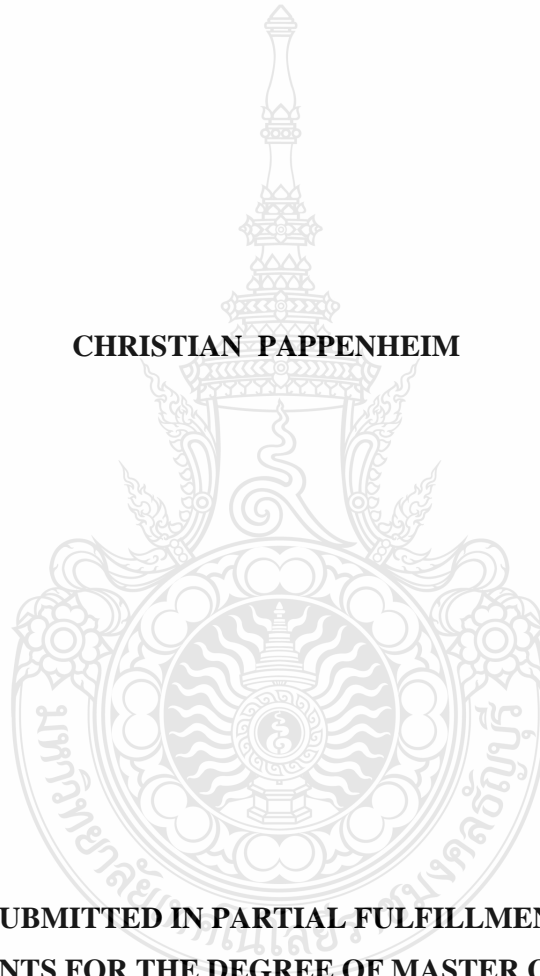


**THE EFFECTS OF INCREMENTAL INNOVATION
ON THE CONSUMER PERCEPTIONS**

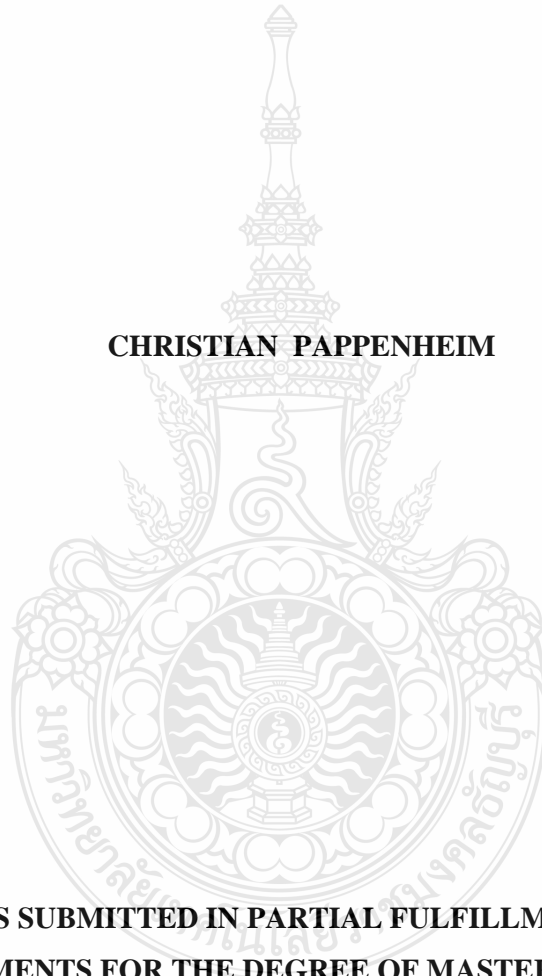
CHRISTIAN PAPPENHEIM



**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
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ADMINISTRATION MAJOR SUBJECT IN INTERNATIONAL BUSINESS
FACULTY OF BUSINESS ADMINISTRATION
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI
ACADEMIC YEAR 2015
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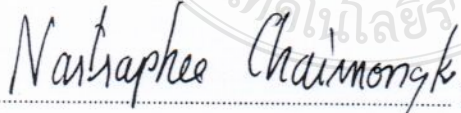
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ABSTRACT

This research aimed to explore 1) the effects of incremental innovations on the consumer perceptions by focusing on both the positive and the negative perceptions, and 2) the consumer perceptions on incremental innovations which caused the firm's success

The sample group, selected using convenient sampling, was consisted of 410 consumers in Bangkok metropolitan and outskirt areas. The research instrument used for collecting data was standardized questionnaires with fixed-alternative questions.

The study showed that the consumers had a positive perception towards incremental innovations. The consumers' perception influenced the marketing success in terms of innovation products. Furthermore, it was found that the consumers did not expect any radical innovations from the manufacturers. Customers also accepted incremental innovations regarding the product development.

Keywords: incremental innovations, radical innovations, consumer perception

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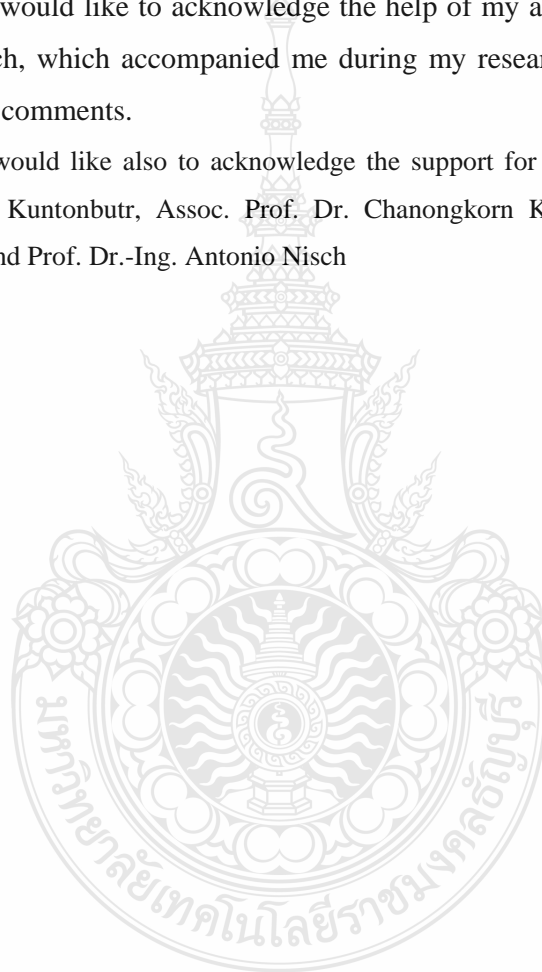
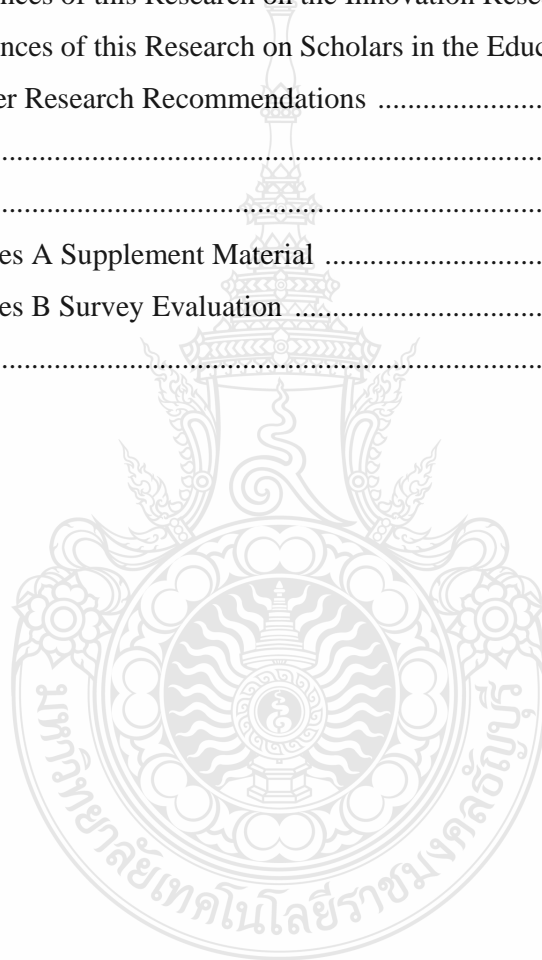


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List of Abbreviations

SME	=	Small and medium enterprise
LE	=	Large enterprise
R&D	=	Research and development
PMTO	=	Product-Market-Technology-Organisation
GDP	=	Gross Domestic Product
P&G	=	Procter and Gamble
APQC	=	The American Productivity & Quality Center



CHAPTER 1

INTRODUCTION

Chapter 1 gives an overview about the relevant aspects about this thesis and why this research should be have done.

1.1 Background and Statement of the Problems

Innovations represent an important factor for the economy, they are leading to economic growth and prosperity. For companies innovations are opportunities for increased sales and yields, and for consumers innovations help among others to make the life easier in various areas of the life. In the following some sample innovations and how they have effected our life:

Table 1.1 Innovations benefits and impacts

Innovations	Benefit	Impact
Telephone	Direct exchange of information in realtime	Information can be exchanged immediately and that made doing business more efficient
Radio	Possibility to spread information over far distances to a mass of people at the same time	Equalising of information asymmetries
Automobile	To transport people and goods over long distances	People and goods can be brought faster and more efficient to individual places

In accordance with Everett, M. Rogers (2003), an innovation can be an idea, a practice, or a new object that is perceived as new by an individual. Nowadays we classify innovations in different classes from radical innovations to incremental innovations. In which radical innovations can have major impacts on the economy, single industry sectors, and on the consumers habits. While the impacts of single incremental innovations are less disruptive, but can lead in sum over a certain period of time also to bigger changes, also called breakthrough innovations. To illustrate the

differences between radical and incremental innovations, two examples are given. See table 1.2: Radical vs. incremental innovations impacts.

Table 1.2 Radical vs. incremental innovations impacts

Type	Innovation	Impact
Radical	Digital photography	The dawn of the digital photography was also the beginning of tremendous changes in the photo developer industry, as the consumer tend now to store the photos digital
Incremental	Color Television	The invention of the television itself was a radical innovation, but to add the possibility to watch the TV program in color was just one step in the development of televisions and had no mayor impacts on the industry or the habits of the consumer

Because of the huge impacts of radical innovations on the economy, industries, and the habits of the people, they offer possibilities for high revenues and profits, and that make them alluring for companies and individuals.

But of course, not every innovation will be successful in the market. Moreover, several studies about innovation have outlined, that innovation projects have a higher than normal risk, resulting in increasing failure rates. Approximately 35 to 45% of all new products still fail (Boulding, Morgan, and Staeling, 1997). This is still valid as we can see in the Product Development Benchmarking Study from December 2010 accomplished by the Product Development Institute and APQC.

As we could see that innovation is related to risk and the risk is rising with the grade of innovation, lower risk for incremental innovations and higher risk for radical innovations, companies or individuals shouldn't only focus on radical innovations.

Radical innovations involve a high allocation of resources like manpower and capital, that increase the risk of going bankruptcy in the case of failure. Incremental innovations otherwise not allocate generally as many resources as radical innovations, what makes them less risky and more frequent, but related to the lower level of risk, less profitable. The well known Professor Theodore Levitt from the Havard Business School stated that, "imitation is not only more abundant than innovation, but actually a much

more prevalent road to business growth and profits” (Levitt, 1966, p.33). Also the scholars Kleinschmidt and Cooper stated that incremental innovations are important for the firms overall profitability (Kleinschmidt and Cooper, 1991).

Surprisingly most of the research is focused on the management and marketing of radical innovations, but where most of the companies today compete with incremental innovations and a big share of the companies turnover are due to product generation sales, e.g. Apple’s iPhone or Samsung’s Galaxy Phones.

Product development is a complex and multifaceted part in a companies business activities. The bandwidth ranges from small incremental innovations for an existing product over to radical innovations - a new product. It is questionable if whether one “New Product Development” theory can be generalised for all kind of new product development projects (Dewar and Dutton, 1986). And since the development and management of radical innovations has been studied more than the development of incremental innovations (Cooper, 1994), the research of incremental innovations will be in the main focus of this thesis.

The consumer perception against incremental innovations can be different, from positive to negative, which has an effect on the success of the products market performance. If the consumer perception against the incremental innovation is not positive and strong enough, it is likely that the new product will fail in the market and the brand image will suffer.

With this research I will find out if there is a relationship between the consumer perception and the market success of incremental improved products.

1.2 Purpose of the Study

The overall objective of this thesis is to extend the knowledge and understanding of incremental innovation from the consumer side.

Consumer side:

1. This study will explore the perception of consumer regarding incremental innovations.
2. This study will investigate the expectation of the consumer referring new products.

The gained knowledge should help producers, in the development process of new and improved products in several ways in the future. On one side, they gain knowledge overall and in detail about the perception of incremental innovations, if consumer have positive feelings or negative feelings regarding them. With this knowledge producers are able to choose those incremental innovations that are more likely to be successful after the product market launch. On the other side, if consumer always expect from producers radical innovations. This knowledge will help producers to find a better mix between incremental and radical innovations.

For scholars the study will give hints for improvements in the education of managers in leading positions.

1.3 Research Questions and Hypothesis

In this thesis I investigated from the point of view of the consumer side. The following questions determine the areas of the investigation:

Consumer side:

1. How consumers do perceive incremental innovations in Thailand?
 - 1.1 Commonly
 - 1.2 Regarding to the incremental product developments of Apple's iPhone
2. Do consumers always expect radical innovations in Thailand from producers?

Hypothesis 1: There is a significant relationship between the consumer perception of an incremental improved product regarding the grade of innovation and the market success of the product.

Hypothesis 2: Radical Innovations are preferred than incremental innovations.

1.4 Theoretical Perspective

The theoretical perspective from this study is derived from the technology epiphanies model from Donald A. Norman and Roberto Verganti (2014). The model assumes that there is a real tangible innovation and that there is an existing mindset on the consumer side that can influence each other. In the model, technological innovation has the ability to change the consumers mindset and vice versa.

1.5 Definition Terms

Innovation

Innovation takes place in many areas of our lives, to narrow the scope of the concept of innovation, it is considered in this thesis that the concept of innovation is only in conjunction with the participants in the economy.

