A QUASI-EXPERIMENTAL INVESTIGATION OF THE MODERATING EFFECTS OF GAMIFICATION ON THE RELATIONSHIP BETWEEN CUSTOMER ENGAGEMENT AND NEW SERVICE DEVELOPMENT PROCESS INVOLVEMENT

A QUASI-EXPERIMENTAL INVESTIGATION OF THE MODERATING EFFECTS OF GAMIFICATION ON THE RELATIONSHIP BETWEEN CUSTOMER ENGAGEMENT AND NEW SERVICE DEVELOPMENT PROCESS INVOLVEMENT

A Dissertation Presented to
The Institute for Knowledge and Innovation Southeast Asia (IKI-SEA)
Business School of Bangkok University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in Knowledge and Innovation Management

Voravee Ruengaramrut

2019

This dissertation has been approved by The Institute of Knowledge and Innovation Southeast Asia (IKI-SEA) Business School of Bangkok University

Title: A Quasi-Experimental Investigation of The Moderating Effects of Gamification on The Relationship Between Customer Engagement and New Service Development Process Involvement

Author: Voravee Ruengaramrut

Dissertation Committee:

Dissertation Advisor

(Assoc. Prof. Dr. Vincent Ribière – Bangkok University)

Dissertation Co-advisor

(Assoc. Prof. Dr. Stefania Mariano – Bangkok University)

Committee Member

(Professor Emeritus Dr Nonglak Wiratchai – Bangkok University)

Committee Member

(Dr. Xavier Parisot – Bangkok University)

CHE Representative

(Assist. Prof. Dr. Haruthai Numprasertchai - Kasertsat University)

(Assoc. Prof. Dr. Vincent Ribière)

Ph.D. KIM Program Director – Managing Director IKI-SEA

23 January 2018

DECLARATION

In accordance with the Bangkok University Honor Code, I certify that my submitted work here is my own work, and that I have appropriately acknowledged all external sources that were used in this work

Date: 23 January 2018

Name: Voravee Ruengaramrut

Original Signature: _____

Ruengaramrut, V. Ph.D. (Knowledge and Innovation Management), 23 January 2018, The Institue for Knowledge and Innovation Southeast Asia (IKI-SEA), Business School – Bangkok University, Thailand

A quasi-experimental investigation of the moderating effects of gamification on the relationship between customer engagement and new service development process involvement (216 pp.)

Advisor of dissertation: Assoc. Prof. Vincent Ribière, Ph.D., Assoc. Prof. Stefania Mariano, Ph.D.

ABSTRACT

A significant portion of innovative efforts in business is related to the development of new services. The organizations that provide novel services now have the potential to build closer relationships with customers and also higher growth opportunity than others. Organizations can increase their competitive advantage and enhance their relationship with their customers with new service development.

In this research, gamification is considered as a moderating factor that helps boost up customer engagement and intention to be involved in service development process as same as the performance of development process. This research believes that gamification's element can strengthen up level of customer involvement and level of customer engagement to the service.

The quasi-experimental investigation was conducted in three phases, which are; strategic planning, idea generation, and idea screening. To investigate the result, confirmatory factor analysis (CFA) was used as a test method. The result shows that there is a significant association between intention to be involved in NSD process and NSD process involvement in gamification context. In the means time, the strongest

impact of gamification in the three phases of new service development is strategic planning phase. In addition, we also found that participants who participate in gamification context will be more engagement and have high intention to be involved in NSD process. This study provides the first steps in findings the ability of gamification in a role of moderator variable to create strong relationship between customer engagement and new service development process involvement. The implications both for academically and for the practitioners are discussed as same as directions for future research are also provided in this research.

Keywords: gamification, customer engagement, new service development, new service development process, intention to be involved in new service development process

ACKNOWLEDGEMENT

I would like to use this great opportunity to express my gratitude to everyone who supported me throughout the completion of my work. I am thankful for their aspiring guidance, meaningful suggestion, and friendly advice during these tough years.

First and foremost, I would like to express my deepest gratitude to my advisor, Prof. Vincent Ribière. Without his support and accepting me to be his student I could not see the day I can come up and complete this work. His guidance, his supports, and his encouragement were meant a lot to me. Prof. Vincent is not only my wonderful advisor, but he also has been a tremendous mentor for me for both research as well as my career. His advice and all suggestions have been invaluable.

Besides my advisors, I would like to express my sincere appreciation to my co-advisor, Assoc. Prof. Dr. Stefania Mariano, who provided insightful comments as same as encouraging and supporting my research ideas. This research could not complete without her valuable guidance.

A very special thank you also to Dr. Mayuree Suacamram who supported me so much. I cannot imagine I can finish the final part without her kind support. She is not only supported regarding knowledge, but she put all her energy and devote her time to meet me anytime that I asked without hesitating even in her busy time.

I also would like to express my special thanks of gratitude to Dr. Stefania and the members of my panel for taking the time to consider my research as same as giving the meaningful suggestions for my work and my personal vision improvement.

Every result described in this thesis was accomplished with the help and support of my friends who need to be my personal consultants through these a long

way for me. I would like to thank you all my friends who support me in every aspect and always beside me when I struggling to find the solution. My sincere and gratitude goes to Ms. Panita Chalermchokwijit, Mr. Chaiwat kittileadworakul, Mr. Surasa Watcharin, and Ms. Watsaporn Pataravoranee.

Thank you to all my Bangkok Phd. Fellow and KIM staff, I love all the moment that all of us keep encouraging each other. It was a wonderful moment, and this will be my precious memory that I will never forgot.

Last but not least, I praise the enormous amount of help to Ms. Piyanoot Kamalanon who provide unending inspiration and also being my good listener and good assistant all the time. Thank you for always provided me an emotional support in every moment of this long way journey.

Most importantly, I would like to thank you my parents, my brother, my aunt and my grandmother, whose love and guidance are with me in whatever I pursue. They are the most important purpose of life for me, and they are the significant energy that drives me to this stage of life.

TABLE OF CONTENTS

	Page
ABSTRACT	vi
ACKNOWLEDGEMENT	viii
TABLE OF CONTENTS	x
LIST OF TABLES	xiv
LIST OF FIGURES	xviii
CHAPTER 1 INTRODUCTION	viii
1.1 Background	viii
1.2 Purpose of Research	5
1.3 Research Questions	5
1.4 Significance of the Research	7
1.5 Personal Motivation	8
1.6 Thesis Outline	9
CHAPTER 2 LITERATURE REVIEW	12
2.1 Introduction	12
2.2 Customer Engagement	12
2.2.1 Definition of Customer Engagement	11
2.2.2 Customer Engagement Dimensions	16
2.2.3 Customer Engagement Process	18
2.2.4 Customer Engagement Value (CEV)	23
2.2.5 Signification of Customer Engagement	24
2.3 Intention to be Involved in New Service Development Process	25

TABLE OF CONTENTS (Continued)

Page

CHAPTER 2 LITERATURE REVIEW (Continued)

2.4 New Service Development 27

2.4.1 The Characteristics of a Service 28

2.4.2 The Difference between New Service Development (NSD) and New Product Development (NPD) 28

2.4.3 New Service Development Process 32

2.4.4 Successful Factor for New Service Development 41

2.4.5 New Service Performance 43

2.4.6 Customer and New Service Development Process 46

2.5 Gamification 50

2.5.1 Difference between Play and Game 53

2.5.2 The Concept of Gamification 55

2.5.3 Elements of Gamification 56

2.5.4 Gamification and Psychology 61

2.5.5 Octalysis Framework 66

2.5.6 Bartle Gaming Personality Types 69

2.5.7 Changing Behavior 72

2.5.8 Gamification and Customer Engagement 80

2.5.9 Gamification and New Service Development Process 82

2.5.10 Cooperation and Competitive in Gamification 84

2.5.11 Component Diagram 85

2.6 Research Model 88

TABLE OF CONTENTS (Continued)

Page

CHAPTER 2 LITERATURE REVIEW (Continued)

2.6.1 Construction of the Research Model 88

2.6.2 Research Hypotheses 91

CHAPTER 3 RESEARCH METHODOLOGY 93

3.1 Research Paradigms and Research Processes 93

3.1.1 Research Paradigms 93

3.1.2 Research Processes 95

3.2 Research Design 98

3.2.1 Experimental Sequence 98

3.3 Instrument 100

3.3.1 Quantitative Instrument 101

3.4 Experimental Context 113

3.5 Areas of Study 113

3.6 Group for Experiments 114

CHAPTER 4 DATA ANALYSIS AND RESULTS 116

4.1 Introduction 116

4.2 Pilot Test 117

4.2.1 Lessons from the Pilot Study 117

4.2.2 Reliability and Validity 121

4.3 Experimentation Results 131

4.3.1 Experimentation process 132

4.3.2 Findings 139

TABLE OF CONTENTS (Continued)

Page

CHAPTER 5 DISCUSSION AND CONCLUSION 163

5.1 Significant Results 163

5.2 Implications for the Researcher and Practitioner 165

5.3 Limitations 170

5.3.1 Limitations Related to the Experimentation 170

5.3.2 New Service Development Process 171

5.3.3 The Difference Between the Experimentation Context and Real-life Service Creations 172

5.4 Suggestions for Future Research 174

BIBLIOGRAPHY 171

APPENDICES 195

APPENDIX 1: Instrument for Pre-test before the experimentation process (Facebook Context) 196

APPENDIX 2: Instrument for Post-test before the experimentation process (Facebook Context) 202

APPENDIX 3: Instrument for Pre-test before the experimentation process (Private University Context) 203

APPENDIX 4: Instrument for Post-test before the experimentation process (Private University Context) 209

APPENDIX 5: Scorecard (Both Facebook and Private University Context) 210

BIO DATA 211

LICENCE AGREEMENT OF THESIS PROJECT 212

LIST OF TABLES

Page

Table 2.1: Definition of customer/consumer engagement 13

Table 2.2: Comparing the G-D logic and S-D logic perspective adapted from Vargo 2009 by Yazdanparast et al., 2010 14

Table 2.3: S-D logic fundamental propositions (Vargo, 2009. p. 35) 15

Table 2.4: List of characteristics of a service 29

Table 2.5: Stages and Activities in new service development process 39

Table 2.6: Financial and non-financial performance measurements for new service performance 43

Table 2.7: Customer role in new service development process by Alam & Perry (2002) 49

Table 2.8: Mode of Gamification Integration by Tambo et al., 2014 52

Table 2.9: Definition of Gamification 53

Table 2.10: Sub-eight types of player from Bartle's Player Types adapted from 71

Table 3.1: Paradigms, methods and tools by Mackenzie and Knipe (2006) 95

Table 3.2: Research methodology and instrument in each phase of experimentation 98

Table 3.3: Group of participants 103

Table 3.4: Gamification in each new service development process 106

Table 4.1: N size (Customer Engagement Pre-test) 122

Table 4.2: Cronbach's Alpha (Customer Engagement Pre-test) 123

Table 4.3: N size (Intention to be involved in NSD Process Pre-test) 123

LIST OF TABLES (Continued)

Page

Table 4.4: Cronbach's Alpha (Intention to be involved in NSD Process Pre-test) 123

Table 4.5: N size (Customer Engagement Post-test) 124

Table 4.6: Cronbach's Alpha (Customer Engagement Post-test) 124

Table 4.7: N size (Intention to be involved in NSD Process Post-test) 124

Table 4.8: Cronbach's Alpha (Intention to be involved in NSD Process Post-test) 125

Table 4.9: Covariances Result between pre and post-test customer engagement 129

Table 4.10: Correlations result between pre and post-test customer engagement 129

Table 4.11: Characteristics of Different Fit Indices Demonstrating Goodness – of – Fit Across Different Model Situations 130

Table 4.12: Demographic Characteristics of participant 131

Table 4.13: Number and degree of participants towards each experimentation context 132

Table 4.14: The process instruction for strategic planning stage 134

Table 4.15: The process instruction for idea generation stage 135

Table 4.16: The process instruction for idea screening stage 137

Table 4.17: Comparing Main Model with Group Model (Gamified and None Gamified Environment) 143

Table 4.18: Comparing Main Model of Facebook service context with Group Model (Gamified and None Gamified Environment) 145

Table 4.19: Comparing Main Model of Private university service context with Group Model (Gamified and None Gamified Environment) 148

LIST OF TABLES (Continued)

Page

Table 4.20: Paired Samples Statistics result for none gamified environment 151

Table 4.21: Paired Samples Correlation result for none gamified environment 151

Table 4.22: The Paired Samples Correlation table shows that the level of customer engagment result between preest and posttest in none gamified environment 151

Table 4.23: Paired Samples Statistics result for gamified environment (Hypothesis 4) 152

Table 4.24: Paired Samples correlation result for gamified environment (Hypothesis 4) 152

Table 4.25: The Paired Samples Correlation table shows that the level of customer engagement result between pretest and posttest in gamified environment (Hypthesis 4) 153

Table 4.26: Descriptive Statistics per Group (Gamified and None gamified environment) (Hypothesis 4) 154

Table 4.27: Independent samples t-test Result (Hypothesis 4) 154

Table 4.28: Paired Samples Statistics result for none gamified environment (Hypothesis 5) 156

Table 4.29: Paired Samples correlation result for none gamified environment (Hypothesis 5) 156

Table 4.30: The Paired Samples Correlation table shows that the level of intention to be involved in NSD process result between pretest and posttest in none gamified environment (Hypothesis 5) 157

LIST OF TABLES (Continued)

Page

Table 4.31: Paired Samples Statistics result for gamified environment (Hypothesis 5) 157

Table 4.32: Paired Samples correlation result for gamified environment (Hypothesis 5) 158

Table 4.33: The Paired Samples Correlation table shows that the level of intention to be involved in NSD process result between pretest and posttest in gamified environment (Hypothesis 5) 158

Table 4.34: Descriptive Statistics per Group (Gamified and None gamified environment) (Hypothesis 5) 159

Table 4.35: Independent samples t-test result (Hypothesis 5) 159

Table 4.36: Summary of the hypotheses findings 160

LIST OF FIGURES

Page

Figure 1.1: Research Conceptual Model 6

Figure 2.1: A conceptual framework for the process of engagement by Bowden (2009) 19

Figure 2.2: The process of loyalty by Hollebeek, L. (2009) 20

Figure 2.3: Consumer engagement process in a virtual brand community by Brodie et al. (2013) 21

Figure 2.4: Stage Gate Model by Cooper (2008) 33

Figure 2.5: Generic innovation process by Schulteß, Wegener, Neus & Satzger (2010) 34

Figure 2.6: New service development process that can work parallel by Alam & Perry (2002) 38

Figure 2.7: Gamification between gaming and playing, whole and parts 55

Figure 2.8: The game element hierarchy by Werbach & Hunter (2012) 59

Figure 2.9: Element of gamification by Wood & Reiners (2015) 61

Figure 2.10: Model of motivation in games (based on Ryan&Deci, 2000 and Vassileva, 2012) from Richter, Raban, & Rafaeli, 2014, p. 24 63

Figure 2.11: The Self-Determination Continuum Showing Types of Motivation With Their Regulatory, Loci of Causality and Corresponding process. (Ryan & Deci, 2000 p. 72) 66

Figure 2.12: Octalysis framework by Yukai Chou 68

Figure 2.13: Bartle gaming personality types 69

Figure 2.14: Type of gaming personality with the third axis 70

LIST OF FIGURES (Continued)

Page

Figure 2.15: Flow Theory 73

Figure 2.16: Fogg Behavior Model 77

Figure 2.17: Component diagram (Ruengaramrut, 2015) 87

Figure 2.18: Research Conceptual Framework 91

Figure 3.1: The Inductive Approach Typically Used in Qualitative Research 96

Figure 3.2: The Deductive Approach Typically Used in Quantitative Research (Creswell, 2014) 97

Figure 3.3: Research Instrument in each phase 99

Figure 3.4: Data Collection Process 101

Figure 3.5: Control Group and Treatment Group Experimentation Process 103

Figure 3.6: Group for experiment: Facebook context 115

Figure 3.7: Group for experiment: a private university context 115

Figure 4.1: Relationship result between latent variable (Pre-test customer engagement) and five observed variables 127

Figure 4.2: Relationship result between latent variable (Post-test customer engagement) and three observed variables 128

Figure 4.3: Correlation result between pretest and posttest latent variables 128

Figure 4.4: AMOS result for main model included both Gamified and None Gamified Environment 130

Figure 4.5: Participants participate in strategic planning stage 136

Figure 4.6: Example of result from strategic planning and idea generation stage 136

LIST OF FIGURES (Continued)

Page

Figure 4.7: Participants participate in idea screening stage 138

Figure 4.8: Example result from participant in idea screening stage 138

Figure 4.9: AMOS result for none gamified environment 142

Figure 4.10: AMOS result for gamified environment 142

Figure 4.11: AMOS result for Main Model of Facebook service context (both gamified and none gamified environment) 144

Figure 4.12: AMOS result for Facebook service context for gamified environment 144

Figure 4.13: AMOS result for Facebook service context for none gamified environment 145

Figure 4.14: AMOS result for Main Model of private university service context (both gamified and none gamified environment) 146

Figure 4.15: AMOS result for Facebook service context for gamified environment 147

Figure 4.16: AMOS result for Private university service context for none gamified environment 148

Figure 4.17: Process of Paired Sample t-test and Independent Sample t-test for hypothesis 4 150

Figure 4.18: Process of Paired Sample t-test and Independent Sample t-test for hypothesis 5 155

CHAPTER 1

INTRODUCTION

1.1 Background

In this era, service has undeniably become a significant product for many organizations. Excellent services can bring about good customer experiences and help organizations to win over competitors in this extremely competitive environment. This can be confirmed by a statement from the Organization for Economic Co-operation and Development (OECD). OECD states that service sectors have generated more than two-thirds of gross domestic product (GDP) globally. According to this, services establish a main part of the total economic activity and employment (De Jong, Bruins, Dolfsma, & Meijaard, 2003).

Within this highly competitive environment, service innovation dramatically gains more attention and topics, regarding innovation, has become a major factor for strategic planning; since innovativeness can create a long-term sustainable growth for organizations. However, eventhough the service innovation recently has received more attention, its development still lacks practical implementation and serious consideration. According to Legrand and LaJoie (2013), organizations regard service as an intangible product that does not affect profit directly unlike the tangibles. Also, the implementation of service development is a more complex process than product development. Furethermore, gathering data is a delicate process and the testing and implementation of service products are more difficult; when compared to the tangible commodities. These are the reasons that the serious attention to service product was previously insufficient.

However, as stated previously, the service sector has now surpassed the manufacturing sector in terms of its importance to the economy and is now a focus for most organizations. Service can be considered as part of the product. Many companies with products as their main revenue source cannot deny that good services is important for staff function. Quality service promotes a good relationship between customers and organizations Many products are now becoming commoditized, hence, companies offering good services now have the potential to build closer relationships with their customers and enhance growth opportunities. A significant portion of the innovative efforts in business is already related to the development of new services and this is importantly increasing. One cannot deny that customer satisfaction and loyalty are the results from innovation in services which impact financial performances and long-term potentials to get new customers. The difference between pure products and service products is that “the development of a new service is often more complicated than that of a new manufactured product since service products are predominantly processes rather than objects (Oke, 2007)”.

To create strong service products, customers are a significant resource as they have tacit knowledge about their real needs. In service development, organizations need to be more transparent (Wall, 2011). A service product is dissimilar from a tangible product and relies more on customer experience. When customers are more satisfied with products, organizations can also increasingly reap the benefits for good services. However, customer involvement is still limited to traditional and outdated methods, such as focus groups or one-on-one interviews. These traditional processes are too slow and conventional, making it hard for organizations to actively compete in the marketplace.

With regard to the aforementioned matters, therefore, gamification may be the way forward to increase motivation and interaction between customers and organizations in a more modern and rapid way. The principal goal of gamification is to heighten the engagement level of users through game-like techniques (Flatla, D. R., Gutwin, C., Nacke, L. E., Bateman, S., & Mandryk, R. L., 2011), making gamification participants gain more sense of ownership and understand the purpose when engaging with tasks in the gamified environment (Pavlus, 2010). In contrast with previous researches, this study focused on gamification through two sub-factors, the gamifying process (components, mechanics, dynamics, and intention), and persuasive techniques to change people behaviors, with regard to the customer intention to be involved in new service development processes.

Customer engagement is another factor that can become a powerful competitive differentiator, making it vital for organizations to engender customer loyalty. To keep a long-term customer relationship is a challenge for businesses (Shu-Ching, 2015), and loyal customers have a strong impact on business which is crucial for its survivability and sustainable competitive advantage in the long-term (Gronroos, 2009; Gummesson, 2008). Loyal customers are competitive assets for any business (Shu-Ching, 2015). To get customer loyalty, businesses must pay close attention and focus on consumer engagement programs which play an important role in fostering interactions that encourage repeat purchases (Cooperstein, 2013). Customer engagement can create improved opportunities and promote a bigger market share. The more engaged customers become, the greater likelihood they will spend money on company's products and advocate the brands (Gartner Group, 2011).

The interaction between organization and customer is definitely essential for business success (Bitner, 1990; Shu-Ching, 2015).

To create strong customer engagement, an organization needs to address passive customers. In general, there are two types of customers, namely active and passive customers. Active customers are precious resources. They are ready to provide their information to companies while simultaneously searching for data from others to make deliberate and conscious decisions (Roos & Gustafsson, 2011). Passive customers, on the other hand, are totally different; the proportion of passive customers that move to other companies is higher (Roos & Gustafsson, 2007). Passive customers are unable to come up with convincing reasons to keep the current relationship when competitors tempt them to switch over. Nontheless, they are still a significant asset for an organization. Passive customers are satisfied with the products and services of an organization, but they are not passionate about them. Infiltrating the group of passive customers and changing their mindsets present a great growth opportunity. The difficulty is, however, to completely understand customer needs, which often is a costly and inexact process. Even when consumers know exactly what they want, they cannot often transfer that information clearly or effectively complete (Oke, 2007). As mentioned previously, gamification is a tool that can increase motivation and interaction between customer and organization. Promoting consumer engagement and intention to be involved in new service development processes was also the main focus for this research. To increase the rate of customer engagement and the success rate of new service innovation processes, gamification was explored as a moderating factor.

Nevertheless, there is still a lack of empirical study on the relationship between gamification, customer engagement, intention to be involved in new service development process, and new service development process involvement. To explore the relationship between these four main factors, this research aimed to find a connection between each factor and also investigate and explore the significance of gamification towards customer engagement and new service development process.

1.2 Purpose of Research

The purpose of this study was to identify the ability of gamification to increase the level of intention to be involved in new service development process and customer engagement. Focusing on the involvement of a customer who is really engaged with the service of an enterprise, this research attempted to demonstrate that gamification acts as a moderating factor and can help to increase the success rate of service innovation. With the success rate being the ultimate goal, this research also explored a relationship between customer engagement and new service development processes. Each stage of new service development will involve the customer in different tasks with the gamification element. The measurement of customer engagement impact on intention to be involved in new service development process was also investigated.

1.3 Research Questions

The research attempted to answer the following questions:

1.3.1 To what extent does customer engagement enhance new service development involvement?

1.3.2 To what extent does intention to be involved in new service development enhance new service development involvement?

1.3.3 Does gamification moderate the relationship between intention to be involved in new service development process and new service development process involvement, and to what extent?

1.3.4 To what extent does customer engagement increase after customers have been involved in a gamified NSD process?

1.3.5 To what extent does intention to be involved in NSD process increase after customers have been involved in a gamified NSD process?

According to the research questions, below is a research conceptual model (Figure 1.1). This model shows the relationship between each concept, which are; customer engagement, intention to be involved in the new service development process, and new service development process by having gamification as a moderating variable.

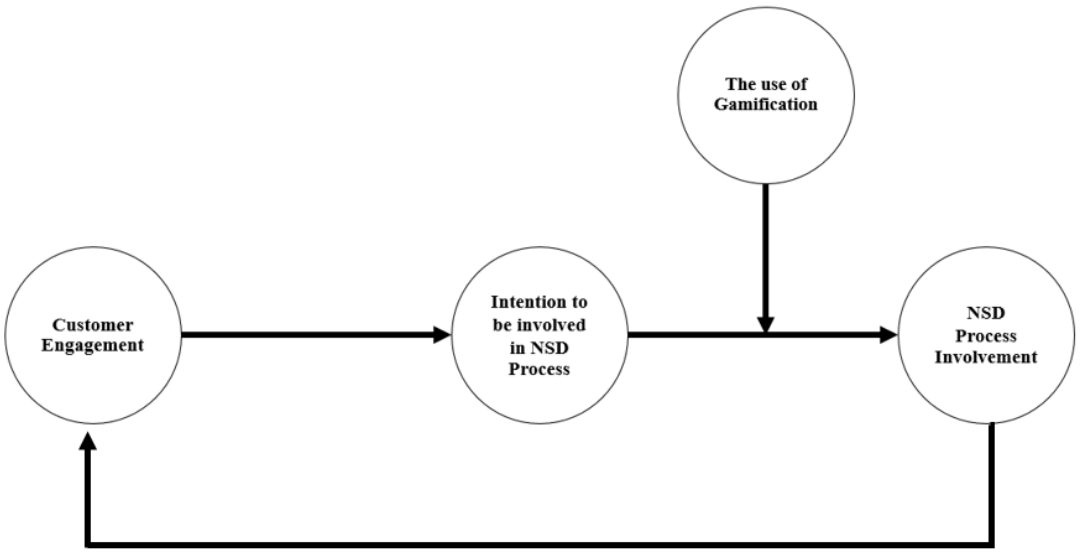


Figure 1.1: Research Conceptual Model

1.4 Significance of the Research

Various organizations are trying to increase their capacity to provide innovative service (Carbonell, Rodríguez-Escudero, & Pujari, 2012). Accordingly, these services become strong products of each organization. Lack of good service or any presence of below-standard service might affect customer satisfaction. Providing opportunities for customers to share their ideas or be involved in the development process is an undeniably important issue for organizations. Customers are a valuable resource that can help organizations explore new or strong ideas that exist outside the organization since customers can perceive the service in the different perspective. This can help to increase the success rate of organization for developing new service. Taking a lack of customer involvement into account, organizations will miss opportunities to leverage existing competitive advantages. Also, organizations will waste a lot of effort for the investment to discover and design services that might not meet customer need. An involvement of customer in the process is significant. The involvement does not only impact the pattern of service that will launch to the market but, in the meantime, can also create memorable experiences, which will likely lead to customer loyalty. This research made a contribution by helping organizations to understand the significant impact of customer engagement on the development of new service better. In addition, this research presents gamification as a tool to moderate the relationship between customer engagement and new service development process to be more efficient. This understanding and exploration will help organizations to create a strong relationship with the customers and at the same time organizations can innovate a service that satisfies customers or market needs. Customers can interact

with organizations through gamification, which can be a powerful tool to motivate customers to interact without tediousness.

1.5 Personal Motivation

With five years experiences working with consulting firms mainly on customer engagement and customer service value, the researcher has found that customers are the main key that can help organizations to be innovative and thinking outside the box. However, in order to bring the customers to the development process, sending messages or relying on word of mouth is not enough. Besides, correct data, gained from face-to-face interaction, might not help the organization to gain the data required in this enormous and fast process in the big data era.

During these three years, from 2015 to 2017, the researcher found that various organizations use and consider gamification to be a tool for both employees and customer engagement. However, there was no study that pays attention to find the impact of gamification on its ability to increase customers' service development process involvement.

The researcher strongly believes that gamification can be a powerful tool that can encourage customers to involve in the process, which will help organizations to gain more competitive advantage in a long-term. On the other hand, the organizations can gain more knowledge and feedback from customers and, concurrently, they can also increase their customer loyalty during the involvement.

With passion towards customer engagement, service development process, and gamification, the researcher would like to understand a relationship between these three factors as well as the impact of gamification towards the NSD process and the intention to be involved in the process. The researcher strongly believes that the

findings from this research can be a foundation for organizations to treat gamification as more than just a game and reward, and find a way to get customers involved in their service development process.

1.6 Thesis Outline

The structure of this thesis is as follows: The first chapter delivers an overview of this thesis, which includes background, objective, research question, proposed framework, significance, purpose, motivation, and thesis outline. The second chapter provides academic literature by emphasizing three main areas which are customer engagement, new service development, and gamification. The third chapter discusses the methodological approaches including research context, research design, research instrument, and research experiment. The fourth chapter includes data analysis and result. The last chapter delivers discussion and conclusion of this research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will discuss several concepts that are highly relevant and used throughout this study. This chapter covers three different topics, which are, customer engagement, intention to be involved in the new service development, new service development process, and gamification.

2.2 Customer Engagement

Customer engagement is a significant topic that all organizations need to consider. Customer engagement leads to consumer loyalty which contributes to repurchasing and also involvement and interaction with the organizations. Thus, understanding the engagement concept will assist organizations to comprehend their customers and also increase their loyalties.

Engagement has been discussed in many areas; it is not only present in the business context, but also in psychology, sociology, information systems, education, marketing, and organization behavior (Brodie, Ilic, Juric, & Hollebeek, 2013). Engagement is recognized to "represent a dynamic process occurring over time and is thus potentially characterized by different phases (Bowden, 2009) and/or differing levels (Sprott, Czellar & Spangenberg, 2009) (Holleebeek, 2009. p. 3)". According to this, engagement outcome can be measured at particular levels at specific points (Holleebeek, 2009)

In a business world along of which employee engagement is focused, customer engagement is another concept of high interest as the engagement between

the consumers and the brand or product can strongly affect performance and customer value (Jaakkola & Alexander, 2014).

2.2.1 Definition of Customer Engagement

Customer engagement has a strong significance in market performance. Ravaglia, Brivio and Graffigna, (2015) mentiones that the definition of customer engagement in The Marketing Science Institute's 2010–2012 Research Priorities (2010) that "customer engagement is a key research area contributing to enhanced academic insight into consumer behavior in complex, interactive and/or co-creative environments (Ravaglia et al., 2015. p. 92)". With increasing competition in markets, customer engagement is a significant factor that can help organizations to retain their customers. There are various aspects of customer engagement. However, the primary goal is to achieve customer loyalty and gain a competitive market advantage (Brodie et al., 2013, Banyte & Dovaliene, 2014). The main aim of customer engagement is the long-term objective of creating a loyal relationship between the customer and the organization. The consumer must feel that they are valued and have the opportunity to interact and be involved in more activities or company events that can help to develop or improve products and services.

Vivek, Beatty and Morgan (2012) mentions the different aspect of customer engagement from the practitioner and the academic side. The practitioner side looks at customer engagement as activities facilitating repeated interaction which will strengthen the emotional, psychological, or physical investment that the customer has in a brand (Vivek et al., 2012). In contrast, the academic side defines customer engagement as, *"Intensity of customer participation with both representatives of the organization and with other customers in a collaborative knowledge exchange*

process (Wagner & Majchrzak, 2007 p. 20)". The perspectives are not the same, but they are not dissonant. Customer investment is significant for an organization in terms of financial gain. On the other hand, customer knowledge and collaboration between organization and customer are also very important. The customer is a powerful key that can help organizations to create products and services that correspond to their need.

The terms "consumer engagement" and "customer engagement" (CE) have been mentioned in academic marketing and service literatures in the last decade. In this regard, there are various definitions and concepts of customer engagement.

There are various kinds of definitions for customer engagement which derive from both practitioners and academics. Most consider customer engagement in terms of a relationship between individuals at the level of customer cognitive, emotional, and behavioral factors towards a brand or organization. To understand customer engagement, this research reviewed the literature on the subject. Table 2.1 presents existing literature on customer/consumer engagement with various scholars presenting their definition, antecedents, consequences, and dimensions.

Table 2.1: Definition of customer/consumer engagement

Author	Year	Definition
Brodie	2013	*A multidimensional concept comprising cognitive, emotional and or behavioral dimensions, (which) plays a central role in the process of relational exchange where other relational concept are engagement antecedents and or consequences in iterative engagement processes within the brand community.*
Vivek	2012	*The intensity of an individual's participation and connection with the organization's offerings and activities initiated by either the customer or the organization.*
Brodie	2011	*A motivational state that occurs by virtue of interactive, co-creative customer experience with a focal agent/object (e.g. brand) in focal brand relationship.*
Sedley	2010	*Repeated interactions that strengthen the emotional, psychological or physical investment a customer has in a brand.*
Bowden	2009	*A psychological process that models the underlying mechanisms by which customer loyalty forms for new customers of a service brand as well as mechanisms by which loyalty may be maintained for repeat purchase customers of a service brand.*
Wagner&Majchrzak	2007	*Intensity of customer participation with both representatives of the organization and with other customers in a collaborative knowledge exchange process.*
Patterson	2006	*The level of a customer's physical, cognitive and emotional 'presence' in their relationship with a service organization.*

From previous literatures, customer engagement can be classified into unidimensional and multidimensional conceptualization (Yoshida, Gordon, Nakazawa, & Biscaia, 2014). For unidimensional conceptualization, customer engagement is focused only on the behavioral perspectives. In contrast, multidimensional conceptualization discusses customer engagement that it comprises several sub-dimensions including cognitive, emotional, and behavioral ones (Hollebeek, 2011; Vivek, Beatty & Morgan, 2012; Brodie et al., 2013). However, according to the literature review, customer engagement has something more than a behavioral aspect and, therefore, this study focuses on multidimensional conceptualization.

To understand customer engagement concept, the related theories of customer engagement were studied. Service dominant (S-D) logic is a relevant theory that is related to customer engagement and mentioned in various literatures. S-D logic was developed by Vargo and Lush in 2004 and has revised on 2008. Vargo (2009) has explained that the difference between service dominant logic and good dominant (G-D) logic is "a transcending view of relationships". In contrast, service dominant logic is more focused on relational perspective especially on the customer as well as customer engagement. The differences between G-D logic and S-D logic perspectives are summarized in Table 2.2 (Yazdanparast, Ila, Swartz, & Stephen, 2010). Vargo (2009) suggested that G-D logic may be viewed as embedded in the context of S-D logic. For example, the main product of salons is hair cutting or hair designing services. The customers can experience and purchase the products if they are satisfied.

Table 2.2: Comparing the G-D logic and S-D logic perspective adapted from Vargo 2009 by Yazdanparast et al., 2010

	G-D Logic	**S-D Logic**
Meaning of Relationship	• Dyadic bonds represented by trust and commitment • Long-term patronage-repetitive transactions	• Reciprocal, service-for-service nature of exchange Co-creation of value • Complex, networked structure of the market • Temporal, emergent nature of value creation • Contextual nature of value determination
Normative Implication	• Manage customers through communication, satisfaction, etc. to maximize customer lifetime value	• Collaborative nature of value determination • Collaborate with customers to develop mutually beneficial value propositions • Co-create value through service-for-service exchange

Vivek (2009) stated that the perspective of marketing's relationship has moved from "market to" to "market with" standpoint. The customers, not only purchasing products or services, are a significant resource to co-create with the organization. In turn, that means customers are involved more in non-transaction activities. However, to involve more in non-transaction activities does not only cover complaints, feedbacks or reaction to product or service but also activities in terms of co-creation as customers are persons who know exactly what they want, and their perspective and knowledge can help organizations to improve their product or service.

As previously mentioned, a product is tangible and relying on their physical attribute to reach customer engagement. However, service is intangible. Hence, to create customer engagement with service product is more complicated than that with a product. The success of building engagement for service is based on customer interaction with service (Kaltcheva, Patino, Laric, Pitta, & Imparato, 2014).

Table 2.3: S-D logic fundamental propositions (Vargo, 2009. p. 35)

Fundamental propositions	Explanation/justification
FP1: service is the fundamental basis of exchange	The application of operant resources (knowledge and skills), "service," is the basis for all exchange. Service is exchanged for service
FP2: indirect exchange masks the fundamental basis of exchange	Goods, money, and institutions mask the service-for-service nature of exchange
FP3: goods are distribution mechanisms for service provision	Goods (both durable and non-durable) derive their value through use – the service they provide
FP4: operant resources are the fundamental source of competitive advantage	The comparative ability to cause desired change drives competition
FP5: all economies are service economies	Service (singular) is only now becoming more apparent with increased specialization and outsourcing
FP6: the customer is always a co-creator of value	Implies that value creation is interactional
FP7: the enterprise cannot deliver value, but only offers value propositions	The firm can offer its applied resources and collaboratively (interactively) create value following acceptance but cannot create/deliver value alone
FP8: a service-centered view is inherently customer oriented and relational	Service is customer determined and co-created; thus, it is inherently customer-oriented and relational
FP9: all economic and social actors are resource integrators	Implies that the context of value creation is networks of networks (resource integrators)
FP10: value is always uniquely and phenomenologically determined by the beneficiary	Value is idiosyncratic, experiential, contextual, and meaning laden

According to S-D logic, it presents that customers are strongly beneficial in terms of co-creation. Furthermore, customers can also help organizations in co-creation phase as well as creating a network and providing feedbacks and knowledge insight from customer side. Their interaction with organizations and services can create more experiences. With good enough experiences, these can cause the customer to re-purchase and re-select those organizations, brand, or services. With regard to this increasing opportunity for the customer to involve with the organization, the engagement level might be increased. Taking this point into account, this research will find the relationship between customer engagements and customer intention to involve in service development process within gamification environment.

