=3.362, CI = 3.08 - 3.63). The result shows that among three brands, iPhone brand is strongly expected by its customers with fingerprint identify factor. It also means, customers will be more satisfied with iPhone brand if the brand tries to innovate its quality of fingerprint identify factor.

In the Screen factor, Samsung brand (Mean = 3.50, CI = 3.25 - 3.74) had the biggest mean among three brands. iPhone brand (Mean=3.405, CI = 3.22 - 3.58) is followed the value of mean. Then, Others brand had the smallest mean value with (Mean = 2.943, CI = 2.62 - 3.26). The result shows that among three brands, Samsung brand is strongly expected by its customers with screen factor. It also means, customers will be more satisfied with Samsung brand if the brand tries to innovate its screen factor.

In the Face detection factor, iPhone brand (Mean = 3.374, CI = 3.18 - 3.564) had the biggest mean among three brands. Samsung brand (Mean=3.316, CI = 3.07 - 3.561) is followed the value of mean. Then, Others brand had the smallest mean value with (Mean = 2.884, CI = 2.58 - 3.17). The result shows that among three brands, iPhone brand is strongly expected by its customers with face detection factor. It also means, customers will be more satisfied with iPhone brand if the brand tries to innovate its face detection function.

The purpose of this chapter was to present the trend of answering score in each group, the mean of each group about factors in individual group general and stage particular. Therefore, finding out the factors make the significant difference and largest difference between two groups, which group has more difference than other do for each factor. The results show the factor make significant different between groups will effect on customer's decision of buying and innovation product.

5. Conclusions

Firstly, the practical, some of answers from customers are not able to meet all of standards in the survey, all of these surveys are canceled before analyzing data. As a result, the female percentage all of brands such as iPhone, Samsung and Others is more than male customers. It mean that the main gender need to be carried by mobile companies is female. All of factors relating to new product will depend on female's trend. Especially, we found out the main age period customer is from 25-34 years old. The finding plays important role in the new strategy for companies, which need to compete with their competitors on the market. These days, customers would like to use cash for shopping. The monthly income of customers in Vietnam focuses on small than 300 USD per month and them willing to pay for the phone from 300 – 500 USD per product. The many customers will buy new ones when the old one was ruined and some of individuals will if they are bored in their phone. Recently, the reason making he will be customer definitely is internet review for Samsung and Others brand, and previous experience for iPhone brand.

Secondly, ANOVA test showed that the factors making the significant differences among three groups - Samsung, iPhone and Others brand for customer satisfaction in making buying decision are confidential, brand image and color. For innovation research, these factors made the significant difference among three brands are battery, eye-catching, finger print, screen, and face detection. The remaining factors made no significant difference among three brands phone.

Finally, by comparing the Mean and Confident Interval of each factor among three groups, research figured out in customer satisfaction affecting aspect - iPhone is the best brand in Confidential Information, Samsung is well-known for its Brand Image and Color factor in the market. On the other hand, in expected innovation aspect - iPhone is expected to innovate its Battery, Finger print, and Face Detection functions. Whereas Samsung is supposed to innovate the Screen and Other brands is looked forward to innovating the Eye-catching.

The research used data from customers of popular mobile phone brands so that we could find what most of customers need or their expectation for the new generation product.

Firstly, customers expect a new generation phone, which will be updated method to charge battery quick and faster. That is not a new idea because Samsung launched Nano technology for their battery to reduce the time for charging their battery. However, their technology is still imperfect and has many mistakes such as overheating and burning of the phones. Therefore, men want to do everything on the phone so that they need a phone with a stable and long span battery. However, customers not yet found out the phone satisfied them as well. As a result, the technologies around battery are a competitive field to other companies.

Secondly, customers are not only expect a long life battery, they also require a large memory capacity and RAM for their phone. In modern life, 3D and many Ds technology will appear in the future, that means big data analyze will be used in cellphone in short time. However, in the moment, all of us could see that Games, and those that are 3D in particular, can consume huge amounts of RAM storing game graphics, textures, 3D models and sound. While having 512 MB may seem smooth for running basic applications and the operating system, it may not be enough to store game information without resorting to annoying and frequent loading screens in high-end games.

Using a phone as a remote to locate offline devices is another expectation of customers. Many things need to be controlled in a busy life especially unconnected internet things such as key, USB, small things... Another hand, following the recommends from customers, they would like to hold a new phone, which will be different recent sample – the phone could transform to total others sharp, product, or invisible objects. From researcher point of view, it is a strange idea. However, maybe it could be real in the future.

Regarding to Contributions Through the research, author hope it will show the trend of intelligent product in the industry recently. By forming a questionnaire survey for customers, which were made by summarizing the key factors of latest ideas from many people in Vietnam, more than 300 people attend to fill in the survey and agreed with using their data in research. Depending on affecting factors in the research, companies absolutely find out the ideas that what are their competitors and future market need and which factor company need to be considered most. In the case company want to extend the market, company has to understand about the difference thinking of customers between others brands. Company will be successes or failed in innovation depend on the results of the difference in the large percentage

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