The term innovation can be explained as the process or action of creating something new, but it can't be described by a single definition, different definitions are common in the area of science as innovation takes place in various fields:

“...the successful conversion of new concepts and knowledge into new products, services, or processes that deliver new customer value in the marketplace.” (American Society for Quality- ASQ)

“Innovation is the multi-stage process whereby organisations transform ideas into new/improved products, service or processes, in order to advance, compete, and differentiate themselves successfully in their market -place.” (Baregheh, Rowley, & Sambrook, 2009, p. 1334)

“Innovation represents the core renewal process in any organization. Unless it changes what it offers the world (product/service innovation) and the ways in which it creates and delivers those offerings (process innovation) it risks its survival and growth prospects.” (Bessant, Lamming, Noke, & Phillips, 2005, p. 1366)

“...innovation is the process that turns an idea into value for the customer and results in sustainable profit for the enterprise.” (Carlson & Wilmot, 2006, p. 4)

“...production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome.” (Crossan & Apaydin, 2010, p. 1155)

“...a product, process or service new to the firm, not only new to the world or marketplace.” (Hobday, 2005, p. 122)

“The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for

the purpose of creating new value for customers and financial returns for the firm.”
(Innovation Measurement, 2007, p. 18627)

“...innovation is the conversion of a new idea into revenues and profits.”
(Lafley & Charan, 2008, p. 21)

“Innovation is the process of making changes, large and small, radical and incremental, to products, processes, and services that results in the introduction of something new for the organization that adds value to customers and contributes to the knowledge store of the organization.” (O’Sullivan & Dooley, 2009, p. 5)

“...is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.” (OECD, 2005, p. 46)

“...an idea, practice, or object that is perceived as new by an individual or another unit of adoption.” (Rogers, 2003, p. xx)

“The commercialization of any new product, process, or idea, or the modification and recombination of existing ones.” (Rothaermel, 2013, p. 172)

“...the practical implementation of an idea into a new device or process.”
(Schilling, 2013, p. 18)

“...the act of generating more value for the customer and the business by fulfilling a job to be done better than anyone else.” (Silverstein, Samuel, & DeCarlo, 2009, p. xviii)

After evaluating the definitions above, five main similarities / keywords could be identified regarding innovations:

- New products
- New services
- New processes (production / organisational)
- Value
- Profit

In the following it is explained what innovation means regarding each keyword:

New products: Innovation can be new products that not exists before or changes in existing products

- New combination of functions
- Additional functions
- Changes in dimensions
- Changes in design

New services: Innovation can be new services that not exists before or changes in existing services

- New combination of services
- Additional services

New processes (production / organisational): Innovation can be new processes (production / organisational) that not exists before or changes in existing processes

- Rising efficiency in the process
- New production methods
- New management methods

Value: Innovation creates a value that can be different for each of the stakeholders.

- Various additional benefits

Profit: Innovation creates profits for the companies in terms of money

- Rising margins
- Rising value of company shares

An illustrative example innovation would be the invention of the personal computer in the seventies of the last century. The personal computer enabled companies and individuals to work in a more efficient way, like in the areas of word processing or calculating.

Types of Innovation in the Economy

Innovation can be classified in different forms:

- Product innovation
- Service innovation

- Process innovation (production / organisational)
- Marketing innovation
- Business model innovation

Triggers for Innovation

In the literature, a distinction is made between two triggers of innovation:

- Technology push - A new product is invented by a company under assumption to know the customers need
- Market pull - A new product is invented on the basis of known customer needs

The origins of the distinction can be traced to Schumpeter (1934).

Gradations within Innovations

Scholars have distinguished amongst different gradations of innovations. For example, Baumol (2004) distinguishes between “revolutionary” and “incremental” innovations. Revolutionary innovation encompass truly novel innovations as incremental innovation encompass incremental improvements in user-friendliness, increased reliability, marginal additions to applications, expansion of capacity for example.

The study will follow the definition of Henderson (1993), he identifies a long-standing distinction in the literature between “radical innovation” and “incremental innovation”. Radical innovation making existing technology obsolete and will replace them, while incremental innovation is described as routine predictable change, that is a logical extension of existing knowledge. Also other scholars follow the distinction of Henderson like Hill and Rothaermel (2003). They identified radical innovations as involving the development of a new technological paradigm that creates new knowledge and understanding and potentially new industrial sectors, whereas incremental innovation builds upon existing knowledge base possessed by incumbent companies. In contrast, radical innovations involve methods and materials that are novel to the incumbents.

Nowadays the term of breakthrough innovations is found in publications, but actually the breakthrough innovations are build up on continuous incremental innovation.

Differences between Incremental and Radical Innovations

Differences between incremental and radical innovations can be found in the fields of aims, risks / costs, and time. On each of these aspects a closer look in the following:

Incremental innovations have the aim:

- To improve existing products, services, processes to maintain their competitiveness

- To reduce costs
 - To enhance efficiency
 - To extend product lifecycle
 - To extend profits
- Where radical innovations have the aim:
- To create a new product, service, or process
 - To create a new market
 - To achieve significant competitive advantage

The risks / costs of radical innovations are much higher than for incremental innovations as radical innovations use more company resources than incremental innovations. Resources can be capital, workforce, or production capacities for example. In single cases the development of radical innovations can lead to company bankruptcy in the case the developed product fails in the market.

There is also a major difference in the aspect of time between radical and incremental innovations. Incremental innovations are mostly not of a complex nature and can be implemented in shorter periods of time than radical innovations.

Most of the innovation takes place in the field of incremental innovations as the lower risks / costs, shorter time periods, and aims are more likely for most of the companies, as they are SME's.

Perception

Perception is the process by which consumers interpret their sensory impressions into a coherent and unified view of the world around them. Though necessarily based on incomplete and unverified (or unreliable) information, perception is equated with reality for most practical purposes and guides human behaviour in general.

Consumer behaviour has been conceptualised traditionally as a dynamic process in which actions are affected by what is learned from previous behaviour as well as by information from external sources.

Incremental and Radical Innovation Perception

Incremental and radical innovation perception can be described as how consumer perceive an innovation with their sensory. The incremental innovation perception would describe that the consumer knows that the product itself is not new as whole, but single areas of it are new in comparison to the predecessor product. The radical innovation perception would describe that the consumer doesn't know about the product and perceive it as complete new as whole.

Cultural Behaviour

Cultural behaviour is extra somatic, it has to be learned. Each human individual learns the cultural behaviours from the social community around it and are expressed by customs and manners. As the cultural behaviour is learned, and humans are underlying a continuous learning process, the cultural behaviour can be changed. This can be seen by changes of customs and manners over the decades of time.

Product Life Cycle

The product life cycle theory describes different stages products go through from the invention to vanish. The main stages are:

- Invention / Development
- Market introduction
- Growth
- Maturity
- Saturation and decline
- Vanish

The product life cycle theory can help the marketing department to set the right actions for each stage of the product life cycle as long knowledge exist in which stage a product is.

Corporate Image

The corporate image describes how an company reputation is perceived by it stakeholders.

Corporate Resources

Corporate Resources can be divided like following:

- Humans
- Capital (cash, bank credits, tangible items like buildings, machines, products, ...)
- Knowledge (patents, licenses, ...)

Resources are needed to produce goods and services.

1.6 Limitations of the Study

The results and conclusions of this study are limited to product innovations and can't be transferred to the area of service, process, marketing, and business model innovation, as these innovations mainly underlie a different value of perception. The study is limited to the perception of citizens from Thailand. Due to differences in the cultural behaviour of citizens of different nationalities, the gained results shouldn't be accepted as general for all other nations.

1.7 Significance of the Study

The study provides insights about the perception of consumers in Thailand regarding incremental product innovations. That gained knowledge will help producers in the field of product development to create a decision matrix for example, if to move forward on with an incremental product innovation or not. This can help to prevent producers for financial damages and or negative impacts on their image. The scholars Gold, Rosseger, and Boylan, Jr. (1980) highlighted that innovation probably make the most of gains in real economic growth and standards of living.

The study also provide overall insight about the expectation of consumers regarding innovation. This will help to get a better differentiation between the different areas of innovation namely incremental innovation and radical innovation and should encourage the demand for further research in the field of incremental innovation.

Finally the study will help lecturers in Thailand, to set an appropriate curriculum for the training of leading managers.

1.8 Theoretical Framework

The theoretical framework from this study is derived from the technology epiphanies model from Donald A. Norman and Roberto Verganti (2014) and the phase gate model. Where the phase gate describes the process and procedure (the frame) to develop incremental or radical innovative products and the epiphanies model how consumer perception can be influenced through innovation.

This thesis will make research about if the consumer perception of an incremental improved product will have impacts on the market performance of the improved product. As better the perception of the incremental innovation as better is the market performance, see hypothesis one. For the evaluation of the hypothesis one this will be measured in amount of owned iPhones in the research sample.

This thesis will also show, that consumers not always have a higher positive perception of radical innovations regarding incremental innovations, see hypothesis two. For the evaluation of the hypothesis two this will be measured with the radical against incremental innovation perception in the research sample. For the management of innovations it means, that incremental innovations for a product have to be examined regarding the consumer perception:

1. If the consumer perception of the innovation is:
 - 1.2 Incremental in the view of the consumer
 - 1.2 Radical in the view of the consumer, but in fact it is incremental
2. If the consumer perception regarding the incremental innovation is positive

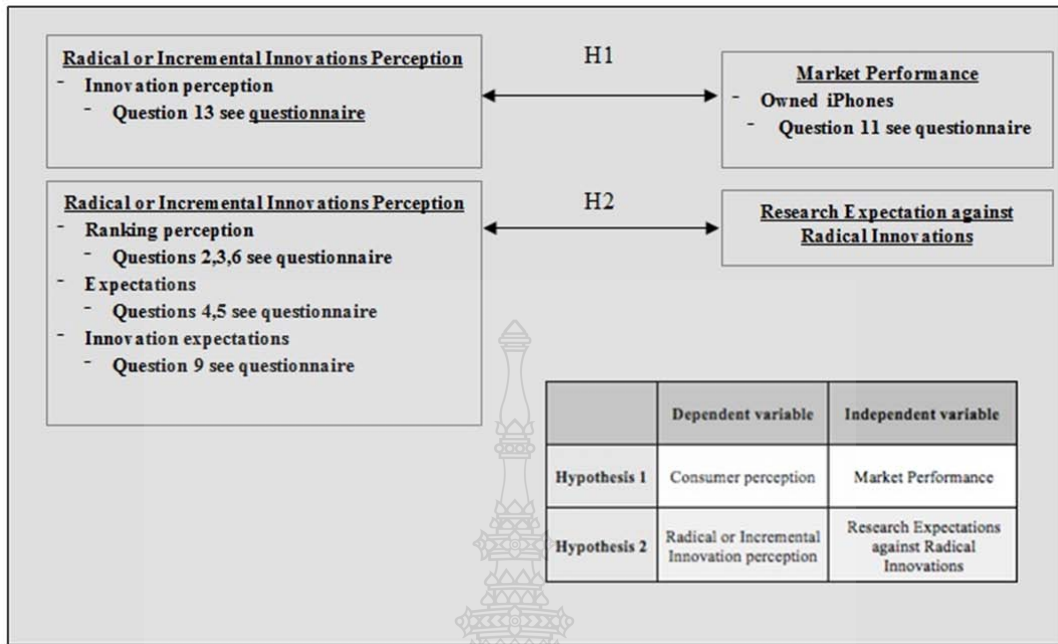


Figure 1.1 Framework



CHAPTER 2

REVIEW OF THE LITERATURE

Chapter 2 deals with the previous researches in the field of innovation and with theories regarding this topic.

2.1 Previous Research

Joseph Alois Schumpeter (1934) was one of the first scholars who conducted research regarding the role of innovations in the economy. He believed that innovation is an essential driver of competitiveness and economic dynamics. In his theory of economic development he argued that booms and recessions are inevitable and cannot be avoided or corrected without thwarting innovation to gain new wealth. This means, innovations are essential for the economic growth.

Kirzner (1997) describes in his theory of entrepreneurship that incremental innovations gives the entrepreneur the opportunity to achieve higher profits by using the same base product in a new arrangement.

Everett M. Rogers (2003) researched in the field of perception of innovations. He created the diffusion of innovations theory. This theory describes how an innovation is adopted through consumers over the time. In this theory Rogers already pointed out that the consumer perception of an innovation plays an important role, see the persuasion stage in the diffusion of innovations theory.

Kleinschmidt and Cooper (1991) made researches in the field of the impact of the innovativeness on the market success. They could show, that there is a non-linear relationship, both high and low innovative products had market success, U-shaped function. This highlights, that incremental innovations are as important as radical innovations. And as the risk of the development of incremental innovations is lower than for radical innovations, firms and scholars should spend more attention to incremental innovations.

Rogers and Shoemaker (1971) made researches in the field of consumer perception. They found out in a figurative sense that it matters a little, when human behaviour is concerned, a product is in fact new or not as measured by the lapse of time

since its first use or discovery. They point out, that "it is the perceived or subjective newness of the idea for the individual that determines his/her reaction to it. If the idea seems new to the individual, it is an innovation".

Boer and During (2001) describe the requirements for successful innovation as following:

- Balanced attention to each part of the innovation process. This balance depends on the type of innovation involved and may need to be adjusted in the course of the process.

- People involved in the innovation process should meet the characteristics of it and the organisational arrangements as well to perform, support and manage the innovation process.

- Perceived characteristics of the innovation.

- The appreciation of the characteristics of the innovation process itself.

- The proportion to which appropriate staff can be found to implement the process.

- The extent to which appropriate organisational resources are available.

Boer and During (2001) also describe the people and their roles involved in the innovation process:

- Problem owner -- Perceives a gap between the actual and the desired situation

- Gatekeeper -- Collects and channels information about important changes in the internal and external environment

- Scout -- Surveys a specified, yet unexplored field by collecting specific information

- Idea generator -- Analyses or synthesises information about markets, technologies, approaches or procedures, from which are generated ideas for solving the innovation problem

- Problem solver -- Solves the PMTO-aspects of the innovation

- Champion -- Recognises, proposes, pushes, and demonstrates a new idea for formal management approval, using his position and enthusiasm

- Project leader -- Plans and coordinates the various sets of activities and people/role occupants
 - Integrator -- Balances attention paid to different innovation problems
 - Coach -- Guides and develops less experienced people in their critical roles
 - Ambassador -- An approachable and personable communicator who disseminates the innovation within the organisation, by communicating problems, ideas, solutions between the problem solver(s) and other people in the organisation
 - Re-organisier -- A person who initiates and realises the organisation of the innovation process and pulls the ropes if significant organisational adaption is required as part of the innovation itself

Rogers (1983) identified five innovation characteristics:

- Relative advantage
- Complexity
- Compatibility
- Trialability / Divisibility
- Observability

Researches on this five characteristics by Boer and Doring (2001) showed, that the perceived value of innovation for product innovation and process innovation was higher than the actual value after the innovation was completed. This result of the researches supports the need of this research as the knowledge about consumer perception regarding incremental innovations can help to set the right perceived value for the innovation a company is working on.

Sandeep Kishore (2013) describes in this article for wired.com which potential incremental innovation can reach nowadays on the example of the Apple iPhone. The iPhone was an incremental innovations of existing smartphones. Apple added a larger touchscreen and developed an application store where new applications for the iPhone could be downloaded. Through incremental innovations, Apple created a whole new ecosystem which made the iPhone the preferred medium for accessing the internet. The iPhone became a central part for many people. The iPhone created a market that will be worth approximately \$1.6 trillion by 2018 in the USA. In the article the author also points out, that until 2020 \$5 trillion of GDP will be based on incremental innovation.

Bedell-Avers et. al. (2008) pointed out, the important role of creativity and innovation in the implementation of cost reduction programs.