For a better understanding, the definition of customer engagement is explained in the next section.

2.2.2 Customer Engagement Dimensions

The literature lists three relevant dimensions which are; cognitive responses (I think), emotive responses (I feel), and behavioral responses (I do) (Avnet &Higgins, 2006; Worthington, 2009; Hollebeek, 2011; Brodie et al., 2013). However, in 2012, So & Sparks splitted customer engagement into five dimensions which include enthusiasm, attention, absorption, interaction, and identification. These dimensions cover all engagement perspective. This research used these five dimensions to measure the degree of customer engagement. Each dimension is explained below.

2.2.2.1 Enthusiasm

Enthusiasm is not different from vigor (Patterson, Yu, & DeRuyter, 2006) and activation (Hollebeek, 2009). It represents a strength of an individual's excitement and interest by focusing on engagement. One of the characteristics of

enthusiasm is a strong feeling of excitement that can occur based on an active state. This is not a past state like satisfaction.

2.2.2.2 Attention

Customers who highly engage will have a high attention level. For example, customers with attention to the brand or organization are focused and looking for information related to that brand or organization. Attention is, therefore, a significant factor that organizations need to consider.

2.2.2.3 Absorption

According to So and Sparks (2012), "*Absorption is a high level of concentration and engrossment, extending beyond feeling efficacious and coming close to what has been called "flow" a state of optimal experience (So & Spark., 2012 p. 309)".* Customers with high absorption level have intrinsic enjoyment. They do not use a lot of effort to concentrate, participate, or involve in the process is considered to be wasting their time.

2.2.2.4 Interaction

This is a sharing and exchange of ideas, thoughts, and feelings about experiences with the brand (Vivek, 2009). When customers interact, they become a part of the brand or organization.

2.2.2.5 Identification

Customers with identification are active and selective; they motivate or recommend other customers to experience services or products from the brand or organization. They feel as if they belong to the brand or organization as the self-image of the customer overlaps with the brand image.

These five dimensions do not have any major differences within the three main dimensions, but these five dimensions are more specific and detailed than the previous original three dimensions.

To summarize:

1. Customer engagement occurs within a dynamic and repeated process of interaction or participation between individual and organization.
2. Customer engagement is a multidimensional concept which contains specific expressions of relevant cognitive, emotional, and behavioral dimensions.
3. Customer engagement occurs within a particular set of situational conditions creating different customer engagement levels.

2.2.3 Customer Engagement Process

The customer engagement process is relative to how the outcomes of customer satisfaction and customer loyalty are reached. However, customer engagement depends on various dimensions. An organization cannot expect to receive only positive feedback, they also need to prepare for negative feedback which is hard to control. There are many similar and different points of customer engagement process. To understand the customer engagement process will help organizations to improve activities or tasks that can increase the growth of customer loyalty. The next section summarizes numerous customer engagement concepts by comparing and explaining differences between each model.

Bowden (2009) proposed a conceptual framework for the process of engagement (Figure 2.1) which presented two different temporal pathways for customers. One was taken by a new customer and the other by existing customers.

Each pathway showed a movement of the customers through a sequential psychological process to become return customers and, eventually, loyal customers.

The processes of this conceptual framework can be explained as follows:

1. For a new customer, calculative commitment (continuance commitment) is a significant factor, and purchasing is based on cognitive thinking. If this new customer experiences satisfaction with the brand or product, then they will commit and re-purchase.

2. Repeat customers have the potential to become loyal. Thus, increasing their level of involvement can support levels of trust and vice versa. Trust and involvement also relate to commitment. The development of affective commitment is based on emotions, but this differs from the new customer where commitment is based on their cognitive level.

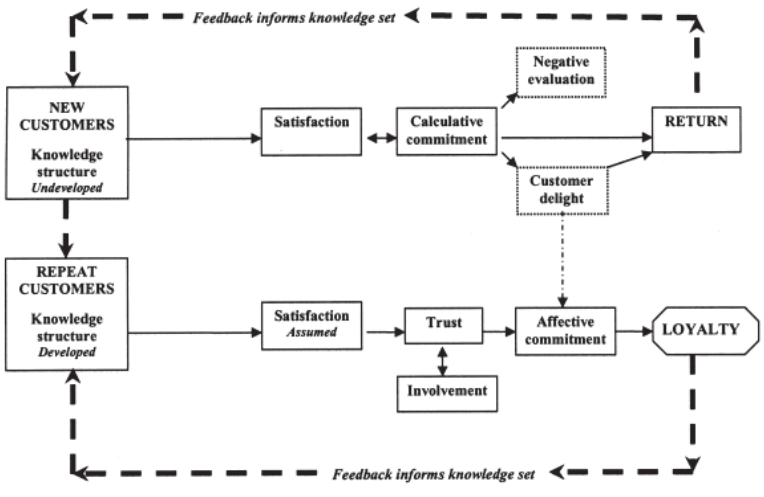


Figure 2.1: A conceptual framework for the process of engagement by Bowden (2009)

According to Bowden's customer engagement process framework, these information-processing patterns occur for both new and repeat customers but in a

different way. New customers have no previous experience which, therefore, causes imprecise expectations of service. Hence, it is hard to measure overall service performance as they have no data to compare. Their knowledge of this new service is still undeveloped. Thus, when new customers attempt to evaluate a new service experience, they mostly rely on tangible and extrinsic motivation (McGill & Iacobucci, 1992).

Commitment is a significant variable for new customers. To strongly commit to the brand or product or even organization, customers need to have previous experience to measure levels of satisfaction and form the commitment. If the level of commitment does not meet the expected level of satisfaction, then the customer might not repeat the purchase. However, Warrington and Shin (2000) stated that even if customers are uninvolved and uncommitted, they can still feel satisfied. They identified that the brand or service provider may be unimportant in the customer decision-making process. This contrasts with repeat customers who are satisfied and repeat the purchase, they already have a higher level of familiarity with the brand and product. Thus, they are more involved and likely to give their feedback on the services/products to the organization. Thus, *"involvement mediates the relationship between satisfaction and commitment, most significantly for repeat purchase customers (Bowden, 2009. p. 69)".*

Figure 2.2: The process of loyalty by Hollebeek, L. (2009)

Hollebeek (2009) presented a model which shows the antecedent components that affect and create engagement which are involvement and interactivity. Customer engagement is driven by involvement and interactivity (Hollebeek, 2011).

Involvement comprises trust, commitment, and customer satisfaction while interactivity is associated with a level of rapport, co-creation, customer empowerment, and customer perceived support/recognition for their efforts. Customer involvement can be measured in terms of the individual level of interest and personal relevance to the relationship of the firm or its product or service. However, interactivity is characterized by some form of customer and firm interaction (Bolton and Saxena-Iyer, 2009).

Customer engagement and customer satisfaction are not completely separate concepts. Both the previous models contain customer satisfaction. Satisfaction will take place when a customer perceives an interaction that meets their needs and expectations (Patterson et al., 2006; Vivek, 2009).

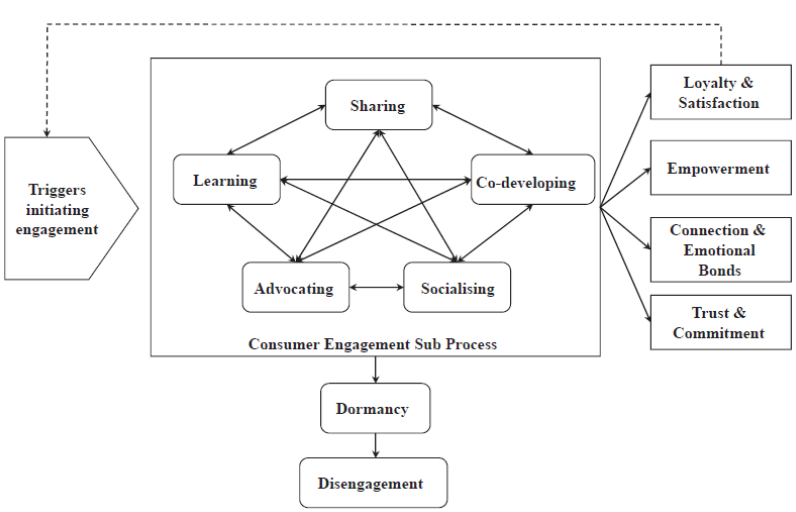


Figure 2.3: Consumer engagement process in a virtual brand community

by Brodie et al. (2013)

Brodie et al. (2013) presents that the consumer engagement process in a virtual brand community as included with a subprocess which is associating with learning, sharing, advocating, socializing, and co-developing. Brodie also identified

the outcomes from the consumer engagement process as *"loyalty and satisfaction, consumer's empowerment, connection and emotional bonds, and trust and commitment (Brodie et al., 2011. p 6)".* Brodie suggested that consumers express their loyalty by comparing product satisfaction with that of other brands and, subsequently, recommendations the preferred product to the others. Loyalty is built when customers perceive co-created values from the engagement process.

Customers desire to be significant co-creators for the organization. When they are satisfied, their level of engagement becomes stronger, and this promotes commitment and loyalty. These benefits are important for an organization and increase their revenue, but they are also related to developing their understanding on customer desires.

According to previous literatures, customer loyalty is the main outcome of all customer engagement process. To create customer loyalty, degrees of customer satisfaction is an important factor along with trust and commitment. The interaction and involvement of customer with the brand or organization are the antecedent components that create a relationship between customer and brand or organization. The interaction or involvement activities do not limit only to the purchasing part, but this can refer to activities between each customer such as sharing and socialization as well as activities between customer and brand or organization such as learning, co-developing, etc. Within this reason, it shows that a strong degree of customer engagement is impactful and beneficial to the organization. The value of customer engagement is discussed in the next section.

2.2.4 Customer Engagement Value (CEV)

Kumar, Aksoy, Donkers, Venkatesan, Wiesel, & Tillmanns (2010) identified customer engagement value as four types of benefit to the service firm, namely:

2.2.4.1 Customer lifetime value (CLV)

CLV focuses on the exchange of transaction, including the frequency and quantity of purchase. It is *"the present value of future profits generated from a customer over his or her life of business with the firm (Kumar et al., 2010, p. 299)".*

2.2.4.2 Customer referral value (CRV)

Referrals is also a significant factor. Organizations can gain more potential customers and reduce costs from customer referrals. "CRV is focused entirely on current customers converting prospects in their social network (both online and offline) into actual customers for which they are rewarded. In many ways, these referring customers can be thought of as non-employee salespeople earning a commission from the sale and can be an effective way of bringing in new customers (Kumar et al., 2010, p. 300)".

2.2.4.3 Customer influence value (CIV)

The difference between CIV and CRV is that CRV focuses only on prospective customers. In contrast, CIV focuses on both prospective and existing customers. Therefore, CIV is based more on a customer intrinsic motivation. CIV not only motivates customers to share their purchase experiences with the firm but also helps other customers with service usage. In contrast, CRV is based on extrinsic motivation. The relationship of the customer with CIV is more profound than with CRV.

2.2.4.4 Customer knowledge value (CKV)

The internal employee and organisation's perspective on product and service knowledge is different from the customer perspective. Thus, consumer ability to provide feedback for service improvement and innovation is crucial. Kaltcheva et al. (2014) mentioned that customers can take on the role of a co-developer and also an information source for the organization. As a result, a customer community is also significant and important for knowledge sharing. A good customer community can lead to a high customer engagement level.

2.2.5 Signification of Customer Engagement

Customers are an essential resource for an organization and their insights interact with products and services from in a way that is different from the organization internal resource. This can help to develop and improve products and services to truly meet customer needs. The ability to integrate the customer into every key process is an important aspect that can boost success and initiate knowledge creation in the marketspace (Kotler, Jain, & Maesincee, 2002).

Customers are the most powerful communicators for brands or organizations. They play no role in oganizations' internal financial interest. When a customer passes on their product knowledge to the others, it is considered as a pragmatic user experience. Nowadays, social network has a powerful impact in this matter. Word-of-mouth advertising is significant for brands and organizations. Messages from one person can pass to the next person very quickly. An exchange of word-of-mouth information can control market communication. When the product or service is recommended by an influential customer, the news goes viral. For example, in cosmetic product market, there are numerous beauty vloggers (Video blogger) on

YouTube. This can spread the popularity of one product very rapidly. One person mentions the product to one another, who then searches for that product and reviews it on their own YouTube channel. Customer behaviors are changing. They now express their satisfaction with products via social networks. A customer role is not limited only to product or service pruchasing but also to communicate its value and acceptability.

However, researches are lacking on how customer engagement impacts on customer involvement in the service development process. This research focuses on the interaction of customers through the gamification environment instead of the normal processes that organizations used in the past such as interviews or focus groups.

2.3 Intention to be Involved in New Service Development Process

Managerial intentions have a significant impact on all organizations. An individual's intention to perform a behavior is a critical precursor of the behavior of interest. According to Cohen, Berkman and Lieberman (2013), the term "intention" is usually associated with the term "goal". However, intention and goal *do* have different characteristics. The intention is a representation of planned action. In contrast, the goal is a reflection of the desired outcome of the actions. Cohen & Levesque (1990) referred to Kuhl (1985), with regard to the intention dimensions, on subject, relation, context, and object. These dimensions address the action and desired end state. The term "Intention" has been discussed a lot in terms of customer purchase behavior which is similar to product involvement (Michaelidou & Dibb, 2008; Choubtarash, Mahdieh, & Marnani, 2013; Butt, 2014). The intention is normally used as an indicator or forecaster of a customer actual behavior (Butt, 2014).

In new service development, customer involvement can split into the breadth and depth level (Carbonell et al, 2012). Breadth level refers to a wide range of activities or just one activity in a new service development process that involves the customer. In contrast, depth level refers to a phase of activity in which the customer is involved. Involvement can also be divided into three types (Foxall & Goldsmith, 1994; Michaelidou & Dibb, 2008; Choubtarash et al., 2013) as follows;

1. Situational Involvement

   Situational involvement focuses on the individuals' concern on the purchase of a product for the period of the situation. It represents a mental state of the customer without the cognitive state. Foxall and Goldsmith (1994) gave an example that the consumer may continue to purchase something until certain situation arises which, subsequently, causes the level of involvement to decrease as that situation has passed. However, at that time of involvement, the consumer may devote an unusual amount of resources such as thought, time, and money to purchase the right product for the situation.

2. Enduring Involvement

   This represents the individuals' attachment to a product when using a product reflects its consumer's lifestyle or self-concept. "*The reaction produced in consumers by-products may be called 'commitment' to the product because purchase or use (avoidance) of the product expresses closely held values (Foxall & Goldsmith, 1994,p. 86)".*

3. Respond Involvement

Respond involvement combines both the situational and enduring aspects. *"It refers to a behavioral orientation which involves information acquisition and decision processes (Michaelidou & Dibb, 2008, p.10)". This type of* involvement is more complex than the previous type since "*it is marked by complex information search, information processing, and decision evaluation (Foxall & Goldsmith, 1994, p. 86)".*

In this research, intention to be involved in service development process reflected the degree of customer intention to be involved and participated in the new service development process. The level of intention to be involved will be measured in this research. The measurement tool was adapted from Rizwan, Qadeer, and Javed (2014). The focus of Rizwan et al. (2014) is about consumers purchases' intention. Rizwan conducted the questionnaire by divided the questions into seven categories, which are; consumer's purchase intention, brand satisfaction, product knowledge, brand trust, brand attachment, the price of the brand/product (low price) and past experience of the consumer toward the brand. However, in this research, the level of satisfaction and the attachment of customer toward brand will be identified in terms of customer engagement's level section. According to this, the adaptation of measurement tool from Rizwan et al. (2014) in this research will be focused only on the level of intention to be involved in NSD process of customer instead of purchasing activity.

2.4 New Service Development

Innovations are crucial for preserving the continuity and maintaining the industry of organizations. Innovations support economic growth, competitiveness,

regeneration, and prosperity of organization (Toivonen & Tuominen, 2009). As an impact of service to economic growth can become a significant challenge for the organization, according to this, the organization cannot omit the topic of new service from the development plan.

As previously mentioned, service sectors are important parts of the total economic activity and employment (De Jong, Bruins, Dolfsma, & Meijaard, 2003) and also generate more than two-thirds of gross domestic product (GDP) globally (OECD). This affirms the importance of service in today's time as a great share of innovative efforts in business is associated with the development of new services. However, service innovations seem to be overlooked, compared to product innovations. Smith (2010) gave a comprehensive and interesting reason that the public has always been concerned about the novelty value of product innovations and inventions. Service innovations does not end up with a remarkable and eye-catching end-products resulted from product innovations.

Services are dissimilar to products that can contribute an eye-catching or tangble moment. Still, in terms of profitability, services tend to be more profitable and also prevent the boundary between tangible and intangible products from becoming blurred (Stamm, 2003). Nonetheless, the development of new services requires a more comprehensive and complicated development process if compared to a development of new products, thus making them different. This section explains a new service development together with its process and customer involvement.

2.4.1 The Characteristics of a Service

A service is an intangible product in which its characteristics are identified in various literatures. The summary is listed below (Table 2.4).

According to the Table 2.4, the customers will assess services after the purchase is made. This is different from a tangible product in that customers can try or test it before purchasing. Service is also produced and consumed simultaneously, and its quality is hard to control. There is a high chance of customer error. Moreover, service does not require complex technology or R&D to produce, unlike a tangible product. Therefore, it is easy to imitate. The service patent and license are overlooked. Tether (2003) summarized the propositions on service innovations as being aligned with the characteristics of service. The significance of service innovations is hard to be separated from product, process, and organizational innovation. Service innovations are more focused on qualitative and intangible effects, which are related to knowledge and development of collaboration.

Table 2.4: List of characteristics of a service

Author	**Service Characteristics**
De Jong et al., 2003 (p.845)	1. Intangible 2. Heterogeneous 3. Simultaneously produced and consumed 4. Perishable
Stamm, 2003 (p. 361 - 365)	1. Consequesnces of the intangibility of services 2. 'Manufacture' and delivery happen simultaneously 3. Difficult to protect 4. Easy to innovate
Shekar, 2007 (p.3)	1. Intangibility 2. Inseparability 3. Variability 4. Perishability

2.4.2 The Difference between New Service Development (NSD) and New Product Development (NPD)

Before examining the difference between NSD and NPD, the difference between NSD and service innovation must be identified, as NSD and service

innovation are used interchangeably in various literatures. However, there are differences between the two. Understanding the difference between NSD and service innovation will help to scope the process for service development in this research.

2.4.2.1 New service development (NSD) and service innovation

Innovation is a buzzword used in various fields but there is still a confusion on its application to new product/service development. Merriam-Webster's Dictionary defines innovation as "a new idea, method, or device". The OECD (Organization for Economic Cooperation and Development) defines innovation as "the implementation of a new or significantly improved product (goods or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (2005, p.46)". Emphasizing more on the definition, innovation includes the development and implementation of "something new". However, an innovation does not always mean developing something new. Innovation is more than coming up with new ideas or novelty. It is something that is beneficial such as profits or personal growth. Hence, service innovation can be identified as a new service or regeneration of an existing service that creates and develops service novelty which benefits the organization (Jong & Vermeulen, 2003; Sillanpää & Junnonen, 2012).

2.4.2.2 Differences between NSD and NPD

As mentioned previously in the characteristics of services part, the difference between NSD and NPD is mainly related to the characteristics of products and services. Many literatures believe that the process to develop new services/products are almost identical. However, product development process is slightly different from its service counterpart. Currently, product and service are

inseparable. For example, car retailers do not only sell cars which are tangible products. The after sales service is another factor for the customer to consider. However, technology embedded into the service does not have as much impact as the one embedded in the product. Thus, the novelty value of services is rarely measured from the technological perspective (Sillanpää & Junnonen, 2012) unlike tangible product. The technology tends to be the turning point for new product competition.

Johne and Storey (1998) explained the three main differences between NSD and NPD, by concentrating on the supply and buying perspectives. The three differences are;

1. Intangibility

Service characteristics are intangible; they can easily be adapted or modified. Service focuses on process more than products. The process time is more rapid than product development. Also, a number of resources involved in the process is often less than product development which needs more input and different resource expertises for each process.

Service is not a tangible product and, therefore, its testing process is not simple. As mentioned previously, service is produced and consumed simultaneously, thus, failures or errors might be detected by the customers. Another weakness is that the service development can be easily imitated by competitors, and it is difficult to prevent this since service developments are not patentable.

2. Heterogeneity

Quality is a significant variable for service. Customers experience service from staff that delivers services to them. As a result, the cycle of service development is shorter than product development. Service can be launched without

being close to a complete perfection. The short cycle time always equals short testing stages (Ettlie & Rosenthal, 2011; Zomerdijk & Voss, 2010). Service standards are difficult to control and, thus, consumers' experience can be varied. Therefore, to prevent bad customer experiences, a standardization of procedures should be considered. Technology can be a useful tool to support this.

3. Simultaneity

Customer needs for services are more varied if compared to the needs for products. Unlike products, services cannot be stocked or planned to maintain and develop as tangible items. To meet customer needs, producers are required to consider time for the development of new products. This must be as promptly as possible in order to meet customer needs while maintaining standards. Hence, planning is critical and significant, since services are produced and delivered simultaneously.

2.4.3 New Service Development Process

Many different models of the innovation process are discussed in the literatures, both on closed and open innovation. Sprujit (2016) listed seventy-one innovation methodologies. There are some similar processes and also different and unique methods. Some are linear processes while some are not. However, they mostly are generic or containing a sense of it. This research focused on potential and process in service innovation that influenced potential or possibility of customer involvement. Each stage of the innovation process is different, and it is critical to understand what it takes to integrate customers into the different phases of the innovation process.

2.4.3.1 Generic process (sequential development models)

The most relevant process model for new product development is the stage-gate model. This is characterized by dividing the process into various stages of

development tasks. Each stage consists of separations called gates. Gates are the moments for decision making. The most well-known stage-gate model composes of six stages and five gates (Figure 2.4).

At each stage, the project team needs information and gathers data for analysis. Then, each stage gate requires a Go/Kill decision. If the decision is not dropped from the gate, then the company will continue to invest in the project (Cooper, 2008).

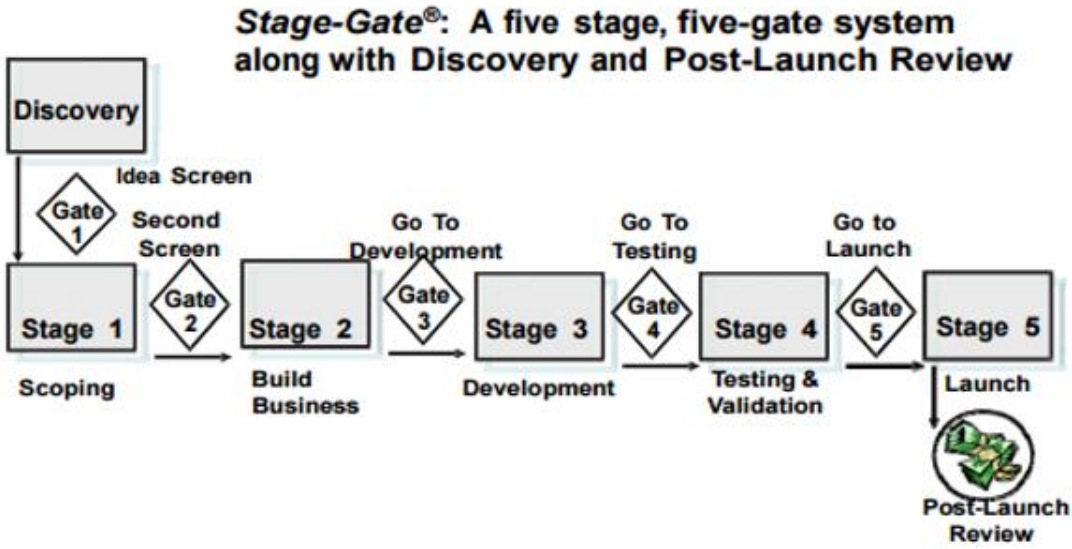


Figure 2.4: Stage Gate Model by Cooper (2008)

Guimarães, Romero and Medeiros (2014) mentions a research by O'Connor (1994) concerning whether organizations misunderstood the concept of stage-gate and applied it without any flexibility, such as a waste of time for managers in gates that does not need to be carried out; delays in project execution due to unnecessary activities or waiting for gates postponed due to the lack of agenda from members of the evaluation commission; projects being conducted outside the system

of stage-gate and elimination of the innovative nature of the project portfolio of the company.

Each stage of the stage-gate model is relevant to other research. Some tasks are deleted, and some are added. Schulteß, Wegener, Neus and Satzger (2010) summarizes relevant tasks that are the main activities for the generic innovation process.

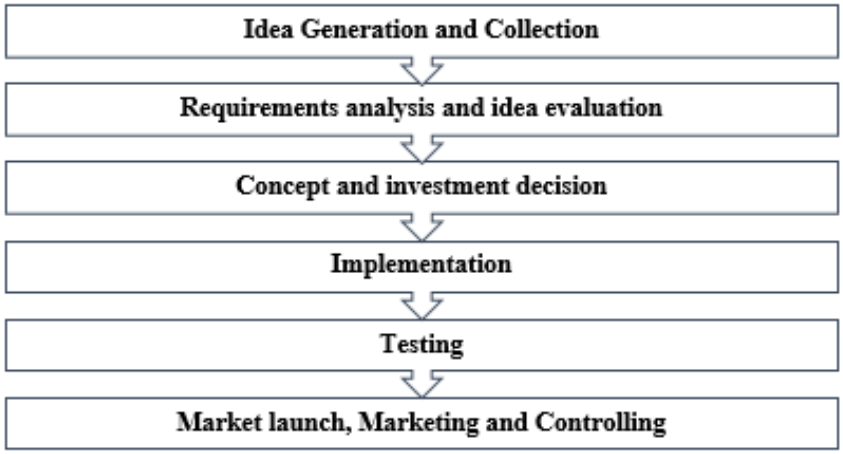


Figure 2.5: Generic innovation process by Schulteß, Wegener, Neus & Satzger (2010)

The generic process has one important limitation; it is time consuming. The process needs to advance step by step and this makes the process launch can be occured. The literature in the service development process area considered this limitation. Service development requires a shorter time than product development, therefore each stage can be overlapped (Alam, 2007). The next section presents a model of new service development process from various literatures.

2.4.3.2 New service development process model

Most service development processes are similar and considered as "generic process". In contrast, product development time varies and focuses on

different types of products. As mentioned earlier, service is an intangible product and there are small details in activities comparing the process of product and service innovation. New service development models are based on the new product development framework (Stevens, 2005). This section presents the diversity of each well-known model.

Shekar (2007) presented the difference between new product and new service development by dividing the development into two main stages and ten sub-stages. This was similar to other researchers who divided development into exploration, idea generation, selection/execution, and commercialization phases (Breuer, Wogatzky, & Steinhoff, 2011). The difference between new product and service developments, according to Shekar (2007), is that for the new product development, the interaction of the organization staff and the customer is not so important compared to new service development. The customers might be involved in new product development but in a limited group, which is different from the new service development process. For the new service development process, it is hard to limit the group of people who need to involve in the process as well as finding the standard approach to develop the service.

According to Shekar (2007), new service development process seems to be more people-oriented. Customer satisfaction and reaction are highly significant for this development. With more people-oriented in the service development process, changes can easily be made when compared with product development. Service development is more labor intensive and less investment intensive (De Jong et al., 2003).

In the service development process, the standard approaches are difficult to apply since the characteristics of service are more complicated than a product. With this complication and difficulty to apply standard process, the service development process is less formal (Kelly & Storey, 2000) and it is difficult to identify the stages of a stage-gate.

Since there are various approaches to the description of new service development process, the next section explains the background of service development process and also defines the differences between each model.

The tasks for new service development and new product development are somewhat similar in terms of sequence and scope (Booz, 1982.; Bower, 1989). The activities in the process are similar to new product development process. Booz (1982) presented the seven sequential steps approach for the new product development process. Since service has unique characteristics that differ from tangible products, the NPD process is insufficient. However, the NPD process is systematic and formalized, therefore various studies have used it as a foundation for NSD models (Lin & Hsieh, 2011).

In 1989, Scheuing & Johnson presented a model with fifteen stages of the service process. The model began with a formulation of new service objectives and strategy, followed by idea generation until its launch in the market. The overall aim of the whole process was to break down the stages into more detail than previous models. The specific and new stage that really presented the unique value of service development process over product development process was personnel training. Since service is people-oriented, personnel training as a new highlight stage represented the difference between the product and service process.

In 2000, Johnson, Menor, Roth, and Chase presented the nonlinearity of the NSD process through a continuous cycle model. The four main stages were design, analysis, development, and full launch. Each stage had thirteen detailed tasks to produce and launch a new service (Table 2.5). The process also had important support factors as teams, tools, and organizational context (Johnson et al., 2000)

Alam and Perry (2002) proposed a new process model with ten stages (Table 2.5). This was a simplified model with three improvements which were;

1. The bureaucracy was reduced by combining the development phase,

2. Formation of cross-functional team was added to the process, and

3. Some of the stages could be performed in parallel to make the development faster. The process also had stage gate consistent with Cooper & Kleinschmidt (1993), where the gates worked as quality control. Each gate had a check point which required certain criteria to be met before the project was allowed to proceed to the next stage (Lin & Hsieh, 2011).

In addition, Alam & Perry (2002) explained a stage that worked in parallel by dividing three pairs from ten stages as strategic planning with idea generation, idea screening, and business analysis. The last pair was personal training and service testing and pilot run. However, the rest of the stages needed to work as stand-alone processes.

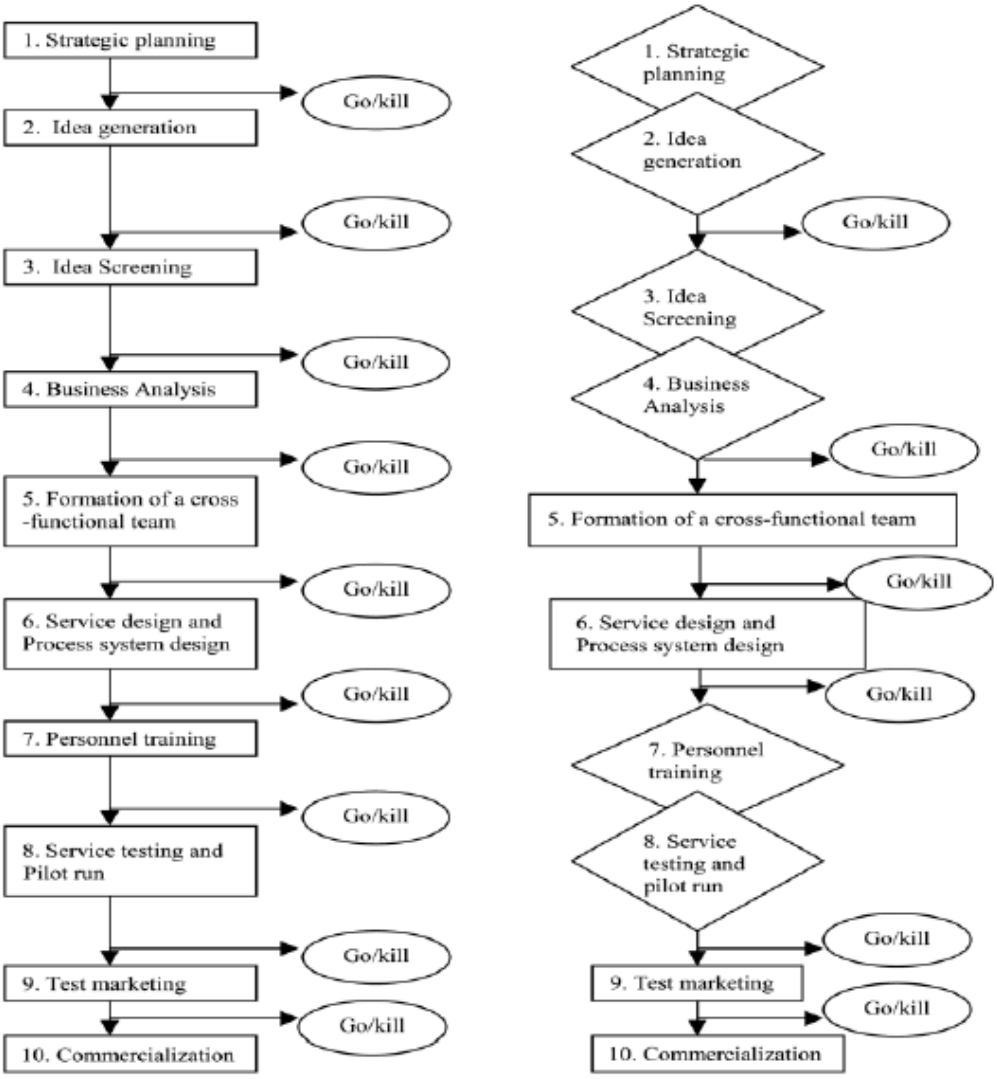


Figure 2.6: New service development process that can work parallel by Alam & Perry (2002)

Table 2.5: Stages and Activities in new service development process

Representative study	Stages and activities in the process
Booz et al., 1982	1. New product strategy 2. Idea generation 3. Screening and evaluation 4. Business analysis 5. Development 6. Testing 7. Commercialization
Bowers, 2009	1. Business strategy 2. New service strategy 3. Idea generation 4. Concept of development, screening and evaluation 5. Business analysis 6. Service development 7. Market testing and commercialization
Scheuing and Johnson, 1989	1. Formulation of new service objectives and strategy 2. Idea generation 3. Idea screening 4. Concept development 5. Concept testing 6. Business analysis 7. Project authorization 8. Service design and testing 9. Process and system design and testing 10. Marketing and program design and testing 11. Personnel training 12. Service testing and pilot run 13. Test marketing 14. Full-scale launch 15. Post launch

Table 2.5 (Continued): Stages and Activities in new service development process

Representative study	**Stages and activities in the process**
Johnson, 2000	1. Design • Formulation of new services objectives strategy • Idea generation and screening • Concept development and testing 2. Analysis • Business analysis • Project authorization 3. Development • Service design and testing • Process, system design and testing • Personnel training • Service testing and pilot run • Test marketing 4. Full launch • Full scale launch 5. Post launch review
Alam and Perry, 2002	1. Strategic planning 2. Idea generation 3. Idea screening 4. Business analysis 5. Formation of cross function team 6. Service design and process system design 7. Personnel training 8. Service testing and pilot run 9. Test marketing and commericalization

The model by Alam & Perry (2002) was the most simplified and worked in parallel, therefore, Alam & Perry's new service development process was used for this study.

As stated above, service development process is a people-oriented model. At each stage, people are a significant resource that can lead to process success. For service development process, the customer can be involved in all stages. This is different from product development process where there are limitations of customer involvement, for example in product implementation tasks. To understand more about customer involvement process, the next section explains the benefits and how the customer can be involved.

2.4.4 Successful Factor for New Service Development

According to the literature, the success of new service development arises from both internal and external factors of the firm. The most relevant and successful factors for new service development are;

2.4.4.1 Strategic factors

A clear direction of a firm on new service development is a significant factor. The ability to respond to competitor actions by allocating employee resources (Ojanen, V., Lanne, M., Reunanen, M., Kortelainen, H. & Kässi, T., 2008) is a factor that firms should not overlook.

2.4.4.2 Organizational factors (cultural issues, inspiring environment etc.)

The organization is also an important factor that has an effect on the success of new service development. The culture of the organization, especially in terms of communication and structure, is crucial to the success of new service

development. The high-level positions such as top managers can create a major impact on new service development, and their support and focus on new service development, together with staff capability, will enable a good environment for service development process.

2.4.4.3 Technological factors

Technological systems help firms by reducing development time and creating more efficient communication between internal resources and customers. By increasing development speed, using high technology, firms can establish a solid position in the market.

2.4.4.4 Market factors

With the fast-changing trends in the markets, each firm must be alert. The flexibility of firms to adapt to changes will promote competition.