Choo and Bontis (2002) noted that while Toyota engages in annual incremental innovation the largest boosts in cost reduction coincide with major product developments. Their strategy is to take multiple individual products and fuse them together into an integrated whole. This has worked wonders for them and indeed is a form of incremental innovation.

Robert Plant (2013) explained in his article for the Wall Street Journal how incremental innovations can help to sustain the companies revenues by following a double strategy, do incremental innovations, and also try to achieve radical innovations. The incremental innovations will bridge the time until a new radical innovations is ready for the market launch. P&G's Tide Pod is a good example, the product was launched in 2012 and now P&G has time to make incremental innovations to it, like adding new ingredients, and at the same time it can develop a new product.

Also Maxwell (2009) points out that incremental innovations are needed to extend the products life cycle until the next radical innovation is ready for the market launch.

Hooley et al. (2008) gave the reasons why a company undertakes innovation activities:

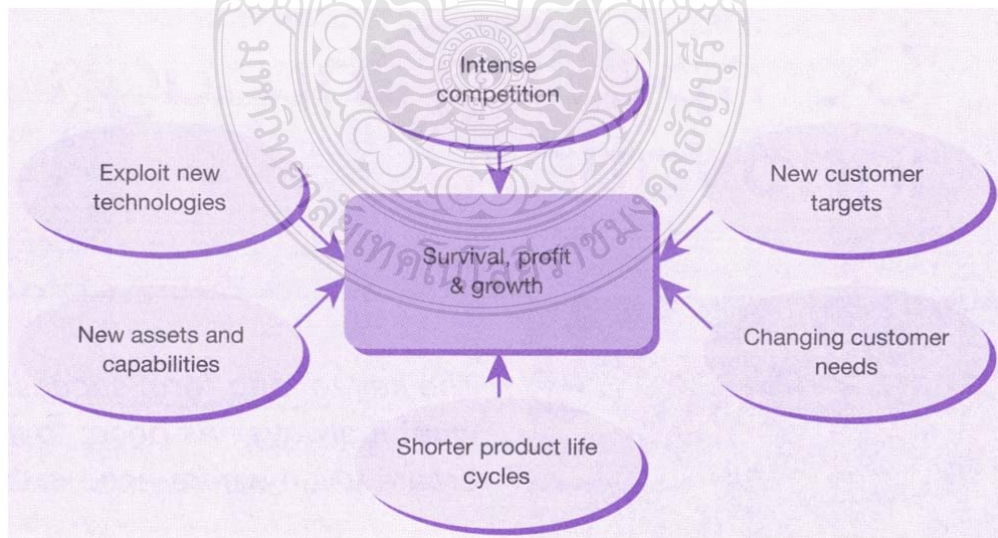


Figure 2.1 Pressures and spurs to innovation (Hooley et al.,1999, p. 372)

Bartels and Reinders (2011) note that most failures of innovations are due to a lack of understanding of consumer expectations. The difference in perception of the novelty of a product between businesses and consumers is a significant risk in the adoption of innovations.

According Ziamou and Ratneshwar (2002) the question of novelty in innovations is seen from the marketer point of view and not the consumer, because the innovations considered as new products are designed by marketers, and then offered to consumers.

Hetet and Moutot (2014) concluded in their dissertation that perceived novelty represents a significant influence on innovations and developed a global model. They also noted that further study of the perception of innovations at all is needed.

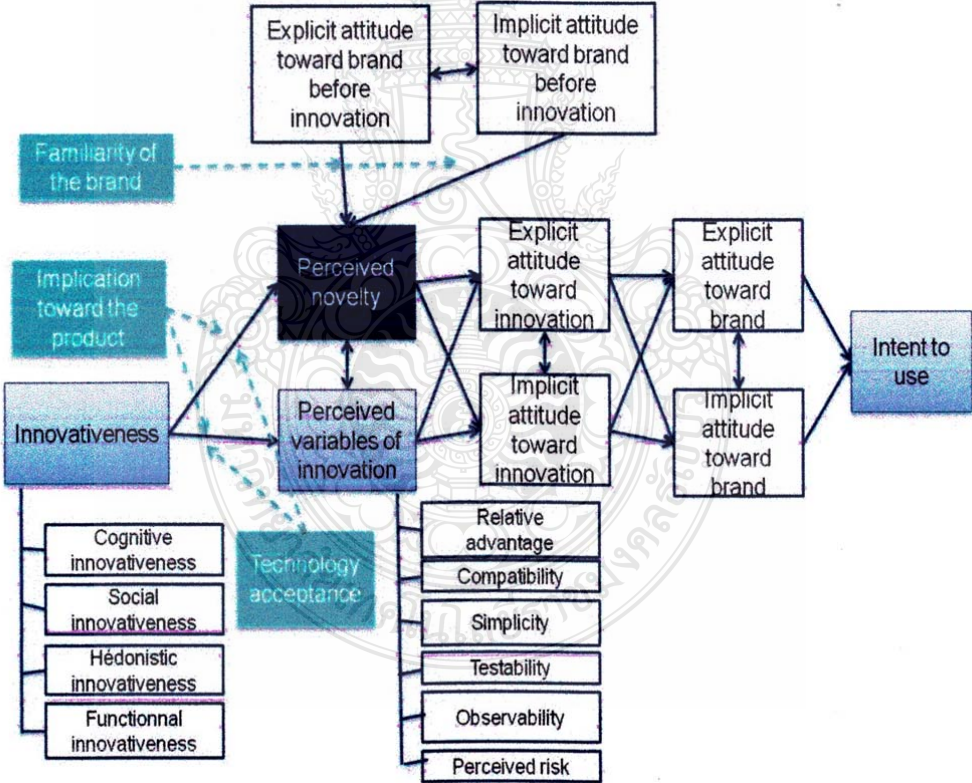


Figure 2.2 Global perception of innovations (Hetet and Moutot, 1999)

2.2 Theory

The basement of this thesis is derived from the technology epiphanies model from Donald A. Norman and Roberto Verganti (2014) and the phase gate model which was described in the Chemical & Engineering News (1951). The phase gate model explain the process of innovation management in details, whereas the technology epiphanies model describes how customer perception can influence innovations. This chapter will have a closer look on both theories.

Phase gate model

The phase gate model, also known as a phase-gate process, is a project management tool to filter out low potential innovations. The phase gate model was used since the 1940's in the chemical engineering industry as chemical complexity and the scale of chemical processes rapidly grew. Later other industries with equal complex products or projects adopted the model, the NASA for example started to use this model in the 1960's.

In the phase gate model a project is divided into different phases and at the end of each phase is a gate. The gate is a symbol for the decision if the project will be continued or terminated. In the field of new product developments, the decision is made from the top management. The decision is a snapshot based on the existing information at that time.

A common phase gate model comprises five phases and five gates, and two upstream and downstream activities, which are:

- Discovery
 1. Scoping
 2. Build business case
 3. Development
 4. Testing and validation
 5. Launch

- *Post launch review*

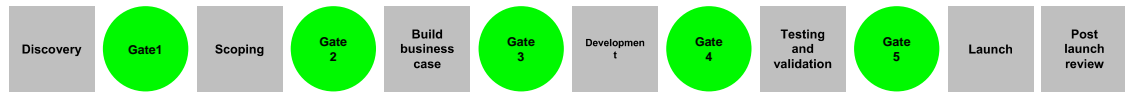


Figure 2.3 Phase gate model

Phases

Each phase in the phase gate model comprises a set of activities performed usually by a team from different departments within the company, as most activities concern different departments at the same time. The three main activities are:

- Operations —> Gathering of information to reduce uncertainties and risks
- Integrated Analysis —> Determine uncertainties and risks
- Deliverables —> Results of integrated analysis as basis for each gate

Discovery

The upstream activity discovery has the task to find project ideas which can be implemented through the company resources. Normally this will be made through the use of idea generation techniques, e.g. brainstorming, mind mapping. After choosing the idea, it has to be presented to the decision makers, normally that will be the top management.

Phase 1: Scoping

In the scoping phase several research activities are done, e.g. market studies and screenings, product SWOT analysis. The aim is to get an comprehensive overview to determine the possibility of success. The scoping phase is resource intensive, complex. and difficult. This phase is crucial for the later success of the new product.

Phase 2: Build the business case and plan

This phase comprises four major activities:

- Product definition and analysis
- Building business case
- Building project plan
- Feasibility review

Phase 3: Development

In the development phase all plans from the past will be executed. Teams will be set up and team leaders will be defined to ensure to achieve the project aim in time and budget.

Phase 4: Testing and validation

In the phase the following areas will be evaluated:

- Product itself
- Production process
- Customer acceptance
- Expected gains

Phase 5: Product launch

In this phase the product will be placed in the market. The following activities have to be done in this phase:

- Marketing strategy
- Training of sales and support personnel
- Setting price
- Select distribution channels
- Setting production amount for the start

Post launch review

The post launch review is used to determine problems, successes, and failures during the phases. This will help to extend the company's knowledge to improve e.g. project management skills, product knowledge, production process knowledge, market knowledge.

Gates

At the gates decisions are made about if the project will be continued, killed, held, or has to be recycled. The following issues will be assessed:

- Quality of execution
- Business rationale —> Is the project still attractive from an economic point of view
- Action plan —> Actions and resources are planned reasonable

The output of the gates, beside the fundamental decision to kill or to continue the project, are the settings for the requirements for the next phase.

Technology epiphany model

The technology epiphany model is a young theory described by Donald A. Norman and Roberto Verganti. According to them, the level of innovation is influenced by the changes in meaning and in technology and can be from incremental to radical. The main core of the model is that incremental or radical changes in technology can course incremental or radical changes in the meaning of consumers and vice versa.

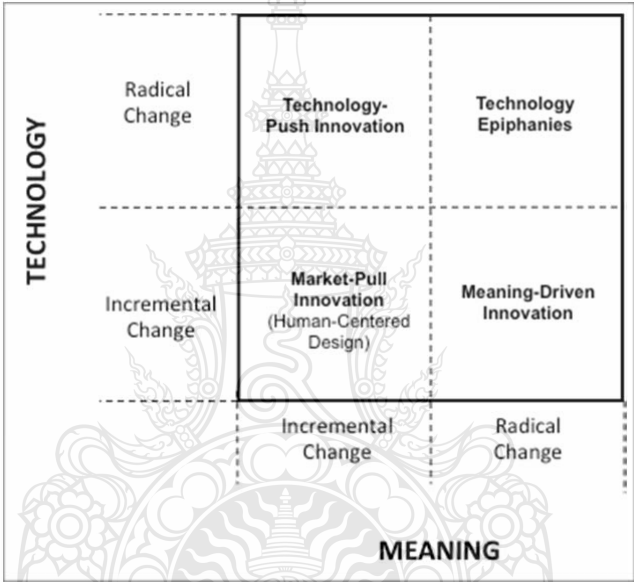


Figure 2.4 Technology epiphany model (Norman and Verganti)

For a better understanding a closer look on the video game industry in the last 20 years is taken. Nintendo, Sony, and Microsoft where the dominant players in the market. 20 years ago Nintendo was the market leader for video game consoles and the consumers where mainly a group of expert players and the graphics were more simple that time. With technical developments in the computer chips industry, which could offer more powerful chips for lower costs, the consumer entertainment electronics producer Sony entered the market with the Playstation, a new powerful video game console with outstanding technical specifications at that time. After a while, also the software giant Microsoft developed a powerful video game console. That started a

technical innovation process and lead finally to an meaning change in the market. Through technical innovation and the internet, players were capable to play with many people from all over the world the same game at the same time. The market shifted from a single player experience to a multiplayer experiences and was technology driven. During this time, Nintendo lost the market leadership to Sony. In 2006 Nintendo introduced the Wii, a new game console with a complete new market focus regarding its users. Nintendo not focused mainly on the expert gamers, it set the target on the family, that everyone could enjoy. This was due to the production of lower-cost MEMS acceleration sensors and infrared sensors. The sensors allowed people by natural movements (e.g. serving movement at tennis) to interact with the video game console. The market shifted again from expert players to everyone and meaning driven. Sony and Microsoft followed this meaning shift rapidly with their own products which comprised technological incremental innovations.

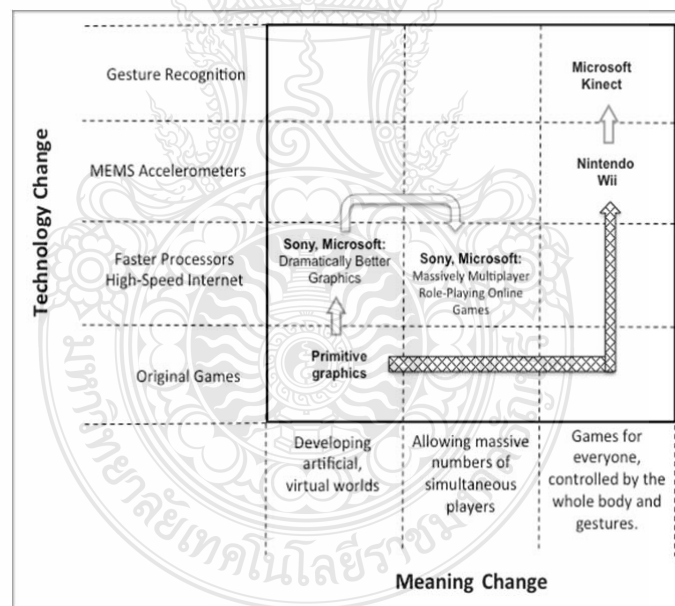


Figure 2.5 Technology & meaning change (Norman and Verganti)

CHAPTER 3

RESEARCH METHODOLOGY

Chapter 3 explains how the research process was been conducted.

3.1 Sequences of Research

The research for this Thesis will follow the following schedule:

- Define research topic
- Pre-data collection
- Define research questions
- Literature review
- Complete first three chapters
- Prepare consumer survey
- Implement survey
- Evaluate survey datas
- Complete chapter four and five

3.2 Sampling Technique

The type of research is a survey research on a quantitative base. With this study the stated hypotheses are been proven with the correlation coefficient Pearson's r (hypothesis one) and the Pearson's chi-square test (hypothesis two) if they are more likely or not.

The population for the hypotheses one and two are set by the assumed units in use of the Apple iPhone in Thailand.

Non probability sampling (convenience sampling) was chosen as sampling technique of choice for the hypotheses one and two. As the results of the research of hypotheses one and two is in proportions, the following formula is used to determine the sample size with a confidence level of 95%:

$$n = \frac{Z_{c.l.}^2 pq}{E^2} \quad (3.1)$$

where:

n = number of items in sample

$Z_{c.l.}^2$ = square of the confidence level in standard error units

p = estimated proportion of successes

q = $1 - p$, or estimated proportion of failures

E^2 = square of the maximum allowance for error between the true proportion and the sample proportion, or $Z_{c.l.} pq$ squared

$Z_{c.l.}^2$ = 95% (1.96)

p = 70% (0.7)

q = 30% (0.3)

E^2 = 5% (0.05)

n = 322.69 ~ 323

The sample for the research of the hypotheses one and two should comprise 323 people. Regarding to truehits.net from 07. March 2015, 4,949,409 iPhones (population for hypotheses one and two) were in use in Thailand. Lin Lan (1976) recommends for a research population over 500,000 people a sample size of 322 people for a confidence level of 95%.