2.4.4.5 Network-related factors

The focus of networking is not exclusively between the firm and partner; the relationship between the firm and the customers is also as important. A good relationship can help firms to encourage partner and customer commitment and their trust towards the provided services.

A sole factor could not contribute to the success of new service development. As a matter of fact, organizations should consider each and every factor in order to create a strong impact. Organizations should also be transparent to allow an influx of information or knowledge from external sources; especially from the customers. Customers are those who receive direct/indirect services from the organization. As previously stated, service can be volatile which prompts the organizations to be alert and prepared for unexpected changes. A measuring system for service performance is

also an important tool that can help organizations to monitor the performance of each service product.

2.4.5 New Service Performance

As stated previously, service sector has contributed a major part of the total economic activity. The competition in the service sector is focused on ever-changing situations. The changes can be associated with price, quality, innovation, and flexibility to deliver or respond to customer needs (Sapri, M., Kaka, A., & Alias, B., 2005). Measuring the success of a new service performance launched to the market is a significant process that organizations cannot ignore. The most relevant performance measurement system is the measurement on financial performance. Financial performance measurement is the most standard method used to measure new service performance. According to Sapri et al. (2005), financial performance measurement for services was introduced in 1903 but, in the 1990s, a measurement on quality of services, focusing on consumer satisfaction, was predominant. Bastic & Nekrep (2009, p. 69) stated that there are two different performance measurements for new service performance; the financial and non-financial. The difference between the two is explained in Table 2.6.

Table 2.6: Financial and non-financial performance measurements for new service performance

Financial Perfornance Measurement	Non-Financial Performance Measurement
• Short to mid-term performance • Assessing level of sales, profits and market share	• Mid to long-term performance • Assessing image enhancement, customer acquision and competitive advantage development

According to Table 2.6, the financial performance measurement is used to evaluate short to mid-term performance which focuses on the level of sales, profits, and market share. In contrast, the non-financial performance measurement is used to evaluate long-term performance which focuses on image enhancement, customer acquisition, and competitive advantage development.

Sapri et al. (2005) also suggested five significant keys with indicators to measure business performance which can be adapted to measure service performance. The five significant keys included;

"1. Customer Satisfaction

1.1 Perceived value

1.2 Overall Satisfaction

1.3 Complaints

1.4 Gains and Losses of customer

1.5 Customer awards/recognition

2. Financial and Market

2.1 Financial

2.1.1 Return on equity

2.1.2 Return on investment

2.1.3 Operating profit

2.1.4 Earnings per share

2.2 Market

2.2.1 Market share

2.2.2 % new product sales

3. Human Resources
    3.1 Absenteeism
    3.2 Turnover
    3.3 Employee satisfaction
    3.4 Training effectiveness
    3.5 Grievances
    3.6 Suggestion rates
4. Suppliers
    4.1 Quality
    4.2 Delivery
    4.3 Price
    4.4 Cost
5. Company Specific
    5.1 Defects and errors
    5.2 Productivity
    5.3 Cycle time
    5.4 Regulatory/Legal compliance
    5.5 New product introduction
    5.6 Community services
    5.7 Safety
    5.8 Environment (Sapri et al., 2005)”

The success of new service performance is stemmed from both financial and non-financial factors and, thus, every organization should pay attention to both factors to ensure sustainable development. While profit and market share are significant for

organizations, however, to maintain customer loyalty and satisfaction with the provided services is also significant. Moreover, organizational management during the launch or development of new service is also important. Therefore, this research will be focusing on customer involvement in the new service development process due to its undeniable importance. This research believed that, with customer involvement, the new service performance could contribute to stronger competitiveness in the market.

2.4.6 Customer and New Service Development Process

Involvement in the service development process should not limited only for the research and development department or those that work for service development project themselves. Conversely, embracing the idea and knowledge from different individuals and methodologies will consequently enhance the development process. Taking this idea into account, one of the important keys for service development is customers. Customers are individuals who interact with the provided service directly and, if involved in the process, their experience on provided service will be beneficial to the new service development process.

2.4.6.1 Person who involve in new service development

According to Johne and Storey (1998), there are three groups of people which are significant for new service development namely; the development staffs, the customer-contact staffs, and the customers themselves. Each play different roles but, still, input information from customers is always needed since they interact with the provided service and can identify the quality of the product. To further discuss the development, however, other researchers have introduced more groups that are worth noting. Gottfridsson (2009) presented eight groups of actors related to the service

development process. The eight were *"the Strategic Creators, the Competing Actors, the Deciding Actors, the Supporting Actors, the Prime Movers, the Suppliers, the Service Performers, and the Users (Gottifridsson, 2009. p. 1)".* Gottfridsson grouped users as the internal key function, since they played two roles; the user and co-producer. They received information from the service provider and they also provided the feedback.

The impact and benefit of customer involvement and customer interaction on innovation process have been discussed by many researchers, especially in the service sector. Each study mentioned a similar or different point of view on how customers are involved in each innovation process. Since one significant characteristic of service is the inseparability of product and consumption, customer involvement can affect the development process. However, customer involvement seems to be limited to only providing feedback to a company after they receive the final products or services. Various studies have stated that customer involvement in the process has a significant impact in terms an innovation frequency and increased opportunities of market success (Parthasarthy & Hammond, 2002; Jacob, 2006) which would assist an enterprise to properly respond to the market and customer requirements. Late customer involvement in the innovation process might lead to the failure of many well-established enterprises as they are potentially prone to entering a given market too late (Arnold, Erner, Mockel, & Schlaffer, 2010).

Customers are also significant in terms of information for the service development process as they are aware of their needs which, in turn, implies the organizations to improve their acitivities/tasks to better satisfy the customers. Thus, feedback from the customers is an important information that helps organizations to

drive their service and improve their product. Service companies should involve their customers as co-innovators (Alam, 2002; Edvardsson & Olsson, 2006; Möller, Rajala, & Westerlund, 2008; Chesbrough, 2011) in order to develop superior and differentiated new services, reduce development cycle time, costs, and uncertainty, improve producer-user relationships, and obtain higher values and profits. As mentioned previously, a faster NSD process is significant for organizations. The customer involvement in the process can create rapid NSD process and also reduce the number of parallel processing stages. The given customers infomation can reduce the time for researchers to solve or indentify real issues.

Desouza, Awazu, Jha, Dombrowski, Papagari, Baloh & Kim J (2008) stated that the critical part of innovation is knowledge transfer which requires high-level human interaction and high-quality communication. Desouza categorized the different ways that customers can take part in innovation into three categories; the customer-driven innovation, the customer centered innovation, and the customer focused innovation. In this regard, this research focused on customer-driven innovation which is different from the other two. This is because the role of customer centered innovation is to become a communicator, and for customer focused innovation, the customer takes an innovator role. In contrast, for customer-driven innovation, customer role is dynamic. The interaction between customers and organization is required. However, Desouza also stated that customer-driven innovation is impossible to be controlled. This research believed that gamification will be an important key to develop and create more advanced interaction and communication between the organization and the customer. Also, the researcher

believed that the limitations on the transfer of tacit knowledge from customer to organization might be reduced by gamification.

2.4.6.2 Customer in each stage of the new service development Process

For the service development process, the customers are involved in every stage as presented by Alam & Perry (2002). Researchers explained the customer involvement in new service development process in each stage (Table 2.7).

Table 2.7: Customer role in new service development process by Alam & Perry (2002).

New Service Development Stages	**Activities that Customer can be Involved**
Strategic Planning	Customer can generate feedback data.
Idea Generation	Customer can state their needs, problems, and solutions as same as criticize existing service and provide a requirement and criteria.
Idea Screening	Customer can suggest on sales guide, market size and also can show reaction to the concept. This is included that customer can help on go/kill decision.
Business Analysis	Organization can reach to more financial data, profitability of the concept and competitors' data from customer
Formalization of Cross Function Team	Customer can help top management team select their team member.
Service Design and Process System Design	Customer can help in review the design and suggest their opinion for improvement
Personal Training	Customer can involve and suggest their feedback in mock service delivery process and observe the service product.
Service Testing and Pilot Run	Organization can invite customer to participate in simulated service deliver process. So, customer can give their suggestion on the improvement and design change.
Test Marketing	Customer can help on suggest and comment on marketing plan before organization launch the service.

Table 2.7 (Continued): Customer role in new service development process by Alam & Perry (2002).

New Service Development Stages	Activities that Customer can be Involved
Commercialization	Customer can give their feedback to organization about the service's performance as same as spread word of mouth communication to new potential customer.

With customer involvement in each step, the organization can identify the exact service product that customers truely need. Likewise, if customer dissatisfaction is detected in any stage, the organization can develop and improve their service in time before any occurrence of critical error. However, as mentioned above, the communication between organization and customer should be developed and this research believed that gamification can be a significant tool to solve this problem.

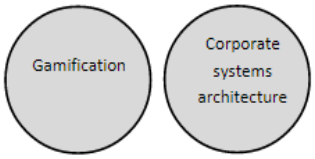
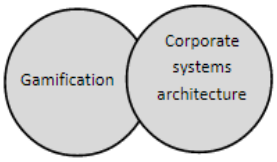
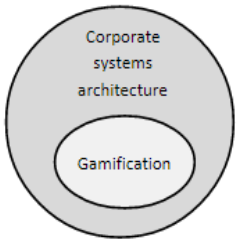
2.5 Gamification

The term "gamification" is usually defined *"as the use of gameplay mechanics for non-game applications"* (Deterding, Khaled, Nacke, & Dixon, 2011; Grove, 2011), with the intent of injecting fun, play, and passion into tasks and processes (Tambo, Andreasen, & Ullerup, 2014). Gamification's main objective is to increase users' engagement by applying game-like techniques (Flatla et al., 2011) to encourage sense of ownership and purpose when engaging with tasks (Pavlus, 2010). However, gamification cannot turn routine activities into games, but it redesigns work processes by adopting game mechanisms for an enjoyable experience.

The significance of gamification is increasing as organizations seek new ways of strengthening their connection to both users of their products/services and their employees. Gamification and the use of game-based elements are becoming increasingly important and common; they are compatible with existing systems or possible to be applied to design the new ones. Tambo et al. (2014) presented a model of gamification integration in the organization. According to the literature, there are three models of gamification integration which are standalone, partly integrated, and fully integrated (Table 2.8). Each model has different advantages and disadvantages. The standalone model is the easiest and fastest to implement. However, it provides no alignment between gamification solutions and the corporate system. Therefore, we believe that the use of gamification should be partly or fully integrated with corporate architecture. According to this, one can possibly determine the advantage and relationship between gamification, customer engagement, and new service development process. Customer engagement and new service development are factors that already exist in organizations. Therefore, the standalone gamification model will not take part in this research.

Gamification is known as a new concept that applies game elements to improve the systems and users' engagement. Nonetheless, it is not limitedly used for customer engagement, but it is also used frequently for studying and employee engagement. It can appear both in online and offline versions. There is no limitation of gamification pattern. However, it is typically understood to be giving an individual player the opportunity to develop themselves through stages and earn various types of merits, either in singleplayer or in multiplayer contexts (Tambo et al., 2014).

Table 2.8: Mode of Gamification Integration by Tambo et al., 2014

Mode of integration	Standalone	Partly integrated	Fully integrated
			
Description	This mode is a completely freestanding gamification solution with no integration to any components in the corporate archicture	This mode is partly integrated with certain elements in the corporate architecture, and enables many of the promises of gamification.	The last mode is completely integrated into the corporate architecture, and affects business processes, existing applications.
Advantages	Easy, fast	Easy, low risk	Complex, risky
Disadvantages	No aligned	Silo-thinking	Substantial maintenance

In this research, we believed that gamification could be a significant tool to stimulate the relationship between customer engagement and new service development process. This is because, even if customers are loyal to a certain product, sometimes they cannot express their exact opinions on improving the organization, and their feedback is periodic and occasional. However, with gamification, customers can come up with their ideas to support the organizations and, in turn, the organizations are able to create an engaging environment which can maintain or increase customer loyalty. In this case, customer feedback is also significant, but, with the normal process, the customer might not be able to recognize their feedback impact on improving the product/service. In contrast, using gamification introduces game elements whereby customers can provide feedback to organizations in a new approach by focusing on interaction and sense of belonging. Organizations can provide incentives for customers to propose their ideas or feedbacks that pass their qualification. The benefit of this is not only to get quality ideas or feedbacks, but organizations can retain customers and increase their revenue.

To understand more about gamification, the next section explains the difference between gamification and other categories of game, as well as the differences between game and play, together with play and fun. A comprehension on each part will result in an ability to distinguish gamification from other types of games.

Table 2.9: Definition of Gamification

Scholar	Definition
Bakker and Demerouti, 2007	The nechanics of gaming to non-game activities to change people's behavior. When used in a business context, gamification is the process of integrating game dynamics (and new game mechanics) into a website, business service, online community, or marketing compaign in order to drive participation and engagement.
Deterding, 2011	The use of video game element in non-gaming systems to improve user experience (UX) and user engagement.
Zichermann and Christopher, 2011	The process of game-thinking and game mechanics to engage users and solve problems.
Huotari and Hamari, 2012	A process of enchancing a service with affordances for gameful experiences in order to support user's overall value creation.
Werbach and Hunter, 2014	Gamification is the process of making activities more game-like.

2.5.1 Difference between Play and Game

2.5.1.1 Play & Game

The definition of "play" and "game" is rather similar. However, even if they are similar, there are distintive to an exttent. According to Hinske, S., Lampe, M., Megerkurth, C., & Rocker, C. (2007), scholars have stated that 'play' is inherent to human beings. Playing can be seen as an expression of joy and recreation. Also, playing is significant for creating and improving psychomotor skills and functions. In

contrast, various scholars have similarly discussed the game by identifying the game as “a form of competitive activity or sport played according to rules” (Hinske et al., 2007, Balata, Mikovec, Slavik, & Macik, 2016). The obvious difference that scholars have identified between game and play is that game is a system or an activity that has a final measurable outcome with certain rules as an engagement mechanism. The movement of the game can be either individual or team (Salen & Zimmerman, 2003). According to this, the key elements in this description, and this definition, respectively, are:

1. Activity with rules and an outcome,
2. System,
3. Artificial conflict, and
4. Quantifiable outcome.

Moreover, games are often considered as a subset of play but the most specific factor that differentiates the two is a rule. Salen and Zimmermann (2003) mentioned that game is a closed system in which all the rules and framework are already set since the beginning and cannot be changed during the ongoing game.

2.5.1.2 Playing & Gaming and Whole & Part

Beyond the difference of game and play, Deterding et al. (2011) defines sub category of games and play with a different idea by categorizing them into 4 categories. Sebastian explained his idea by using 2 by 2 matrix to explain gamification and to explain each concept of the game and play to each partial. On one axis, it is the difference between whole and part and another axis presents the difference between game and play (Figure 2.7).

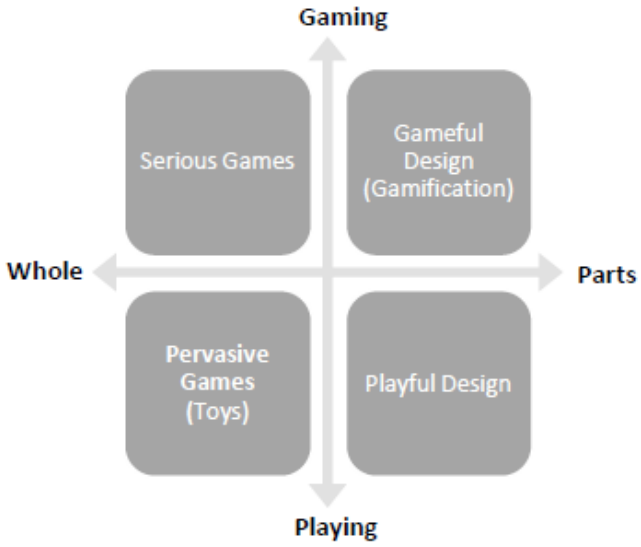


Figure 2.7: Gamification between gaming and playing, whole and parts

According to figure 2.7, gamification falls into the gaming and parts side, in accordance with the definition of gamification stated by Deterding et al. (2011) as it means “the use of game design elements in non-game contexts”. This can imply that gamification is about extracting the elements of games to make them entertaining and incorporate them into non-game situations.

2.5.2 The Concept of Gamification

The most relevant definition of gamification was given by Deterding et al. (2011) as it is “the use of game design elements in nongame contexts”. Sailer, Hense, Mandl, and Klevers (2013) suggested that gamification was always used for achieving goals but was limited by feedback systems which provided information about creating progress through target setting. Also, participation was voluntary. For gamification, elements in the game were applied in a non-gaming context and for non-entertainment purposes. Since gamification was not limited to online platforms or technology based, so, gamification design can be referred to the use of game design instead of game-

based technologies that was applied in non-game-contexts. Still, technology or any IT infrastructure support can still help to reduce the challenge from its practice in terms of data collection to process the result. There is no restriction that gamification cannot work in offline platforms. IT support just helps to speed up the process.

As mentioned earlier, there might be a misperception that gamification can only be implemented on an online platform, which is not the case. Also, the gamification concept is often misunderstood as a sole implementation of "Points, Badges, and Leaderboard based system" (PBLs). In fact, the sole implementation of PBLs to the activities will not change the participants behavior, which is contradictory to the significant objective of the gamification. In addition, PBLs can sometimes create unhealthy environments. There are more elements, other than the PBLs, that need to be carefully considered when designing gamification. Other gamification elements are explained in the next section.

2.5.3 Elements of Gamification

This section explains and identifies the elements of games that are used in gamification. The most relevant elements are mechanic and dynamic. However, in this study, the aesthetic was also included. This study believed that the players' feelings and emotions also had a significant impact on the success of gamification in accordance with the MDA (mechanic, dynamic, and aesthetic) framework (Hunicke, LeBlanc & Zubek, 2004). "The MDA framework is a formal approach to understanding games which attempts to bridge the gap between game design and development, game criticism, and technical game research (Hunicke et al., 2004)". The details are as follows;

1. Game Mechanics are defined as control mechanisms or a construct of rules and techniques provided for players in gaming context. Game mechanics are also particular components of games in data representation and algorithms levels.

2. Game Dynamics are elements that create aesthetic experiences. Game dynamics define the run-time behaviors of the mechanic elements that occur by player inputs or outputs during the game.

3. Aesthetics describes as "the desirable emotional responses evoked by the player when interacting with the game system" (Hunicke et al., 2004). In this regard, the objective of game mechanics and game dynamics is to ensure a maximization game aesthetics.

However, the original idea of MDA framework was purposefully used for game design. Werbach & Hunter (2012) proposed a new element of gamification design model, which composes of the three assigned layers namely the "mechanics", "dynamics" and "components" layers. In comparison to previous models, the proposed model does not discuss the aesthetic components but rather the components layer instead. According to the literature, components are described as tools and approaches that can be utilized. Of the three layers, which are stacked into a triangular shape, the top layer is the dynamic layer, supported by the mechanics and components layers, respectively (Figure 2.8). Details of each layer are as follows;

1. The Dynamics Layer

This layer is defined as the most abstract layer within this gamification system. The dynamics which are examined include constraints, emotions, narratives, progressions, and relationships. These dynamics help to build a system, but they never directly enter into the game. The layer is a result of interaction and behavior of the

participants who are motivated by the components and mechanics layers of this gamification model. The outcomes of this layer are related to behaviors, interactions, and intentions of the participants.

2. The Mechanics Layer

This layer is defined as the basic process "which drive the action forward" (Werbach & Hunter, 2012, p.79). The mechanics layer is the part that is contributed to the players engagement. Werbach and Hunter (2012) discussed various important elements that belong to this layer which include feedbacks, rewards, cooperations, turns, chances, and senses of competition and challenge. The layer is considered to be relatively more abstract than the components layer. Game mechanics are guidelines that dictate gameplay. The outcomes are possible participants' reactions that can be detected during each stage of the game as well as the drivers that influence their behavior.

3. The Components Layer

This is the concrete layer and the most specific in detail. It is an actual element of the implemented gamification system, designed to achieve the defined objectives. The most useful elements of the components layer are "achievements, avatars, badges, collections, content unlocking, levels, points, quests, social graph, teams and virtual goods" (Werbach & Hunter, 2012, p. 80). Werbach and Hunter listed fifteen elements that engaged user interaction.

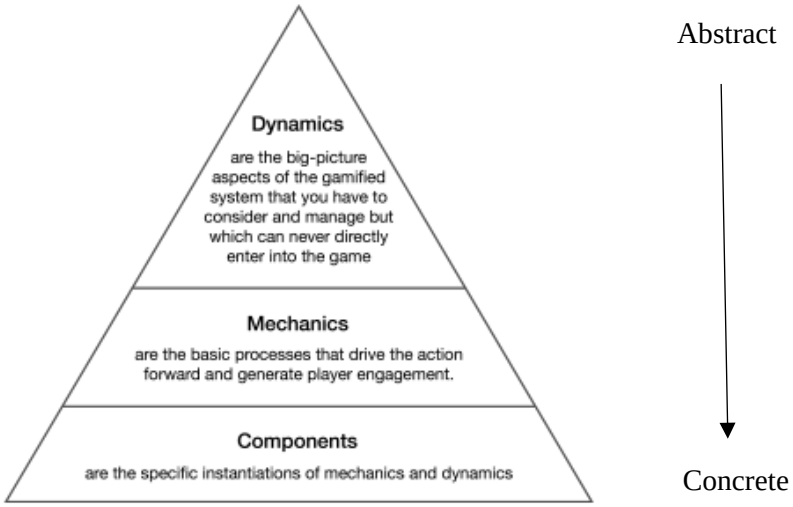


Figure 2.8: The game element hierarchy by Werbach & Hunter (2012)

In 2015, Wood & Reiners developed a new model following Werbach & Hunter (2012) (Figure 2.9). The authors proposed that game elements consist of components, mechanics, dynamics, and intentions. Wood & Reiners's model is similar to the Werbach & Hunter's (2012) in that it discusses abstact and concrete elements of the gamification model and, more importantly, the components element is the most concrete in this model. However, Wood and Reiners added the intentions element into the model which, in turn, makes it more specific. Intentions element is described in a wider context but, in particular, it focuses on particular outcomes that the system designers aim to encourage and support with gamification (Wood & Reiners., 2015, p. 3042). According to this, designers should focus on objectives and targets even if they are relatively unclear during the first stage. If not, this might lead to taking a wrong design direction and the result might turn to be unexpected or even decrease the participants' performance. The erroneous direction which deviates from the objectives and target in gamification might negatively affect customer loyalty and

engagement. The intention element is, therefore, a very important element that gamification designers should prioritize to clarify.

Apart from the intention element that is differed from Werbach & Hunter (2012) and Wood & Reiners (2015) also explained the difference between components and mechanics elements. According to Wood, the mechanic element is more abstract than the components element. The concept of mechanics element is regarding defining the participants' potential actions. These include possible reactions of participants that occur during a certain ongoing event. There are factors that can influence user behavior in different game environments. On the other hand, components are the most concrete part. To select a component for the game environment, the designers need to consider the intention and purpose of the gamification along with the target group.

According to the abovementioned, all the elements of gamification help to distinguish and differentiate it from other models. It discusses various elements, and each one can hugely impact the organizations. However, a balance in the game is required. As stated previously, if the PBL environment is unhealthy in which a large gap between the top ranked players and the followers is apparent, then motivation will be lacking. The low ranked players will recede from the game environment. As previously mentioned, the design of the game is very important. The designer needs to carfully think about objective, target, behavioral outcome, and how the results support the objectives. The gamification will succeed if all the key elements are unified and proceeded altogether (Wood & Reiners., 2015).

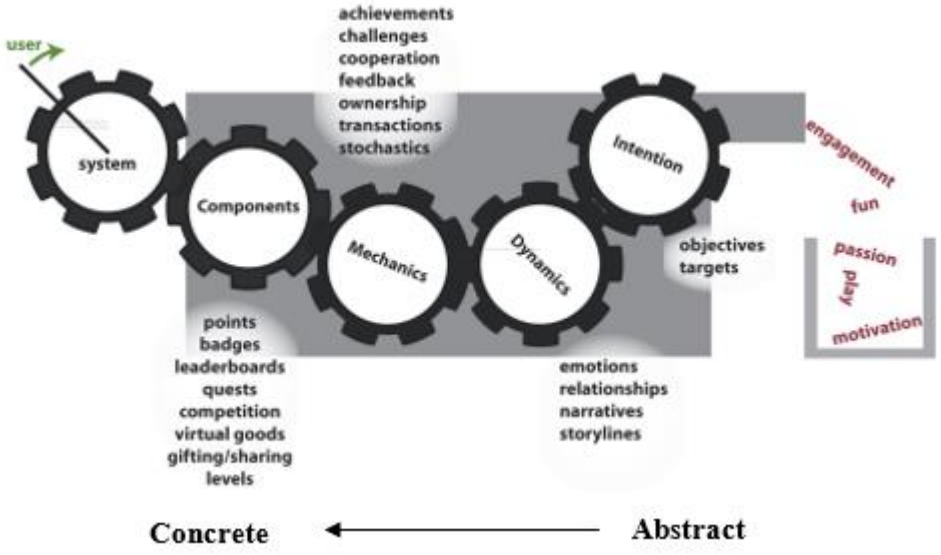


Figure 2.9: Element of gamification by Wood & Reiners (2015)

2.5.4 Gamification and Psychology

Psychological theory is usually mentioned in gamification studies as gamification can be applied to reap benefits from understanding individuals' behavior and their possible behavioral change(s). It helps game designers to find appropriate game elements for their game contexts. Moreover, the objective of gamification is to foster engagement and motivate concerned individuals. Hence, motivation has been extensively researched within gamification scope. This section explains and presents the motivation model that is mostly related to gamification.

2.5.4.1 Motivational theories and models

Many researchers have discussed the relationship between customer engagement, service innovation process and, new service development. However, there is a lack of explanation regarding the intrinsic customer engagement factors that could affect new service development. Therefore, this study attempted to find the

relationship between the effects of customer engagement sub-factors, namely cognitive, emotional, and behavioral factors, on new service development.

Other than the game element, several authors have opined that applications of points, badges, and leaderboard are not enough to create a balanced gamification, ideally for the participants. The three elements are merely feedback items (Cathie & Eric, 2013). Hence, game designers need to focus on the elements that can drive both intrinsic and extrinsic motivation, and encourge an engagement loop from participants. This study explored gamification by focusing on two sub-factors which are gamifying process and persuasive technique, attempting to find a relationship between persuasive technique in gamification and customer engagement and, at the same time, to find a relationship between customer engagement and service innovation when gamification is applied as a moderator.

The findings are expected to be helpful for organizations in order to increase the success rate of their innovation application. Moreover, such findings can become guidelines for organizations to improve their service innovation process and increase customer engagement through gamification.

Generally, there are two types of motivation that are the intrinsic and extrinsic (Deci & Ryan, 2000). Vassileva (2012) presented an approach that covered both intrinsic and extrinsic motivations using a spectrum. Vassileva also added social motivation into the center of the spectrum between intrinsic and extrinsic motivation as presented in Figure 2.10.

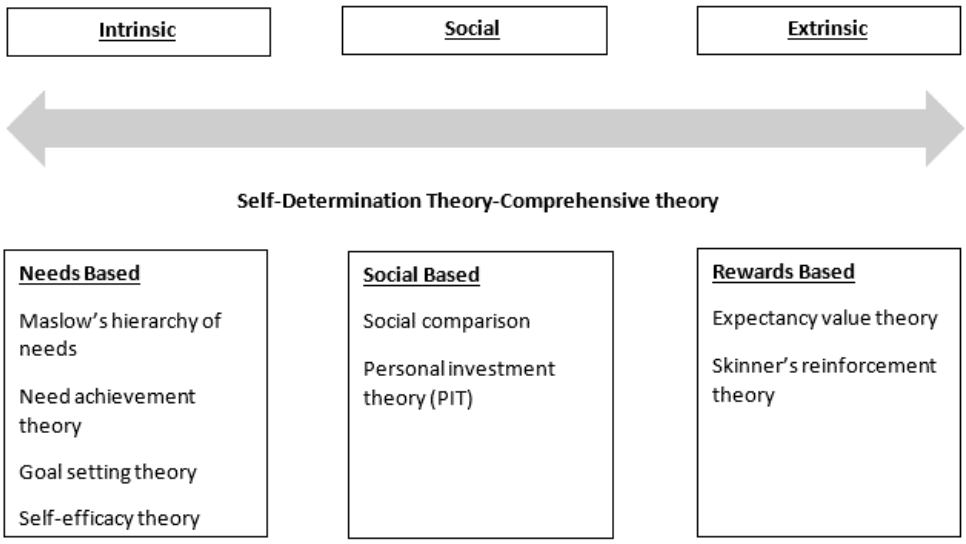


Figure 2.10: Model of motivation in games (based on Ryan&Deci, 2000 and Vassileva, 2012) from Richter, Raban, & Rafaeli, 2014, p. 24

The "needs based" part is considered intrinsic which is aligned with Maslow's hierarchy of needs that includes need achievement theory, goal setting theory, and self-efficacy theory. Each theory is explained as follows.

Hierarchies of Needs; This theory of motivation was developed by the psychologist Abraham Maslow. It discusses five levels of needs, vertically ranging from physiological needs, safety needs, belonging needs, esteem needs, and self-actualization (Lillienfeld, Lynn, Namy, & Woolf, 2009).

Need Achievement Theory; This theory is related to developing or demonstrating oneself as being more capable than the others in terms of superior ability (Atkinson & Litwin, 1960; Nicholls, 1984). In game design, this theory can be applied by setting up reward structures that lead smarter players to the goal and, simultaneously, encourage high potential players to aim beyond the goal in the competition stage (Richter et al., 2015).

Goal Setting Theory; Goal setting theory is a result of the achievement theory. However, this theory focuses more on a specific challenging goal. It is not a normal goal but rather a long-term goal for the players to achieve thereafter (Richter et al., 2015).

Self-efficacy; This refers to perceived performance ability from a particular activity. The final results of self-efficacy are decided by four types of experience including performance attainment, the secondhand experience from observing the others' performance, verbal persuasion, and social influences (Bandura, 1982). Self-efficacy levels can either improve or obstruct motivation. Regularly, high self-efficacy individuals opt to perform more challenging tasks (Richter et al., 2015).

With regard to the social based part, Social Comparison Theory and Personal Investment Theory are discussed as follows;

The Social Comparison Theory: "Social comparison states that people seek to evaluate their beliefs, attitudes, and abilities by comparing their reaction with others (Richter et al., p. 29)". This is found in certain elements of games, for example, the players ranking.

Personal Investment Theory (PIT): "PIT denotes the level to which a person will invest personal resources, effort, and time for an activity depending on personal incentives, beliefs regarding oneself, and comprehended alternatives (Richter et al., 2015.p. 29)". This theory reflects the incentives that games can offer, since each individual has a different perception and reaction degree towards divergent incentives.

Regarding external motivation, Vasssileva (2012) mentioned that rewards-based theories are key factors that impact extrinsic motivations. Three motivation theories are discussed in this category which are;

Expectancy Value Theory (EVT); “this theory is related to the strength of motivation to strive for a certain goal, to the expectations to attain the desired goal, and to the incentive value of that particular goal (Richter et al., p. 30)”.

Skinner’s Principle of Partial Reinforcement; “this theory explains that behavior is the product of reinforcements. Different behaviors depend on the schedule of reinforcement, that is, the pattern of delivering it (Richter et al., p. 31)”.

Vassileva (2012) suggested that previous motivation models followed the self-determination theory which was considered comprehensive. The self-determination theory contains a continuum of self-determination, ranging from intrinsic motivation and extrinsic motivation to amotivation (Ryan & Deci, 2000; Gillison, Standage, & Skevington, 2006). Amotivation, in this circumstance, is a state where a sense of purposes and intentions is lacking. Ryan stated that amotivation is resulted from devaluing a certain activity and experiencing a sense of self-incapability (Ryan & Deci, 2000). Another different aspect of a motivation is intrinsic motivation. This motivation internally originates from each individual. It can occur when challenges are overcome, and a sense of belonging, pride, or enjoyment is felt. The central type of motivation is the extrinsic motivation. This can be seperated into four sub-groups as external regulation (occurs from external influence such as being told to act), introjected regulation (occurs when individuals take and adopt external motivators), identified regulation (occurs when a certain benefit of performing an action is perceived), and integrated regulation (occurs when identified regulations have been fully assimilated to oneself) (Ryan & Deci, 2000).

The self-determination theory helps to understand what and how human behavior is initiated and regulated by discussing social and environmental conditions

that could affect personal decisions and engagement in activities (Gears & Braun, 2013). This theory can be applied to gamification element design, since its goal is to change ones' behavior and encourage engagement. Understanding and applying this motivation theory will help game designers to frame and create game elements that can foster the intrinsic and extrinsic motivation of the players.

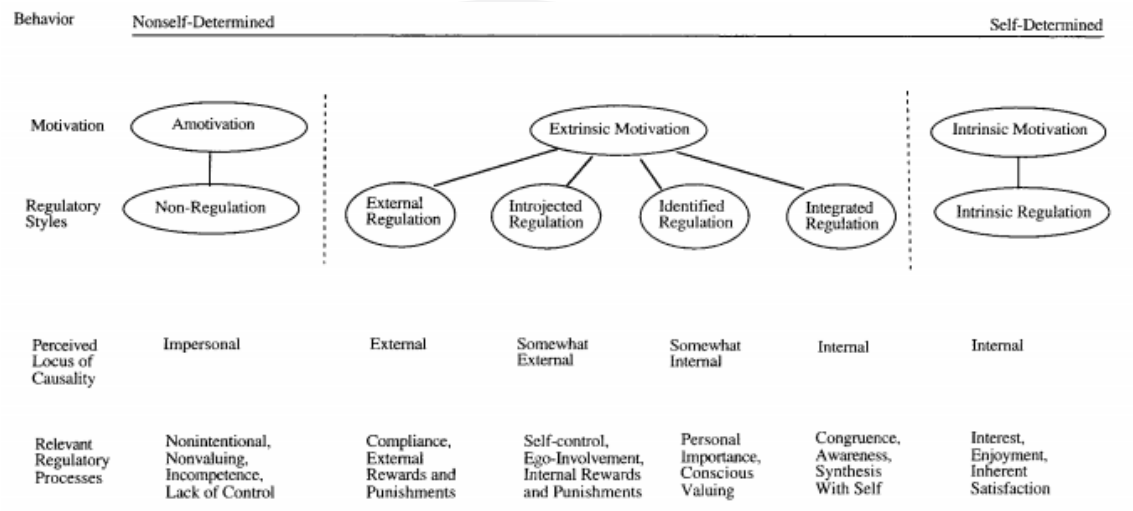


Figure 2.11: The Self-Determination Continuum Showing Types of Motivation With Their Regulatory, Loci of Causality and Corresponding process. (Ryan & Deci, 2000 p. 72)

In accordance with the motivation model, game designers can consider the types of players and select the game elements that best fit for each type or context. The type of player is explained in the next section.

2.5.5 Octalysis Framework

This framework is created by Yu-Kai Chou (2015), an author and international keynote speaker on Gamification and Behavioral Design. This framework is included with eight core drivers. One facet is named the white hat driver, while one another is

called the black hat drivers. The driver's principle of the two are different. The white hat stands for drivers that empower and control certain individuals. However, on this facet, a sense of urgency is irrelevant to the drivers. In contrast, with regard to the black hat drivers, this facet of octalysis displays the drives bring about senses of urgency, obsession or addiction.

Other than black and white hats, on other facets of the shape, the driver can be devided into intrinsic and extrinsic motivation. The intrinsic motivations belong to the right side of the framework, while the extrinsic motivations are on the left. The differences between both intrinsic, which are regarded as the eight core drivers in this framework, are;

1. Meaning: Epic meaning and calling

The purpose of this driver is to persuade participants to believe that their actions are greater than their and the others' expectations.

2. Accomplishment: Development and accomplishment

The target of this driver is to formulate progress, development, and the achieving skill by introducing a sense of challenges.

3. Empowerment: Empowerment of creativity and feedback

This driver will be expressed when participants engaged in a creative process where their thoughts are ustilised on novelties.

4. Ownership: Ownership and possession

The participants are motivated by a ssense of ownership over certain entities. This driver will motivate participants to feel and heighten their thoughts to improve their performances.

5. Social influence: Social influence and relatedness

This driver includes all the social elements that motivate individuals to develop similar principle or skillset by taking social environment and its influence into account.

6. Scarcity: Scarcity and impatience

Scarcity and impatience are the core drivers of the black hat facet. These drivers cause individuals to sense scarcity and impatience to wait over something; however, they need to wait and return to check the ability or benefit that they want.

7. Unpredictability: Unpredictability and curiosity

When certain situations are out of control and plans go offtrack, individuals' thought tend to be on high attention or high irritation.

8. Avoidance: Loss and avoidance

Avoidance is the driver that motivates participant to avoid something negative since the happening.

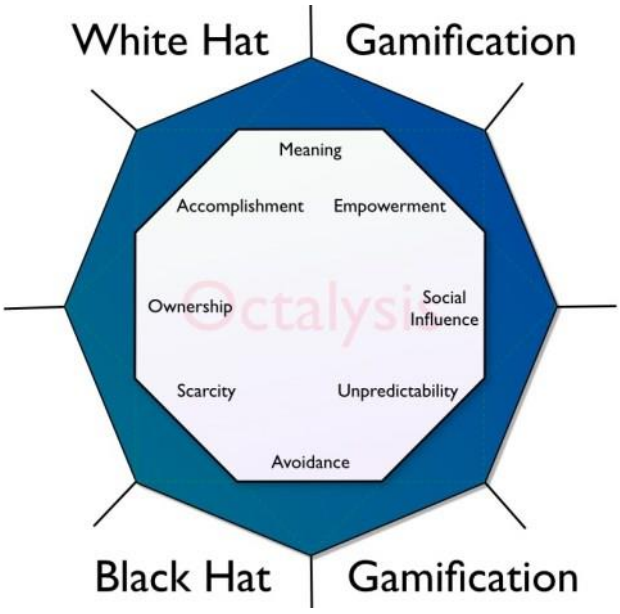


Figure 2.12: Octalysis Framework by Yukai Chou

2.5.6 Bartle Gaming Personality Types

The original Bartle gaming personality types contained four kinds of players which can be described as killers, achievers, socializers, and explorers.

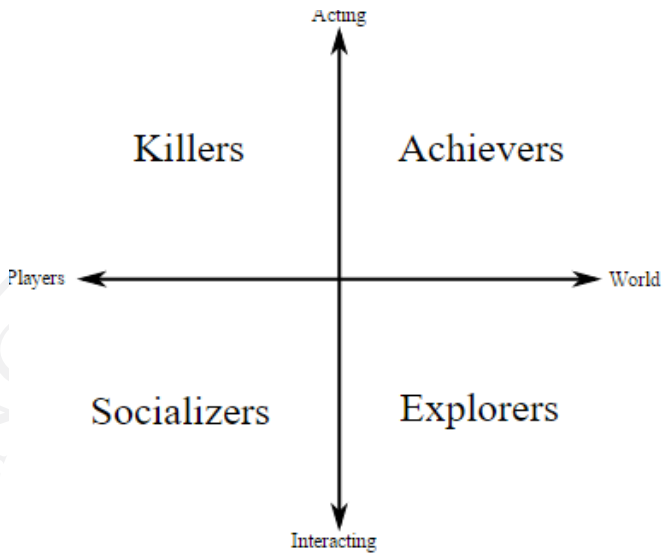


Figure 2.13: Bartle gaming personality types

In regard to this personality model, Bartel explained that the x-axis emphasizes on the players and the environment. The y-axis moves from interacting to acting. The four quadrants of the graph are divided into the four typical players. In 2003, Bartel expanded the model by adding the third axis (implicit and explicit) to the original axises. The player types were separated into eight sub-types.

Bartel identified the differences between implicit and explicit. Implicit is associated with unconscious actions and explicit means acting with forethought. For a better understanding on player types, the following sections will further explain each type.

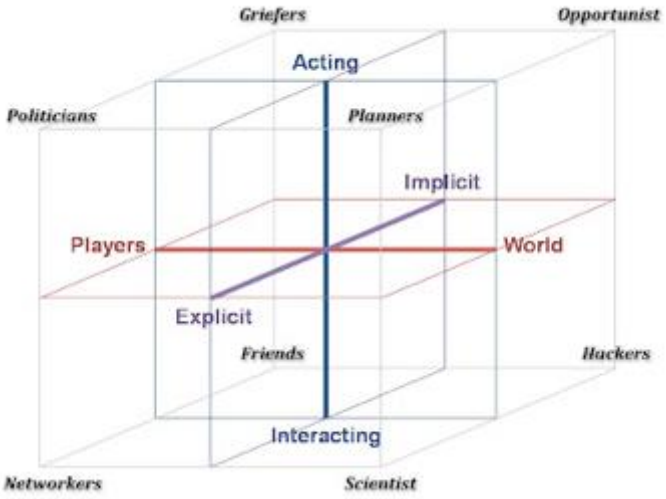


Figure 2.14: Type of gaming personality with the third axis

2.5.6.1 Four original types of gaming personality

2.5.6.1.1 Players (participants)

Player who fall in this category focus on gaining points in certain level of success. They will attempt to obtain rewards and recognitions, even if the aforementioned points are not beneficial to the players. In this case, this group of individuals tend to strive if the rewards are prestigious to them.

2.5.6.1.2 Explorers (Interacting – with the world)

This type of player seeks excitement and adventure to discover something in the game. They are ready to learn and explore. However, if the game has bound by certain restrictions, this kind type of players may become unsatisfied.

2.5.6.1.3 Socializers (Interacting – with players)

Players in this category are enjoyable when they can interact and form relationships with other players in the game.

2.5.6.1.4 Killers (Acting – on players)

People in this category thrive on competition with the others. They love and prefer opportunities to compete with others.

2.5.6.2 New player types have the following behavioral characteristics

Table 2.10: Sub-eight types of player from Bartle's Player Types adapted from Huber & Hilty, 2014 p. 11

Original types of gaming personality	**Implicit Type**	**Explicit Type**
Achievers	Opportunists – Player who seek for opportunity but avoid obstacle.	Planners – Player who work around obstacle and has clear goal to achieve.
Explores	Hackers – Player who pursue new fancy sensation activities and truly understand the virtual world.	Scientist – Player who keenly form theories and test them. They systematically obtain new knowledge and seek to explain phenomenons that occur in game environment.
Socializers	Friends – Player who interact or cooperate and have a deep understanding and accept the others that are familiar to them.	Networkers – Player who try to find people to interact and have connection with.
Killers	Griefers – People who love to attack and win acknowledgement from the others by achieving the victory	Politicians – People who persuade the others to contribute their community

Understanding player types can help game designers to designate the game elements that are suitable for each type of player and the objectives of the game. In this research, the customer types in terms of players could not be identified at the initial stage. Therefore, instead of classifying players and design elements based on

player types, this research designed the game environment. The details of environment design are explained in the research methodology section.

2.5.7 Changing Behavior

Motivation is a significant factor that drives individual behavior. Each person has a different reaction to different motivation types. This is related to the goal of each person. Some individual one's importance on extrinsic motivation. The driver that can influence them to act is external rewards. However, some individual is more concerned about intrinsic motivation such as the volunteers. Financial reward does not hugely influence them to act since they are more confident that their works which cause social impact is highly valuable. As mentioned, intrinsic and extrinsic motivation sources can be both internal and external, but motivation must exist to prompt the corresponding behavior (Dichev, Dicheva, Angelova, & Agre, 2014, p. 85). There are various theories of behavioral change, which are mostly related to motivation. Behavioral understanding can help researchers to comprehend and apply these theories appropriately.

2.5.7.1 Flow theory

Various researchers mentioned that flow theory is linked and also one of the most important psychological results from gamification (Murphy, Chertoff, Guerrero, and Moffitt, 2013 & Sailer et al., 2013). Csikszentmihalyi described flow as *"the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it (Csikszentmihalyi, 1990, p4)".* According to its definition, the state of flow is also a significant factor that can change to participants' behaviors. The game designers should consider the state of flow as an outcome of

gamification since each game element impacts to the participants' optimal experience. The appropriate game environment can help to increase the engagement level and change the behavior of participants.

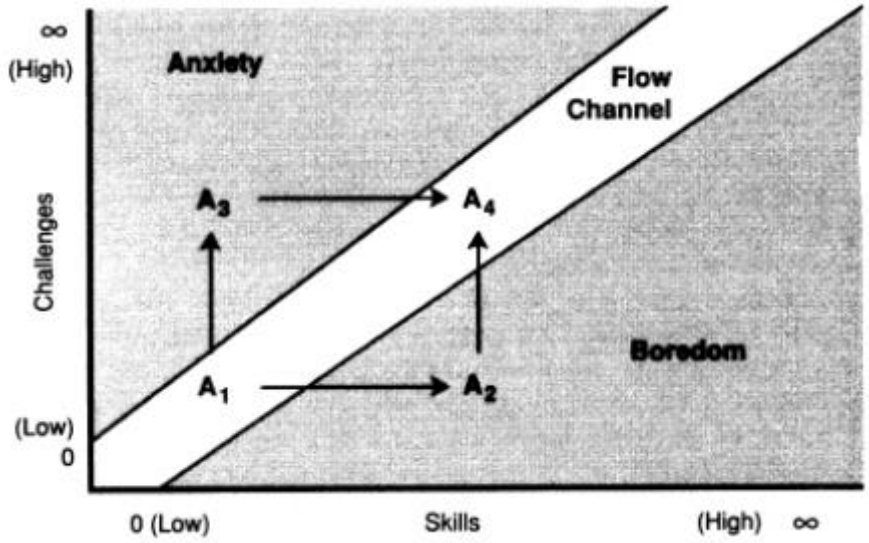


Figure 2.15: Flow Theory

This graph (Figure 2.15) shows the relationship between skills and challenges, which is the two theoretically most significant dimensions of the experience. According to Csikszentmihalyi, "A" represents a boy named Alex in the example who is playing tennis. From the graph, Alex appears at four different points of time. At A1, Alex has no skill and is not in the difficult challenge stage. Thus, with the basic challenge, he feels enjoyment. Then, if Alex keeps hitting the ball without any challenge, his skill increases, and he grows bored (A2). However, if he has a chance to face a highly skilled player he will become anxious (A3). On the other hand, if he keeps practicing and balancing the skill and perceived challenge he will get to flow again (A4).

As well as boredom, anxiety, and flow areas, Csikszentmihalyi (1990) also described seven core components of the flow. These components can be broken

down into two categories: conditions and characteristics. Conditions are the prerequisites to the flow, and characteristics are what happens while you are in a flow.

2.5.7.1.1 Conditions of flow

1. Clear tasks

Individuals understand the task they must complete

2. Feedback

Individuals receive clear and immediate feedback on their successes and failures.

3. Concentration/focus

Individuals are not distracted and fully focused on the task

4. An attainable and balance goal

Goal is challenging and within their abilities to complete

2.5.7.1.2 Characteristics of flow

1. Control

Individuals believe their actions can cause direct impact on tasks and that they can influence the outcome.

2. Diminished awareness of self

Complete focus on the task leaves little room for self-consciousness or doubt. This is often described as becoming a part of the activity.

3. Altered sense of time

Perception of time is distorted. Seconds can feel like minutes, minutes like hours. Yet time also passes quickly and unnoticed.

2.5.7.1.3 Flow theory and game design.

Murphy **(**2013**)** explained how flow can help game designer to keep the balance between challenge and skill of the players in the game**.** The author listed the awareness points that designer should keep in mind, which are;

1. Use clear tasks

Task needs to be clear and causes no confusion to the player.

2. Provide feedback

The designers should consider providing simple and direct feedback if a player demonstrates progress.

3. Balance challenge with player skill and time

Challenge and skill need to be balanced. However, this needs to be considered along with time. For example, a basic challenge is required for a new player. Then the challenge difficulty should be increased to accommodate skillful players.

4. Minimize distractions

Avoid elements that direct attention away from the tasks.

2.5.7.2 Fogg Behavioral Model

Apart from the state of flow model, it is also possible to apply the FBM (Fogg Behavioral Model), created by Fogg (2009), to this study to better understand the relationship between game elements and behavioral changes. Persuasion is defined as *"any instance in which an active attempt is made to change a*

person's mind" (Petty & Cacioppo, 1981, p. 4). The FBM also portrays how behavior is the result of three specific elements coming together at one moment. These three elements are motivation, ability, and triggers. If even one of the elements is missing, behavioral change will not occur.

With regard to the aforementioned, the difference between the FBM and state of flow is that state of flow is an optimal experience in which the person is completely involved in an activity. In flow, there are two significant factors that can help the participant to achieve the right balance between skill and challenge. Therefore, the designer needs to plan the task and element for the participants to keep them in the flow. If they are out of the flow, they must be able to get back on track as soon as possible to prevent boredom or anxiousness, which will eventually result in an unbalanced environment.

The FBM also helps game designers to create a balanced environment in the game. The purpose of the FBM is to help researchers and game designers to replicate about behavior in more construct. By using this framework, researcher and game designer can understand at their own persuasive designs, either in research or commercial settings, and see new potentials to persuade users. researchers and game designers can also use the FBM to identify the problems in persuasive systems that fail to achieve the intended outcomes (Ruengaramrut, Ribiere and Ammi, 2015). In these situations, the FBM helps individuals to think systematically about the elements of motivation, simplicity, and the strategies used for triggering behavior. According to this model, "in order for an individual to perform the behavior, one must: (1) be sufficiently motivated; (2) have the ability to perform the behavior; and (3) be

triggered to perform the behavior. All three factors must coincide for the behavior to occur; otherwise, the behavior will not happen (Fogg, 2009)" (Figure 2.16).

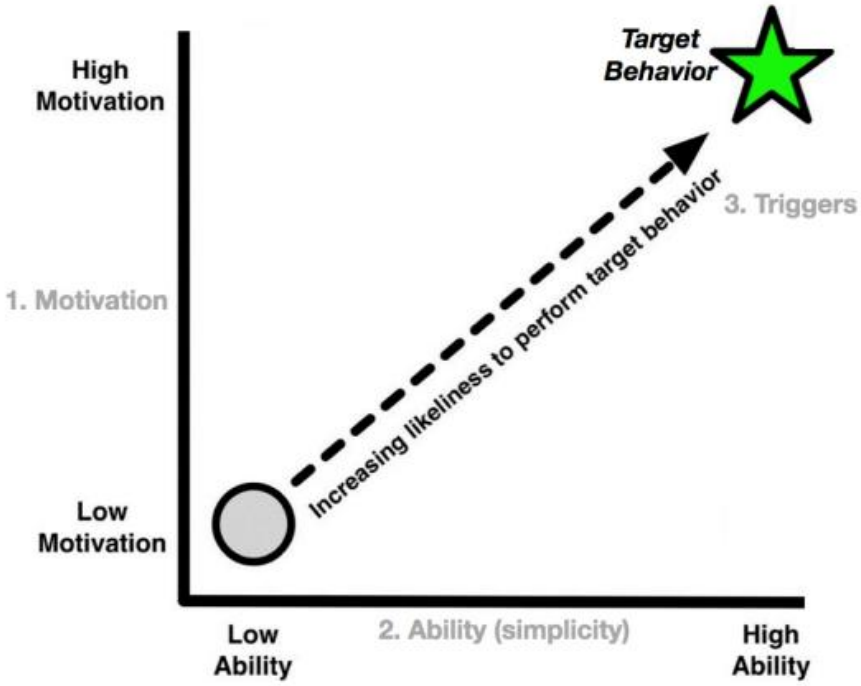


Figure 2.16: Fogg Behavior Model

In addition, with three elements (motivation, ability and triggers) of fogg behavior model, game designer need to consider and create balancing between each element to create better gamified environment.

1. Motivation

Extrinsic motivation is an important factor while intrinsic motivation is also a significant one that will affect to individuals' motivation. Fogg describes three sub-elements of motivation that will affect the motivation iteself, which are;

Sensation: pain and pleasure: In a gamified environment, rewards can be the elements that foster sensational motivation to participants.

Anticipation: hope and fear: There are various levels of participants in a gamified environment. The elements that can represent the progress of the

participants, such as types of their status or quests in the game, can be the factors that induce in anticipation motivation to reach higher levels.

Social cohesion: acceptance and rejection: The interaction between each participant in an environment such as collaboration to complete certain tasks might be an example of this motivation type.

2. Ability (element of simplicity)

Ability is one factor that influences the occurrence of a behavior. Even if a person is highly motivated, a behavior might not occur if he does not have the ability to do so. According to FBM, there are six sub-elements of simplicity, which are; time, money, physical effort, brain cycles, social deviance, and non-routine (Fogg, 2009).

Thus, for gamification, it can be a complex challenge for certain tasks or missions, but designers need to break it into small stages. Chou (2015) has stated that participants will involve in the gamified environment by going through series of stage, rather than the sole single stage or event, where they can improve their understanding. Chou also categorizes user development stage in gamification into 4 phases, which are; Discovery, Onboarding, Scaffolding, and Endgame, which each stage participant has the ability to develop their growth.

Discovery is the first phase of the journey. This will start when participants discover, experience and learn about the product or service.

Onboarding is a phase that game designers try to train participants to become familiar with rules, options, and mechanics of the game.

Scaffolding, for this phase, participants use all the rules and options that they learned from onboarding phase to achieve victory.

The End Game (Final phase), When individuals believe and feel that they have completed everything and there are no more unexplored quests/elements to be savoured.

As mentioned above, this study focuses on service innovation process and also considers service innovation process as a task or challenge of the game. To improve the participants' set of bilities, one can consider it appropriate to follow Chou (2015) suggestion.

3. Triggers

Motivation and ability alone are not sufficient to determine a behavior (Fogg, 2009). Triggers will be an element that pushes individuals to achieve the target. It is a factor to track the time that pushes individuals to perform and put more effort to participate. Triggers also can be separated into three types, which are;

Facilitator – This kind of trigger is for users who are highly motivated but do lack certain abilities. This trigger will assist them to behave or perform more easily. Some help tool should be provided to support participants to work on it. For example, alert trick and tip or guide messages that can help participants to find an alternative way or act as a clue for participants to pass to the next level.

Spark – This kind of trigger tends to motivate people to perform the tasks. Sparks are something that can make participants excitemented or raise their determination to deal with game actions. Examples of sparks are the appearance of the game, the environment or any choice that activate participants through uncertain avoidance situation. Also, progress bar, performance diagram, and leader board can be significant spark triggers as participants can view their competitors' levels. This can trigger them to put more effort to overcome the others.

Signal – This kind of trigger is similar to a reminder when players already have the motivation and ability to perform. In the gamified environment, for this type of participants, the reminder can help them to achieve the goal. Reminder message or timer in the game can be a good example of the signal trigger in the gamified environment.

To apply Fogg behavioral model to gamification, game designers need to understand that those game elements must contain three factors in a single moment as mentioned in Fogg behavioral model condition. When three factors, which are *"*sufficient motivation (to perform the behavior), sufficient ability (i.e., the player can easily carry out the behavior), and an effective trigger (i.e., the player is triggered to do the behavior through reminders, cues, calls to action, etc.) (Gaggioli, 2012. p. 281)" are simultaneously presented, the participants are ready to reach target behavior. However, even though various gamification literatures and studies have mentioned about the FBM model, there is still a lack of empirical study on how this model is applicable to gamification in the new service development process. This research will apply FBM to the experimental part to observce how FMB will cause an impact on gamification environment to create new service development process by the customers.

2.5.8 Gamification and Customer Engagement

Many companies use gamification as a tool to encourage strong engagement for their customers (BBVA's innovation center, 2012). For example, Microsoft launched the Ribbon Hero application, an application that encourages Microsoft office users to learn more about its software features. Similarly, the most popular website for coder and code learner, Code Academy has interactive activities

containing game mechanics and dynamics such as points, badges, and progress bars provided for users learn coding. Financial services also implement a lot of game mechanics and dynamics into purchasing or saving methodology of the customers, especially credit cards usage. For example, customers receive reward points once they use a credit card to purchase and, subsequently, receive more reward points when they purchase certain specific extra items. Gartner predicted that more than 70% of the global 2,000 businesses will apply gamification by 2015 (Gartner Group, 2011).

The result of customer engagement level after their interaction in the gamification environment was studied in this research. The researcher believed that gamification is a strong engagement tool that can result in customer involvement with the product or service. Gamification contains various kinds of game elements and, by using them, can change individuals' behaviors. In the gamification environment at the individual level, the social game element can generate the inter-customer connection. Organizations need concrete structural plans and designs for gamification, with thorough research on customer behaviors. Customer engagement will be lifted since customers can more frequently interact with services and products and, thereby, return feedback to the organization. This study did not focus on the engagement at the group level (more relevant for employee engagement contexts) but rather at the individual level (customer) by measuring customer engagement level in five dimensions which cover enthusiasm, attention, absorption, interaction, and identification. Customer engagement level score was measured before and after participation in the gamification environment.

2.5.9 Gamification and New Service Development Process

The communication between customer and service is difficult since service is intangible (Stevens and Dimitriadis, 2005). According to this, service firms are proactively reaching out to customers as their involements are necessary. However, as a matter of fact, the customers are not approaching the firms to privide any idea or information once they identify issues or activities that they want firms to improve. As a result, this has eventually turned into a one-way relationship and firms need to reach out to customers to receive more input through focus groups, customer observation, or in-depth interviews (Alam and Perry, 2002). The interaction between firms and customers seems to be periodic and occasional, therefore, there is a possibility that customers cannot recall their service experience. The generic way of interaction between firms and customers in the process development is time-consuming; it requires effort to meet customers and there is little motivation for customer involvement and engagement in the development process.

As mentioned above, customer involvement in innovation process has a significant impact on the organizations. Thomke and Von Hippel (2002) proposed steps to turn customers into innovators by suggesting that organizations should develop a user-friendly toolkit for customers. Even though the focus of this article is mainly on the production process, it also airs a generic idea to show that tools can help customers to get involved and participate easily. Accordingly, this would have a substantial impact on an organization, with the link with gamification as another important factor in this research. The researcher believed that gamification can be a stimulator to improve the relationship of customer engagement and service innovation process.

Various business fields have realized the capability of gamification that can drive participants to change their usual behavior or motivate them to do more or better, especially in customer and employee behaviors. The use of gamification on customer engagement by Starbucks is a very clear example. Starbucks Coffee Company uses gamification as a tool to enrich the Starbuck's customer experience and increase sales. Every time customer purchases a Starbucks product, they accumulate stars (which actually look like cups that are diagrammatically filled in). To encourage customers to collect points, Starbucks Reward has also set up three levels of customer loyalty as welcome, green, and gold levels. Each level has different benefits. To participate in the loyalty program, customers need to make an effort to use the Starbucks card or application at the time of their purchase.

As well as the business field, education is another area that involves gamification as a significant tool. In this online technology era, much educational software has popped up in the virtual world. The boundary of education is blurred. One can now study and obtain knowledge from anywhere and at any time. Duolingo is a well-known application for language study. Duolingo bridges the difficulties in learning a new language. With time limitations and uninteresting study applications, gamification can help to bridge the gap between the will to learn and boredom that occurs during learning process. Duolingo has a game element in their application, making the study more enjoyable and easyily trackable.

Thus, the success of applying gamification can create business opportunities with innovation management (Tambo et al., 2014). This study believed that gamification could help to develop new service development process and also assist

organizations to attract customer insight better than other ways of customer involvement in process development.

2.5.10 Cooperation and Competitive in Gamification

One of the significant goals of gamification is to make applications attractive for users and increase user motivation to solve some specific problem (Balata, 2015). With the capability of game mechanics in gamification, this can be implemented in many contexts including healthcare, education, and the business industry. As stated in the definition of the game from Salen and Zimmerman (2003), “A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.” (p. 80). According to the literature, the system can be closed or opened, and represented by four elements as objects, attributes, internal relationships, and environment. Participants interact with the system and challenge. The environment of gamification is another factor that is really interesting, since it can set the mood of the participants. This research focused on two types of environment which are competition and cooperation environments; compared without pre-structuring the environment. It identified which kind of environment best boosted participant involvement in service development process and determined the level of customer engagement after the participant (customer) had a chance to experience the gamification environment. This research identified the difference between collaboration and cooperation as below.

Collaboration is the act or process of “shared creation” or discovery (Thomson and Perry, 2006) or shared support. Collaboration creates new values by the working together process, not the individual effort.

Cooperation. In contrast to collaboration, cooperation focuses on each other's goals rather than a shared goal. It is a process of individual exchange of information and resource to support each personal goal. The achievement comes from individual effect.

In the experimentation design, both environments have been conducted in the experimentation process. Participants who involved in the experimentation have experienced in both collaboration and cooperation environment along the experimentation process.

2.5.11 Component Diagram

This section presents a component diagram showing the relationships of each game element with customer engagement elements that lead to supportive and beneficial effects on the service innovation process. The diagram was presented at the 12th International Conference on Intellectual Capital Knowledge Management & Organizational Learning ICICKM, 2015. This component diagram was adapted and extended from Marek Hyla's gamified learning environment diagram (Hyla, 2015). Fogg's behavioral model was integrated into the gamified environment in order to further highlight the relationships between game elements and behavioral changes. According to this, each game element, contained in the different sub-elements of Fogg's behavioral model, had a different capability to build motivation, ability, or create a trigger for a player. In this component diagram, individuals are at the center of the gamified environment. They interact with each game element by treating service innovation process as their tasks and challenges to achieve the goal. This diagram also shows the different approaches that utilized to interact with the gamified environment. When individuals are challenged (competition) or when they are part of

a group that support one another (cooperation), individual engagement is expectedly obvious. Gamification can re-create such contexts to increase individual engagement (Ruengaramrut et al., 2015). The component diagram also shows the antecedents of customer engagements which are involvement and interactivity. The difference between these two antecedents is that involvement comprises trust, commitment, and customer satisfaction. In contrast, interactivity contains the level of rapport, co-creation, customer empowerment, and customers' perceived support/recognition for their efforts. Customer involvement relates to the individual level of interest and personal relevance in the relationship to a firm or to its product or service. However, interactivity is characterized by certain forms of customer and firm interaction (Bolton and Saxena-Iyer, 2009).

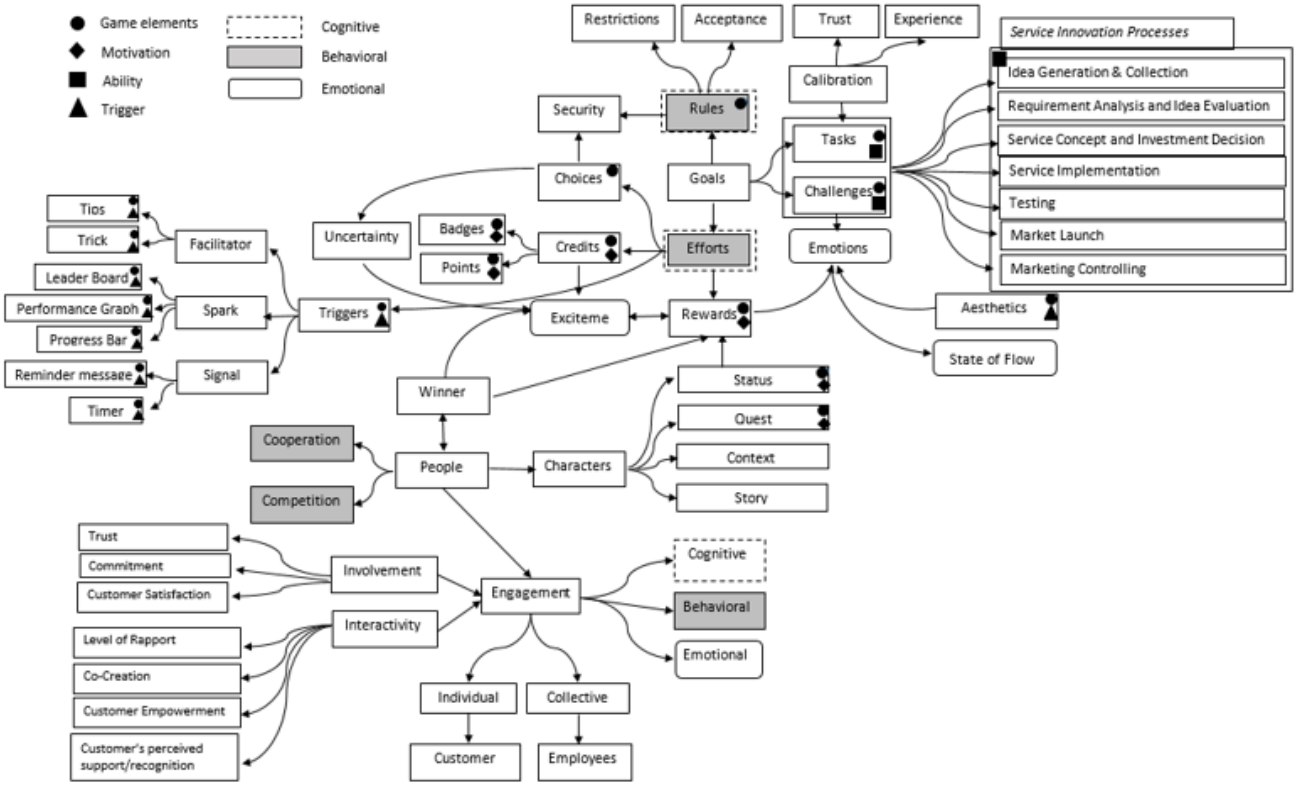


Figure 2.17: Component diagram (Ruengaramrut, 2015)

2.6 Research Model

2.6.1 Construction of the Research Model

This research proposed a theory based on the following ones, which are reviewed in the earlier section.

1. Potential dimensions of customer engagement (So et al., 2012).
2. New service development process and Customer role in the new service development process (Alam and Perry, 2002).
3. A behavior model for persuasive design (Fogg, 2009).
4. Element of gamification (Werbach and Hunter, 2012., Wood and Reiners, 2015).
5. Customer Intention to be involved in the new service development process (Rizwan et al., 2014).

From the theories described in the literature review, one could not find any research which presents how gamification can boost up new service development process as well as the statistical results that show how gamified experience will help increase customer engagement and intention to be involved in the innovation process. Furthermore, there is still a lack of empirical research study that compared participants' behavior in collaborative and cooperative gamified environment. As presented previously, various researchers (De Brentani & Cooper, 1992; De Brentani and Ragot, 1996; Alam & Perry, 2002; Edvardsson and Olsson, 2006; Möller et al., 2008; Carbonell et al., 2009; Chesbrough, 2011) agreed that customer involvement in the development process is significant. However, the process of involvement remains sporadic. The co-development or co-creation activities between firm and customers,

regarding new service, are still considered traditional such as customer observation, in-depth interview, or group discussion. These traditional approaches no longer work and are deemed a waste on resources (Roberts & Piller, 2016). Based on these literature gaps, this research will study the potential of gamification, which can be a new tool and mechanism to encourage customers to involve in the service development process which, accordingly, is likely to impact service innovation efficiency.

Also, since gamification's main goal is to increase the engagement of users by applying the game-like technique (Faltla et al., 2011), this study will demonstrate those game elements that can become significant factors to bolster customer engagement level when they have opportunities to experience the gamified environment. For customer engagement dimensions, this research will use the proposed customer engagement dimensions from So (2012), the dimension contains enthusiasm, attention, absorption, interaction, and identification. So (2012) splitted these five dimensions from traditional customer engagement (cognitive, emotional and behavior (Avent and Higgins, 2006; Worthington et al., 2009; Hollebeek, 2011; and Brodie et al., 2013)). The split makes the measurement easier and the analysis could be carried by focusing more on specific details of each customer expression.

The level of intention to be involved in new service development process is also another significant variable that this study would like to explore. The introduction of this variable is a part of the novelty of this study. Additionally, to the customer engagement level, the researcher also believed that gamification can be a tool to increase customer intention to be involved in the new service development. With the gamification element and persuasive design that is embedded in

gamification, customer behavior can be positively changed to benefit for the organization. The mutually profitavble circumstances between organization and customer can be seen at this stage. Gamification can increase the level of customer engagement together with an intention to be involved in new service development, which can increase a number of loyal customers. Simultaneously, the customers can experience a fresh way to interact with the organization and also obtain their preferred results from such involvement.

For gamification, the researcher utilized Wood and Reiners' elements (2015) (component, mechanics, dynamics, and intentions). Wood and Reiners's gamification elements are currently the most comprehensive and likely to provide detailed concepts on the topic. To design the gamification environment for the experiment in this study, gamification elements concept from Wood and Reiners was used together with persuasive design theory from Fogg (2009). Fogg behavior model contains three elements (ability, motivation, and triggers). To design gamification, this model helps a game designer to systematically pick the desired game elements which would, eventually put into practice. According to this, the following research model was proposed.

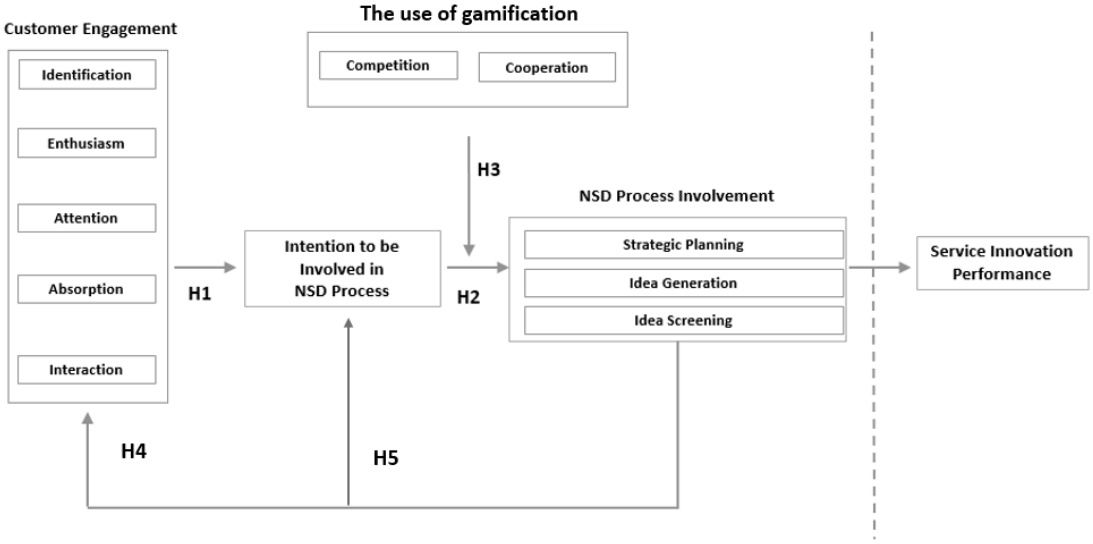


Figure 2.18: Research Conceptual Framework

2.6.2 Research Hypotheses

The following proposed hypotheses are listed at below;

Hypothesis 1: The degree of customer engagement (which is composed of the identification, enthusiasm, attention, absorption and interaction variables) positively affects their intention to be involved in the new service development process.

Various researchers (Bowden, 2009., Hollebeek, 2009., Brodie et al., 2013.) have mentioned that a customer who has experienced engagement can eventually become a loyal customer. Loyal customers or highly engaged customers are those who commit to the brand or products. Due to their commitments, this group of a customers should be considered as a group that is willing to participate in brands or products activities.

Hypothesis 2: The degree of customer intention to be involved in the new service development process positively affects their involvement in the process.

This research classifies intention to be involved into five types (details are in literature review part). The person who highly intends to be involved in the process is called the dependable. This group of people does not object to disclose their idea in order to help the organization to develop the process. According to this, when a customer has a high degree of intention, they are likely to be more determined in the development process; compared to a person who does not intend to be involved.

Hypothesis 3: Customers who participate in the gamified environment reflect a stronger relationship between intention to be involved in NSD process and the effectiveness in the process than those who participate in a none gamified environment.

The gamified environment contains game elements that can alter game participants' behavior. With this capability of gamification in mind, the customers who participate in this environment will be more effective in the new service development process. In this research, the researcher believed that, with Gamification as a moderating factor, the relationship between intention to be involved in new service development process and the effectiveness in the new service development process will be stronger.

Hypothesis 4: The degree of customer engagement will be increasing after the customers were involved in new gamified service development process

When customers' sense of self-imporamce is enriched whe they receive more recognition or perceive a sense of belonging to the brands or products. This will, in turn, help increase their customer engagement. With regard to the research methodology, certain cost/time limitations were found on the sampling process. Taking this limitation into account, this research conducted the new service

development process experiment in three stages of which are strategic planning, idea generation, and idea screening as these stages contributed to the highest frequency of customer input (Alam and Perry, 2002).

Hypothesis 5: The degree of intention to be involved in NSD process will be increasing after the participants were involved in new gamified service development process

Similar to the customer engagement level, after the participants' involvement in gamification process for the new service development, there is a better possibility that they will be involve in the future process; unlike participants who do no have opportunities to involve in gamification environment.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter provides information on methodologies ultilized in this research. The research paradigm, research approach, and research procedures will be explained in this chapter. The research instrument has been designed to measure and find relationships between each research variables. The study context will also be described in this section.