3.3 Instrumentation

To capture the answers, one standardised questionnaire with fixed alternative questions was designed and used. The questionnaire measured the consumer perceptions for:

1. The relationship between the consumer perception of an incremental innovation of a product.
2. If consumer perception are higher positive for radical innovations than incremental innovations.

3.4 Procedure of the Data Collection

The data for the questionnaire was collected through random interviews (simple random sampling) at several locations throughout central Bangkok and an internet survey. To enhance the range of the internet survey, social media platforms was used.



CHAPTER 4

RESEARCH RESULTS

Chapter 4 deals with the evaluation and interpreting of the research results by using statistical methods.

4.1 Survey Results of Consumer Perception Fieldwork

In the following the collected data form the survey of the consumer perception is evaluated. The aim of the evaluation of the gathered data is to confirm or to refute the hypothesis one and two.

Survey Parameters: Date, Place, and Responses

Table 4.1 Survey parameters: Date, place, and responses

Date	Place	Responses
17.10. - 08.11.2015	Internet Survey: http://cengagebrm.az1.qualtrics.com/SE/?SID=SV_dp5DKGEcSNMdHA9	150
18.10.2015	Rajamangala University of Technology Thanyaburi, Pathumthani	70
21.10.2015	Lad Phrao Road Soi 81	6
31.10.2015	Imperial World Lad Phrao, Lad Phrao Road	30
01.11.2015	Imperial World Lad Phrao, Lad Phrao Road	54
03.11.2015	Rajamangala University of Technology Thanyaburi, Pathumthani	100
Total:		410

Demographic Data

As this research is basic research, the consumers are considered as one homogeneous group. The differentiation between sex, age, income, and location within Thailand and their effects on the consumer perception should be examined in future researches.

Limitation

As the Apple Inc. only provide detailed statistical datas referring the sales in units world wide and not for each country, the gained data from the sample are correlated to the sales in units world wide under the assumption, that the distribution of the total sales in units will mirror the distribution of the sales in units for each country approximately in proportion for the non scientific approach of this thesis.

Statistical Methods

The following statistical methods are used to evaluate the gathered data from the field survey.

Mode: The mode is the value that mostly appears in the collection of numbers.

$$Mo = x(h_{\max}) \quad (4.1)$$

where:

- Mo = Mode
- X = Collected numbers
- h_{\max} = Number that mostly appears

Median: The median is the value that is halfway into the set.

$$Me = X_{\frac{n+2}{2}} \quad \text{or} \quad Me = \frac{X_{\frac{n+2}{2}} + X_{\frac{n+2}{2} + 2}}{2} \quad (4.2)$$

where:

- Me = Median
- x = Collected numbers
- n = Total numbers of observations

Skewness: The skewness indicates how symmetrical the distribution of the collection of numbers is.

$$\gamma = \frac{n \sum_{i=1}^n (X_i - \bar{X})^3}{(n-1)(n-2)S^3} \quad (4.3)$$

where:

- \bar{X} = Mean
- X = Collected numbers
- n = Number of collected numbers
- S = Standard deviation
- γ = Skewness

Kurtosis: The kurtosis indicates the peakiness of the distribution of the collection of numbers.

$$\text{Kurt}[Y] = \frac{n(n+1) \sum_{i=1}^n (X_i - \bar{X})^4}{(n-1)(n-2)(n-3)S^4} - \frac{3(n-1)^2}{(n-2)(n-3)} \quad (4.4)$$

where:

- \bar{X} = Mean
- X = Collected numbers
- n = Number of collected numbers
- S = Standard deviation
- Kurt [Y] = Kurtosis

Correlation Coefficient (Pearson's r): The correlation coefficient measures the association between two at-least interval variables.

$$r_{xy} = r_{yx} = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2 \sum_{i=1}^n (Y_i - \bar{Y})^2}} \quad (4.5)$$

where:

- \bar{X} = Mean variable 1
- \bar{Y} = Collected numbers variable 1
- X = Mean variable 2
- Y = Collected numbers variable 2
- $r_{xy} = r_{yx}$ = Correlation coefficient

Pearson's Chi-Square Test: The Pearson's chi-squared test (χ^2) is a statistical test applied to sets of categorical data to evaluate how likely it is that any observed difference between the sets arose by chance.

$$\chi^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i} \quad (4.6)$$

where:

- χ^2 = Pearson's cumulative test statistic
- O_i = The number of observations of type i
- E_i = The expected (theoretical) number
- n = The number of cells in the table

Normality Testing

In normal distribution, skewness values are between +1 and to -1, and kurtosis values are not beyond +1.96 and -1.96 (Tabachnick & Fidell, 1996).

Univariate Statistical Analysis

Evaluation Question 1

Table 4.2 Evaluation Question 1 - Response and percentage distribution

Do you distinguish between a radical innovation and an incremental innovation?			
#	Answer	Response	%
1	Strongly Disagree	8	2,198
2	Disagree	16	4,396
3	Neither Agree nor Disagree	116	31,868

Table 4.2 Evaluation Question 1 - Response and percentage distribution (Cont.)

Do you distinguish between a radical innovation and an incremental innovation?			
#	Answer	Response	%
4	Agree	190	52,198
5	Strongly Agree	34	9,341
Total:		364	100

Table 4.3 Statistic Question 1

Statistic Question 1						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	4	4	-0.753	1.247	364

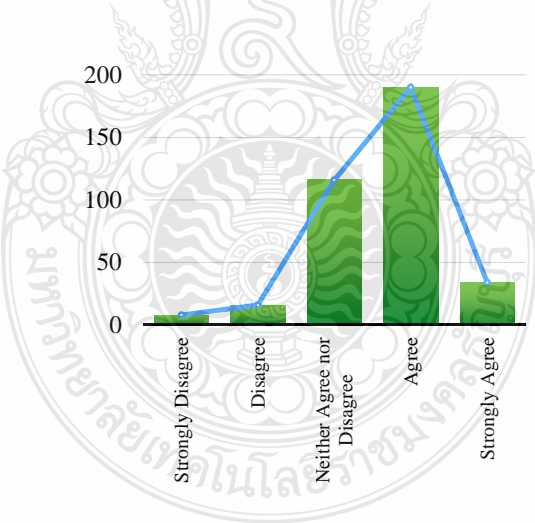


Figure 4.1 Responses Question 1

Mode: The mode of 4 shows, that “Agree” mostly appears, and thus most of the research sample, about 61% (“Strongly Agree”, “Agree”), distinguish between radical and incremental innovation.

Median: The median of 4 indicates that more than the half of the research sample “Agree” or “Strongly Agree” and distinguish between radical and incremental innovation.

Skewness: The skewness of -0.753 indicates that there is a asymmetrical distribution of responses in the area of confirmation, which also confirms the positive attitude that the research sample distinguish between radical and incremental innovation.

Kurtosis: The kurtosis of 1.247 shows a peaked distribution and the highest point is over the positive attitude area and also confirms the positive attitude that the research sample distinguish between radical and incremental innovations.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96 the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 61% of the research population distinguish between radical and incremental innovation. Derived from this, it can be assumed, that more than the half of the research population has different opinions regarding radical and incremental innovation.

Evaluation Question 2

Table 4.4 Evaluation Question 2 - Response and percentage distribution

Do you think radical innovations are better than incremental innovations?			
#	Answer	Response	%
1	Strongly Disagree	13	3,652
2	Disagree	131	36,798
3	Neither Agree nor Disagree	74	20,787
4	Agree	119	33,427
5	Strongly Agree	19	5,337
Total:		356	100

Table 4.5 Statistic Question 2

Statistic Question 2						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	2	3	0.093	-1.100	356

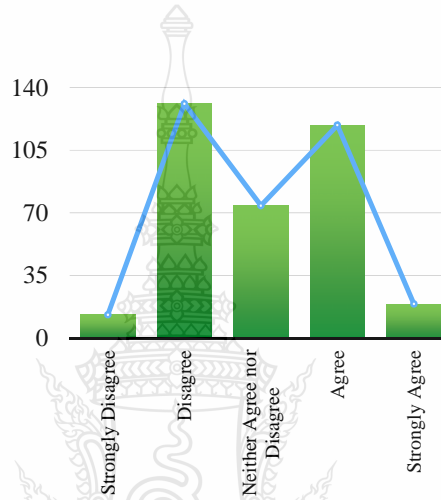


Figure 4.2 Responses Question 2

Mode: The mode of 2 shows, that “Disagree” mostly appears, about 40% of the research sample disagree (“Strongly Disagree”, “Disagree”) that radical innovations are better than incremental innovations.

Median: The median of 3 indicates that the distribution of the research sample is roughly divided between “Agree” and “Disagree”.

Skewness: The skewness level is with 0.093 very low and support an uncertainty in the research sample, higher symmetry in positive and negative responses.

Kurtosis: The kurtosis with -1.100 is negative and indicates a flatter distribution with no single peak. As we can see in figure 4.2, the curve of the responses has nearly two equal peaks over the positive and negative response area.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 40% of the research population don't think that radical innovations are better than incremental innovations, about 39% think that radical innovations are better than incremental innovations, and about 21% are uncertain. Under the assumption that the 21% of the research population distinguish between radical and incremental innovations, see question 1, a positive acceptance of the incremental innovation depends from each single perception of an improved product. But regarding the research sample it can be assumed that it is mostly thought, that radical innovations are not better than incremental innovations.

Evaluation Question 3

Table 4.6 Evaluation Question 3 - Response and percentage distribution

Do you think incremental innovations are a good way to keep a product up to date?			
#	Answer	Response	%
1	Strongly Disagree	18	5,085
2	Disagree	99	27,966
3	Neither Agree nor Disagree	62	17,514
4	Agree	151	42,655
5	Strongly Agree	24	6,780
Total:		354	100

Table 4.7 Statistic Question 3

Statistic Question 3						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	4	3	-0.283	-1.003	354

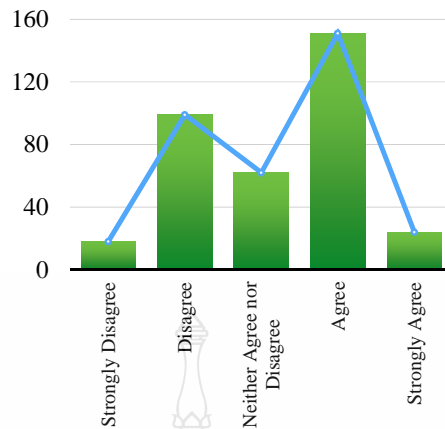


Figure 4.3 Responses Question 3

Mode: The mode of 4 indicates, that “Agree” mostly appears and thus most of the research sample, about 49% (“Strongly Agree” , “Agree”), think that incremental innovations are a good way to keep a product up to date.

Median: The median of 3 indicates that the distribution of the research sample is roughly divided between agree and disagree.

Skewness: The skewness level with -0.283 shows a tendency to the positive response area. The negative skewness shows an asymmetrical distribution of the responses with a slight concentration in the positive response area.

Kurtosis: The kurtosis with -1.003 is negative and indicates a flatter distribution with no single peak. As we can see in figure 4.3, the curve of the responses has two peaks over the positive and negative response area, in which the peak over the positive response area is higher.

Normality Testing: As skewness values are between $+1$ and -1 , and kurtosis values are not beyond $+1.96$ and -1.96 , the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 49% of the research population think that incremental innovations are a good way to keep a product up to date. On the other hand, 33% of the research population think that it is not a good way. Skewness and kurtosis support that in the research sample the positive attitude outweigh

and many of the respondents of the research sample accept incremental innovations as a good way to keep an product up to date.

Evaluation Question 4

Table 4.8 Evaluation Question 4 - Response and percentage distribution

Do you always expect from your favourite brands / manufacturers new innovative products or are you also satisfied with improved products?			
#	Answer	Response	%
1	I always expect new innovative products	65	18,414
2	I am also satisfied with improved products	79	22,380
3	A mix of both	209	59,207
Total:		353	100

Table 4.9 Statistic Question 4

Statistic Question 4						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	3	3	3	-0.857	-0.837	353

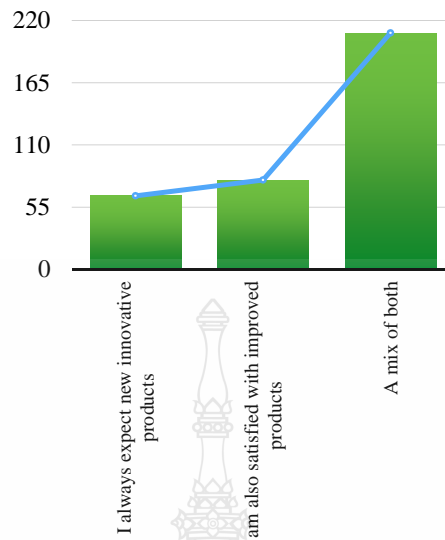


Figure 4.4 Responses Question 4

Mode: The mode of 3 shows, that “A mix of both” was answered most, about 59%, regarding question 4.

Because of the question and answer type, an evaluation of median, skewness, kurtosis, and normality testing is irrelevant.

Conclusion: With a confidence level of 95%, about 59% of the research population expect from its favourite brands / manufacturers new innovative and also improved products, about 22% would be also only satisfied with improved products, whereas a minority of about 18% expects only new innovative products. Overall we can assume that about 81% of the research population have a positive attitude against incremental innovations.

Evaluation Question 5

Table 4.10 Evaluation Question 5 - Response and percentage distribution

How do you think about incremental product improvements?			
#	Answer	Response	%
1	Product improvements are good, as long as I get a much better product than before	285	80,737
2	I always wait until a new product comes on the market	55	15,581
3	I not care about it	13	3,683
Total:		353	100

Table 4.11 Statistic Question 5

Statistic Question 5						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	3	1	1	2.131	3.750	353

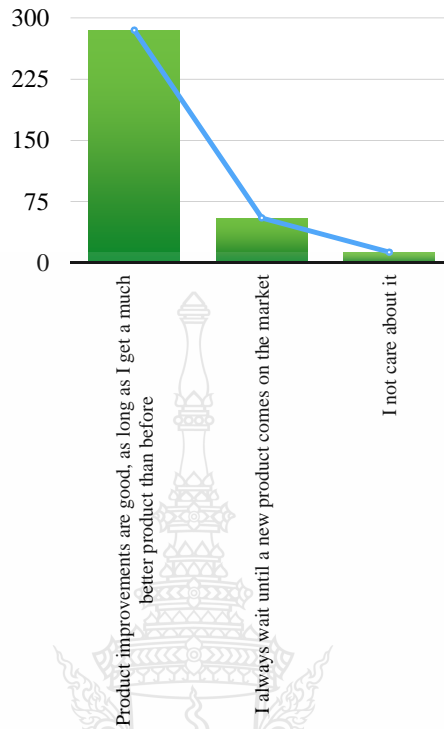


Figure 4.5 Responses Question 5

Mode: The mode of 1 shows, that answer 1, “Product improvements are good, as long as I get much better products than before”, mostly appears and thus most of the research sample have a positive attitude against incremental innovations.