3.1 Research Paradigms and Research Processes

3.1.1 Research Paradigms

A number of theoretical paradigms are discussed in the literatures such as positivist (and post positivist), constructivist, interpretivist, transformative, emancipatory, critical, pragmatism and deconstructivist. For a better understanding on research paradigms, MacNaughton, Rolfe, and Siraj-Blatchford (2001) proposed a definition for research paradigm which cover three elements, namely;

1. Believing about the nature of knowledge,
2. A methodology and
3. Criteria for validity (p.32).

Mackenzie and Knipe (2006) discussed the difference between each paradigm in the following table (Table 3.1).

Table 3.1: Paradigms, methods and tools by Mackenzie and Knipe (2006)

Paradigm	Methods (primarily)	Data collection tools (examples)
Positivist	Both quantitative and qualitative methods can be used in this paradigm, by quantitative tends to be main methods.	Experiments Quasi-experiments Tests Scales
Interpretivist	Qualitative methods are a lead method. Quantitative method can be used also.	Interviews Observations Document reviews Visual data analysis
Transformative	*Qualitative methods with quantitative and mixed methods. Contextual and historical factors described, especially as they relate to oppression (Mertens, 2005, p. 9)*	Diverse range of tools - particular need to avoid discrimination. E.g.: sexism, racism, and homophobia.
Pragmatic	Qualitative and/or quantitative method can be used. Methods will be use based on the questions and purpose of research.	Include tools from both May positivist and interpretivist paradigms.

According to this Table 3.1, the positivist paradigm was used in this research since it started by determining a framework to collect data in order to support the theory. It was also served to avoid ambiguous measurement results as positivist paradigm attaches equal imporatance on measuring both ratio and ordinal scale. The study was based on variables measured with numbers and analyzed with statistical procedures. In the next section, the detail of research process will be described.

3.1.2 Research Processes

According to Creswell (2014), there are two types of research process, which are;

1. Inductive Approach

The inductive approach is necessary for researchers to build their patterns, categories, and themes. This is a bottom-up process, starting from gathering information which causes the researchers to become more accustomed to the subject or coordinate with the representative of such samples. After receiving the data, the

researchers can perform data analysis and define patterns/generalisation. In conclusion, taking the data analysis and the already mentioned patterns into account, the researcher is expectedly able to propose generalizations or theories; which is partly a result of their understandings on the subject matter. The process of inductive approach is displayed in Figure 3.1.

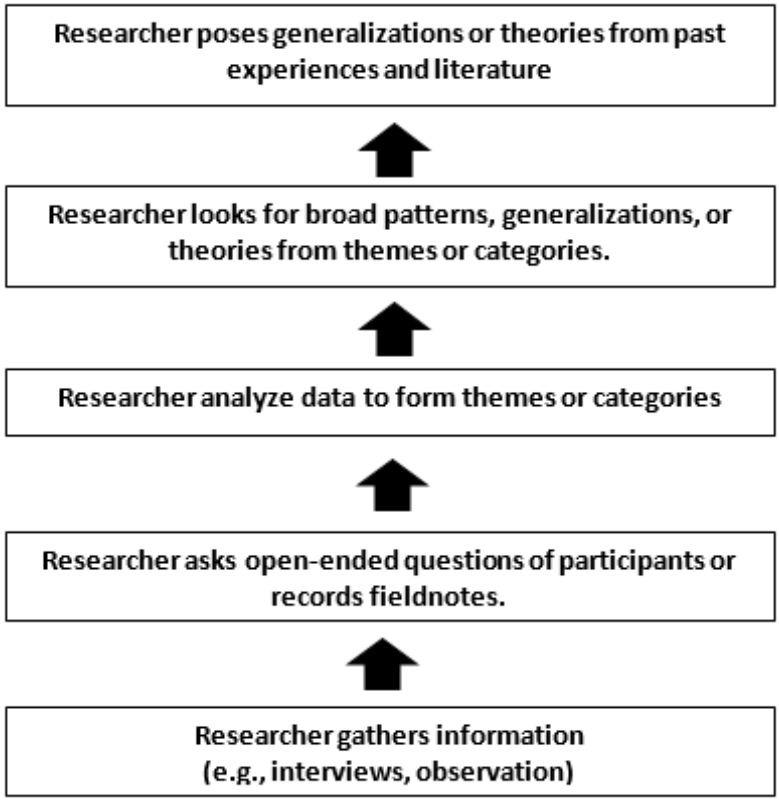


Figure 3.1: The Inductive Approach Typically Used in Qualitative Research (Creswell, 2014)

2. Deductive Approach

This approach is typically used in quantitative research. The objective of this research approach is to test or verify a theory, which rather is different from the inductive approach. Below is the step of deductive approach.

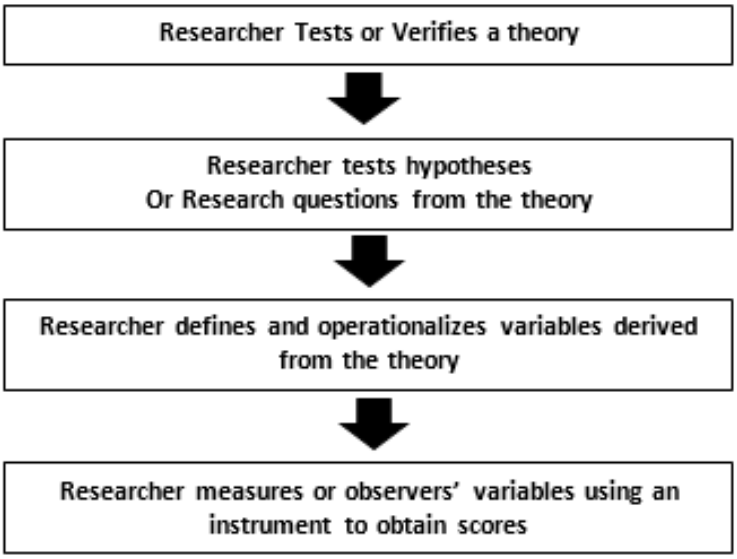


Figure 3.2: The Deductive Approach Typically Used in Quantitative Research (Creswell, 2014)

This research applied the deductive approach on hypothesis testing by opting questionnaire survey and experimental research design in order to study relationships between variables and verify cause and effect in highly controlled circumstances. With research questions, research purposes, and research instruments, a quantitative method was used for as methodology for this study. In this regard, a pilot study was conducted to test the instruments. Questionnaires were available in English and Thai which welcomed participants of different nationalities. To ensure an appropriateness of the translation, the proof was a necessity. Furthermore, participants' understanding on questions in the questionnaire was also verified to prevent errornous feedback. To complete this quantitative approach, open-ended questions were used to obtain more indepth feedbacks from the participants.

3.2 Research Design

This study was interested in indicating the impact of gamified and none gamified activities on the new service development. The researcher believed that undertaking such experiment is an appropriate way to test the aforementioned hypotheses and answer the research questions.

3.2.1 Experimental Sequence

The following section describes the detail designed for each phase of the research methodology. Table 3.2 explains each phase and its applied methodology/instruments, together with research procedure and expected output from each phase.

Table 3.2: Research methodology and instrument in each phase of experimentation

Phase	**Methodology**	**Research Procedure**	**Output**	**Participants**
Phase 1 Pilot Study	Questionnaire survey	Questionnaire Design	Questionnaire	Experienced academics and Expert.
	Gamification Experiment	Gamification pilot test	Updated questionnaire and process for experimentation	
Phase 2	Gamification Experiment. (2 contexts); 1) No Gamified Environment Gamified Environment	Gamified and none gamified experimentations	Experimental Results	Customers who have experienced using Facebook and Private University services

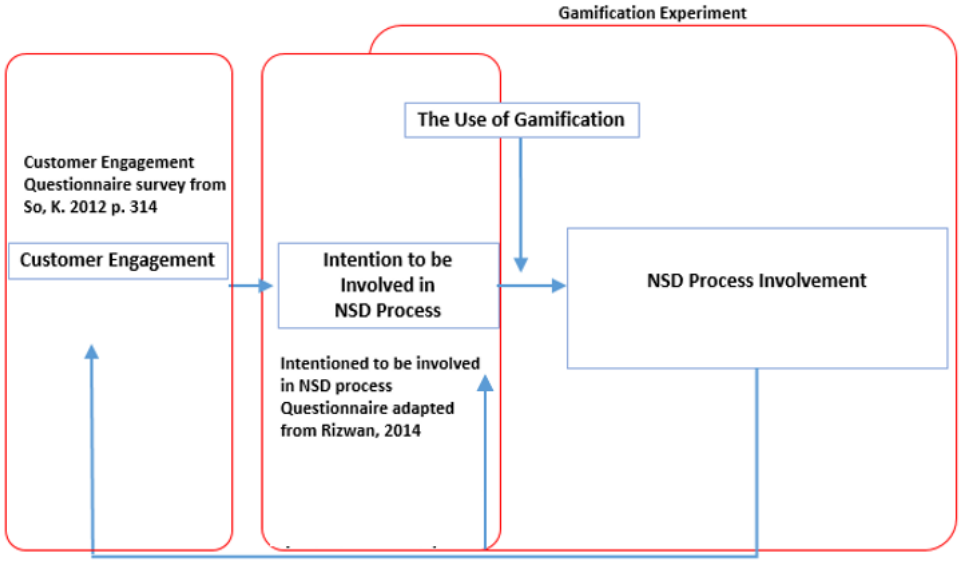


Figure 3.3: Research Instrument in each phase

In the first phase, questionnaire developed by So (2012) was used to measure the level of customer engagement from each participant while questionnaire, adapted from Rizwan et al. (2014) was used to measure the intention to be involved in the new service development process.

In the second phase, two groups of participants who have 1) experienced using Facebook and 2) a private university services were participating in the research in both gamified environment and none gamified environment. The detail of participants is explained in chapter four.

Once the participants have involved and experienced the second experimentation phase, they were handed post-surveys which contained a list of questions that aimed to determine their level of customer engagement as well as the intention to be involved in service development process; after they had experienced gamification and none gamification environments. The instruments' details are explained in the next section.

3.3 Instrument

This research had modified existing instruments that have been established for measuring customer engagement and intention to be involved in the process of the questionnaire survey. For the gamification experimental part, this research presents an experimental method by separating the experiment on new service development into different stages. In this regard, the used instruments were validated by experienced academics and experts in each area. The following section explains the instrument used for each phase.

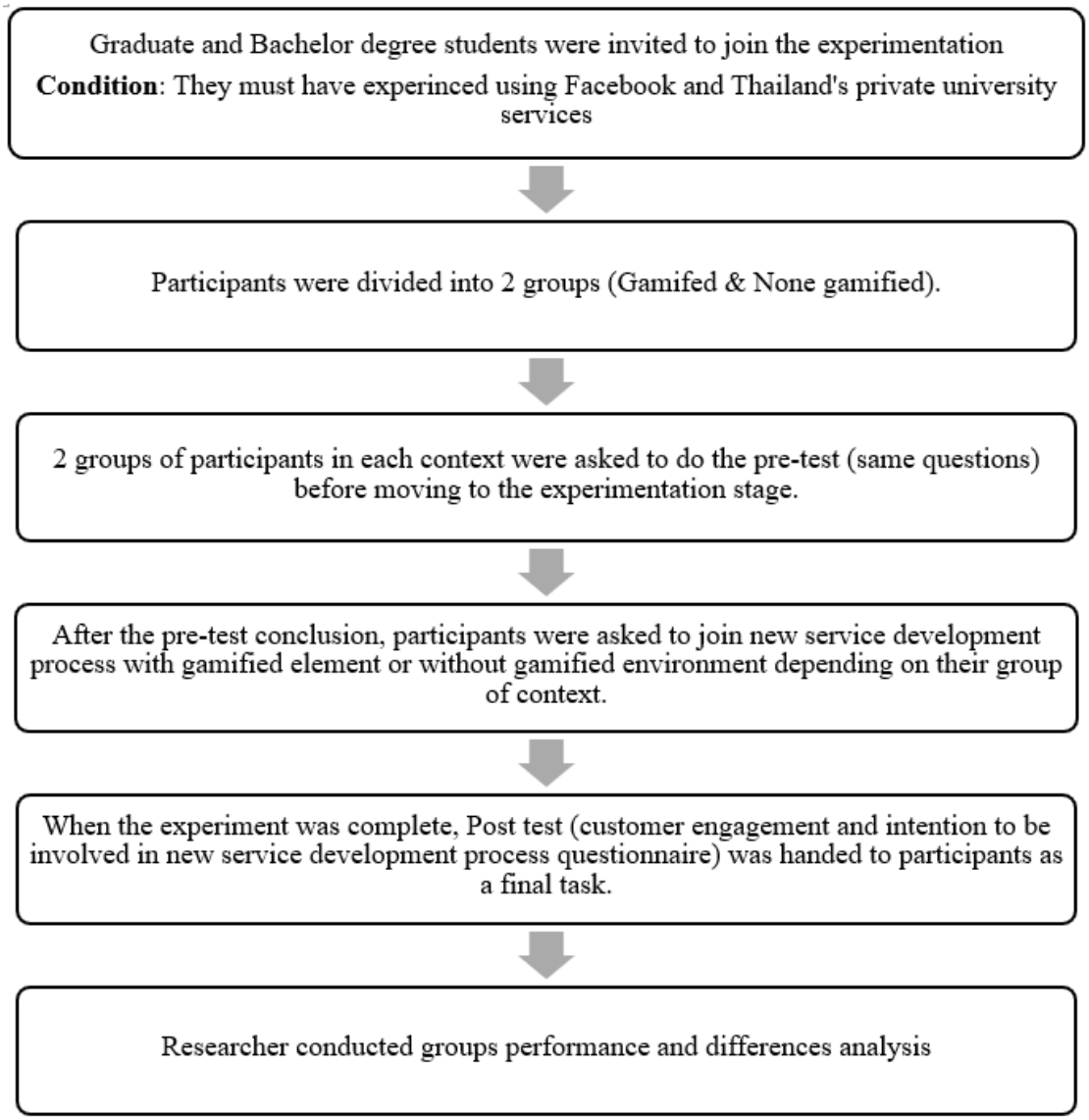


Figure 3.4: Data Collection Process

3.3.1 Quantitative Instrument

3.3.1.1 Questionnaire for customer engagement and intention to be involved in new service development process. Questionnaire to measure customer engagement and intention to be involved in the new service development process was used. The questionnaire for customer engagement level was adapted from So (2012) customer engagement survey (annex 1). The customer engagement components from So (2012) has defined customer engagement as "*a customer personal connection to a*

brand as manifested in cognitive, affective and behavioral responses outside of the purchase (Brodie, Hollebeek and Conduit, 2015).”

For the intention to be involved in new service development process, questionnaire survey from Rizwan (2014) was chosen and adapted (annex 1). The original questionnaire from Rizwan et al. (2014) is used to measure customer purchase intention. However, this research did not study the mentioned subject matter and, therefore, the questions from Rizwan et al. (2014) were adapted to focus more on customer activities regarding to NSD involvement instead.

After the first phase completion, this questionnaire survey was used again when the participants in phase two have already experienced gamification.

3.3.1.2 Gamification experiment. This study adopted a quasi-experimental nonequivalent control group design. The experimental group was set in a gamification environment while the control group will have to develop service process without gamification environment. The dependent variable is new service development process involvement. A quasi-experimental design has to take existing groups rather than drawing on random samples (Gray, 2014). “In experimental and quasi-experimental research, there is also the tendency to make use of hypotheses which the experiment seeks either to support or to refute. Experimental research is usually deductive. Instead of trying to manipulate an independent variable the researcher will often attempt to find groups of people who have experienced it in their own natural setting. An attempt is then made to compare the behaviour of this group with that of a similar group that has not experienced the event or phenomenon (Gray, 2014, p.29)”.

In addition, this research adopted the non-eqauivalent control group design. The pre-test and post-test had been designed and treated as assessments to identify the difference between both groups (treatment and control group) before and after encountering the action intervention.

Control Group	Pretest (Customer Engagement & Intention to be involved in NSD process)	No Treatment	Posttest (Customer Engagement & Intention to be involved in NSD process)
Treatment Group	Pretest (Customer Engagement & Intention to be involved in NSD process)	Experiment Treatment (Gamification)	Posttest (Customer Engagement & Intention to be involved in NSD process)

Figure 3.5: Control Group and Treatment Group Experimentation Process

For gamification experiment, the new service development process steps from Alam and Perry (2002) was applied in this research. In each stage, this research also suggested that gamification activities and processes were to determine the score for participants in each stage by separating the gamification environment into a competitive and cooperative environment (Table 3.3).

Table 3.3: Group of participants

Group of Participant	Group 1	Group 2
Gamification environment	None gamified elements	Gamified elements

Since the experimentation needs to be physically conducted, there are certain limitations on the processes that required participants to work as an individual and in a group. This research conducted experimentation in three stages of new service development process, which are strategic planning, idea generation, and idea screening as these three stages demonstrated the highest frequency of customer input (Alam and Perry, 2002).

Within each stage of the experiment, the concept of a game element from Wood and Reiners (2015) together with Fogg behavioral model (2009) were used together as a baseline for the gamification experimental design in this study. The implementation of both concepts for gamification design is explained at below;

1. Game's components

In this study, points were applied for scoring and determining the status of winner, individually and collectively in group, within each stage. Therefore, the participants were able to acknowledge their position, which will affect the reward and score that they will receive in each activity as well as at the end of the experimentation.

2. Game's Mechanics

There are challenges and opportunities in each activity that encouraged participants to earn more reward and exploit this opportunity to upgrade their position in the game. For instance, in certain activities, extra points were given to the players if their ideas were proposed and voted by the majority. This, regardless of the amount of ideas being presented, inspired the participants to emphasize on proposing qualitative ideas, aiming to win the majority vote.

3. Game's Dynamics

Apart from individual activities, the participants also needed to interact with the other participants collevtively in a group. This will incur different emotions and relationship between participants within the game environment.

4. Participants' intentions

In each stage, participants were provided with an objective and target that they need to complete to win score and leader position.

5. Participant's motivation

The rewards were added in the gamified environment to create motivation for the participants as the positional ranking were communicated to the participants. Also, the activities and interactions between participants had been design (gamified environment).

6. Participant's ability

Guidelines and instructions for each stage were provided and explained to participants. As a result, participants were able to learn and understand how to reach the goal.

7. Game's Trigger

Time limitation, bonus activities, and a reminder were provided.

All the detail of game element in the gamified environment for this study experiment is listed in Table 3.4.

Table 3.4: Gamification in each new service development process

Included in the Research	**New service development**	**Activities**	**Winning Criteria for Gamified Environment**	**None Gamified Environment**	**Gamified Environment**	**Game Element**
Yes	1. Strategic planning	Problem identification Participants (teams) needed to identify issues/problems related to the service they were assigned to.	• No. of submitted problems (Receive 1 point) • Relevance of problem that got the highest vote (Receive 5 points) • The most-voted problem will become the topic for the next stage for each group	8. All participants proposed a number of problems that they were aware of with regard to the touchpoints of customer journey. Participants were allowed to propose as many as possible.	9. All participants proposed a number of problems that they were aware of with regard to the touchpoints of customer journey. Participants were allowed to propose as many as possible.	• No. of problems • Leaderboard • Rewards - Score was granted to each Idea. Time limitation

(Continued)

Table 3.4 (Continued): Gamification in each new service development process

Included in the Research	New service development	Activities	Winning Criteria for Gamified Environment	None Gamified Environment	Gamified Environment	Game Element
Yes	2. Idea generation	Participants were tasked to work on the most-voted issue from stage-1 by generating ideas that could potentially solve the issue.	• No. of submitted idea (Receive 1 point) The top-3 most voted ideas were to become the solutions that will be accounted for in the next step.	• Each member in each team porposed their ideas that could solve the most-voted problem from stage-1. Each participant summed their ideas	• Each member in each team porposed their ideas that could solve the most-voted problem from stage-1. Each participant summed their ideas and noted down a number of solutions into table score.	• No. of ideas • Leaderboard • Rewards - - Score was granted to each idea Time limitation

(Continued)

Table 3.4 (Continued): Gamification in each new service development process

Included in the Research	New service development	Activities	Winning Criteria for Gamified Environment	None Gamified Environment	Gamified Environment	Game Element
Yes	3. Idea screening	3.1 Each team presented their problems and solutions to everyone. 3.2 The Participants needed to screen top ideas presented and explained by each team and, more importantly, give scores by considering;	3.1 The most voted idea (Receive 5 points)	Everyone voted for the best idea	Everyone voted for the best idea	- Rewards: Group that won the highest score received 5 points for everyone in the team.

(Continued)

Table 3.4 (Continued): Gamification in each new service development process

Included in the Research	New service development	Activities	Winning Criteria for Gamified Environment	None Gamified Environment	Gamified Environment	Game Element
		• Novelty: An idea is original, ingenious, imaginative or surprising. • Attractiveness: An idea is truly interesting and fascinating. • Feasibility: This idea can be easily implemented. • Relevance: An idea is relevant if it satisfies the goals set by the problem solver.				

(Continued)

Table 3.4 (Continued): Gamification in each new service development process

Included in the Research	New service development	Activities	Winning Criteria for Gamified Environment	None Gamified Environment	Gamified Environment	Game Element
No	4. Business analysis	4.1 The participants were asked to provide their comments on how the top-voted idea could be implemented for brands to gain competitive edge. This is to examine the feasibility that the idea can be worked on at the next stage. 4.2 The participants were allowed to see and vote for every comment.	Comment that received the high score.	Everyone voted for the best comment	Everyone wrote down their comment (receive 1 point per comment) Everyone voted for the best comment. The most voted comment will receive 5 points.	• Leaderboard • No. of comment • No. of Vote • Rewards

(Continued)

Table 3.4 (Continued): Gamification in each new service development process

Included in the Research	New service development	Activities	Winning Criteria for Gamified Environment	None Gamified Environment	Gamified Environment	Game Element
No	5. Formation of cross functional team	Determine a person to be involved in this process.	From stage-4, the Researcher will provide a list of teams that will be involved in the next stage evaluation.			
No	6. Service design and process system design	Design the full service which covered any concerned activitiy and delivery process for the involved personnel, i.e. staff. Service or any relevant training should be provided to the aforementioned personnel.	Measured by SERVQUL and each personal preference.	Researcher would conduct an evaluation on this stage by employing the SERVQUAL model. *SERVQUAL is a service quality model consisted of five factors; *"1. Tangible – Appearance of physical facilities, equipment, personal and communication materials.* *2. Reliability-The ability to perform the promised service dependably and accurately* *3. Responsiveness- the willingness to help customers and to provide prompt service* *4. Assurance- the knowledge and courtesy of employees and their ability to convey trust and confidence* *5. Empathy- the provision of caring, individualized attention to customers" (DeWitt, 2013 p. 38)*		
No	7. Personnel training					

(Continued)

Table 3.4 (Continued): Gamification in each new service development process

Included in the Research	**New service development**	**Activities**	**Winning Criteria for Gamified Environment**	**None Gamified Environment**	**Gamified Environment**	**Game Element**
No	8. Service testing and pilot run	Execute a re-prototype by roleplay, pre-prototype document, or VDO. Each participant observed the new service.	No. of comments and suggestions	Participants who provided comment and suggestion will receive score.	Participants who provided comment and suggestion will receive score.	• No. of comments and suggestions Rewards
No	9. Test marketing					
No	10. Commercialization					

3.4 Experimental Context

This research study focused on the impact of gamification towards intention to be involved in a process and new service development involvement. The reseacher believed that gamification is capabile of cause impacts in various environments. Two groups of participants were identified to study in this experimentation; which are 1) the Facebook users and 2) the private university service users in Thailand. In this case, Facebook is considered in this study since it is renowned for being an extremely huge online service platform, with customers from almost every corner of the globe. Additionally, Facebook also offers a wide range of services on its platform. With regard to these seemingly abundant number of users, the researcher expectd that, during the experimentation the users' opinions on Facebook services might be adequete. On the other hand, in purtsuit of an opportunity to study a different context, the researcher selected a group of the private university service users in Thailand. Unlike services provided on IT platform, universities are tasked provide their students with educational and support services which were worth including this experimentation.

3.5 Areas of Study

As stated previously, the study focused on three phases of new service development, which cover process strategic planning, idea generation, and idea screening phases. The strategic planning, participants need to identify issues/problems related to Facebook services and a private university services. Then for the idea generation phase, participant will continuesly use the issues/problems from strategic planning stage to find the solution and the last phase, idea screening phase, participants need to screen the idea based on six criterias to find the final appropriate idea, which are;

1. Novelty: An idea is original, ingenious, imaginative or surprising.
2. Attractiveness: An idea is really interesting and fascination.
3. Feasibility: This idea can be easily implemented.
4. Relevance: An idea is relevant if it satisfies the goals set by the problem solver.
5. Thoroughness: An idea is thorough if it is worked out in detail.
6. Financial: An idea is worth enough to invest.

As mentioned in chapter two, new service performance can be measure by financial performance and non-financial performance (Bastic & Nekrep., 2009, p. 69) but these two ways of measurement can be used after the new service already launch to the market. However, the idea screening phase, which is the last phase of experimentation for this study, the outcome is still not the ready service that can launch to the market both financial and non-financial performance cannot be used to screen the idea. According to this, this study has been created six criteria, which mentioned previously to help the participant to screen and identify the idea that should go to the next stage. The screening criteria focus on service user's perspective due to most of the participants in the experimentation are treated as customers of each service. The dimensions or angles of service provider thought will not be included in this phase.

3.6 Group for Experiments

The group for experiments can be divided in to two groups, which are; gamified environment and none gamified environment for both new service development process for Facebook services and a private university services. One participant will participate in only one type of service and one environment. For

example, Mr. A participate in Facebook services and gamified environment. Mr. A will not participate again in Facebook services in none gamified environment and will also not participate in any experimentation's environments of a private university new service development process.

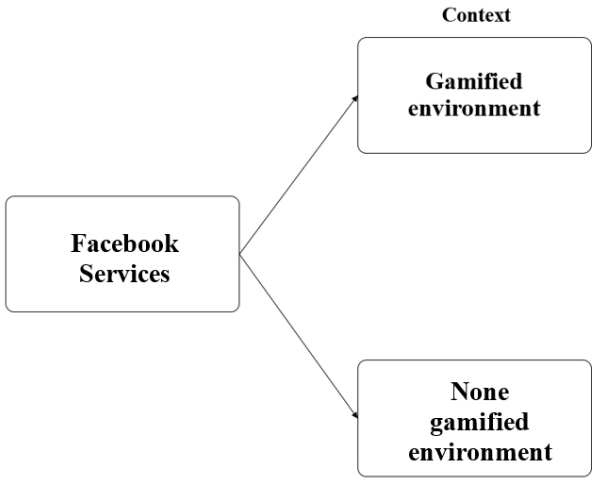


Figure 3.6: Group for experiment: Facebook context

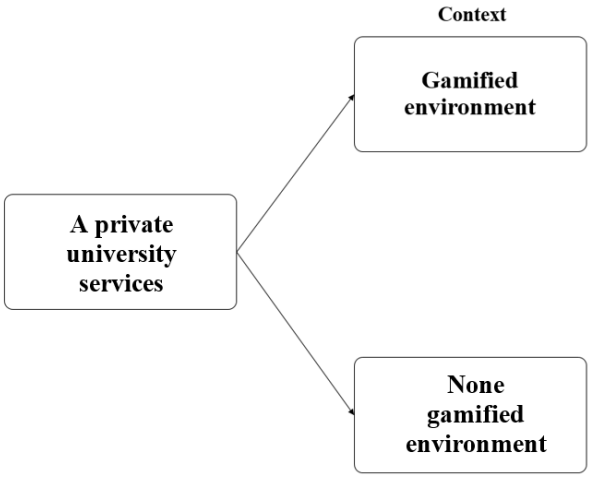


Figure 3.7: Group for experiment: a private university context

CHAPTER 4

DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter discusses the findings from the experimentation of the involvement of participants in new service development (NSD) in gamification and the none gamification environments in two different contexts, which are to create new service development for Facebook and private university services. The chapter consists of several sections. To begin with, participant profiles were developed to introduce the participants to this experimentation. In this case, a summary of group characteristics was also included. The second section presents the results of each hypothesis; in correlation with findings from the research questions. The following research questions were posed:

1. To what extent does customer engagement enhance intention to be involved in NSD?
2. To what extent does intention to be involved in NSD enhance NSD involvement?
3. Does gamification moderate the relationship between intention to be involved in NSD process and NSD involvement, and to what extent?
4. To what extent does customer engagement increase after the customers were involved in a gamified NSD process?
5. To what extent does intention to be involved in NSD process increase after customers have been involved in a gamified NSD process

This chapter presents the findings for research question 1-5.

4.2 Pilot Test

The Pilot test was conducted on 16 October 2015. Under the experimentation part, eight participants joined this pilot test. Age of the eight individuals ranges between 28 – 33 years old whose professions are associated with a business consultant, IT and, architect fields. For the questionnaire part, 30 individuals participated in the instrument pilot test, which helped to identify the reliability of the instruments for this part.

4.2.1 Lessons from the Pilot Study

The pilot test had three overall processes, which were;

4.2.1.1 Pre-survey (Before the experimentation)

In this stage, participants were asked to fill up the pre-surveys as follows:

4.2.1.1.1 Customer engagement survey

4.2.1.1.2 Intention to be involved in the new service development process

4.2.1.2 Experimental process

A particular challenge that the researcher experienced during the experimental process was an unexpected time consumption as the participants were asked to discuss and cluster their results altogether but, however, the discussions on services provided by a certain brand or an organization, in the provided gamified environment, can be different. This had often caused confusions and, as a result, required the researcher to spend more time with the participants; allowing them to discuss the problems and solutions.

The eight individuals needed to participate in the experimentation which covered two contexts namely Facebook services and private university services

contexts. The individuals were asked to participate in the private university services context and Facebook context respectively by one round on Facebook services and another round for private university services.

4.2.1.3 Post survey

The post survey covered an application of customer engagement survey and intention to be involved in new service development process survey of which the questionnaires were different from those used in the pre-survey process.

With regard to the experimentation, the researcher noticed certain problems and weaknesses as follows;

4.2.1.3.1 Thai language questionnaire

The participants did mention that the Thai questionnaire ought to be revised due to its ambiguity if compared with the English version. Moreover, a connection between sentences was not very fluid.

4.2.1.3.2 The need to identify university name in the first round of pilot test

Within the private university services context, participants were asked to provide a name of the university that they mostly engage and interact with. In the pilot test, each of the participants had given different university names. Consequently, this difference had resulted in numerous confusions during the experiment as each participant has experienced different service-related problems. This eventually led to a certain difficulty when each participant was asked to give the score to the others since the perceived problems on the services are considered subjective.

With reference to this problem, the participants then inevitably had to separately explain their problem in succession which unexpectedly consumed more time.

4.2.1.3.4 Clustering process

The clustering process also unexpectedly took longer and became rather complicated; especially the process for the private university services context. This was because eight participants had provided a total of twenty-eight answers of which many were dubious and ambiguous as some answer did not concern service products but rather on tangible products. More importantly, grouping the answers within the same cluster had also been difficult due to their differences. This had required a very careful analysis which affect time consumption on the experiment.

4.2.1.3.5 Counting score

During the pilot test, the eight participants were asked to announce their scores to the facilitator after finishing each activity. However, in the actual experimentation, this might be inappropriate since the total amount of the participants was about four times more.

4.2.1.3.6 Time

The participants commented that the time given for each activity was too short (the short period of time was intended to stir up participants' excitement). They reaffirmed and suggested that the researcher should have given more time to process their thoughts in each activity. They believed that an excessively short period of time could negatively affect the quality of each idea.

4.2.1.2 Improvement and development points from pilot test result

After the pilot test, all the concerns from the participants were considered to improve/develop the final experimentation as follows;

4.2.1.2.1 Thai Language in questionnaire

Thai language questionnaire was reviewed and adjusted in accordance with the participants' concerns during the pilot test.

4.2.1.2.2 The Need to identify university name in the first round of pilot test

The researcher removed the question that requires the participant to provide their engaged university. Instead, the instruction part of the questionnaire was tailored to accommodate the participants of this experiment which were from the same Private University students.

4.2.1.2.3 Clustering Process and Counting Score

From the pilot test, the researcher noted that this process was the most time-consuming and, therefore, the scoring form and instruction were created and would be explained to the participants prior to activity to shorten the activity time. In terms of the score tracking in the scoring form, this was done by the participants. As the individuals also had to participate the experiment collectively in team, the team members were allowed to support/check one another's score. Additionally, the rewarding system was instructed to the participants at the start of the experimentation in the gamified environment. This was expected to help remind the participants that score was individually granted regardless of having to collectively work as a team.

4.2.1.2.4 Time

A given period of time for each activity was adjusted in accordance with suggestions from the participants during the pilot test. The time duration was reduced from 3 hours from the pilot test to 1.5 - 2 hours in the real experimentation. The time duration for small group (< 40) were not longer than 1.5 hours and (> 60 – 80) were not longer than 2 hours.

4.2.2 Reliability and Validity

To ensure that the instruments used in this research is appropriate, their reliability and validity were assessed and identified. The reliability assessment was done to measure a consistency of the instrument, and the validity assessment had aimed to focus on the target of measurement. Both reliability and validity needed to be measured to ensure that the quality of the instrument was acceptable for this study.

4.2.2.1 Reliability. “Reliability is consistency of measurement or stability of measurement over a variety of conditions in which the same results should be obtained (Drost, 2011. p. 105)”. For all questionnaires, experiment instruction, and experiment stage, a double translation from Thai to English was conducted to ensure correct connotation and context in both languages. Thereafter, the reliability of the questionnaire and gamification experiment, by implementing pilot tests, were provided.

In addition, technically, reliability is an indicator for consistency, which is used to estimate the stability of measures administered at different times to the same individuals or applying the same standard or the equivalence of sets of items

from the same test or of different observers scoring a behavior or event using the same instrument (Kimberlin, 2008).

In this research, the researcher utilized Cronbach's Alpha to measure reliability. Cronbach's Alpha is the most well-known method to evaluate internal consistency reliability. The method was developed by Lee Cronbach's in 1951 to provide a test/scale measure for the internal consistency. The range is from 0.00 to 1.00, with higher coefficients indicating higher levels of reliability. Besides, reliability estimation displays the amount of measurement error in a test. Simply put, this interpretation of reliability is the correlation of test itself. Squaring this correlation and subtracting from 1.00 produces the index of measurement error (Tavakol & Dennick, 2011). Nunnaly (1978) has indicated that 0.7 is an acceptable reliability coefficient.

Cronbach's Alpha reliability statistics. For each construct, the researcher analyzed the Cronbach's Alpha statistical value as presented below.

1. Customer Engagement Pre-test

The Cronbach's Alpha value for the *Support* construct α= 0.924 is greater than 0.7. Consequently, one can be satisfied with the reliability level of this construct.

Table 4.1: N size (Customer Engagement Pre-test)

		N	**%**
Cases	**Valid**	30	100.0
	Excluded[a]	0	0.0
	Total	30	100.0

Table 4.2: Cronbach's Alpha (Customer Engagement Pre-test)

Cronbach's Alpha	N of Items
0.924	28

2. Intention to be involved in NSD Process (Pre-test)

The Cronbach's Alpha value for the *Intention to be involved in NSD Process* α=0.845 is greater than 0.7. Consequently, one can be satisfied with the reliability level of this construct.

Table 4.3: N size (Intention to be involved in NSD Process Pre-test)

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	0.0
	Total	30	100.0

Table 4.4: Cronbach's Alpha (Intention to be involved in NSD Process Pre-test)

Cronbach's Alpha	N of Items
0.845	6

3. Customer Engagement post-test

The Cronbach's Alpha value for the *customer engagement post-test* construct α= 0.757 is greater than 0.7. Consequently, one can be satisfied with the reliability level of this construct.

Table 4.5: N size (Customer Engagement Post-test)

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	0.0
	Total	30	100.0

Table 4.6: Cronbach's Alpha (Customer Engagement Post-test)

Cronbach's Alpha	N of Items
0.757	3

According to the aforementioned results, all the instruments have the value of Cronbach's Alpha higher than 0.7. Therefore, one can conclude that all the instruments are reliable.

4. Intention to be involved in NSD Process (Post-test)

The Cronbach's Alpha value for the *Intention to be involved in NSD Process* α=0.846 is greater than 0.7. Consequently, one can be satisfied with the reliability level of this construct.