Because of the question and answer type, an evaluation of median, skewness, kurtosis, and normality testing is irrelevant.

Conclusion: With a confidence level of 95%, about 81% of the research population thinks that product improvements are good, as long as they get a much better product than before, about 16% of the research population waits that a new product comes on the market. Only a small percentage of about 3% of the research population not cares about it. Overall we can assume, if the incremental innovation has a positive perception, most of the consumers in the research population have a positive attitude against incremental innovations.

Evaluation Question 6

Table 4.12 Evaluation Question 6 - Response and percentage distribution

Do you think complete new products are better than improved products?			
#	Answer	Response	%
1	Strongly Disagree	39	11,143
2	Disagree	148	42,286
3	Neither Agree nor Disagree	96	27,429
4	Agree	53	15,143
5	Strongly Agree	14	4,000
Total:		350	100

Table 4.13 Statistic Question 6

Statistic Question 6						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	2	2	0.478	-0.305	350

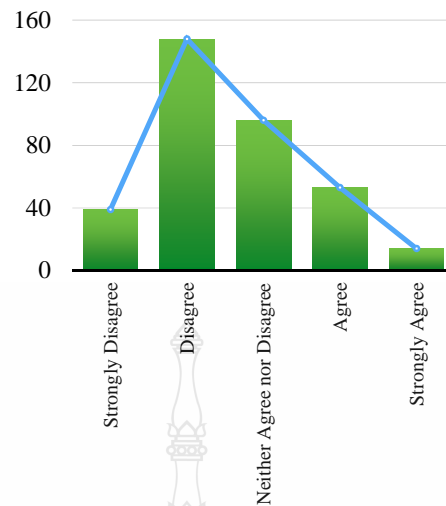


Figure 4.6 Responses Question 6

Mode: The mode of 2 shows, that “Disagree” mostly appears and thus most of the research sample, about 53% (Strongly Disagree “, “Disagree”), don’t think that complete new products are better than improved products.

Median: The median of 2 indicates that more than the half of the research sample “Disagree” or “Strongly Disagree” and think that complete new products are not better than improved products.

Skewness: The skewness of 0.478 shows that the distribution of responses has a tendency to the negative response area and is asymmetrical with a long tail to the positive response area. This shows a concentration of responses in the negative response area, see figure 4.6.

Kurtosis: The kurtosis should be positive as the distribution is singular peaked. A mathematical testing with two different programs (SPSS V23, EXCEL 2011) always had a negative kurtosis as result, it is to assume that a mathematical error is present here.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality. As long as the kurtosis error has no effect on the interpreting of the response distribution.

Conclusion: With a confidence level of 95%, about 53% of the research population “Disagreed” that new products are better than improved products. Only about 19% of the research population “Agreed” that new products are better than improved products. Overall we can assume if the incremental innovations have positive perceptions, most of the consumers in the research population have a positive attitude against incremental innovations.

Evaluation Question 7

Table 4.14 Evaluation Question 7 - Response and percentage distribution

Do you always buy the latest version of a product?				
#	Answer	Response	%	
1	Yes	108	30,857	
2	No	242	69,143	
Total:		350	100	

Table 4.15 Statistic Question 7

Statistic Question 7						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	2	2	2	-0.832	-1.315	350

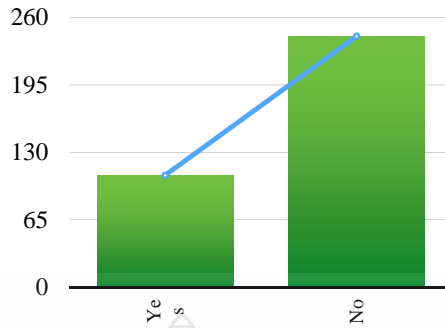


Figure 4.7 Responses Question 7

Mode: The mode of 2 shows, that “No” mostly appears, about 69%, and thus most of the research sample not always buy the latest version of a product.

Median: The median of 2 indicates that more than the half of the research sample not always buy the latest version of a product.

Because of the question and answer type, an evaluation of skewness, kurtosis, and normality testing is irrelevant.

Conclusion: With a confidence level of 95%, about 69% of the research population not always buy the latest version of a product. It can be supposed, that the acceptance for improved products is high. But regarding this, further research is suggested, as maybe other reasons play a crucial role regarding this question, e.g. income, market knowledge (information asymmetry).

Evaluation Question 8

Table 4.16 Evaluation Question 8 - Response and percentage distribution

How often a product should be complete improved?			
#	Answer	Response	%
1	Every 6 month	116	33,143
2	One time per year	180	51,429
3	Every two years	42	12,000

Table 4.16 Evaluation Question 8 - Response and percentage distribution (Cont.)

How often a product should be complete improved?			
#	Answer	Response	%
4	Every three years	10	2,857
5	Every four years	2	0,571
Total:		350	100

Table 4.17 Statistic Question 8

Statistic Question 8						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	2	2	0,912	1,321	350

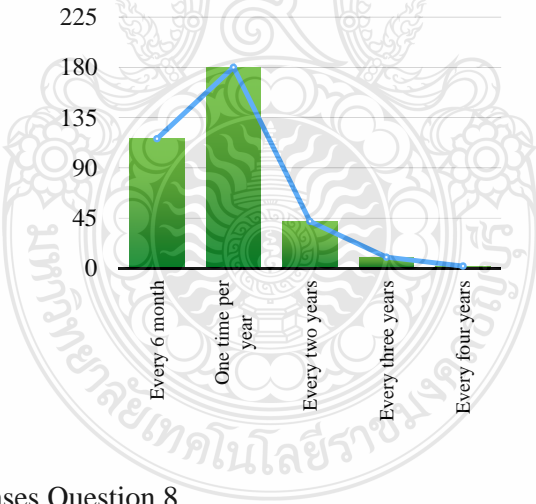


Figure 4.8 Responses Question 8

Mode: The mode of 2 shows, that “One time per year” mostly appears and thus most of the research sample, about 51%, thinks, that a product should be complete improved one time per year.

Median: The median of 2 indicates that more than the half of the research sample thinks that a products should be complete improved one time per year or even every 6 month.

Skewness: The skewness of 0.912 shows an asymmetrical distribution with a long tail to the right, that indicates a concentration of responses in the response area of one time per year.

Kurtosis: The kurtosis of 1.321 indicates a single peaked distribution, as we can see in figure 4.8, the peak is above the response area for one time per year.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 51% of the research population thinks a product should be complete improved one time per year and 33% thinks a product should be complete improved every six month. It can be supposed that most of the research population expects an ongoing product improvement process from the manufacturers.

Evaluation Question 9

Table 4.18 Evaluation Question 9 - Response and percentage distribution

Which kind(s) of innovations should an innovative company do?				
#	Answer	Response	%	
1	Only radical innovations	26	7,450	
2	Only incremental innovations	42	12,034	
3	A mix of both, incremental and radical innovations	277	79,370	
4	Neither nor	4	1,146	
Total:		349	100	

Table 4.19 Statistic Question 9

Statistic Question 9						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	4	3	3	-1.865	2.777	349

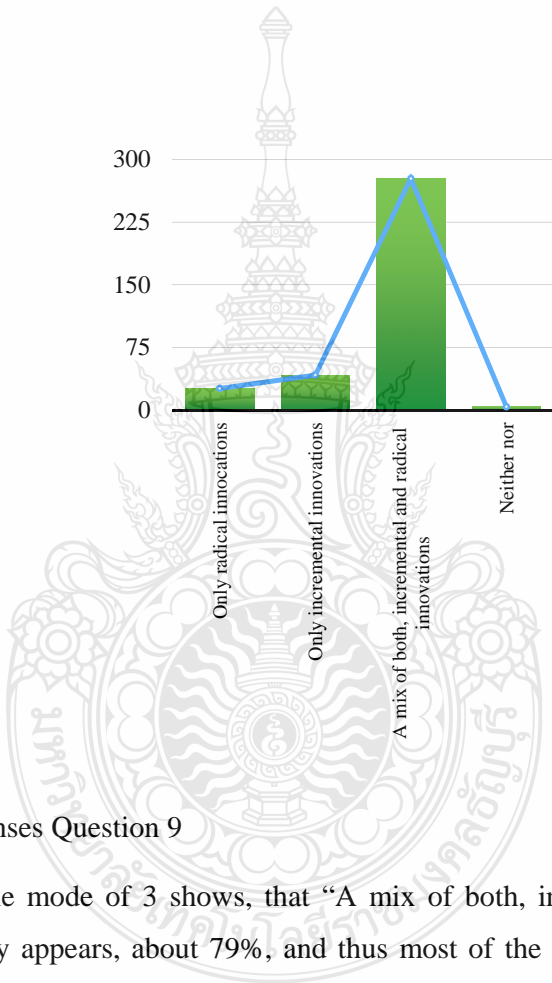


Figure 4.9 Responses Question 9

Mode: The mode of 3 shows, that “A mix of both, incremental and radical innovations” mostly appears, about 79%, and thus most of the research sample think, that companies should do a mix of incremental and radical innovations.

Because of the question and answer type, an evaluation of median, skewness, kurtosis, and normality testing is irrelevant.

Conclusion: With a confidence level of 95%, about 79% of the research population thinks an innovative company should do incremental and radical innovations.

Evaluation Question 10

Table 4.20 Evaluation Question 10 - Response and percentage distribution

Do you own an iPhone now or do you have owned an iPhone in the past?			
#	Answer	Response	%
1	Yes	208	60,116
2	No	97	28,035
3	In the past	41	11,850
Total:		346	100

Table 4.21 Statistic Question 10

Statistic Question 10						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	3	1	1	0.989	-0.324	346

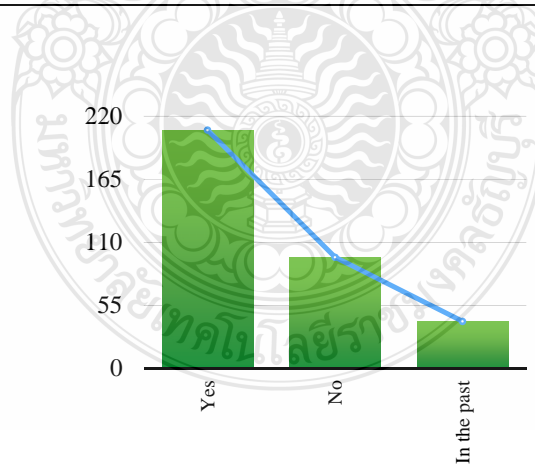


Figure 4.10 Responses Question 10

Mode: The mode of 1 shows, that “Yes” mostly appears, about 60%, and thus most of the research sample own an iPhone.

Because of the question and answer type, an evaluation of median, skewness, kurtosis, and normality testing is irrelevant.

Conclusion: With a confidence level of 95%, about 72% of the research population own or has owned an iPhone. Regarding the following questions this indicates, that the research population has gained own experienced regarding the iPhone.

Evaluation Question 11

Table 4.22 Evaluation Question 11 - Response and percentage distribution

Which iPhone did you owned and which do you have now?					
#	Answer	Response Now	Response Past	Total	%
1	iPhone 06/2007	7	7	14	3,263
2	iPhone 3G 07/2008	3	20	23	5,361
3	iPhone 3GS 06/2009	2	24	26	6,061
4	iPhone 4 06/2010	10	51	61	14,219
5	iPhone 4S 10/2011	29	71	100	23,310
6	iPhone 5 09/2012	43	35	78	18,182
7	iPhone 5C, 5S 09/2013	48	23	71	16,550
8	iPhone 6/Plus 09/2014	46	0	46	10,723
9	iPhone 6S/Plus 09/2015	10	0	10	2,331
		198	231	429	100

Because of the question and answer type, an evaluation of mode, median, skewness, kurtosis, and normality testing is irrelevant.

Conclusion: The market penetration of the iPhones from the first generation to the iPhone 3GS was not so high as the price was at that time for many people not affordable. The market penetration of the iPhone 6/Plus and 6S/Plus is not meaningful, as both versions are not long enough in the market at the time of the research. But it is interesting to see, that the iPhone 4S was more owned than the iPhone 4 in comparison that the iPhone 5S was less owned than the iPhone 5 overall. Here it can be assumed that the iPhone 5S was less innovative perceived than the iPhone 4S at their each market launch against their precursors.

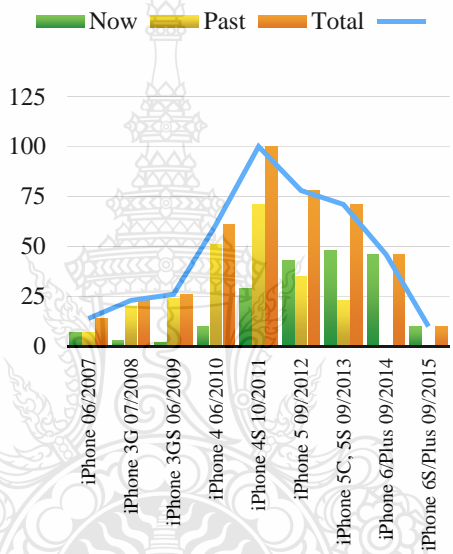


Figure 4.11 Responses Question 11

Evaluation Question 12.1

Table 4.23 Evaluation Question 12.1 - Response and percentage distribution

How do you perceive the product development from the iPhone? All iPhones generations were radical new?			
#	Answer	Response	%
1	Strongly Disagree	21	7,317
2	Disagree	96	33,449
3	Neither Agree nor Disagree	70	24,390

Table 4.23 Evaluation Question 12.1 - Response and percentage distribution (Cont.)

How do you perceive the product development from the iPhone? All iPhones generations were radical new?			
#	Answer	Response	%
4	Agree	85	29,617
5	Strongly Agree	15	5,226
Total:		287	100

Table 4.24 Statistic Question 12.1

Statistic Question 12.1						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	2	3	0.055	-0.933	287

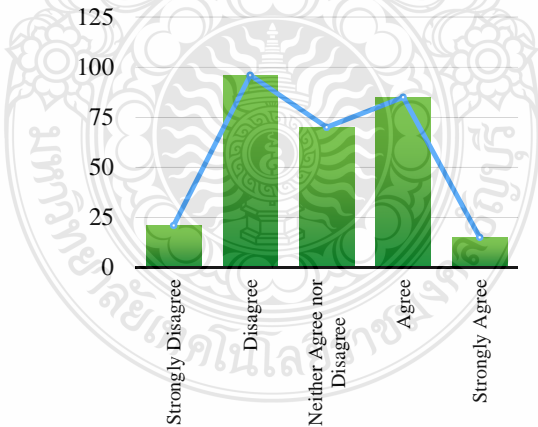


Figure 4.12 Responses Question 12.1

Mode: The mode of 2 shows, that “Disagree” mostly appears, about 33%, and thus most of the research sample not perceive all iPhones generations as radical new.

Median: The median of 3 indicates that the distribution of the research sample is roughly divided between agree and disagree.

Skewness: The low skewness of 0.055 shows that the distribution is nearly symmetrical around the mean and indicates a balance between the negative and positive response area.

Kurtosis: The kurtosis of -0.933 shows that the distribution of the responses is flattered, in this case, two peaks can be seen, one over the negative response area and over the positive response area.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality.

Conclusion: At all, the research population is uncertain if all iPhone generations were radical new. With a confidence level of 95%, about 41% “Disagree” and about 35% “Agree”.

Evaluation Question 12.2

Table 4.25 Evaluation Question 12.2 - Response and percentage distribution

How do you perceive the product development from the iPhone? All iPhones generations after the first generation were incremental innovations?			
#	Answer	Response	%
1	Strongly Disagree	6	2,143
2	Disagree	32	11,429
3	Neither Agree nor Disagree	45	16,071
4	Agree	169	60,357
5	Strongly Agree	28	10,000
Total:		280	100

Table 4.26 Statistic Question 12.2

Statistic Question 12.2						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	4	4	-0.976	0.701	280

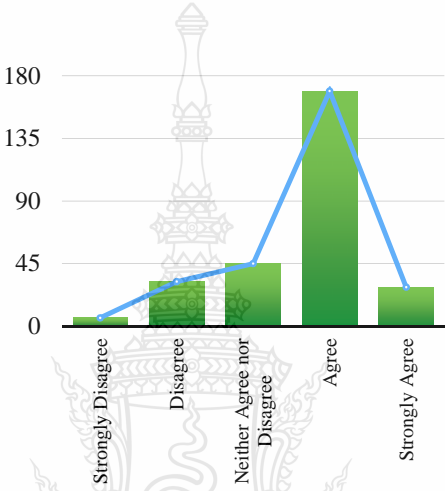


Figure 4.13 Responses Question 12.2

Mode: The mode of 4 shows, that “Agree” mostly appears, about 60%, and thus most of the research sample perceive that all iPhones gene-rations after the first generation were incremental innovations.

Median: The median of 4 indicates that more than the half of the research sample “Agree” or even “Strongly Agree” that all iPhones gene-rations after the first generation were incremental innovations.

Skewness: The skewness of -0.976 confirms the asymmetrical distribution with a long tail to the left negative response area and indicates that most of the responses were in the positive response area.

Kurtosis: The kurtosis of 0.701 shows that the distribution is singular peaked. In this case the peak is over the agree response area.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 60% of the research population “Agree” and 10% “Strongly Agree” that the iPhone generations after the first generation were incremental innovations. It can be said, that most of the research population knows and accept, that the iPhones after the first generation are not radical innovations. If the success of the iPhone in Thailand is taken into consideration, this knowledge has no negative effect on the success of the iPhone in Thailand.

Evaluation Question 12.3

Table 4.27 Evaluation Question 12.3 - Response and percentage distribution

How do you perceive the product development from the iPhone? A mix of both, incremental and radical innovations?			
#	Answer	Response	%
1	Strongly Disagree	7	2,545
2	Disagree	21	7,636
3	Neither Agree nor Disagree	83	30,182
4	Agree	138	50,182
5	Strongly Agree	26	9,455
Total:		275	100

Table 4.28 Statistic Question 12.3

Statistic Question 12.3						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	4	4	-0.715	0.695	275

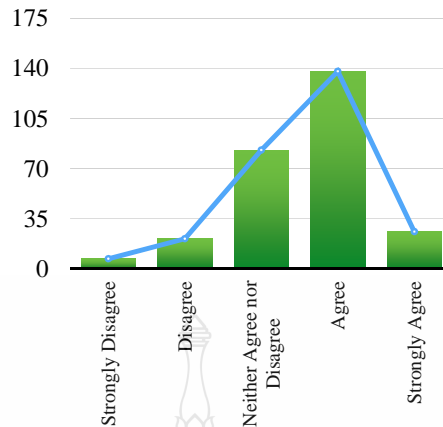


Figure 4.14 Responses Question 12.3

Mode: The mode of 4 shows, that “Agree” mostly appears, about 50%, and thus most of the research sample think, that the product development from the iPhone is a mix of both, incremental and radical innovations.

Median: The median of 4 indicates that more than the half of the research sample “Agree” or even “Strongly Agree” that the product development from the iPhone is a mix of both, incremental and radical innovations.

Skewness: The skewness of -0.715 confirms the asymmetrical distribution with a long tail to the left negative response area and indicates that most of the responses were in the positive response area.

Kurtosis: The kurtosis of 0.701 shows that the distribution is singular peaked. In this case the peak is over the agree response area.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 50% of the research population “Agree” and 9% “Strongly Agree” that the development of the iPhone generations include radical and incremental innovation elements.

Evaluation Question 13

Because of the question and answer type, an evaluation of mode, median, skewness, kurtosis, and normality testing is irrelevant.

Table 4.29 Evaluation Question 13 - Response and percentage distribution

How do you perceive the grade of innovation for each version of the iPhone?			
#	Answer	Response Radical	Response Incremental
1	iPhone 06/2007	104	156
2	iPhone 3G 07/2008	71	187
3	iPhone 3GS 06/2009	37	223
4	iPhone 4 06/2010	95	171
5	iPhone 4S 10/2011	53	210
6	iPhone 5 09/2012	92	173
7	iPhone 5C, 5S 09/2013	71	191
8	iPhone 6/Plus 09/2014	128	148
9	iPhone 6S/Plus 09/2015	108	159

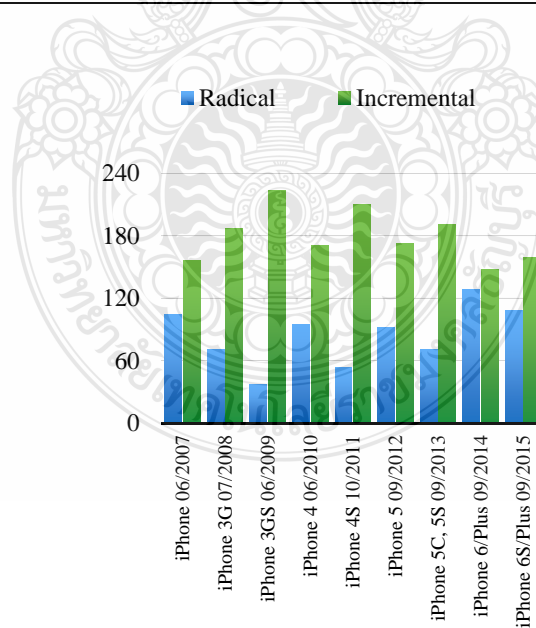


Figure 4.15 Responses Question 13

Conclusion: It can be clearly seen that all iPhone generations are more as incremental innovative perceived as radical innovative. Interesting are the perceptions from the iPhone first generation to the iPhone 3GS, the perception as incremental innovative is rising and the perception as radical innovative is declining. From the iPhone 4 an undulation can be seen, radical innovative perception declines and rises, incremental innovative perception rises and declines. Also interesting to see is the incremental perception from the iPhone 4 and iPhone 4S in comparison to the iPhone 5 and iPhone 5S. From iPhone 4 to iPhone 4S the incremental perception rose stronger than from iPhone 5 and iPhone 5S. This can be an explanation why more iPhone 4S were sold in comparison to the iPhone 4 and less iPhone 5S were sold in comparison to the iPhone 5 in the sample population. Another interesting point is to see, that the iPhone 5 was less radical innovative perceived in comparison to the iPhone 4. This can be an explanation why more iPhone 4 were sold than iPhone 5. The iPhone 6 was perceived more radical innovative than all other iPhone generations before. It has to be seen, how the market penetration will look like in the future. It is to assume, that the less radical innovative perception of the iPhone 5 has prompted the Apple Inc. to make more efforts regarding the development of the iPhone 6.

Evaluation Question 14

Table 4.30 Evaluation Question 14 - Response and percentage distribution

How often do you usually buy a new iPhone?			
#	Answer	Response	%
1	Every 6 month	1	0.358
2	One time per year	17	6,093
3	Every two years	51	18,280
4	Every three years	33	11,828
5	Every four years	13	4,659

Table 4.30 Evaluation Question 14 - Response and percentage distribution (Cont.)

How often do you usually buy a new iPhone?			
#	Answer	Response	%
6	Every five years	10	3,584
7	Uncertain	154	55,197
Total:		279	100

Table 4.31 Statistic Question 14

Statistic Question 14						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	7	7	7	-0.602	-1.320	279

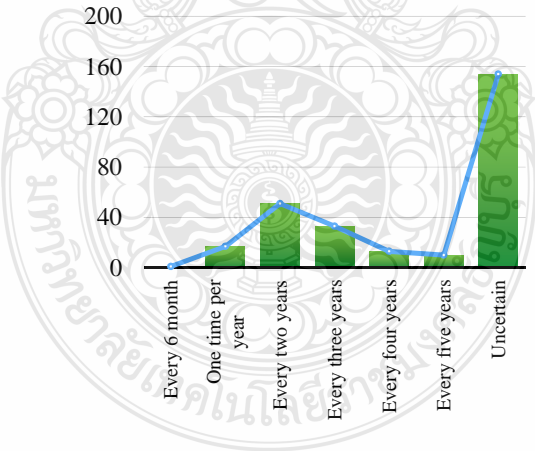


Figure 4.16 Responses Question 14

Mode: The mode of 7 shows that “Uncertain” mostly appears, about 55%, and thus most of the research sample is uncertain about how often they buy a new iPhone generation.

Because of the question and answer type, an evaluation of median, skewness, kurtosis, and normality testing is irrelevant.

Conclusion: With a confidence level of 95%, about 55% of the research population is uncertain about the interval when they buy a new iPhone generation. Further research is suggested to find out the reasons and influences on the decision to buy a new iPhone generation, e.g. broken telephone, lost, contract conditions.

Evaluation Question 15

Table 4.32 Evaluation Question 15 - Response and percentage distribution

Would you say that Apple Inc. is an innovative company?			
#	Answer	Response	%
1	Strongly Disagree	8	2,676
2	Disagree	16	5,351
3	Neither Agree nor Disagree	41	13,712
4	Agree	167	55,853
5	Strongly Agree	67	22,408
Total:		299	100

Table 4.33 Statistic Question 15

Statistic Question 15						
Min Value	Max Value	Mode	Median	Skewness	Kurtosis	Total Responses
1	5	4	4	-1.139	1.676	299

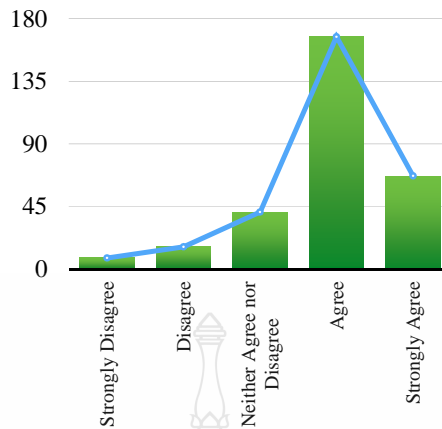


Figure 4.17 Responses Question 15

Mode: The mode of 4 shows that “Agree” mostly appears, about 59%, and thus most of the research sample thinks that Apple Inc. is an innovative company.

Median: The median of 4 indicates that more than the half of the research sample “Agree” or even “Strongly Agree” that Apple Inc. is an innovative company.

Skewness: The skewness of -1.139 shows an asymmetrical distribution with a long tail to the left and indicates an concentration in the positive response area.

Kurtosis: The kurtosis of 1.676 shows that the distribution is singular peaked, in this case the peak is over the positive response area.

Normality Testing: As skewness values are between +1 and -1, and kurtosis values are not beyond +1.96 and -1.96, the response distribution was within the range of normality.

Conclusion: With a confidence level of 95%, about 55% of the research population “Agree” and 22% “Strongly Agree” that the Apple Inc. is an innovative company. As the Apple Inc. has rarely presented radical innovations in the last few years, it can be assumed that most of the population have a positive perception regarding incremental innovation.

Bivariate Statistical Analysis

Table 4.34 Correlation Owned iPhones, Radical & Incremental Innovations Perception

	Owned iPhones (ResearPercech Sample)	Radical Innovative ption	Incremental Innovative Perception
iPhone 06/2007	14	104	156
iPhone 3G 07/2008	23	71	187
iPhone 3GS 06/2009	26	37	223
iPhone 4 06/2010	61	95	171
iPhone 4S 10/2011	100	53	210
iPhone 5 09/2012	78	92	173
iPhone 5C, 5S 09/2013	71	71	191
iPhone 6/Plus 09/2014	46	128	148
iPhone 6S/Plus 09/2015	10	108	159
	Correlation to Owned iPhones:	-0.254	0.320

The correlation between owned iPhones and radical innovation perception is with -0.254 weak. The correlation indicates, that if the perception is more radical innovative, the ownership of iPhones will be less. The correlation between owned iPhones and incremental innovation perception is with 0.320 also weak. The correlation indicates, that if the perception is more incremental, the ownership of iPhones will be higher.

The results of the correlations could give an explanation why the iPhone 4S is more owned than the iPhone 5C, 5S in comparison to their precursors iPhone 4 and

iPhone 5. The iPhone 4S was more incremental innovative perceived than the iPhone 5C, 5S in comparison, +39 iPhone 4S to iPhone 4 > +18 iPhone 5C, 5S to iPhone 5.

But overall the result of the correlation is not meaningful. Further research has to be done to obtain better results.

To show that it can be assumed that there is a meaningful relationship, the results of the survey are correlated in the following with the units in sales worldwide, but it is to note, that this approach has no scientific relevance, but it will support the need of further research.

Table 4.35 Correlation between Sales, Radical & Incremental Innovations Perception

	Sales in Units (in million)	Radical Innovative Perception	Incremental Innovative Perception
iPhone 06/2007	5.41	104	156
iPhone 3G 07/2008	15.76	71	187
iPhone 3GS 06/2009	30.07	37	223
iPhone 4 06/2010	57.39	95	171
iPhone 4S 10/2011	109.51	53	210
iPhone 5 09/2012	138.16	92	173
iPhone 5C, 5S 09/2013	159.79	71	191
iPhone 6/Plus 09/2014	210.11	128	148
iPhone 6S/Plus 09/2015	95.58	108	159
Correlation to Sales in Units:		0.459	-0.419

The correlation between sales in units and radical innovation perception is with 0.459 in the medium area. The correlation indicates, that if the perception is more radical innovative, the sales will be higher. The correlation between sales in units and incremental innovation perception is with -0.419 in the medium area. The correlation indicates, that if the perception is less incremental, the sales will be higher.