Table 4.7: N size (Intention to be involved in NSD Process Post-test)

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	0.0
	Total	30	100.0

Table 4.8: Cronbach's Alpha (Intention to be involved in NSD Process Post-test)

Cronbach's Alpha	N of Items
0.846	3

According to the abovementioned results, all the instruments have the value of Cronbach's Alpha higher than 0.7. Therefore, one can conclude that all the instruments are reliable.

4.2.2.2 Validity

1. The content validity of the questionnaire

To measure the content validity of the questionnaire, the instrument was forwarded to groups of individuals who are experienced and familiar with business consulting as the researcher assumed these individuals understand the concept of customer engagement as well as the process of product or service developments which involve customers' participation.

2. Face validity

With regard to the limitation of the population samples in this research, the researcher limitedly focuses on the population to the students from the graduate school in public and private universities in Thailand as participants who were able to engage and commit to the experimental process were necessary. Moreover, participants who were involved in experimental stage needed to experience an interaction with services of the specific brands and organizations. According to this, an experiment with other groups of people who did not participate in this research can be assessed to confirm the validity of the instruments, which will impact research results.

3. Model Validity

Validity is the measurement of an accuracy of certain instruments used in a study (Said, 2011). In this research, the structural equation modeling (SEM) is used to measure model validity. SEM techniques is a common tool that is used for conducting an initial evaluation of the differential validity of measurement instruments in the model (Ruth, 2000). The researcher used a Confirmatory Factor Analysis (CFA) in Structural Equation Modeling (SEM) to test the validity and reliability of the instruments in this research through AMOS (Analysis of Moment Structures) programs relating to the application of SEM within the framework of a CFA model of which CFA will illustrate the pattern of observed variables for those latent constructs hypothesized model. The most important purpose was to find the positive or negative correlations between the conceptual framework constructs.

Due to the limitation of number of participants in this research, the observed variables were reduced from the original plan, especially in part of customer engagement questionnaire. As mentioned previously, the customer engagement questionnaire divided into two parts, which are; pretest and posttest. For pretest, there are thirty-four questions and posttest, there are six questions. The reason that the number of questionnaire are different is, during the pilot test and even in the real experimentation, researcher discussed with pilot group as same as observed from the real experimentation group that participant were tired to do the same amount of questionnaire during the posttest session and participant have mentioned that after the experimentation to do the same set of questions they might need sometimes to reflecting and observing themselves how engage and intention to be involved to the process is changing from their side toward the services that they have involved in the

experimentation. However, with the limitation of following process as same as time limitation, researcher designed to reducing the number of questionnaires for posttest instead. This supports participants in terms of time as same as still create engaging moment for participant toward the experimentation.

As stated previously, to ensure that the reducing of observed variables due to the limitation of the experimentation's conditions, is not affect to the result of this research the correlation between pretest of customer engagement and posttest customer engagement have been conducted.

To find the correlation between, pretest and posttest, researcher started with identifying relationship inside pretest and posttest of each observed variables in each latent variable. After that the correlation test between pretest customer engagement and posttest customer engagement was conducted.

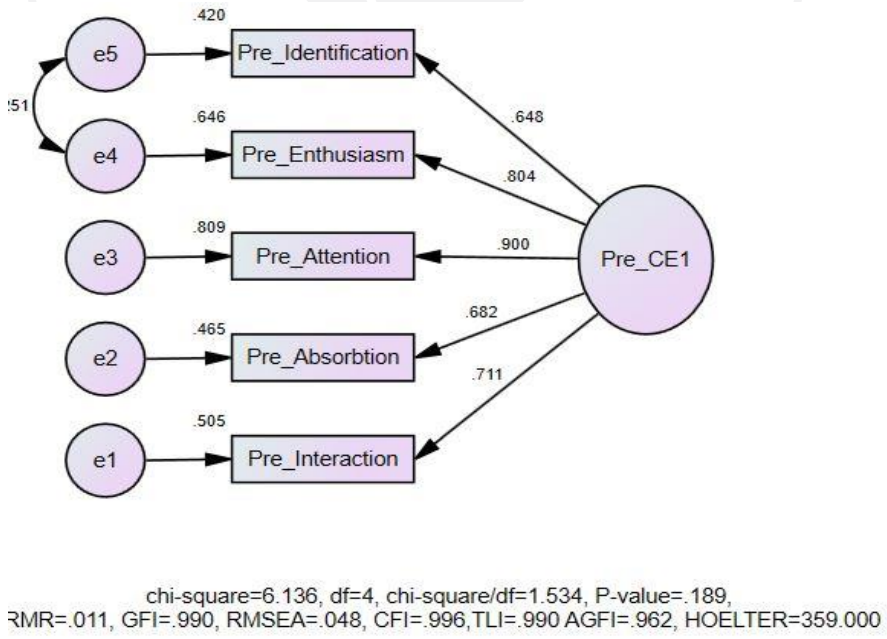


Figure 4.1: Relationship result between latent variable (Pre-test customer engagement) and five observed variables

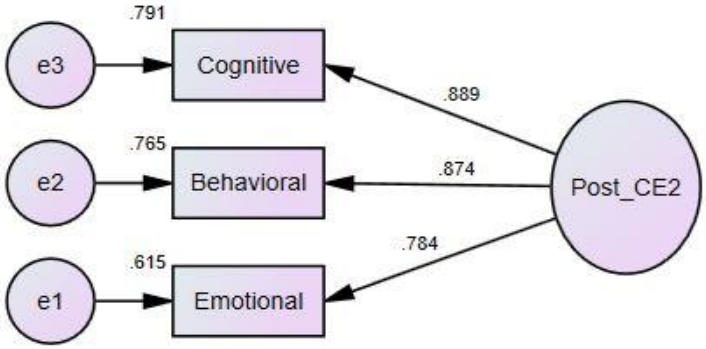


Figure 4.2: Relationship result between latent variable (Post-test customer engagement) and three observed variables

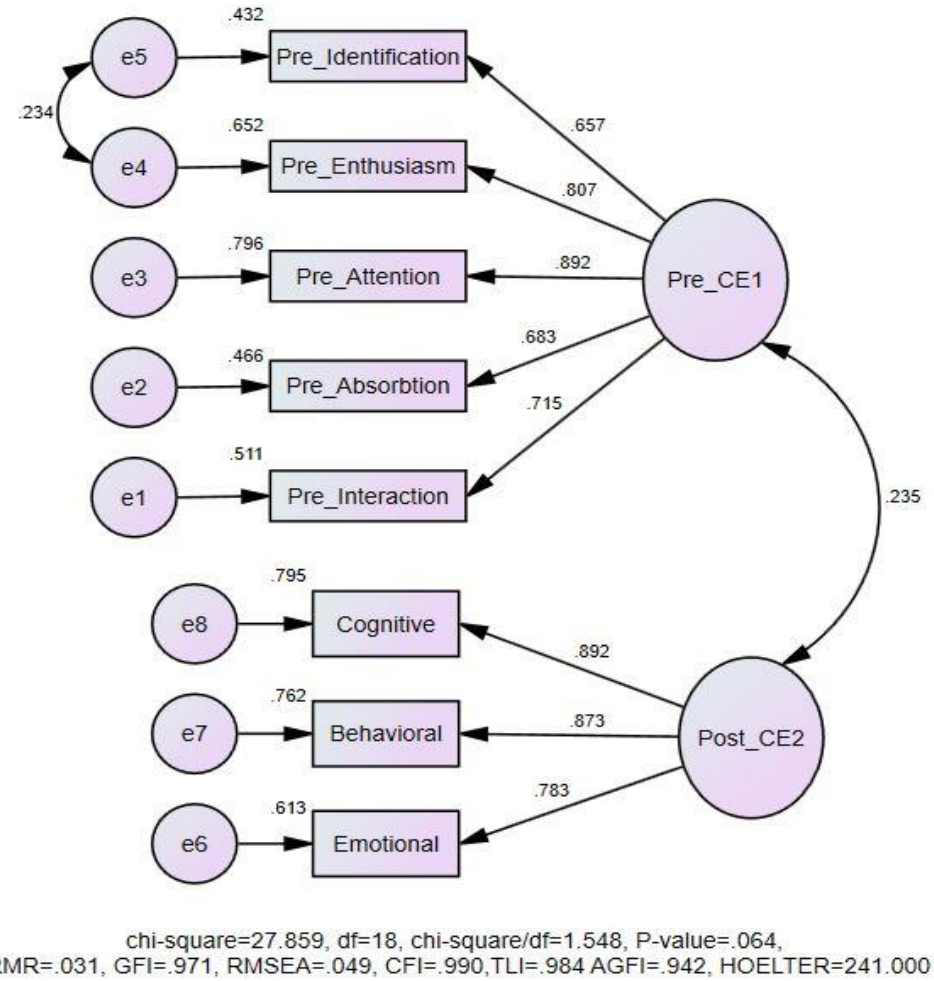


Figure 4.3: Correlation result between pretest and posttest latent variables

Table 4.9: Covariances Result between pre and post-test customer engagement

	Estimate	**S.E.**	**C.R.**	**P**
Pretest customer engagement <--> Posttest Customer engagement	0.076	0.025	3.025	0.002

Table 4.10: Correlations result between pre and post-test customer engagement

	Estimate
Pretest customer engagement <--> Posttest Customer engagement	0.235

According to the result, pretest customer engagement and posttest customer engagement have significantly correlate between each other.

Other than above, to ensure that the model is fit, the CFA process was used to determine whether the hypothesized structure provides a good fit to the data or not. As same as the CFA was used to identify the relationship between each variable in the model.

As mentioned earlier, this study used Structural Equation Modeling (SEM) with AMOS 21.0 to test the hypothesized relationship among variables. The SEM enables a researcher to simultaneously estimate the multiple regression equations in a single framework, and examine the interrelated relationship, both directly and indirectly, between several latent constructs in the same decision context (Hair, Black, Babin, & Anderson, 2010). The measurement model indices revealed that the proposed model was generally fit and parsimonious. Thus, the fit test results confirmed that all of the variables can be tested and measured in the proposed model (Table 4.11).

Table 4.11: Characteristics of Different Fit Indices Demonstrating Goodness-of-Fit Across Different Model Situations

No. of Stat. vars. *(m)*	*N* < 250			*N* > 250		
	***m* ≤ 12**	**12 < *m* < 30**	***m* ≥ 30**	***m* < 12**	**12 < *m* < 30**	***m* ≥ 30**
χ^2	Insignificant *p*-values expected	Significant *p*-values even with good fit	Significant *p*-values expected	Insignificant *p*-values even with good fit	Significant *p*-values expected	Significant *p*-values expected
CFI or TLI	.97 or better	.95 or better	Above .92	.95 or better	Above .92	Abo e 90
RNI	May not diagnose misspecification well	.95 or better	Above .92	.95 or better, not used with *N* > 1,000	Above .92, not used with *N* > 1, 00	Above .90, not used with *N* > 1,000
SRMR	Biased upward, use other indices	.08 or less (with CFI of .95 or higher)	Less than .09 (with CFI above .92)	Biased upward; use other indices	.08 less (with CFI above .92)	.08 or less (with CFI above .92)
RMSEA	Values < .08 with CFI = .97 or higher	Values < .08 with CFI of .95 or higher	Values < .08 with CFI above .92	Values .07 wi h C I f .97 o higher	Values < .07 with CFI of .92 or higher	Values < .07 with CFI of .90 or higher

Note: m = number of observed variables; *N* applies to number of observations per gr p when applying CFA to multiple groups at the same time.

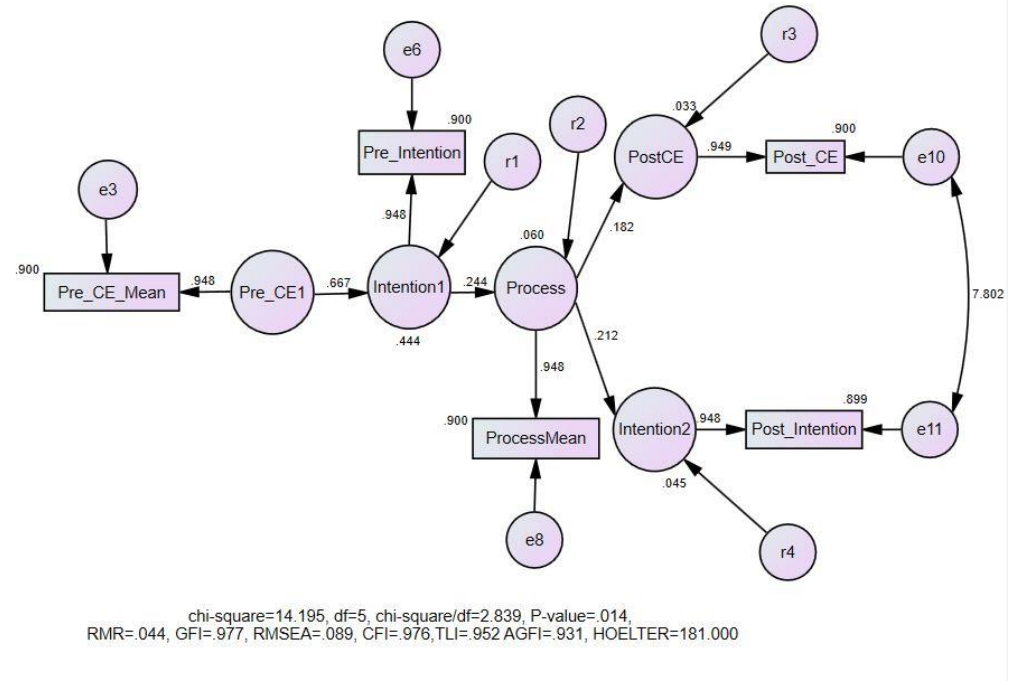


Figure 4.4: AMOS result for main model included both Gamified and None Gamified Environment

According to the fit indices (Table 4.11), the overall model was significant. From these results, in this research, this model was selected as the best fit for the data.

4.3 Experimentation Results

The first section in this part will present demographic profile of participants which includes gender, age, nationality and context of experiment. These characteristics are shown in Table 4.12.

Table 4.12: Demographic Characteristics of participant

Characteristics	**n (frequency)**	**Percentage**
Gender		
Female	122	52.361
Male	111	47.639
Age-Group		
17 – 20	113	48.498
21 – 24	75	32.189
25 – 28	35	15.021
29 – 32	6	2.575
33 – 36	3	1.288
37 – 40	1	0.429
Nationality		
Bangladesh	1	0.429
Burmese	1	0.429
Cambodian	2	0.858
Chinese	16	6.867
German	3	1.288
Indian	4	1.717
Indonesian	1	0.429
Italian	1	0.429
Japanese	2	0.858
Korean	1	0.429
Myanmar	6	2.575
Nepalese	1	0.429
Nigerian	1	0.429
Pakistan	1	0.429

Table 4.12 (Continued): Demographic Characteristics of participant

Characteristics	**n (frequency)**	**Percentage**
Thai	189	81.116
Ukrainian	1	0.429
Vietnamese	2	0.858
Context of Experimentation		
Facebook Services	**162**	
Control Group	95	40.773
Treatment Group	67	28.755
University Services	**71**	
Control Group	33	14.163
Treatment Group	38	16.309

4.3.1 Experimentation process

Six rounds of experimentation were conducted over a period five day, which involved bachelor (2 rounds) and master's degree students (4 rounds) in a private university. The experimentation was conducted between October 2016 until February 2017. Four rounds used a gamified environment and two rounds a none gamified environment. The number of participants for gamified and none gamified was balanced.

Table 4.13: Number and degree of participants towards each experimentation context

Context of Experimentation	**Type of Degree**	**No. Of participant**
Facebook Services		**162**
Control Group	Bachelor/Master	95
Treatment Group	Bachelor/Master	67
University Services		**71**
Control Group	Bachelor	33
Treatment Group	Bachelor	38

The experimentation process comprised of both individual and group activities and was divided into three phases of the NSD process; which were strategic planning, idea generation, and idea screening phase. Before and after the experimentation, participants were asked to take the pretest and posttest respectively. This included questionnaires about customer engagement and intention to be involved in NSD process.

The experimentation process is displayed below;

1. Strategic planning stage

In this stage, participants were asked to come up with the problems that they have been experiencing from using Facebook or university services or provide any suggestion that could be applied to improve the services. The process instruction is at in table 4.14;

Table 4.14: The process instruction for strategic planning stage

Identify Problem Stage
• Participants were divided into 4 groups (Approximately 5-6 people per group, total no. of participant 36)
• Each group received a customer journey paper (A3) of each environment. • Customer journey is provided by facilitator.
• Each participant received paper with scoring table to record their score.

• Member of each group were asked to come up with problems that they have experienced (This could be any problem in any touch point of the customer journey).
  • Participants wrote down their problems on post-it and stick it to the customer journey paper.
  • Participants were allowed to write down as many problems as preferable but the problems that were allowed to be stuck on the customer journey paper must not to be identical. In this regard, among the first participants to stick their problems would be more advantageous.
  • Each team member wrote down the number of problems that they can come up with on the table score.

• **Find the relevant problem to next stage**
Members in each group received 3 stickers to attach to the problem that they believed was the most significant/severe.
  • <u>Rule</u>
  • Participants were not allowed to vote for their own problems.
  • Participant must only vote for the others' problems.
  • A member's problem that received the highest vote would be selected for the next stage.
  • In this part, every participant had 5 minutes to read and decide which problem that they will vote for.

2. Idea generation stage

In this stage, participants in each group were asked to propose their ideas that could potentially solve the problem that received the highest score from first stage and agreed upon by each group. The process instruction is demonstrated in table 4.15;

Table 4.15: The process instruction for idea generation stage

Idea Generation Stage
1) Each group proposed their ideas to solve their pick-up solution from the 1st stage
• Each team received new A3 paper with column that displayed names of participants. • Each member in each team wrote down their ideas that could potentially solve the problem chosen from the 1st stage and stick them on the given A3 paper. • Each participant counted their numbers of idea that were stuck to the wall and subsequently noted down the number of solutions into scoring table. • In this part, each team had 10 minutes.
2) Identifying the best 3 ideas from each group
• Each team member received 3 stickers. • Each member had 10 minutes to attempt to understand the ideas • Each member attached the stickers to 3 ideas that they like most <u>Rule</u> It was not allowed to attach the stickers on their own idea • 3 ideas that were most-voted would become the solutions applied in the next step.
3) Creating the big picture
• Each team used the top 3 ideas from previous step to create storytelling by drawing or writing it in the A3 paper. • Each team had 10 minutes to create the storytelling. • This activity would lead to next step. In front of the participants, each team was asked to present their problems and ideas to solve them.

Figure 4.5: Participants participate in strategic planning stage

Figure 4.6: Example of result from strategic planning and idea generation stage

3. Idea screening stage

This is the final stage of this experimentation. In this stage, each group was asked to find the best solution to solve the final problem, derived from the strategic planning stage. The process instruction is portrayed in table 4.16;

Table 4.16: The process instruction for idea screening stage

Idea Screening Stage

Finding the most concerned problem and the best solution
• Each group received 6 stickers (Different colors). Each sticker represented different characteristics, namely;
  • Novelty: An idea is original, ingenious, imaginative or surprising.
  • Attractiveness: An idea is truly interesting and fascinating.
  • Feasibility: An idea can be easily implemented.
  • Relevance: An idea is relevant if it satisfies the goals set by the problem solver.
  • Thoroughness: An idea is thorough if it is worked out in detail.
  • Financial: An idea is worth an investment.

• Each group chose their representative (1-2 people) to present their problems and solutions. Each group had 5 minutes to present
• After every presentation was done, each team attached the aforementioned stickers, considering their characteristics Rule Participants were not allowed to vote for their own problem.
• Facilitator summarized the result to everyone and wrap up the activities before moving to the post-survey process.

Figure 4.7: Participants participate in idea screening stage

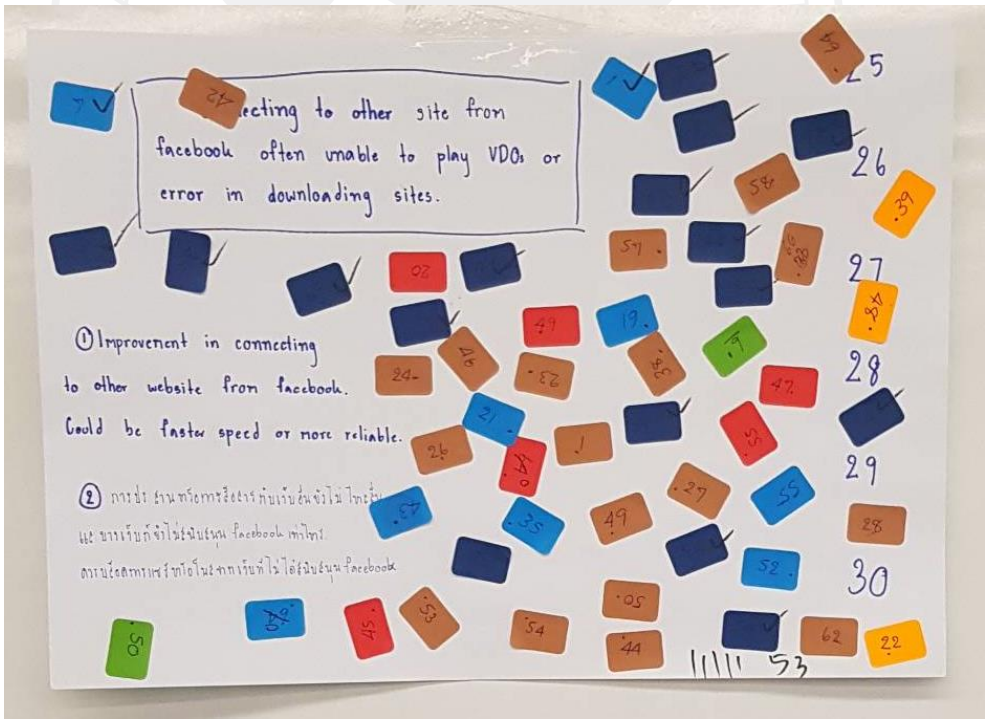


Figure 4.8: Example result from participant in idea screening stage

4.3.2 Findings

This part presents the result of this research. The analysis and the evaluation of the experimentation result were performed through the conceptual framework of this research. The results related to the structural model and explain the result of five research questions, which are;

Research Question 1: To what extent does customer engagement enhance the new service development process involvement?

The objective of research question 1 is to ensure that customer engagement can enhance the efficiency of new service development process.

H1: The degree of customer engagement has a positive effect on their intention to be involved in the new service development process

$H1_0$: There is no relationship between customer engagement and the intention to be involved in the new service development process

For hypothesis 1, the result already shows in figure 4.4 that customer engagement has a positive effect on each participant's intention to be involved in new service development process (standardized coefficient = 0.667).

Research question 2: To what extent does intention to be involved in the new service development enhance new service development involvement?

The research hypothesis for research question 2 is;

H2: The degree of customer's intention to be involved in the new service development process has a positive effect on their involvement in the process.

$H2_0$: There is no relationship between intention to be involved in the new service development process and the NSD process involvement

For hypothesis 2, the result already shows in figure 4.4 that intention to be involved in NSD process has a positive effect on each participant's NSD process involvement (standardized coefficient = 0.244).

Research Question 3: Does, and to which extend gamification moderate the relationship between intention to be involved in new service development process and new service development process involvement?

The aim of this research question is to find the impact of gamification toward the relationship between intention to be involved in new service development process and new service development process involvement.

H3: Customer who participate in the gamified environment have a stronger relationship between intention to be involved in NDS process and NDS process than customers who participate in a none gamified environment

$H3_0$: There is no relationship between customer engagement and the intention to be involved in the new service development process

From research question 3, to measure the relationship of variables and identify the impact of gamification as a moderator model of this research, the SEM analysis has been performed on data from different environment, which are; gamified environment and none gamified environment.

To analyze the moderating effect of gamification, this research conducted the moderating variable analysis follow Awang, Z (2012) AMOS instruction. First the data had been splitted into two groups based on the moderator variable test, in this

case, the data from gamified environment and none gamified environment had been separate. Then the data had been processing via the AMOS programs.

To identify that gamification is a moderator or not, researcher had compared the chi-square of main model (Table 4.17) with both gamified environment and none gamified environment. The moderation test will be significant, if the chi-square of separate model gamified and none gamified environment higher than main model, which contain both data of gamified and none gamified environment. According to the result, the chi-square of gamified and none gamified environment higher than main model. So, the model for gamified and none gamified environment (sperate environment) are significant. Other than that according to structural model, the result shows that the standardized coefficient score between intention to be involved in NSD process to NSD process involvement in gamified environment is higher than none gamified environment (standardized coefficient score of gamified environment= 0.470, none gamified environment = -0.34).

1. None gamified environment

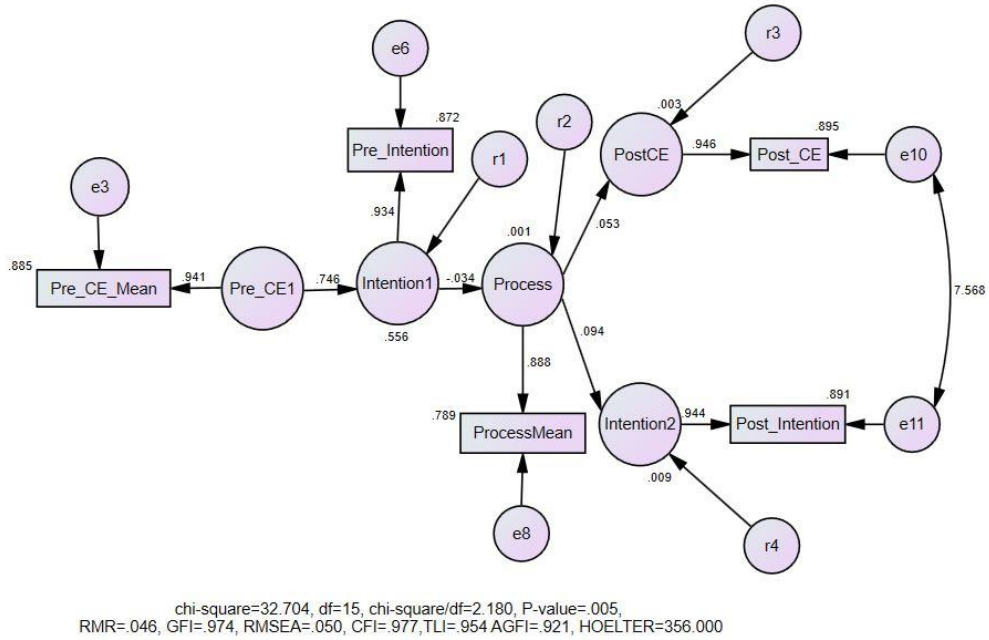


Figure 4.9: AMOS result for none gamified environment

2. Gamified environment

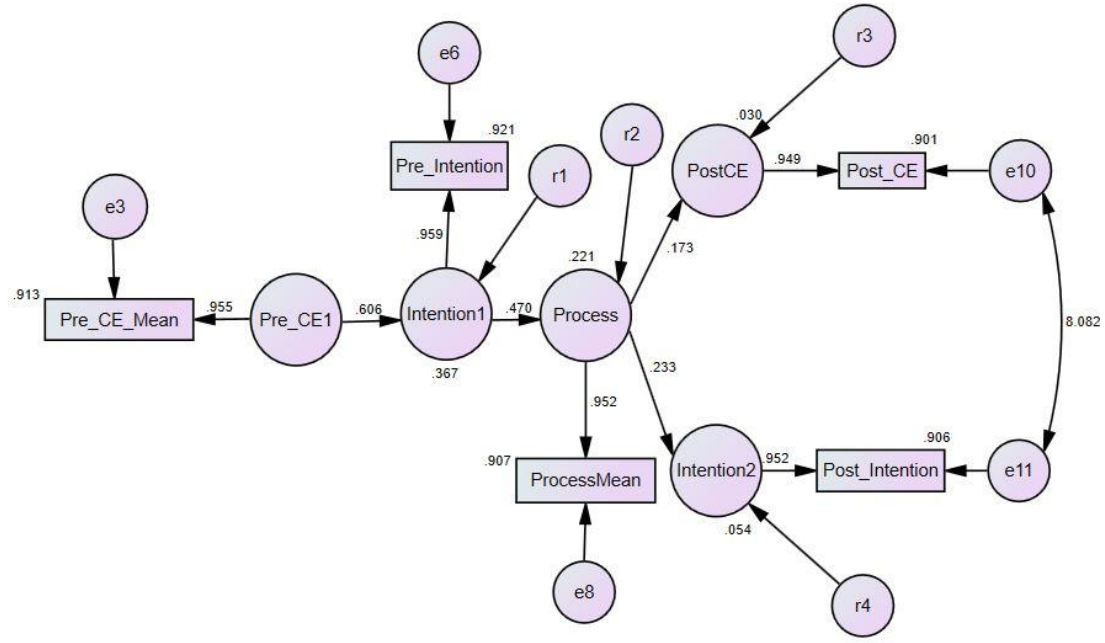


Figure 4.10: AMOS result for gamified environment

Table 4.17: Comparing Main Model with Group Model (Gamified and None Gamified Environment)

Model	**Chi-Square**	**df**	**Beta**
Default model	14.195	5	.244*
Group model	32.704	15	
- Gamified Environment			.470*
- None gamified environment			-0.34
χ2 diff	18.509		
dfDiff		10	
Result on Moderation	**Model different was significant**		

From the overall model and sperate model via environment, which are; gamified and none gamified environment, this research also analyzed gamification as a moderator in both Facebook services context and private university context. As same as main model, in both Facebook services and private university services context, this research starts the analysis by comparing the overall model of each context together with separate data into two types, which are participants who participate in gamified and none gamified environment in each context. Below is the result separated via context.

Facebook services context

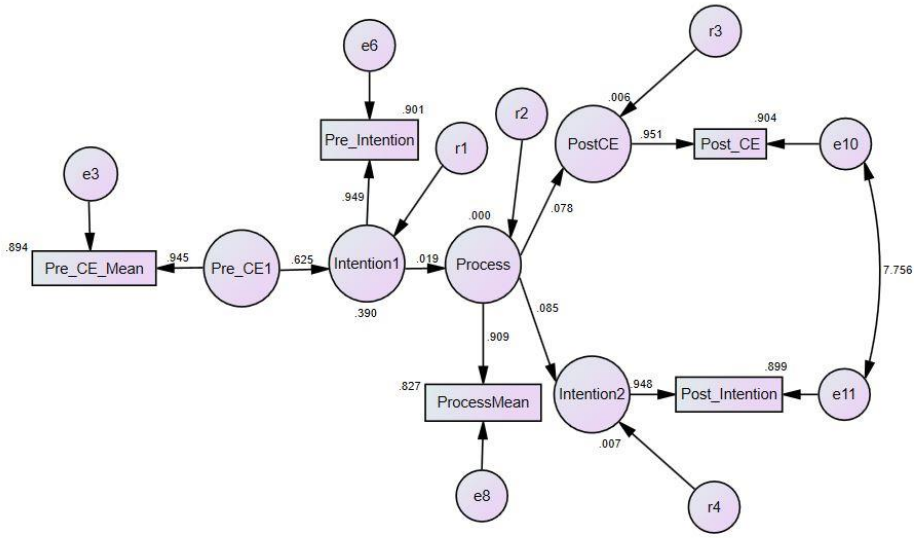


Figure 4.11: AMOS result for Main Model of Facebook service context (both gamified and none gamified environment)

1. Gamified environment for Facebook context

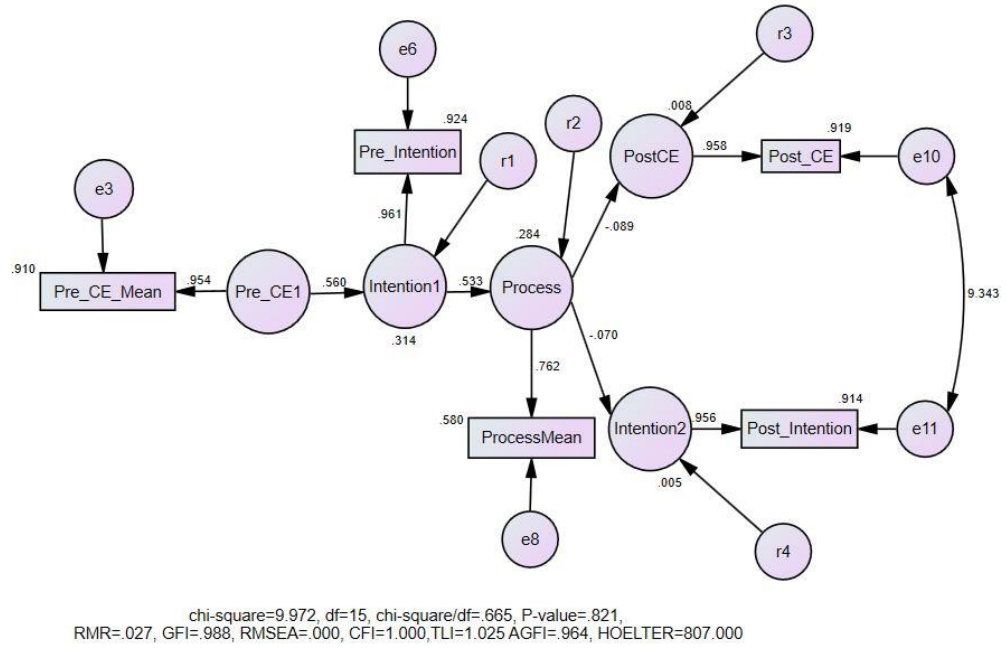


Figure 4.12: AMOS result for Facebook service context for gamified environment

2. None gamified environment for Facebook context

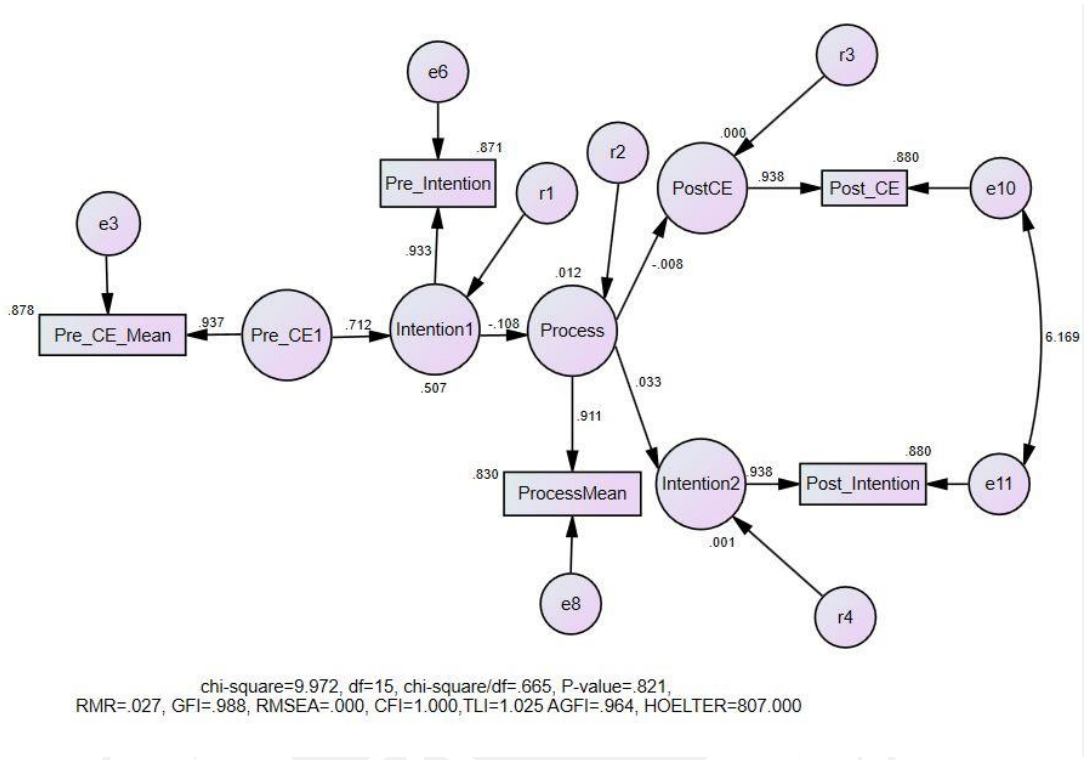


Figure 4.13: AMOS result for Facebook service context for none gamified environment

Table 4.18: Comparing Main Model of Facebook service context with Group Model (Gamified and None Gamified Environment)

Model	**Chi-Square**	**df**	**Beta**
Default model	1.516	5	.019
Group model	9.972	15	
- Gamified Environment			.533*
- None gamified environment			-.108
χ2 diff	8.456	10	
dfDiff	1.516	5	.019
Result on Moderation	**Model difference was insignificant**		

As same as previous, to identify that gamification is a moderator or not in Facebook context, researcher compared the chi-square of main model (Table 4.18)

with both gamified environment and none gamified environment in Facebook context. The moderation test will be significant, if the chi-square result of main model with contain both gamified and none gamified data less than the separate environment's chi-square. According to the result, the chi-square of gamified and none gamified environment (separate environment) are less than main model with contain both gamified and none gamified data (8.456 < 18.307). So, the model for gamified and none gamified environment (sperate environment) are insignificant. According to this result, this can describe that gamification did not perform as a moderator variable for Facebook service context.