To make these correlations more visible, the table 4.38 shows the sales in units differences between the single iPhone generations and the changes in the perceptions. It

can be seen, that the radical innovation perception rose from the iPhone 3GS to the iPhone 4, and the sales in units were increased by about 91%. This can be seen also from the iPhone 5C,5S to the iPhone 6/Plus, the radical innovation perception has risen and the sales in units has risen as well. The interesting aspect is now, that the radical perception from the iPhone 4S to the iPhone 5 also has risen, but not in the same way like above, here it was >50 to 39. This let assume, that if the radical innovation perception is not strong enough, the sales will not rise exceptionally.

Table 4.36 Correlation between Sales, Radical & Incremental Innovations Perception in changes

	Sales Differences in Units (in million)	Radical Innovative Perception	Incremental Innovative Perception
iPhone 06/2007 - iPhone 3G 07/2008	10,35	-33	31
iPhone 3G 07/2008 - iPhone 3GS 06/2009	14,31	-34	36
iPhone 3GS 06/2009 - iPhone 4 06/2010	27,32	58	-52
iPhone 4 06/2010 - iPhone 4S 10/2011	52,12	-42	39
iPhone 4S 10/2011 - iPhone 5 09/2012	28,65	39	-37
iPhone 5 09/2012 - iPhone 5C, 5S 09/2013	21,63	-21	18
iPhone 5C, 5S 09/2013 - iPhone 6/Plus 09/2014	50,32	57	-43
iPhone 6/Plus 09/2014 - iPhone 6S/Plus 09/2015	-114,53	-20	11

Conclusion: It can be assumed, that if the perception is less incremental and higher radical and vice versa, the sales in units will be higher or less.

Reliability Test

Table 4.37 Correlation between Radical and Incremental Innovations Perception

	Radical Innovative Perception	Incremental Innovative Perception
iPhone 06/2007	104	156
iPhone 3G 07/2008	71	187
iPhone 3GS 06/2009	37	223
iPhone 4 06/2010	95	171
iPhone 4S 10/2011	53	210
iPhone 5 09/2012	92	173
iPhone 5C, 5S 09/2013	71	191
iPhone 6/Plus 09/2014	128	148
iPhone 6S/Plus 09/2015	108	159
	Correlation to Radical Innovative Perception:	-0,989

To test if the gained results are reliable, the perceptions of radical innovative and incremental innovative are correlated, as it is to expect, that if the radical innovative perception is high the incremental innovative perception is low and vice versa. The correlation coefficient should be ideally at -1. As the correlation coefficient is -0.989, nearly -1, it can be assumed, that the results are reliable.

Hypotheses Evaluation

Hypothesis 1: There is a significant relationship between the consumer perception of an incremental improved product regarding the grade of innovation and the market success of the product.

It could be seen that there is a weak negative correlation between the radical innovation perception and the ownership for the iPhone generations and weak positive correlation between the incremental innovation perception and the ownership for the iPhone generations. As the correlation is not meaningful, the hypothesis one can not be confirmed, but it can be assumed that the hypothesis one is true, see the correlation with the sales in unit worldwide. Further research is necessary to confirm this assumption with a scientific reliable approach.

Hypothesis 2: Radical innovations are preferred than incremental innovations.

To test the hypothesis two, the Chi-Square test is used. For this, single questions of the survey are combined to the “Radical against incremental consumer perception” and the statistical mode of the questions is compared with the research expectations against radical innovations:

Where for O_i and E_i for questions 1,2,3,6: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree or Disagree, 4 = Agree, 5 = Strongly Agree

Table 4.38 Radical against Incremental Innovation Consumer Perception

Radical against Incremental Innovation Consumer Perception		
	Question No.	Mode
Ranking perception +/-	Q2	2
	Q3	4
	Q6	2
Expectations	Q4	3
	Q5	1
Innovation expectations	Q9	3

Table 4.39 Chi-Square Test: Radical against Incremental Innovation Consumer Perception

Chi-Square Test: Radical against Incremental Innovation Consumer Perception					
	Question No.	O_i	E_i	(O_i-E_i)	(O_i-E_i)²/E_i
Ranking perception +/-	Q2	2	5	-3	1.8
	Q3	4	1	3	9
	Q6	2	5	-3	1.8
Expectations	Q4	3	1	2	4
	Q5	1	2	-1	0.5
Innovation expectations	Q9	3	1	2	4
					21.1

The higher the value of the Chi-Square test, the less likely it is that the expected and observed values are the same.

Expected was that radical innovations are preferred than incremental innovations. The Chi-Square test shows, that radical innovations are not preferred than incremental innovations with a significance level of >99% for the research population. Hypothesis two is to reject.

CHAPTER 5

DISCUSSION AND RECOMMENDATION

Chapter 5 gives a summarisation of the results of the research and gives recommendations for further researches in the field of radical and incremental innovations, and a possible application in the product development.

5.1 Outcome of the Research Regarding the Contribution of the Study

The contribution of this study was to gain knowledge about the perception of incremental innovations, if consumer have positive feelings or negative feelings regarding them. With this study it could be shown, that it can be assumed that consumer have positive feelings regarding incremental innovations, see hypothesis two. The researches in the field of perception of innovation from Everett M. Rogers (2003) showed that the perception of the innovations plays a crucial role in the persuasion stage.

It could not be shown with a scientific approach, that if the perception of the incremental innovation tend to be perceived as radical innovative, the perception will influence the market success of a product, see hypothesis 1. This outcome of the research support the studies from Kleinschmidt and Cooper (1991) that both high and low innovative products had market success. But the question here is, how the consumer perceived the low innovative products, as incremental or as radical? As it could be shown with a non scientific that it can be assumed that when an incremental innovation (low innovative) is perceived more as a radical innovation (high innovative) it will influence the market success of it, further research is necessary to obtain scientific prove that the innovation perception will influence the market success of a product.

The other contribution of this study was to gain knowledge if consumer always expect from producers radical innovations. With this study it could be shown, that consumer not always expect radical innovations. Incremental innovations are also accepted from consumer regarding the product development. This outcome of the research is supported by the studies from Kleinschmidt and Cooper (1991), the market success of high and low innovative products, as both high and low innovative products had market success.

5.2 Influences of this Research on the Product Development

As it can be assumed, in a not scientific approach, that the perception of the incremental innovations have an influence on the market success of an incremental improved product, the perception of the incremental improved product should be measured before market launch, to minimise the risk of a failure of the incremental improved product in the market. It would be useful to set individual perception benchmarks for each kind of product based on data from the past, but further research is necessary to get scientific reliable proof.

5.3 Influences of this Research on the Innovation Research

Incremental innovation plays in the actual research of innovations a little role, as radical innovations promise higher yields for the economy at all and for the company as single economy units. But with this research it could be shown, that incremental innovations are perceived from the consumer on the same level as radical innovations. The budget for radical innovation researches are generated normally from the current product range yields of a company. But if the current product range is not up to date any more, or improvements are not accepted from the consumers, the yields will decline and the budget for radical innovations will decrease. It follows ultimately that greater attention should be paid to incremental innovations in the area of research.

5.4 Influences of this Research on Scholars in the Education Sector

With the outcomes of this research, scholars should give incremental innovations a higher attention and should encourage further researches from the students.

5.5 Further Research Recommendations

The aim of this research was to show that the perception of an incremental innovation has influence on the market success of an improved product and that incremental innovations are on the same positive level perceived as radical innovations. As the result not gave in a scientific war prove, only a likely probability, further research has to be done.

Further in should be conduct research in the following areas:

- Factors that influence the perception of incremental and radical innovations:
- Personal factors?
- ultural factors?
- Product factors?
- Which factor(s) trigger(s) the impulse to buy a new product generation?
- Are different product groups different perceived regarding the grade of innovation?
- Research regarding incremental innovation perception of different products and their market success.



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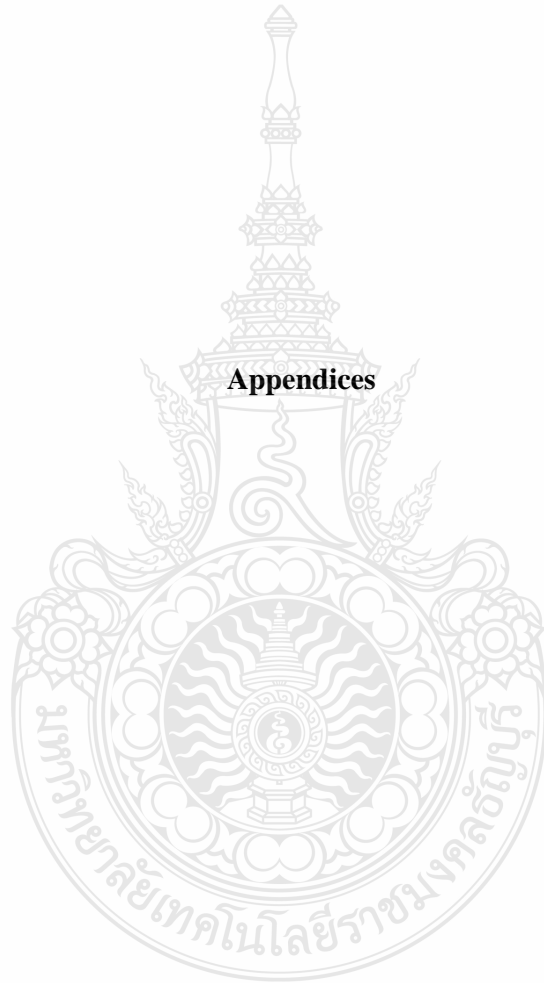
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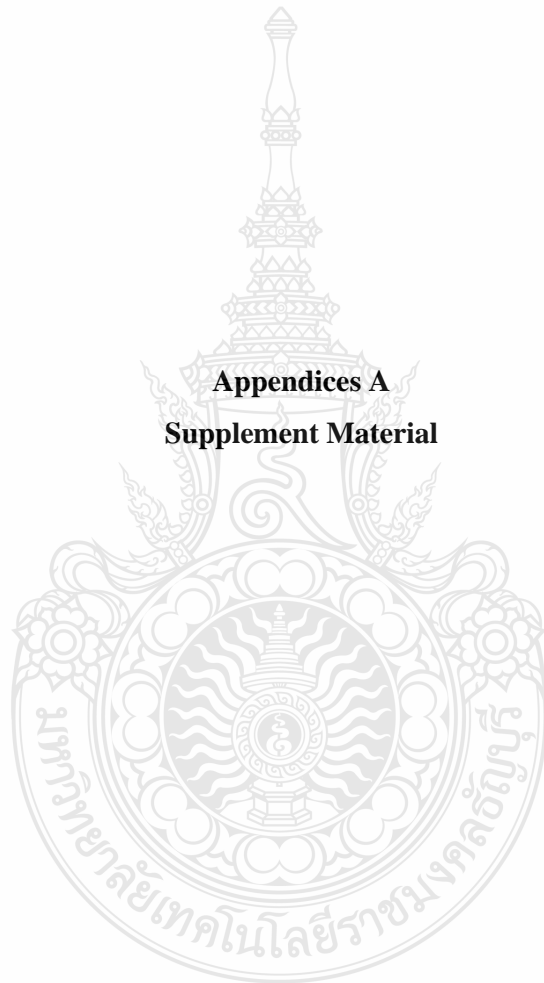
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Appendices



Appendices A
Supplement Material



Questionnaire - Thai

แบบสอบถาม – ความคิดเห็นลูกค้า

แบบสอบถามนี้เป็นส่วนหนึ่งของการทำวิจัยในระดับปริญญาโท คณะบริหารธุรกิจ สาขาการบริหารธุรกิจระหว่างประเทศ มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี จังหวัดปทุมธานี ประเทศไทย โดยนายคริสเตียน แพพเพนไฮม์

แบบสอบถามนี้ถูกจัดทำขึ้นเพื่อเก็บข้อมูลความคิดเห็นของผู้บริโภคเกี่ยวกับนวัตกรรมแบบค่อยเป็นค่อยไปของผลิตภัณฑ์อิเล็กทรอนิกส์แบบสอบถามแบ่งออกเป็น 2 ส่วน มีทั้งหมด 15 คำถาม การตอบแบบสอบถามจะต้องทำให้เสร็จภายใน 10 นาที

ก่อนที่เริ่มทำแบบสอบถาม

กรุณาอ่านคำอธิบายเกี่ยวกับนวัตกรรมแบบก้าวกระโดดและแบบค่อยเป็นค่อยไป ดังต่อไปนี้ “การนำเอาแนวคิดและความรู้ใหม่ใส่ลงไปในการผลิต การบริการ หรือกระบวนการใหม่ที่เป็นไปอย่างสำเร็จ ทำให้เกิดคุณค่าใหม่ๆ ที่ลูกค้าจะได้รับขึ้นภายในตลาด” (American Society for Quality ASQ) นวัตกรรมแบ่งออกเป็นสองรูปแบบได้แก่ แบบก้าวกระโดด (สิ่งใหม่โดยสมบูรณ์) และแบบค่อยเป็นค่อยไป (ค่อยพัฒนาทีละเล็กทีละน้อยในระหว่างช่วงวงจรชีวิตของผลิตภัณฑ์) นวัตกรรมแบบก้าวกระโดดเกิดขึ้นด้วยจุดมุ่งหมายที่จะสร้างผลิตภัณฑ์ การบริการ และกระบวนการใหม่ สร้างตลาดใหม่ และสร้างรายได้เปรียบในการแข่งขัน ในขณะที่นวัตกรรมแบบค่อยเป็นค่อยไปนั้น มุ่งเพื่อพัฒนาผลิตภัณฑ์ บริการ และกระบวนการที่มีอยู่แล้วเพื่อคงไว้ซึ่งความสามารถในการแข่งขัน ลดต้นทุน เพิ่มประสิทธิภาพ ทำให้ผลิตภัณฑ์มีอายุยืนขึ้น และเพิ่มทุนผลกำไร

ส่วนที่ 1 - ข้อมูลทั่วไป

Q1 คุณมีความรู้สึกที่แตกต่างต่อ

นวัตกรรมแบบก้าวกระโดดและแบบค่อยเป็นค่อยไปในการพัฒนาผลิตภัณฑ์

- ไม่ใช่ที่สุด (1)
- ไม่ใช่ (2)
- เฉยๆ (3)
- ใช่ (4)
- ใช่ที่สุด (5)

Q2 คุณคิดว่านวัตกรรมแบบก้าวกระโดดดีกว่าแบบค่อยเป็นค่อยไป

- ไม่ใช่ที่สุด (1)
- ไม่ใช่ (2)
- เฉยๆ (3)
- ใช่ (4)
- ใช่ที่สุด (5)

Q3 คุณคิดว่านวัตกรรมแบบค่อยเป็นค่อยไปเป็นวิธีการที่ดีที่สุดที่จะทำให้ผลิตภัณฑ์ทันสมัย

- ไม่ใช่ที่สุด (1)
- ไม่ใช่ (2)
- เฉยๆ (3)
- ใช่ (4)
- ใช่ที่สุด (5)