Private University Context

1. Main Model of Private University Services

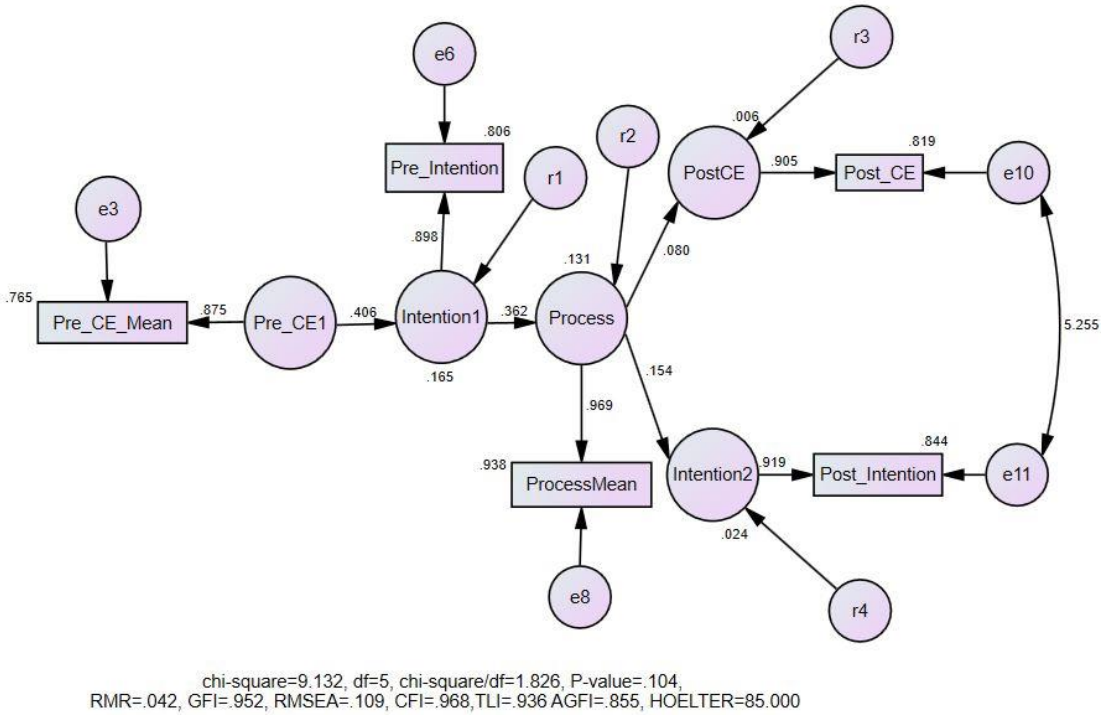


Figure 4.14: AMOS result for Main Model of private university service context (both gamified and none gamified environment)

Gamified environment for private university context

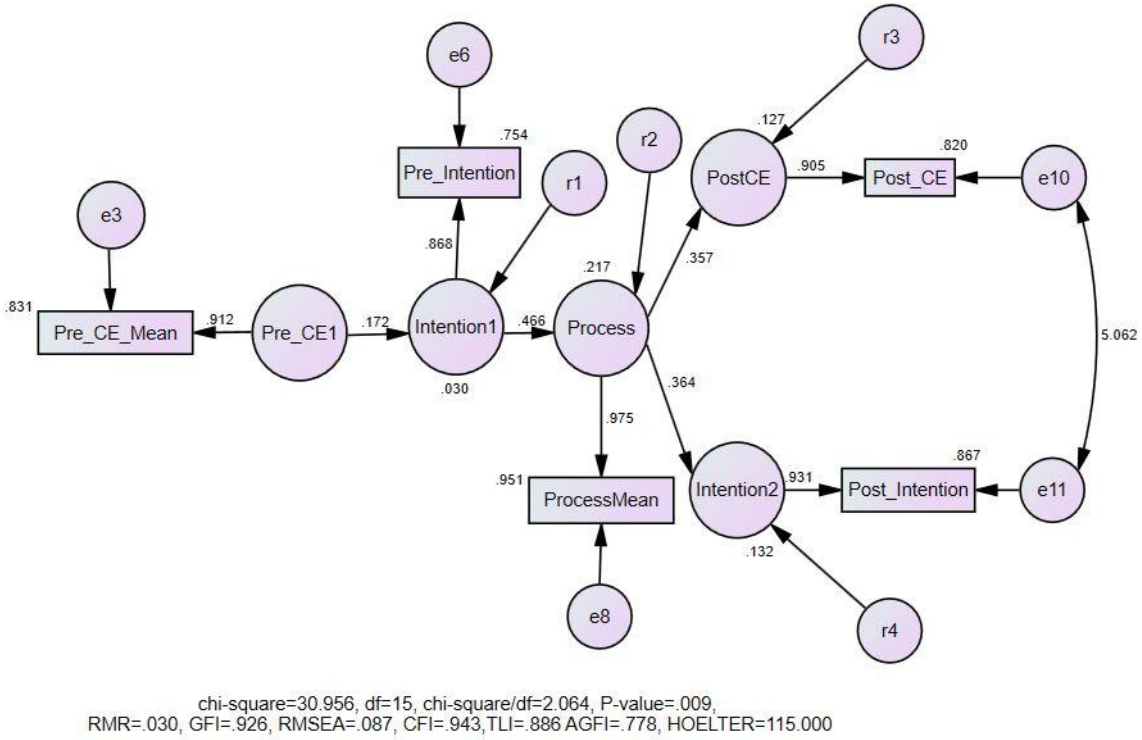


Figure 4.15: AMOS result for Facebook service context for gamified environment

2. None Gamified environment for private university context

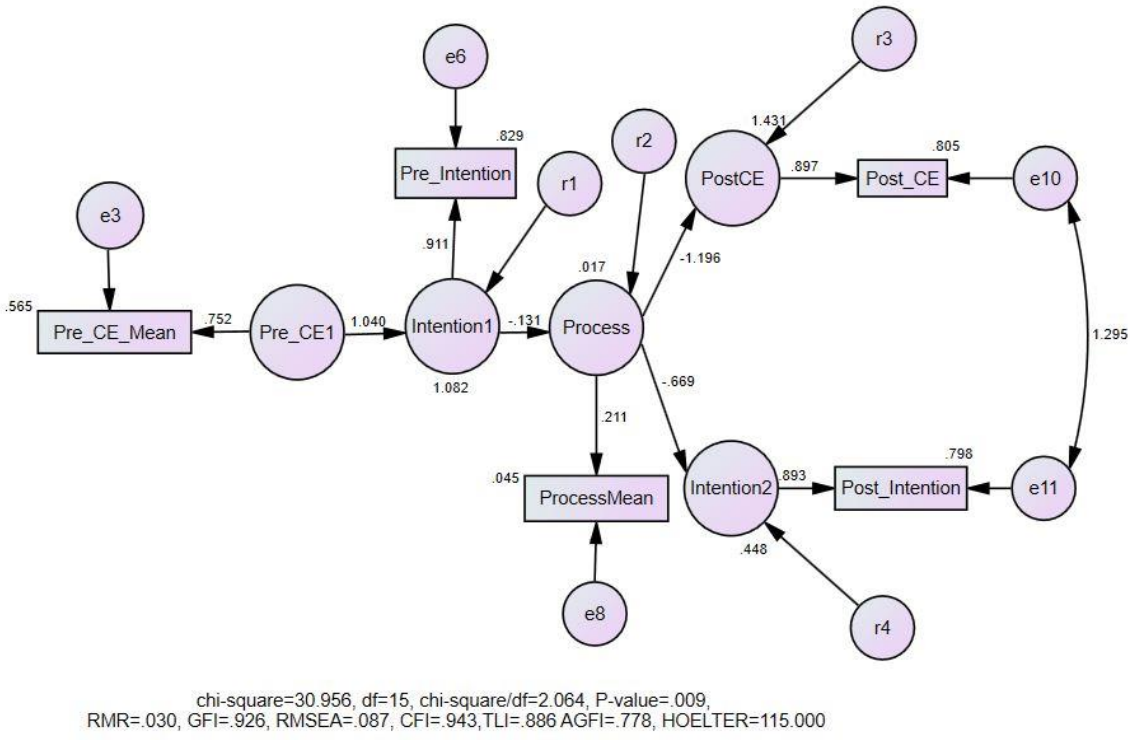


Figure 4.16: AMOS result for Private university service context for none gamified environment

Table 4.19: Comparing Main Model of Private university service context with Group Model (Gamified and None Gamified Environment)

Model	**Chi-Square**	**df**	**Beta**
Default model	9.132	5	.362*
Group model	30.956	15	
- Gamified Environment			.466*
- None gamified environment			-.131
χ2 diff	21.824		
dfDiff		10	
Result on Moderation	**Model different was significant**		

As same as previous, to identify that gamification is a moderator or not in Facebook context, researcher had compared the chi-square of main model (Table 4.19) with both gamified environment and none gamified environment in Facebook

context. The chi-square of gamified and none gamified environment is lower than main model (8.456 < 18.307). So, the model for gamified and none gamified environment (sperate environment) are insignificant. According to this result, this can describe that gamification did not perform as a moderator variable for Facebook service context.

Research Question 4: To what extent does customer engagement increase after the customers were involved in the gamified NSD process?

This research question aims to determine the level of customer engagement after the participants were involved in both gamified and none gamified environment in NSD process.

H4: The degree of customer engagement is increased after the customers were involved in the gamified new service development process.

$H4_0$: The degree of customer engagement is not increased after the customers were involved in the new gamified service development

To identify the different between the level of customer engagement of each participant before involved in the new service development process (gamified environment and none gamified environment) and after involved in the new service development process, the paired samples t-test was conducted to compare the level of customer engagement before and after proceeding through gamified and none gamified environment. Paired samples t test will compare two means that represent two different times, which are pretest and posttest result. Due to there are two environments the samples t-test has been conducted two rounds. One round is for none gamified environment and another round are for gamified environment.

After the samples t test was conducted, to compare the level of difference between posttest of two environment, an independent samples t-test was conducted to identify the difference of mean between post-test of gamified and none gamified environment. The result from both paired samples t-test and independent samples t-test are presented below.

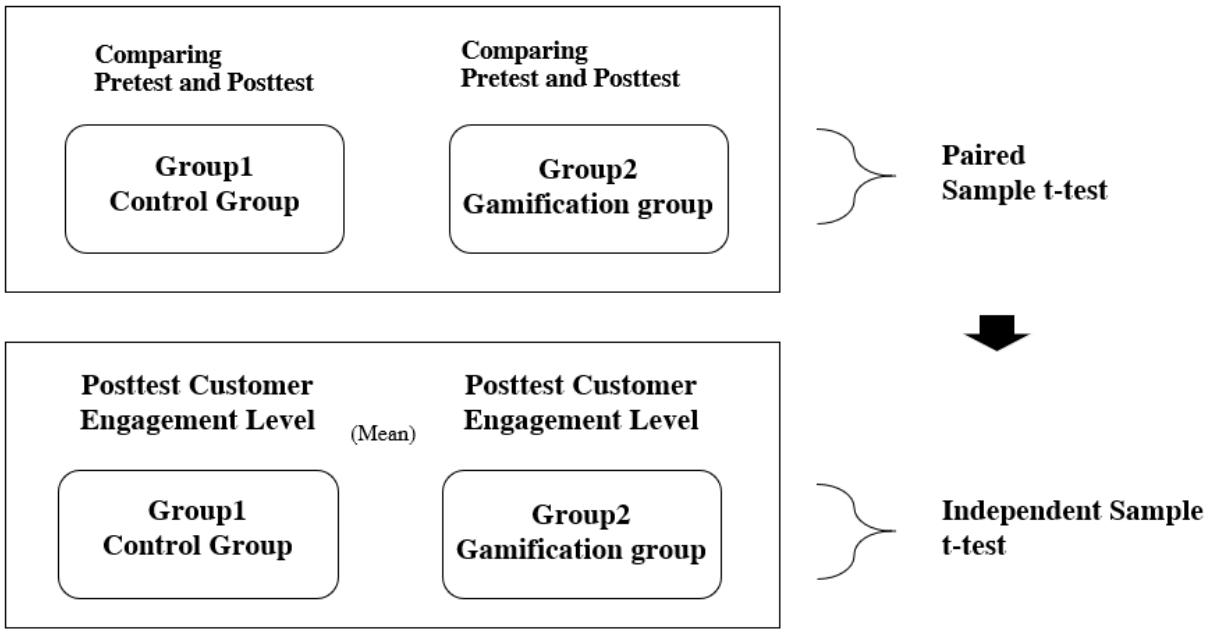


Figure 4.17: Process of Paired Sample t-test and Independent Sample t-test for hypothesis 4

Comparing none gamified environment and gamified environment with paired sample t-test

1. None gamified environment

Table 4.20: Paired Samples Statistics result for none gamified environment

Paired Sample Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pari 1	Pretest	2.77	128	0.57	0.05
	Posttest	3.24	128	0.68	0.06

Table 4.21: Paired Samples Correlation result for none gamified environment

Paired Samples Correlations				
		N	Correlation	Sig.
Pari 1	Pretest & Posttest	128	0.30	0.00

The Paired Samples Correlation table shows that the level of customer engagement result between pretest and posttest in none gamified environment are significantly positively correlated (r=0.30).

Table 4.22: The Paired Samples Correlation table shows that the level of customer engagement result between pretest and posttest in none gamified environment

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-0.48	0.74	0.07	-0.61	-0.35	-7.25	127	0.00

The result from paired samples test presents that in none gamified environment, pretest and posttest were correlated and there was a significant average

difference between pretest and posttest score (t(127) = -7.25, p<0.001). On average, posttest score was 0.48 higher than pretest score (95% CI [-0.61, -0.35])

2. Gamified environment

Table 4.23: Paired Samples Statistics result for gamified environment (Hypothesis 4)

Paired Sample Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pari 1	Pretest	2.81	105	0.66	0.06
	Posttest	3.43	105	0.70	0.07

Table 4.24: Paired Samples correlation result for gamified environment (Hypothesis 4)

Paired Samples Correlations				
		N	Correlation	Sig.
Pari 1	Pretest & Posttest	105	0.19	0.05

The Paired Samples Correlation table 4.24 shows that the level of customer engagement result between pretest and posttest in gamified environment are not significantly positively correlated (r=0.05).

Table 4.25: The Paired Samples Correlation table shows that the level of customer engagement result between pretest and posttest in gamified environment (Hypothesis 4)

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-0.62	0.86	0.08	-0.79	-0.45	-7.37	104	0.00

The result from paired samples test (table 4.25) presents that in gamified environment, pretest and posttest were correlated and there was not significant average difference between pretest and posttest score ($t(104)=-7.37$, $p<0.001$). On average, posttest score was 0.62 higher than pretest score (95% CI [-0.61, -0.35]).

According to paired sample test from both gamified and none gamified environment, the result shows that posttest score from gamified environment and none gamified environment are significantly different from pretest and posttest score from gamified environment tend to have a score higher than none gamified environment.

Comparing none gamified environment and gamified environment posttest result with independent samples t-test

Table 4.26: Descriptive Statistics per Group (Gamified and None gamified environment)

(Hypothesis 4)

Group Statistics					
Type		**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Posttest Customer Engagement	Gamified	105	3.43	0.70	0.07
	None Gamified	128	3.24	0.68	0.06

Table 4.27: Independent samples t-test Result (Hypothesis 4)

Independent Sample Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest Customer Engagement	Equal variances assumed	0.18	0.68	2.13	231	0.03	0.19	0.09	0.01	0.37
	Equal variances assumed			2.12	219.16	0.03	0.19	0.09	0.01	0.37

An independent-samples t-test was conducted to compare the level of customer engagement NSD process after proceeding through gamified environment and none gamified environment. The result shows that there was a significant difference in the scores for gamified environment (Mean=3.43, SD =0.70) and none gamified environment (Mean=3.24, SD =0.68) conditions; t(231) = 2.13. These results suggest that gamification does influence the level of customer engagement.

Research Question 5: To what extent does the intention to be involved in NSD process increase after the customers were involved in a gamified NSD process?

This research question aims to find the impact of gamification towards the intention to be involved in the NSD process by assuming that participants, who have already experienced gamification, will have a higher level of the intention to be involved in the NSD process than those who did not.

H5: The degree of the intention to be involved in NSD process is increased after the customers were involved in the new gamified service development process

$H5_0$: The degree of intention to be involved in NSD process is not be increased after the customers were involved in the new gamified service development.

As same as for research question 4, to identify the difference between intention to be involved in NSD process for gamified and none gamified environment, the paired sample t test and independent sample t test have been conducted to find the difference of each environment and the difference between pretest and posttest.

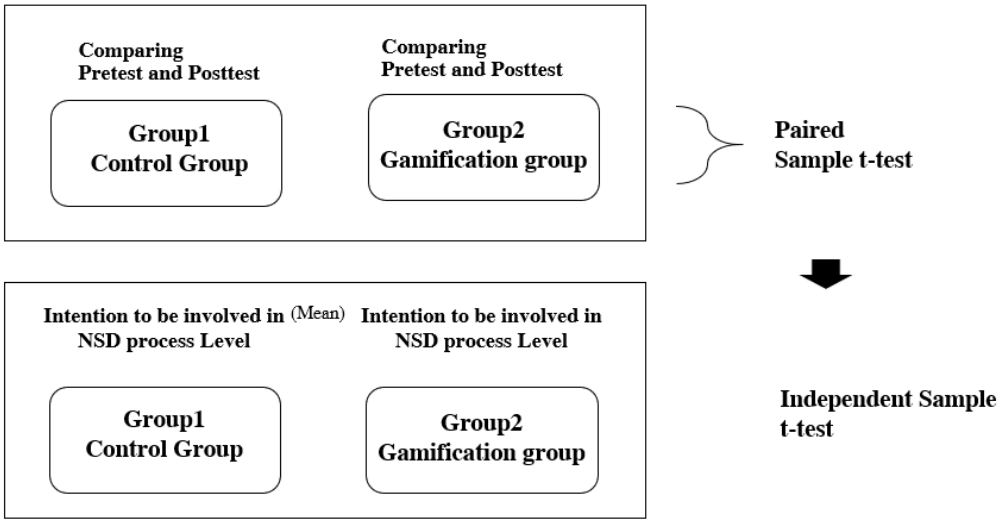


Figure 4.18: Process of Paired Sample t-test and Independent Sample t-test for hypothesis 5

Comparing none gamified environment and gamified environment with paired sample t-test

1. None gamified environment

Table 4.28: Paired Samples Statistics result for none gamified environment (Hypothesis 5)

Paired Sample Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pari 1	Pretest	3.02	128	0.59	0.05
	Posttest	3.28	128	0.73	0.06

Table 4.29: Paired Samples correlation result for none gamified environment (Hypothesis 5)

Paired Samples Correlations				
		N	Correlation	Sig.
Pari 1	Pretest & Posttest	128	0.26	0.00

The Paired Samples Correlation table shows that the level of intention to be involved in NSD process result between pretest and posttest in none gamified environment are significantly positively correlated (r=0.26).

Table 4.30: The Paired Samples Correlation table shows that the level of intention to be involved in NSD process result between pretest and posttest in none gamified environment (Hypothesis 5)

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-0.26	0.81	0.07	-0.41	-0.12	-3.69	127	0.00

The result from paired samples test presents that in none gamified environment, pretest and posttest were correlated and there was a significant average difference between pretest and posttest score ($t(127)= -3.69$, $p<0.001$). On average, posttest score was 0.26 higher than pretest score (95% CI [-0.41, -0.12]).

2. Gamified environment

Table 4.31: Paired Samples Statistics result for gamified environment (Hypothesis 5)

Paired Sample Statistics					
		N	Mean	Std. Deviation	Std. Error Mean
Pair 1	Pretest	105	3.03	0.76	0.07
	Posttest	105	3.45	0.78	0.08

Table 4.32: Paired Samples correlation result for gamified environment (Hypothesis 5)

Paired Samples Correlations				
		N	Correlation	Sig.
Pari 1	Pretest & Posttest	105	0.13	0.20

The Paired Samples Correlation table 4.32 shows that the level of intention to be involved in NSD process result between pretest and posttest in gamified environment are not significantly positively correlated (r=0.13). This means that pretest and posttest of gamified environment are not enforcing each other in this case.

Table 4.33: The Paired Samples Correlation table shows that the level of intention to be involved in NSD process result between pretest and posttest in gamified environment (Hypothesis 5)

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-0.43	1.02	0.10	-0.63	-0.23	-4.32	104	0.00

The result from paired samples test presents that in none gamified environment, pretest and posttest were correlated and there was a significant average difference between pretest and posttest score ($t(104)= -4.32$, $p<0.001$). On average, posttest score was 0.43 higher than pretest score (95% CI [-0.63, -0.23]).

According to paired sample test from the pretest and posttest score from gamified environment did not show positively correlated as same as none gamified environment. However, there are significant different between pretest and posttest score in the gamified environment as same as the none gamified environment. Due to the result, it can be clarified that the NSD process involvement worked well and had an impact on participants.

Comparing none gamified environment and gamified environment posttest result with independent samples t-test

Table 4.34: Descriptive Statistics per Group (Gamified and None gamified environment) (Hypothesis 5)

Group Statistics					
Type		**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Posttest Customer Engagement	Gamified	105	3.45	0.78	0.08
	None Gamified	128	3.28	0.73	0.06

Table 4.35: Independent samples t-test result (Hypothesis 5)

Independent Sample Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest Customer Engagement	Equal variances assumed	1.38	0.24	1.72	231	0.09	0.17	0.10	-0.03	0.37
	Equal variances assumed			1.70	215.37	0.09	0.17	0.10	-0.03	0.37

An independent-samples t-test was conducted to compare the level of intention to be involved in NSD process after proceeding through gamified environment and none gamified environment. The result shows that there was no significant difference in the scores for gamified environment (Mean=3.43, SD =0.70) and none gamified environment (Mean=3.24, SD =0.68) conditions; t(231) = 2.13. These results suggest that the variability in both gamified and none gamified is about the same.

The quality of the model was tested using a CFA test. The results on each hypothesis shows in table 4.36

Table 4.36: Summary of the hypotheses findings

Hypothesis		**Result on Hypothesis**
H1	The degree of customer engagement (which is composed of the identification, enthusiasm, attention, absorption and interaction variables) has a positive effect on their intention to be involved in the new service development process.	☑
H2	The degree of customer's intention to be involved in the new service development process has a positive effect on their involvement in the process.	☑
H3	Customers who have already participated in a gamified environment results in a stronger relationship between the intention to be involved in the NDS process and the NDS process involvement; in comparison to the those who only have participated in a none gamified environment.	☑
H4	The degree of customer engagement is increased after the customers were involved in the gamified new service development process.	☑
H5	The degree of the intention to be involved in NSD process is increased after the customers were involved in the new gamified service development process.	☒

Hypothesis 1: This hypothesis was constructed to identify the relationship between customer engagement and the intention to be involved in NSD process.

According to the result, customer engagement was a significant predictor of the intention to be involved in the NSD process.

Hypothesis 2: The hypothesis 2 was constructed to find a relationship between the intention to be involved in the NSD process and the NSD process involvement variable. The researcher found that intention to be involved in NSD process was a significant predictor to the NSD process involvement.

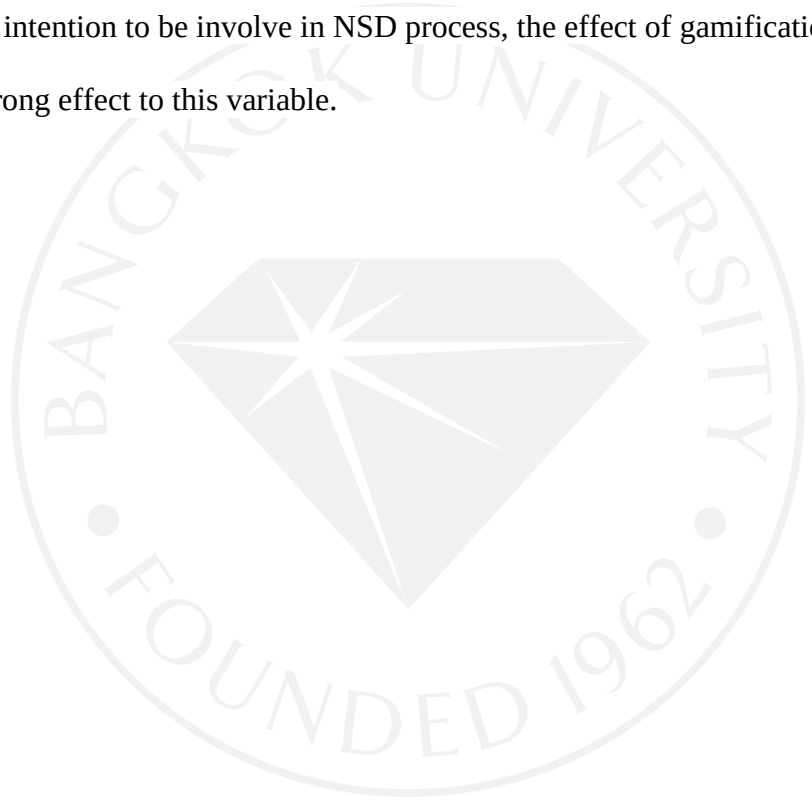
Hypothesis 3: In order to find the significance of gamification that was used as a moderator variable in this research, AMOS model data output, the researcher found that there is a stronger significant association, between the intention to be involved in the NSD process and the NSD process involvement, found in gamified environment; in comparison to the none gamified. This can prove that gamification can be used as a moderator variable to strengthen the relationship between the intention to be involved in the NSD process and the NSD process involvement activities.

This research also identifies the moderating effect of gamification by testing as the group of two contexts, which are; Facebook services context and private university services context. The result separate via each context found that for Facebook services context, gamification did not perform as a moderator variable. In contrast, gamification did perform as a moderator variable for private university context.

Hypothesis 4: To identify an increasing level of the customer engagement after involving in the NSD process, the paired sample t-test and independent sample t-test was conducted. The researcher found that there is a significant difference in customer engagement level regardless of experiencing the gamified and none

gamified environments. Still, the result of those who participated in the gamified environment tends to be relatively higher than those who did not.

Hypothesis 5: To identify an increasing level of the intention to be involved in the NSD process, the paired sample t-test and independent sample t-test was also adopted to find such result. The result shows that there was not significant difference in the scores for gamified environment and none gamified environment. This means that for intention to be involve in NSD process, the effect of gamification does not have strong effect to this variable.



CHAPTER 5

DISCUSSION AND CONCLUSION

The purpose of this study was to identify the effect of gamification on increasing the level of intention to be involved in the new service development (NSD) process as well as increasing the level of customer engagement. The researcher conducted the experimentation focusing on subjects who had some previous experience with the online service platform Facebook and who had experiences with private university services. This research applied a quasi-experimentation design which asked the treatment and control groups to participate in pre-test/post-test activities under gamified and none gamified environments. According to the findings, despite the different nature of both services, the experimentation results show that gamification is a moderating factor that is associated with an increase participants' involvement in the NSD process, and their intention to be involved in the NSD process and customer engagement were also increased after the experimentation.

This final chapter presents a discussion of the findings, based on the proposed model and hypotheses and relevant implications from academic researches and practitioners. The chapter also presents the limitations associated with this study as well as the recommendations for future research.

5.1 Significant Results

Service is an intangible product that many organizations find challenging to improve which is mainly due to the relationship between an organization and the customers. As previously stated, the relationship is relatively based on a one-way communication which starts from the organization (Alam & Perry, 2002). Taking this

relationship into account, an organization can only periodically and occasionally receive feedbacks (interaction/participation) from its customers. Therefore, in seeking an approach to improve such services, the researcher studied the use of gamification as a moderator variable to develop/improve the speed of the interaction between an organization and its customers.

From the literature review, there was a lack of studies that applied quasi-experimentation to find the relationship between the use of gamification with service related subjects such as the customer engagement, intention to be involved in the NSD process, and NSD process involvement. More importantly, various researchers mostly based their researches on theoretical explanations or an application of survey to collect the data. Moreover, the researcher found that studies on the use of gamification in different product developments is still limited. Thus, the researcher decided to study the use of gamification in two different types of services which are private university services and IT related services platforms (Facebook). By considering the different service natures, the researcher found that gamification can be applied for both service developments and, in turn, implies that the gamification application is not quite limited.

Apart from the flexibility of the gamification application, one of the most significant results that was found is that gamification acts as a moderator variable that strengthens the relationship between the intention to be involved in the NSD process and the NSD process involvement. It means that by using a gamified environment participant will be more likely to shift from just an intention to participate in a NSD to their actual participation in such process.

In contrast, to measure the performance of the new service innovation and NSD, most of the literatures focus on two different areas which are financial performance and non-financial performance based (Table 2-6) (Spri et al., 2005; Bastic & Nekrep, 2009, p. 69). However, for the idea screening phase of this research, the researcher developed specific criteria that participants needed to use to justify their idea using other perspectives rather than just focusing on the financial aspect. The criteria included; novelty, attractiveness, feasibility, relevance, and thoroughness of the proposed service. According to the experimentation observation, the resercher found that participants had a hard time in the phase of idea screening, the researcher assumed that participants needed more information, with regard to each criteria, directly from the service providers, which ended up being a limitation of this study since the research was unable to get the service providers to collaborate in this study.

Another significant finding in this research is the fact that participants in gamified environment have a higher level of intention to be involved in the NSD process and customer engagement than those who participated in the none gamified environment. This indicates that gamification has a positive impact on the relationship between customer and service development process as well as customer behavior, emotion, and cognition towards services.

5.2 Implications for the Researcher and Practitioner

The most important goal of this study was to investigate the impact of gamification towards the intention to be involved in the NSD process and the NSD process involvement. One of the first major results of the research is that, in order to engage and involve the customers in the NSD process, gamification can play a significant positive role by increasing the NSD process involvement intention.

However, the rewards that motivate customers/participants to get involved in the process need to be carefully considered in accordance with the subjects. During the experimentation, involving both bachelor and master's degree students, the researcher observed the interaction between both groups of participants during the rewarding time and noticed different reactions. For the bachelor's degree group, participants were excited with the given points during the experimentation in contrast to the master degree group which was more focusing on the types of reward. With regard to the activity environment, however, the atmosphere between gamified and none gamified environments were totally different. The researcher noticed that the gamified environment groups were more excited and active while those in the none gamified environment groups were seemingly disengaged and repeatedly asking to start the final activity during the experimentation process. With regard to this finding, organizations or practitioners that wish to implement gamification as a tool to foster involvement or engagement will need to consider the type of participants and after-process rewards. This can be helpful to reduce cost and time consumption in the long run.

Other than the reward, the triggers, which are leader board and time limit, are seemingly important factors in the gamified environment. During the experimentation, the researcher noticed that the participants were alert and excited when they realized that the time had reached its limit, simultaneously with their real-time position on the leader board. These two triggers created a competitive environment, individually, as well as collaborative atmosphere among groups. In terms of the implementation, implementer needs to consider the timeline for each phase since it encourages participants' focus and intention to involve which lead to a

better engagement. This can be linked with the reward. In the experimentation process, under the gamified environment, the researcher stated clearly in the introduction part that reward would be granted to the winner. This helped the participants to be more focused throughout the activities as they knew that their activities will impact the outcome. In contrast, the participants who participated under the none gamified environment seemed to be less focused and engaged unlike those in the gamified environment.

In terms of game design, the most significant factor that practitioner needs to keep in mind is that the game element needs to bring positive motivation to the gamified environment and each person has a different reaction to different motivation types. As stated in chapter two, the researcher created the gamified environment for experimentation by using the concept of gamification from Wood and Reiners (2015) in which the gamified environment needs to contain components, mechanics, dynamics, and intentions elements. Since motivation is a significant factor to encourage and engage participants to be involved in the process, the researcher also considers the significant elements from the persuasive design theory from Fogg (2009) which are ability, motivation and triggers in order to the research to be more specific and to ensure an increase of the level of motivation. During the experimentation, trigger elements were often used by embedding them into the game mechanics. With the combination of game element and persuasive behavior, the researcher found that participants' ability and motivation were enhanced in the gamified environment.

In addition, the gamification process for the experimentation in this research was developed using the four phases of getting participant involved in the gamified

environment, as suggested by Chou (2015), which are; discovery, onboarding, scaffolding, and endgame. Participants started to experience their discovery journey by an introduction of the overall NSD process. Next, participants received rules and instructions for each stage as well as game mechanics that they will face in each stage. Following with scaffolding phase, in this phase after participants received all instructions, they were given the opportunity to interact and experience all rules and instruction of the game environment. The final phase, end game, happened after participants experienced the entire NSD process. According to this, adding a new trigger or new game element might help create an exciting atmosphere and increase involvement in gamified environment again for the next level or for the next stage. In our experimentation we only had one round so we didn't apply this approach.

To apply this into an actual situation, implementers can start identifying what kind of behavior that implementers expect from participants or customers and think about the motivation elements that participants and customers will be engaged with in the process which is then followed a consideration on the trigger elements. When implementers know the overall objective and participants/customers nature, implementers can start designing the game elements which can be systematically incorporated into the environment.

On the other hand, Chou (2013) introduces the Octalysis framework which contains eight core drivers. These eight core drivers can help game designers to identify their preferred objectives and output of the game with regard to both ability and motivation of the participants. To emphasize, game designer can start by identifying the sense of urgency of the objective. According to the model, it divides the eight cores into two sides. One is the group of cores that presents the sense of

urgency, which implies that individuals like to feel obsessed or addicted with the situation. In contrast, another group is the group of cores that presents the feeling of being powerful and in control. A situation that they are willing to face does not have as much of the sense of the urgency as the previous one.

In this research, both sides of the game elements from Octalysis framework were equally implemented to the experimentation. In addition, every eight core drivers are also divided into intrinsic and extrinsic motivations. However, even though the reward (extrinsic motivation) is a significant factor to gain attraction and engagement from the participants, intrinsic motivation is also significant in this experiment. To encourage intrinsic motivation, before the start of the experimentation, researcher instructed the participants regarding the objective and the significance of the outcome which could be beneficial to the service providers. This is an example of one approach to encourage intrinsic motivation. Within a gamified environment in this study, the focus of the outcome is that participants need to identify the service problems as well as alternative and innovative services that they have been expected to receive from the provider. Furthermore, they need to be able to justify what will be their proposed service ideas are innovative and viability. Even though the researcher aimed to equally apply the two sides of the Octalysis framework, the amount of each driver used might be different, which could happen depending on the activity and situation. For example, during the experimentation of this research, some participant who were in the gamified environment got confuse and cannot follow the step in the process. To bring them back on track, a person who controls the game environment need to apply the empowerment driver such as reminding the step of that activity or other achievements to the participants who are

focusing on the competition. This is because they might want to know more about other achievements. The game element, such as leaderboard, will be the important element.

However, one of the most important tasks for the game designer is to keep the atmosphere and environment positive and healthy. For instance, a certain participant might earn the highest score and, in turn, dispirit the other participants in the next activity since they know that they cannot keep up to that certain participant. This will cause the participants to become disengaged and, subsequently, affect the whole environment. This is not ideal and beneficial for the objective of the process.

5.3 Limitations

The limitations of this research can be divided into three areas, which are limitations related to the experimentation, limitations of the new service development process and limitation related to the difference between the experimentation context and real-life service development.

5.3.1 Limitations Related to the Experimentation

This research focused on the impact of gamification towards the intention to be involved in the process and the new service development involvement**.** Due to the limited time and resources available for the experimentation, only 2 contexts were selected which were the online service platform Facebook and a private university service offer**.** As for the experimentation, the researcher needed participants who can be strongly engaged in this experimentation at every stage and those who were already familiar with the existing services**.** The 2 selected services helped meeting these requirements for our experimentation**.** During the experimentation, under the private university context, participants had no issues or concerns on the

experimentation as they are students from the same university**.** However, during the Facebook experimentation, the researcher found that some foreign participants were not familiar with Facebook and some are also inactive users**.** Consequently, they were removed from the experimentation.