Q4 คุณอยากให้แบรนด์สินค้าผู้ผลิตรายใดของคุณคิดค้นสินค้าใหม่ๆ เสมอ

หรือคุณมีความพอใจกับผลิตภัณฑ์ที่ได้รับการพัฒนา

- ต้องการให้มีผลิตภัณฑ์ใหม่ๆ เสมอ (1)
- พอใจกับผลิตภัณฑ์ที่ได้รับการพัฒนา (2)
- ทั้งสองอย่าง (3)

Q5 คุณมีความคิดเห็นอย่างไรต่อการพัฒนาผลิตภัณฑ์แบบค่อยเป็นค่อยไป

- การพัฒนาผลิตภัณฑ์เป็นสิ่งที่ดี ตราบเท่าที่ทำให้เกิดเป็นผลิตภัณฑ์ที่ดีมากยิ่งขึ้นกว่าเก่า (1)
- รอจนกว่าจะมีผลิตภัณฑ์ใหม่เข้ามาในตลาดเสมอ (2)
- ไม่สนใจเลย (3)

Q6 คุณคิดว่าผลิตภัณฑ์ใหม่ดีกว่าผลิตภัณฑ์ที่ได้รับการพัฒนา

- ไม่ใช่ที่สุด (1)
- ไม่ใช่ (2)
- เฉยๆ (3)
- ใช่ (4)
- ใช่ที่สุด (5)

Q7 คุณเลือกซื้อสินค้าแบบใหม่ล่าสุดเสมอ

- ใช่ (1)
- ไม่ (2)

Q8 ควรมีการพัฒนาผลิตภัณฑ์อย่างสมบูรณ์บ่อยเพียงใด

- ทุก 6 เดือน (1)
- ปีละครั้ง (2)
- ทุกสองปี (3)
- ทุกสามปี (4)
- ทุกสี่ปี (5)

Q9 บริษัทที่มีความสร้างสรรค์ควรใช้นวัตกรรมแบบใด

- นวัตกรรมแบบก้าวกระโดดเท่านั้น (1)
- นวัตกรรมแบบค่อยเป็นค่อยไปเท่านั้น (2)
- ผสมระหว่างแบบค่อยเป็นค่อยไปและแบบก้าวกระโดด (3)
- ไม่ทั้งสองแบบ (4)

ส่วนที่ 2 – ข้อมูลเกี่ยวกับไอโฟน (iPhone)

Q10 คุณใช้หรือเคยใช้ไอโฟนหรือไม่

- ใช่ (1)
- ไม่ใช่ (2)
- เคยใช้ (3)

Q11 คุณเคยใช้ไอโฟนรุ่นไหนและตอนนี้ใช้รุ่นไหน

	ปัจจุบัน (1)	อดีต (2)	ไม่ใช่ (3)
iPhone 06/2007	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 3G 07/2008 (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 3GS 06/2009 (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 4 06/2010 (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 4S 10/2011 (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 5 09/2012 (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 5C, 5S 09/2013 (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 6/Plus 09/2014 (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPhone 6S/Plus 09/2015 (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12 คุณคิดว่าการพัฒนาผลิตภัณฑ์ไอโฟนมีรูปแบบใด

	ไอโฟนทุกรุ่นมีการพัฒนาแบบก้าวกระโดด	ไอโฟนทุกรุ่นหลังจากรุ่นแรกมีลักษณะแบบค่อยเป็นค่อยไป	ผลิตภัณฑ์แบบก้าวกระโดดและแบบค่อยเป็นค่อยไป
ไม่ใช่ที่สุด (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ไม่ใช่ (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
เฉยๆ (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ใช่ (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ใช่ที่สุด (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13 คุณคิดว่าไอโฟนแต่ละรุ่นมีนวัตกรรมรูปแบบใด

	แบบก้าวกระโดด (1)	แบบค่อยเป็นค่อยไป (2)
iPhone 06/2007 (1)	<input type="radio"/>	<input type="radio"/>
iPhone 3G 07/2008 (2)	<input type="radio"/>	<input type="radio"/>
iPhone 3GS 06/2009 (3)	<input type="radio"/>	<input type="radio"/>
iPhone 4 06/2010 (4)	<input type="radio"/>	<input type="radio"/>
iPhone 4S 10/2011 (5)	<input type="radio"/>	<input type="radio"/>
iPhone 5 09/2012 (6)	<input type="radio"/>	<input type="radio"/>
iPhone 5C, 5S 09/2013 (7)	<input type="radio"/>	<input type="radio"/>
iPhone 6/Plus 09/2014 (8)	<input type="radio"/>	<input type="radio"/>
iPhone 6S/Plus 09/2015 (9)	<input type="radio"/>	<input type="radio"/>

Q14 คุณซื้อไอโฟนรุ่นใหม่บ่อยแค่ไหน

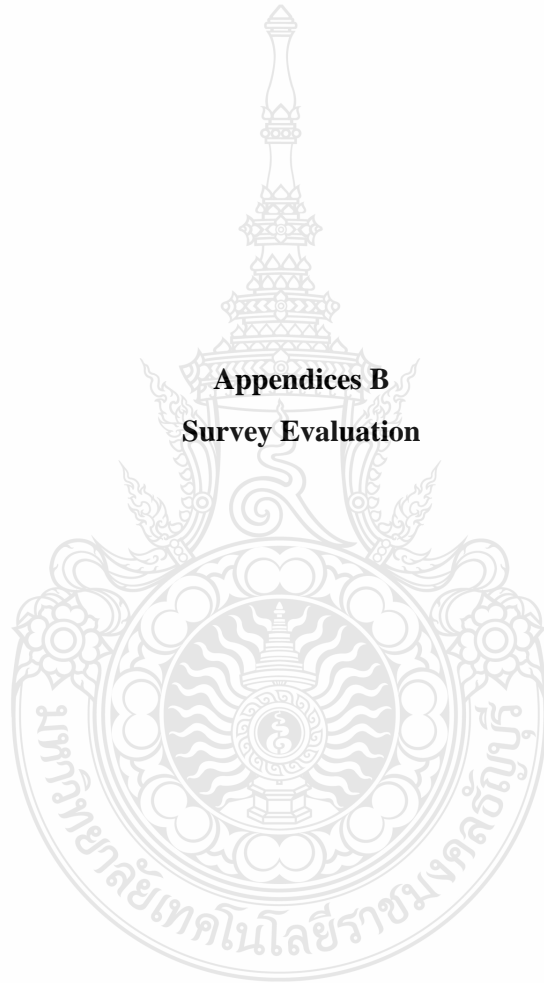
- ทุก 6 เดือน (1)
- ปีละครั้ง (2)
- ทุกสองปี (3)
- ทุกสามปี (4)
- ทุกสี่ปี (5)
- ทุกห้าปี (6)
- ไม่แน่ใจ (7)

Q15 คุณคิดว่า แอปเปิ้ล (Apple Inc.) เป็นบริษัทที่ริเริ่มสร้างสรรค์หรือไม่

- ไม่ใช่ที่สุด (1)
- ไม่ใช่ (2)
- เฉยๆ (3)
- ใช่ (4)
- ใช่ที่สุด (5)



Appendices B
Survey Evaluation



1. Do you distinguish between a social innovation and an incremental innovation?					
Answer	Response Internet Survey	Response Field Survey	Total Response	N	
1. Strongly Disagree	2	0	2	2,154	
2. Disagree	7	9	16	4,355	
3. Neither Agree nor Disagree	18	32	50	11,898	
4. Agree	47	143	190	51,738	
5. Strongly Agree	15	21	36	9,042	
Total	89	205	314	100	
Median	Mode	Skewness	Kurtosis		
4.000	4.000	-0.714	1.247		

2. Do you think radical innovations are better than incremental innovations?					
Answer	Response Internet Survey	Response Field Survey	Total Response	N	
1. Strongly Disagree	4	9	13	1,912	
2. Disagree	27	104	131	36,738	
3. Neither Agree nor Disagree	24	52	76	20,747	
4. Agree	35	84	119	33,427	
5. Strongly Agree	9	18	27	7,412	
Total	99	267	366	100	
Median	Mode	Skewness	Kurtosis		
4.000	2.000	0.091	-1.102		

3. Do you think incremental innovations are a good way to keep a product up to date?					
Answer	Response Internet Survey	Response Field Survey	Total Response	N	
1. Strongly Disagree	5	11	16	5,285	
2. Disagree	11	14	25	7,186	
3. Neither Agree nor Disagree	17	45	62	17,514	
4. Agree	19	112	131	37,815	
5. Strongly Agree	4	23	27	7,787	
Total	56	215	271	100	
Median	Mode	Skewness	Kurtosis		
3.000	4.000	-0.251	-1.203		

4. Do you always expect from your favorite brands / manufacturers new innovative products or are you also satisfied with improved products?					
Answer	Response Internet Survey	Response Field Survey	Total Response	N	
1. I always expect new innovative products	13	45	58	16,424	
2. I am also satisfied with improved products	11	69	80	22,400	
3. A mix of both	43	144	187	52,237	
Total	67	268	335	100	
Median	Mode	Skewness	Kurtosis		
3.000	3.000	-0.857	-1.617		

5. How do you think about incremental product improvements?					
Answer	Response Internet Survey	Response Field Survey	Total Response	N	
1. Product improvements are good, as long as I get a much better product than before	18	207	225	60,737	
2. I always wait until a new product comes on the market	15	41	56	15,545	
3. I just care about it	6	9	15	4,143	
Total	39	257	296	100	
Median	Mode	Skewness	Kurtosis		
2.000	4.000	2.111	4.752		

6. Do you think companies new products are better than improved products?					
Answer	Response Internet Survey	Response Field Survey	Total Response	N	
1. Strongly Disagree	4	11	15	11,144	
2. Disagree	42	104	146	41,296	
3. Neither Agree nor Disagree	26	32	58	16,427	
4. Agree	13	43	56	15,143	
5. Strongly Agree	5	9	14	3,800	
Total	90	219	309	100	
Median	Mode	Skewness	Kurtosis		
2.000	2.000	0.476	-1.405		

22. How do you perceive the project development from the physical & digital side (the first generation were non-physical development)?

Response	Frequency	Percentage	Total Frequency	N
1. Strongly Engage	0	0.00%	0	2,143
2. Engage	13	0.61%	13	11,428
3. Not Too Agree nor Disagree	14	0.65%	45	14,275
4. Agree	35	1.63%	109	90,337
5. Strongly Agree	22	1.03%	28	15,235
Total	68	3.12%	180	100
Mean	Mode	Standard Deviation		
4.302	4.302	0.755		0.755

22. How do you perceive the project development from the physical & digital side (the second generation were non-physical development)?

Response	Frequency	Percentage	Total Frequency	N
1. Strongly Engage	1	0.05%	7	2,143
2. Engage	13	0.61%	21	7,535
3. Not Too Agree nor Disagree	17	0.79%	80	80,340
4. Agree	33	1.54%	135	50,382
5. Strongly Agree	1	0.05%	28	9,835
Total	65	3.03%	179	100
Mean	Mode	Standard Deviation		
4.302	4.302	0.755		0.755

23. How do you perceive the quality of innovation for each subject (1st generation)?

Subject	Frequency	Percentage	Total Frequency	Total Percentage
1. Computer	14	6.52%	124	4%
2. Finance	15	6.99%	71	5%
3. Science	7	3.27%	37	5%
4. Education	10	4.67%	26	4%
5. Social	10	4.67%	30	5%
6. Business	14	6.52%	71	5%
7. Health	14	6.52%	128	4%
8. Information	15	6.99%	87	5%
Total	105	4.83%	1,158	4%

23. How do you perceive the quality of innovation for each subject (2nd generation)?

Subject	Frequency	Percentage	Total Frequency	Total Percentage
1. Computer	1	0.05%	1	0.04%
2. Finance	5	0.23%	17	0.9%
3. Science	11	0.51%	51	0.9%
4. Education	4	0.19%	33	0.9%
5. Social	2	0.09%	11	0.9%
6. Business	5	0.23%	7	0.9%
7. Health	8	0.37%	135	0.9%
Total	64	2.9%	279	0.9%
Mean	Mode	Standard Deviation		
3.302	3.302	0.822		0.822

23. How do you perceive the quality of innovation for each subject (3rd generation)?

Subject	Frequency	Percentage	Total Frequency	Total Percentage
1. Computer	0	0%	6	2.5%
2. Finance	6	2.2%	16	3.0%
3. Science	10	3.1%	41	11.7%
4. Education	8	2.4%	117	10.8%
5. Social	0	0%	57	21.8%
Total	64	21%	439	10%
Mean	Mode	Standard Deviation		
4.302	4.302	1.139		1.139

Apple iPhone unit sales worldwide 2007-2015, by quarter

Global Apple iPhone sales from 3rd quarter 2007 to 4th quarter 2015 (in million units)

Data	Assumed Sales Period
Q3 '07	0,27 iPhone First Generation
Q4 '07	1,12 iPhone First Generation
Q1 '08	2,32 iPhone First Generation
Q2 '08	1,7 iPhone First Generation
Q3 '08	0,72 iPhone 3G
Q4 '08	6,89 iPhone 3G
Q1 '09	4,36 iPhone 3G
Q2 '09	3,79 iPhone 3G
Q3 '09	5,21 iPhone 3GS
Q4 '09	7,37 iPhone 3GS
Q1 '10	8,74 iPhone 3GS
Q2 '10	8,75 iPhone 3GS
Q3 '10	8,4 iPhone 4
Q4 '10	14,1 iPhone 4
Q1 '11	16,24 iPhone 4
Q2 '11	18,65 iPhone 4
Q3 '11	20,34 iPhone 4S
Q4 '11	17,07 iPhone 4S
Q1 '12	37,04 iPhone 4S
Q2 '12	35,08 iPhone 4S
Q3 '12	26,03 iPhone 5
Q4 '12	26,91 iPhone 5
Q1 '13	47,79 iPhone 5
Q2 '13	37,43 iPhone 5
Q3 '13	31,24 iPhone 5S
Q4 '13	33,8 iPhone 5S
Q1 '14	51,03 iPhone 5S
Q2 '14	43,72 iPhone 5S
Q3 '14	35,2 iPhone 6/Plus
Q4 '14	39,27 iPhone 6/Plus
Q1 '15	74,47 iPhone 6/Plus
Q2 '15	61,17 iPhone 6/Plus
Q3 '15	47,53 iPhone 6S/Plus
Q4 '15	48,05 iPhone 6S/Plus

Statistic as Excel data file

Global Apple iPhone sales from 3rd quarter 2007 to 4th quarter 2015 (in million units)

[Access data](#)

Source

Source	Apple
Conducted by	Apple
Survey period	2007 to 2015
Region	Worldwide
Type of survey	n.a.
Number of respondents	n.a.
Age group	n.a.
Special characteristics	n.a.

Note

The quarterly periods for Apple's fiscal year include the following: early October to late December of the previous year (first quarter), early January to late March of the stated year (second quarter), early April to late June of the stated year (third quarter) and early July to late September of the stated year (fourth quarter). The Apple iPhone was first sold in June 2007.

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