Not only the familiarity with the service was a challenge, but a limitation regarding participants**'** nationality was also an important issue**.** Since this study can only involve Thai and foreigner students who have experienced Thai culture, it is possible to find some differences since their cultural and educational backgrounds are different which may have caused them to act/think differently**.** During the experimentation, the researcher noticed that participants interacted to the process differently with regard to their nationality differences**.** However, the large majority of the participants were Thai**.** Cultural issues were not the focus of this research and teams were composed of mix nationalities consequently we have nothing in particular to report on this aspect but it could be the source of future research.

5.3.2 New Service Development Process

According to various literatures, there are various stages that could compose the new product and service development process (Booz et al., 1982; Bower, 1989; Scheuing & Johnson, 1989; Alam & Perry, 2002), which range from problem identification to the product/service launch. However, this study focused only on the first three new service development process stages which were; strategic planning, idea generation, and idea screening stages due to time limitation. Also, according time limitation, the researcher considered only the stages of service development where participants could be involved without the need of a deep understanding of the context, technology or company background. According to this, the aforementioned

three stages of the new service development process were adopted. This is also aligned with Alam and Perry (2002) which reported that these three stages are the one with the highest frequency of customer input.

In each stage of the new service development, the game element and environment designs were done by adopting the concept of the game elements from Wood and Reiners (2015) together with Fogg (2009) behavioral model as a base line for the gamification experimental design. However, due to the fact that this experimentation is not based on online platform, the game elements (aesthetic and real-time scoring) is not included. For the experimentation, the trigger such as time limit or the score system, the researcher still needed to announce those triggers to the participants during the experimentation which interrupted the experimentation flow.

5.3.3 The Difference Between the Experimentation Context and Real-life Service Creation

The experimentation was conducted based on two groups of participants which worked on 1) new private university service and 2) new Facebook service. The experimentation adopted these 2 different contexts to ensure that the use of gamification could affect various types of industries. However, as stated previously, the experimentation needed participants who could commit to the process. Therefore, university students were selected as samplers for this study, since the experimentation could be conducted at the university and it was more comfortable for the students to be involved in the process rather than conducting the experimentation outside the university due to the restraint on transportation and venue. Even though the students who participated in the process of experimentation could identify some problems that the service provider should consider for improvement and could propose some service

innovation ideas to solve the mentioned problems, the rest of the process (apart from the three phases) was not included into this study as it will have required the involvement of some decision makers from the service providers (University and Facebook) to participate and contribute to the final outcome. This is because they are the person who most understand the direction of the business as well as the limitation regarding technology, manpower, or finance that organizations can invest in the new idea.

In addition, from the results of the first two phases of the experimentation (the strategic planning and the idea generation), the 2 service providers could consider them as a customer opinion and use it as a substrate in the next phase of the new service development process. However, in the last experimentation phase (the idea screening phase), the researcher found from an observation that participants were struggling to act in the process as they did not acknowledge the limitation regarding the investment budget for the new service that they need to screen, the marketing direction that organization are planning, or the readiness of the organization in terms of the implementation. According to this and to the statistical analysis results, the researcher found that the participants were more disengaged in the idea screening activities in comparison to the other two activities. In contrast to the real-life service creation, if an organization can arrange an effective collaboration between organization personnel and customer, the latter will understand the process and the need of organization accordingly. This might impact and magnify customer engagement and involvement during the idea screening stage as well as the other processes for the new service development.

The limited variety of participants profiles is another limitation of this research. In this regard, more than eighty percent of the participants in this study were between 17-24 years old. However, if an organization wishes to apply gamification in the new service development process or use it as a tool to track customer behavior, the obtained results from different customers' profiles might differ from this study. Factors like participants working experiences, expectation of the services, emotions, or even the mindset could be impacted by the respondents' age.

5.4 Suggestions for Future Research

This researcher conducted the experiment in three stages of the new service development process which are the strategic planning, the idea generation, and the idea screening due to the fact that these three stages reported the highest frequency of customer input (Alam & Perry, 2002) and also the limitation regarding time for data collection. In the future research, it could be useful to study the whole chain of the new service development process where customers can contribute ideas and information. In this research we presented the steps of experimentation for whole process mentioned in chapter three (Table 3-4).

Having a follow up assessment could be considered for the future research. The objective will be to follow up participants to come back to complete the post-test, instead of conducting it right after the experiment. This will allow participants to halt, reflect, and participate in each process one at a time which could extend the time needed between the pretest and posttest compared to this experimentation. The results from the gamified and none gamified environments might then be different from the

current results as participants have more time to think and reflect or even apply a newly invented strategy to win each stage.

The use of gamification is another area that could be further expanded in future research, especially the impact of gamification towards the whole chain of the new service development process, which can range from the problem identification to the product launching stage as this research did the experimentation only on the early stages.

Other than the experimentation context, more diverse participants profiles (demographics) should also be considered for the future research. The different types of participants or occupations might provide a different result in comparison to our research which heavily relied on participations with similar age and occupational backgrounds. Since this research focuses only on bachelor and master's degree students, ages of the participants are within the same range. It could be beneficial for the future research if one can identify the differences that age could make in terms of the game elements or participant behaviors. This might help the implementers to design the game elements that are appropriate for each category of the participants.

Regarding the demographic of the participants, after the experimentation, the researcher also found that for future research one could consider categorizing the participants based on the level of the intention to be involved in the NSD process. This can be applied in addition to Maslow's theory (1943) which is one of the best and well-known motivation theories. According to the theory, individuals have four types of need that must be satisfied before they can act unselfishly (Griffin, 2012). The four types of need, in order of importance, are physiology, safety, love/belonging,

and esteem. Maslow identifies these four types of needs as deficiencies that require fulfillment to release tension. With regard to the suggestions for future research, the measurement for the level of intention to be involved can help to identify the relationship between the intention and the participants' experiences (before and after participating in the gamified process). The participants involved in the process could then be categorized by their 5 levels of intention, which are;

1. The "Solitary" is a person who does not want to be involved at all. They merely want to experience the service or product for their own satisfaction but consider an involvement in the development process as a waste of time.

2. The "Reward Seeker", is a person who can occasionally help or be involved in a process, if any reward is granted. Their activities involvement is driven by an extrinsic reward rather than an intrinsic reward.

The "Belongings", are persons who feel that they are a part of brand or organization. They favor helping or asking the others to involve but only in trivial activities as they are not confident of their capability.

3. The "Importance", is a person who feels that their involvement is significant. Their opinion also causes impact and is beneficial to the products and organizations.

4. The "Dependable", this is a group of people who truly favor involving in the development process. They do not refrain from giving their idea and helping the organization to develop the process. They are also inspiring and bringing the others to join the involvement process.

The types of participant that are categorized by the intention to be involved in the NSD process can help the game designer or researcher to identify the dynamics and mechanics of game elements that are appropriate for each participant.

Lastly, conducting an experiment with customers of a company that are already involved in co-creation process can be another viable option for future research. This can be a good opportunity to identify the capability of gamification as well as improving the use of gamification in a co-creation process which involves customers and companies that are already accustomed to gamification in their new service development.

BIBLIOGRAPHY

Alam, I., & Perry, C. (2002). A customer oriented new service development process. *Journal of Services Marketing, 16*(6), 515-534.

Alam, I. (2007). New service development process: Emerging versus developed markets. *Journal of Global Marketing*, *20*, 43–55.

Arnold, H., Erner, M., Mockel, P., & Schlaffer, C. (2010). *Enterprise Architecture in Innovation Implementation, in Applied Technology and Innovation Management*. Springer. p. 132-144. Berlin, Heidelberg: Springer.

Atkinson, J. W., & Litwin, G. H. (1960). Achievement motive and test anxiety conceived as motive to approach success and motive to avoid failure. *The Journal of Abnormal and Social Psychology, 60*(1), 52–63.

Avnet, T., & Higgins, E. T. (2006). How regulatory fit affects value in consumer choices and opinions. *Journal of Marketing Research, 43*(1), 1−10

Awang, Z. (2012). Structural Equation Modeling Using Amos Graphic: UiTM Press.

Bakker, A. B., & Demerouti, E. (2007): The Job Demand-Resource Model: State of the Art. Journal of Managerial Psychology 22:309-328.

Balata, J., Mikovec, Z., Slavik, P., & Macik, M. (2016). Game Aspects in Collaborative Navigation of Blind Travelers. *Handbook of Research on Holistic Perspectives in Gamification for Clinical Practice*, 27.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37* (2), 122–147.

Banyte, J., & Dovaliene, A. (2014). Relations between Customer Engagement into Value Creation and Customer Loyalty. *Procedia - Social And Behavioral Sciences*, 156, 484-489.

Bartle, R. (n.d.). *Hearts, Clubs, Diamonds, Spades: Players Who Suit Muds.* Muse Ltd., Colchester, Colchester, Essex, UK. Retrieved from http://www.mud.co.uk/richard/hcds.htm

Bastic, M., & Nekrep, M. (2009). *Key success factors of service innovation in transitional markets.* In Proceedings of the 9th WSEAS International Conference on Systems Theory and Scientific Computation (ISTASC'09), World Scientific and Engineering Academy and Society (WSEAS), Stevens Point, Wisconsin, USA, 68-73.

BBVA's Innovation Center. (2012). *Gamification, The Business of Fun*. Innovation Edge.

Bitner, M., Booms, B., & Tetreault, M. (1990). The Service Encounter: Diagnosing Favorable and Unfavorable Incidents. *Journal Of Marketing, 54*(1), 71-84.

Bolton, R., & Saxena-Iyer, S. (2009). Interactive Services: A Framework, Synthesis and Research Directions. *Journal Of Interactive Marketing, 23*(1), 91-104.

Booz, Allen, Hamilton, (1982). *In: New Products Management for the 1980s.* Booz Allen and Hamilton, New York.

Bowden, J. L. (2009). The Process of Customer Engagement: A Conceptual Framework. *Journal of Marketing Theory and Practice, 17*(1), 63-74. doi:10.2753/mtp1069-6679170105

Bowers, M. R. (1989). Developing New Services: Improving the Process Makes it Better. *Journal of Services Marketing*, *3*(1), 15-20.

Brodie, R., Ilic, A., Juric, B., & Hollebeek, L. (2013). Consumer engagement in a Virtual brand community: An exploratory analysis. *Journal Of Business Research*, *66*(1), 105-114.

Brodie, R., Hollebeek, L., & Conduit, J. (2015). Customer engagement contemporary issues and challenges. London: Routledge.

Breuer, H., Wogatzky, M., & Steinhoff, F. (2011). *On The Unique Potentials Of Local Innovation Panels*. Retrieved from www.bovacon.com/papers/2011_Local_Innovation_Panel.pdf

Butt, A. (2014). *The relationship between purchase intention and product involvement: The role of brand attitude as a mediator on this relationship*. 10th International Academic Conference, Vienna, 157-167.

Carbonell, P., Rodríguez-Escudero, A.I., & Pujari, D. (2009). Customer involvement in new service development: an examination of antecedents and outcomes. *Journal of Product Innovation Management, 26*(5), 536-550.

Carbonell, P., Rodriguez-Escudero, A., & Pujari, D. (2012). Performance effects of involving lead users and close customers in new service development. *Journal of Services Marketing*, *26*(7), 497-509.

Cathie, M., & Eric, B. (2013). "Process of Gamification. From The Consideration of Gamification To Its Practical Implementation" *The Sixth International Conference on Advances in Human-oriented and Personalized Mechanisms, Technologies, and Services*.

Chesbrough, H. (2011). *Bringing Open Innovation to Services*. MIT Sloan Management Review, *52* (02).

Chou, Y. (2015). Octalysis: Complete Gamification Framework - Yu-kai Chou.Retrieved from http://www.yukaichou.com/gamification-examples/octalysis-complete-gamification-framework/#.Vh231itUWh3

Choubtarash, N., Mahdieh, O., & Marnani, A. B. (2013). The study of the relationship between consumer involvement and purchase decision (Case study: Cell phone). *Interdisciplinary Journal of Contemporary Research in Business, 4*(12), 276- 296.

Cohen, J.R., Berkman, E.T., & Lieberman, M.D. (2013). *Intentional and incidental self-control in ventrolateral PEC.* In principles of Frontal Lobe Function, ed R.T.K.D.T. Stuss, 2nd Edn. (NY: Oxford University Press), 417 - 440

Cohen, P., & Levesque, H. (1990). Intention is choice with commitment. Artificial Intelligence, *42*(2-3), 213-261.

Cooperstein, D. M. (2013). *Competitive Strategy in the age of the customer*. Forrester. Retrieved from http://solutions.forrester.com/Global/FileLib/Reports/ Competitive_ Strategy_In_The_Age_Of_The_Customer.pdf

Cooper, R. (2008). Perspective: The Stage-Gate®Idea-to-Launch Process—Update, What's New, and NexGen Systems. *Journal Of Product Innovation Management, 25*(3), 213-232.

Cooper, R., & Kleinschmidt, E. (1993). *Screening new products for potential winners*. Long Range Planning, *26*(6), 74-81.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*.New York, NY: Harper and Row.

Creswell, J. W. (2014). *Research Design Qualitative, Quantitative, and Mixed Methods Approaches*. 4th Edition. SAGE Publications, Inc. Printed in the United States of America.

De Brentani, U., & Cooper, R. G. (1992). *Developing successful new financial services for businesses.* Industrial Marketing Management, *21*(3), 231-241.

De Brentani, U., & Ragot, E. (1996). *Developing new business-to-business professional services: What factors impact performance?.* Industrial Marketing Management, *25*(6), 517-530.

Deci, E. L., & Ryan, R. M. (2000). *The 'what' and 'why' of goal pursuits: human needs and the self-determination of behavior.* Psychological Inquiry, *11*, 227–268.

De Jong, J.P.J., Bruins, A., Dolfsma, W., & Meijaard, J. (2003). *Innovation in Service firms explored: what, how and why? Literature review*. Strategic Study B200205, EIM Business and Policy Research, Zoetermeer.

Desouza, K., Awazu, Y., Jha, S., Dombrowski, C., Papagari, S., Baloh, P., & Kim, J. (2008). *Customer-Driven Innovation. Research-Technology Management*, *51*(3), 35-44.

Deterding, S., S., Khaled, R., Nacke, L., & Dixon, D. (2011). *Gamification: Toward a Definition*, Proceedings of the CHI 2011, Vancouver.

DeWitt., D. L. (2013). *Evaluating the Twenty-First Century Library: The Association of Research Libraries New Measures Initiative*, 1997-2001. Routledge, 38.

Dichev, C., Dicheva, D., Angelova, G., & Agre, G. (2015). *From Gamification to Gameful Design and Gameful Experience in Learning.* Cybernetics And Information Technologies, *14*(4).

Drost, E. A. (2011). *Validity and Reliability in Social Science Research*. Education Research and Perspectives, *38*(1), 105 – 123.

Edvardsson, B., & Olsson, J. (1996). Key Concepts for New Service Development. *The Service Industries Journal*, 140-164.

Ettlie, J., & Rosenthal, S. (2011). Service versus Manufacturing Innovation*. *Journal Of Product Innovation Management*, *28*(2), 285-299.

Flatla, D. R., Gutwin, C., Nacke, L. E., Bateman, S., & Mandryk, R. L. (2011). *Calibration games*. Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology - UIST 11. doi:10.1145/2047196.204724

Fogg, BJ. (2009). *A behavior model for persuasive design*. 4th International Conference on Persuasive technology. ACM, California.

Foxall, G. R., & Goldsmith, R. E. (1994). *Consumer psychology for marketing*. London: Routledge.

Gaggioli, A. (2012). *CyberSightings. Cyberpsychology, Bahavior, and Social Networking*, *15*(4), 281 -282.

Gartner Group. (2011). *Gartner says by 2015, more than 50 percent of organizations that manage innovation processes will gamify those processes*. Retrieved from http://www.gartner.com/newsroom/id/1629214

Gears, D., & Braun, K. (2013). *Gamification in Business: Designing Motivating Solutions to Problem Situations*. CHI'13.

Gillison, F., Standage, M., & Skevington, S. (2006). *Relationships among adolescents' weight perceptions, exercise goals, exercise motivation, quality of life and leisure-time exercise behavior: A self-determination theory approach*. Health Education Research, *21*(6), 836–847.

Gottfridsson, P. (2009). Actor Roles in the Service Development Process. *Journal of Public Transportation, 12*(1), 1-18.

Gray, E. D. (2014). *Doing research in the real world*. London: SAGE

Griffin, E. (2012). *A First Look at Communication Theory.* 8th edition, New York: McGraw-Hill. Research methodology.

Grove, J. V. (2011). *Gamification: How competition is reinventing business, marketing & everyday life.* Retrieved from http://mashable.com/2011/07/28/gamification/#ulIi3cBW2uqA

Guimarães, L., Romero, F., & Medeiros, H. (2014). *The application of the lean Innovation approach in the stage-gate model*. ICOPEV 2014 - 2nd International Conference on Project Evaluation, 26-27 June, Guimarães.

Hair, J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis (7th ed.).* Upper saddle River, New Jersey: Pearson Education International.

Hinske, S., Lampe, M., Megerkurth, C., & Rocker, C. (2007). *Classifying Pervasive Games: On Pervasive Computing and Mixed Reality*. Concepts and technologies for persuasive games.

Hollebeek, L. (2009). *Demystifying Customer Engagement: Toward the Development of a Conceptual Model*. Paper accepted for the 2009 ANZMAC Conference, Monash University, Melbourne, 30 November – 2 December.

Hollebeek, L. (2011). Exploring customer brand engagement: Definition and themes. *Journal of Strategic Marketing, 19*(7), 555-573.

Huber, M. Z., & Hilty, L. M. (2014). *Gamification and Sustainable Consumption: Overcoming the Limitations of Persuasive Technologies*. Advances in Intelligent Systems and Computing ICT Innovations for Sustainability, 367-385

Hunicke. R., LeBlanc, M., & Zubek R. (2004). *MDA: A Formal Approach to Game Design and Game Research.* In proceeding of the Challenges in Games AI Workshop, Nineteenth National Conference of Artificial Intelligence, San Jose, CA: AAAI Press.

Huotari, K., & Hamari, J. (2012). *Defining Gamification: a Service Marketing Perspective.* In: MindTrek 2012, 17–22. ACM Press, New York.

Hyla, M. (2015). *Gamification – First things First.* Retrieved from http://elearningindustry.com/gamification-first-things-first

Jaakkola, E., & Alexander, M. (2014). The Role of Customer Engagement Behavior in Value Co-Creation. *Journal of Service Research, 17*(3), 247-261.

Jacob, F. (2006). *Preparing industrial suppliers for customer integration*. Industrial Marketing Management, *35*(1), 45-56.

Johne, A., & Storey, C. (1998). New service development: A review of the literature and annotated bibliography. *European Journal of Marketing, 32(*3/4), 184-251.

Johnson, S. P., Menor, L. J., Roth, A. V., & Chase, R. B. (2000). *A Critical Evaluation of the New Service Development Process: Integrating Service Innovation and Service Design.* New Service Development: Creating Memorable Experiences, 1-32.

Jong, J. P., & Vermeulen, P. A. (2003). *Organizing successful new service development: A literature review.* Management Decision, *41*(9), 844-858.

Kaltcheva, V. D., Patino, A., Laric, M. V., Pitta, D. A., & Imparato, N. (2014). Customers relational models as determinants of customer engagement value. *Journal of Product & Brand Management,23*(1), 55-61.

Kelly, D., & Storey, C. (2000). New service development: Initiation strategies. *International Journal of Service Industry Management, 11*(1), 45-63.

Kimberlin, C. and Winterstein, A. (2008). *Validity and reliability of measurement instruments used in research.* 1st ed. [ebook] Florida: American Society of Health-System Pharmacists, Inc. Retrieved from http://www.ajhepworth.yolasite.com/resources/9817-Reliabillity%20and %20validity.pdf

Kotler, P., Jain, D.C. & Maesincee, S. (2002). *Marketing Moves: A New Approach to Profits, Growth, and Renewal*. Harvard Business School Press, Boston.

Kuhl, J. (1985). *Volitional aspect of achievement motivation and learned helplessness: Toward a comprehensive theory of action control.* In B. A. Maher (Ed.), Progress in experimental personality research, 99-171, New York: Academic Press.

Kumar, V., Aksoy, L., Donkers, B., Venkatesan, R., Wiesel, T., & Tillmanns, S. (2010). Undervalued or Overvalued Customers: Capturing Total Customer Engagement Value. *Journal of Service Research, 13*(3), 297-310.

Legrand, C., & LaJoie, R. (2013). *How service innovation boots bottom lines.* Technology Innovation Management Review, 20 – 25.

Lillienfeld, S. O., Lynn, S. J., Namy, L. L., & Woolf, N. J. (2009). *Psychology: From inquiry to understanding*. Boston: Pearson/Allyn and Bacon

Lin, F., & Hsieh, P. (2011). *A SAT View on New Service Development.* Service Science, *3*(2), 141-157.

Mackenzie, N. & Knipe, S. (2006). *Research dilemmas: Paradigms, methods and methodology.* Issues In Educational Research, *16*(2), 193-205.

MacNaughton, G., Rolfe, S., & Siraj-Blatchford, I. (2001). *Doing early childhood research: International perspectives on theory and practice*. Maidenhead: McGraw-Hill/Open University Press.

McGill, A.L. and Iacobucci, D. (1992). *The Role of Post-Experience Comparison Standards in the Evaluation of Unfamiliar Services.* Advances in Consumer Research, *19*, 570-578.

Michaelidou, N., & Dibb, S. (2008). *Consumer involvement: A new perspective*. The Marketing Review, *8*(1), 83-99. doi:10.1362/146934708x290403

Möller, K. Rajala, R., & Westerlund, M. (2008). *Service innovation Myopia? A new recipe for client-provider value creation.* California Management Review, *50*(3), 31–48.

Murphy, C., Chertoff, D., Guerrero, M., & Moffitt, K. (2013). *Designing Better Games! Flow, Motivation, and Fun.* Cambridge University Press.

Nicholls, J. G. (1984). *Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance.* Psychological Review, *91*(3), 328–346.

Nunnally, J.C. (1978). *Psychometric theory*. 2nd Edition, McGraw-Hill, New York.

O'Connor, P. (1994). Implementing a stage-gate process: A multi-company perspective. *Journal of Product Innovation Management, 11*(3), 183-200. doi:10.1016/0737-6782(94)90002-7

OECD. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. 3rd Edition.

Ojanen, V., Lanne, M., Reunanen, M., Kortelainen, H. & Kässi, T. (2008). *New Service Development: success factors from the Viewpoint of Fleet Asset Management of Industrial Service Providers.* In: INTERNATIONAL WORKING SEMINAR OF PRODUCTION ECONOMICS, 15.Innsbruck, Austria, 369-380.

Oke, A. (2007). Innovation types and innovation management practices in service companies. *International Journal of Operations & Production*.

Parthasarthy, R. & Hammond, J. (2002), "Product innovation input and outcome: moderating effect on the innovation process", *Journal of Engineering & Technology Management, 19*, 75-91.

Pavlus, J. (2010) *The Game of Life. Scientific American*. 303, 43-44.

Patterson, P., Yu, T., & DeRuyter, K. (2006). *Understanding customer engagement in services.* In: Proceedings of ANZMAC 2006 Conference. Advancing Theory, Maintaining Relevance, Brisbane, 4 – 6.

Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches.* Dubuque, Iowa: Wm. C. Brown. (Reprinted 1996, Westview Press, Boulder, CO).

Ravaglia, V., Brivio, E., & Graffigna, G. (2015). *Engaging consumers via Twitter: three successful communicative strategies.* Maximizing Commerce & Marketing Strategies Through Micro-Blogging, Publisher: IGI Global, 91 – 109.

Richter, G., Raban, D. R., & Rafaeli, S. (2014). *Studying Gamification: The Effect of Rewards and Incentives on Motivation*. Gamification in Education and Business, 21-46.

Rizwan, M., Qadeer, W., & Javed, M. (2014). The impact on branded product on customer purchase intentions. *Journal of Public Administration and Governance ISSN 2161-7104, 4*(3).

Roberts, D., & Piller, F. T. (2016). Finding the Right Role for Social Media in Innovation. MITSloan Management Review, *57*(3), 41- 47.

Roos, Inger., & Gustafsson, Anders. (2007). Understanding Frequent Switching Patterns – a Crucial Element in Managing Customer Relationships. *Journal of Service Research, 10*(1), 93-108.

Roos, Inger., & Gustafsson, Anders. (2011). The influence of active and passive customer behavior on switching in customer relationships. *Managing Service Quality: An International Journal, 21(5),* 448 – 464.

Ruengaramrut, V., Ribiere, V., & Ammi, C. (2015). *A Component Diagram Presenting a Gamified Environment Supporting Customer Engagement in a Service Innovation Process.* Proceedings of the 12th International conference on Intellectual Capital Knowledge management & Organizational Learning ICICKM.

Ryan, R., & Deci, E. (2000). *Intrinsic and Extrinsic Motivations: Classic Definitions And New Directions.* Contemporary Educational Psychology, *25*(1), 54-67.

Ryan, R., & Deci, E. (2000). *Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being.* American Psychologist, *55*(1), 68-78.

Sapri, M., Kaka, A., & Alias, B. (2005). *Performance measurement in the service business: the facilities management function.* Real Estate Educators and Researchers Association (REER) Seminar.

Sailer, M., Hense, J., Mandl, H., & Klevers, M. (2013). Psychological Perspectives on Motivation through Gamification. Interaction Design and Architecture(s) *Journal - IxD&A, 19,* 28-37.

Salen, K., & Zimmerman, E. (2003). *Rules of Play: Game Design Fundamentals*. The MIT Press.

Schulteß, P., Wegener, S., Neus, A., & Satzger, G. (2010). Innovating for and with your service customers: An assessment of the current practice of collaborative service innovation in Germany. *Procedia - Social And Behavioral Sciences*, *2*(4), 6503-6515.

Scheuing, E., & Johnson, E. (1989). A Proposed Model for New Service Development. *Journal Of Services Marketing*, *3*(2), 25-34.

Shu-Ching, C. (2015) Customer value and customer loyalty: Is competition a missing link?, *Journal of Retailing and Consumer Services*, *22*, 107-116, ISSN 0969-6989.

Shekar, A. (2007). An innovative model of service development: A process guide for service managers, *The innovation Journal*, *12*(4).

Sillanpää, E., & Junnonen, J. (2012). *Factors affecting service innovations in FM service sector*. Facilities, *30*(11/12), 517-530.

So, K., King, C., & Sparks, B. (2012). Customer Engagement With Tourism Brands. *Journal Of Hospitality & Tourism Research, 38*(3), 304-329.

Smith, D. (2010). *Exploring innovation (2nd ed.).* London: McGraw-Hill Higher Education.

Sprott, D., Czellar, S., & Spangenberg, E. (2009) The importance of a general measure of brand engagement on market behavior: development and validation of a scale. *Journal of Marketing Research, 46*(1), 92–104.

Sprujit, J. (2016). *71 Innovation methodologies*. Retrieve from www.openinnovation.eu/04-02-2016/71-innovation-methodologies/?utm_content=buffer5df25&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

Stamm, B. V. (2003). *Managing innovation, design and creativity*. Chichester: John Wiley & Sons.

Tether, B. (2003). *The sources and aims of innovation in services: Variety between and within sectors.* Economics Of Innovation And New Technology, *12*(6), 481-505.

Stevens, E., & Dimitriadis, S. (2005). "Managing the new service development process: towards a systemic model", *European Journal of Marketing, 39*(1/2), 175 – 198.

Tambo, T., Andreasen, K. E., & Ullerup, A. (2014). *Gamification in Digital Services Innovation Management.* Proceedings of the 23rd International Association for Management of Technology Conference. Vol. 23 Washington: International Association for Management of Technology (IAMOT), 1-18.

Tavakol, M., & Dennick, R. (2011). Making Sense of Cronbach's Alpha. *International Journal of Medical Education, 2*, 53-55.

Thomke, S., & Von Hippel, E. (2002). *Customers As Innovators: A New Way to Create Value.* Harvard Business Review, *80*(4).

Thomson, A. M., & Perry, J. L. (2006). *Collaboration process: Inside the black box*. Public Administration Review 66 (Special Issue, December), 20 – 32.

Toivonen, M., & Tuominen, T. (2009). Emergence of innovations in services. *The Service Industries Journal, 29*(7), 887-902.

Vargo, S., & Lusch, R. (2004). Evolving to a New Dominant Logic for Marketing. *Journal Of Marketing, 68*(1), 1-17.

Vargo, S., & Lusch, R. (2007). Service-dominant logic: continuing the evolution. *Journal Of The Academy Of Marketing Science, 36*(1), 1-10.

Vargo, S. (2009). Toward a transcending conceptualization of relationship: a service-dominant logic perspective. *Journal Of Business & Industrial Marketing, 24*(5/6), 373-379.

Vassileva, J. (2012). *Motivating participation in social computing applications: a user modeling perspective*. User Modeling And User-Adapted Interaction, *22*(1-2), 177-201.

Vivek, S. (2009). *A scale of consumer engagement*. Graduate School of The University of Alabama.

Vivek, S., Beatty, S., & Morgan, R. (2012). Customer Engagement: Exploring Customer Relationships Beyond Purchase. *The Journal Of Marketing Theory \ And Practice, 20*(2), 122-146.

Wagner, C., & Majchrzak, A. (2007). Enabling Customer-Centricity Using Wikis and the Wiki Way. *Journal Of Management Information Systems, 23*(3), 17-43.

Wall, K. (2011). *Chesbrough on Service innovation*. Retrived from http://www.innovationmanagement.se/2011/01/19/chesbrough-on-service-innovation/.

Warrington, P., & Shim, S. (2000). *An Empirical Investigation of the Relationship between Product Involvement and Brand Commitment*. Psychology and Marketing, *17*(9): 761.

Werbach, Kevin., & Hunter, Dan. (2012). *For the Win: How Game Thinking Can Revolutionize Your Business.* Wharton Digital Press.

Wood, L. & Reiners, T. (2015). *Gamification, in M. Khosrow-Pour (ed), Encyclopedia of Information Science and Technology (3rd ed.)*. 3039-3047. Hershey, PA: IGI GLOBAL.

Worthington, S., Russell-Bennett, R., & Härtel, C. (2009). A tri-dimensional approach for auditing brand loyalty. *Journal Of Brand Management, 17*(4), 243-253.

Yazdanparast, Atefeh., Ila, Manuj., Swartz & Stephen M. (2010). Co-creating logistics value: a service-dominant logic perspective. *The International Journal of Logistics Management, 21*(3), 375 – 403.

Yoshida, M., Gordon, B., Nakazawa, M., & Biscaia, R. (2014). Conceptualization and Measurement of Fan Engagement: Empirical Evidence from a Professional Sport Context. *Journal Of Sport Management, 28*(4), 399-417.

Zichermann, G., & Cunningham, C. (2011). *Gamification by design: Implementing game mechanics in web and mobile apps.* Sebastopol: OReilly.

Zomerdijk, L. G., & Voss, C. A. (2010). NSD Processes and Practices in Experiential Services*. *Journal of Product Innovation Management*, *28*(1), 63-80.

APPENDICES

APPENDIX 1: Instrument for Pre-test before the experimentation process

(Facebook Context)

Research Experimentation

Please Fill in your information as following

Gender: ❑ Male ❑ Female
Occupation _____ Company_____

Position_____ Nationality_____

Age_____

Introduction

- Thank you for accepting to be part of this research study looking at the relationship between customer engagement and co-creation process efficiency during the design phase of new service development.
- You were selected as participant for this research as we are looking for graduate students.
- Please read this form and ask any questions that you may have before agreeing to be part of this study.

Description of the Study Procedures

- If you agree to be part of this study, you will be asked to answer a pre-survey before experimentation, involve in experimentation and a post- survey after the experimentation. The process won't take longer than 2 hours.

Confidentiality

- The records of this study will be kept strictly confidential. We will not include your personal information in any report. We may publish information that would make it impossible to identify you.

Questions about the research?

- If you have any questions about this process, or about your rights as a participant in the study, you may contact Voravee Ruengaramrut e-mail:voravee.r@gmail.com

Consent

1. Your signature below indicates that you agree to volunteer as a research participant for this study, and that you have read and understood the information provided above.

Subject's Name

(Full Name): _____

Subject's Signature: _____ Date: _____

Part 1: Customer Engagement Survey

1. **For how long have you used Facebook:_____ Years**

2. **How frequently do you use Facebook?**
   - ❑ Many times per day
   - ❑ Few times per day
   - ❑ Few times per week
   - ❑ Rarely
   - ❑ Never

The survey scale from 1 (strongly disagree) – 5 (strongly agree)

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
When someone criticizes Facebook it feels like a personal insult.	❑	❑	❑	❑	❑
I am very interested in what others think about Facebook.	❑	❑	❑	❑	❑
When I talk about Facebook, I usually say " we" rather than "they".	❑	❑	❑	❑	❑
Facebook' s successes are my successes.	❑	❑	❑	❑	❑
When someone praises this Facebook, it feels like a personal compliment.	❑	❑	❑	❑	❑
I spend a lot of my discretionary time thinking about Facebook.	❑	❑	❑	❑	❑
I am heavily into Facebook.	❑	❑	❑	❑	❑
I am passionate about Facebook.	❑	❑	❑	❑	❑
My days would not be the same without Facebook.	❑	❑	❑	❑	❑
I am enthusiastic about Facebook.	❑	❑	❑	❑	❑
I feel excited about Facebook.	❑	❑	❑	❑	❑
I like to learn more about Facebook.	❑	❑	❑	❑	❑
I pay a lot of attention to anything about Facebook.	❑	❑	❑	❑	❑
Anything related to Facebook grabs my attention.	❑	❑	❑	❑	❑
I concentrate a lot on Facebook.	❑	❑	❑	❑	❑
I spend a lot of time thinking about Facebook.	❑	❑	❑	❑	❑

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
I focus a great deal of attention on Facebook.	❑	❑	❑	❑	❑
When I am interacting with Facebook, I forget everything else around me.	❑	❑	❑	❑	❑
Time flies when I am interacting with Facebook.	❑	❑	❑	❑	❑
When I am interacting with Facebook, I get carried away.	❑	❑	❑	❑	❑
When interacting with Facebook, it is difficult to detach myself.	❑	❑	❑	❑	❑
In my interaction with Facebook, I am immersed.	❑	❑	❑	❑	❑
When interacting with Facebook intensely, I feel happy.	❑	❑	❑	❑	❑
In general, I like to get involved in Facebook community discussions.	❑	❑	❑	❑	❑
I am someone who enjoys interacting with like- minded others in the Facebook community.	❑	❑	❑	❑	❑
I am someone who likes actively participating in Facebook community discussions.	❑	❑	❑	❑	❑
In general, I thoroughly enjoy exchanging ideas with other people in Facebook community.	❑	❑	❑	❑	❑
I often participate in activities of the Facebook community.	❑	❑	❑	❑	❑

Part 2: Intention to be involved in new service development process

According to part 1 please take no more than 5 minutes to answer the survey below. Please think about Facebook.

Co- creation is *" An interactive process involving at least two willing resource integrating actors which are engaged in specific form(s) of mutually beneficial collaboration, resulting in value creation for those actors. (Frow, 2011)".* This at least two willing resources can be customer collaborate with companies or customer with other customers (Humphreys, 2008).

Example: DHL "Parcelcopter Skyport"

DHL, the world' s largest logistic specialist company had involved loyal customer participants in workshop to co- create solution to improve the experience of delivery services for everyone. From the workshop, "Parcelcopter" become one of invention that has chance to go to the test stage. The community members co-create the idea and also tested out the potential service with Parcelcopter. According from the test result, Parcelcopter spend short time to delivery package than normal delivery vehicle. Forbes reported that *Forbes*, DHL's co-creation efforts resulted in customer satisfaction scores rising to over 80 percent, on-time delivery performance increasing to 97 percent or higher and customer churn to decrease (Milbrath, 2016).

The survey scale from 1 (strongly disagree) – 5 (strongly agree)

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
I would intend to be involved in the co- creation phase of new service development activities with Facebook	❑	❑	❑	❑	❑
My willingness to be involved in the co- creation phase of new service development activities with Facebook is high.	❑	❑	❑	❑	❑
I am likely to be involved in any the co- creation phase of new service development activities with Facebook.	❑	❑	❑	❑	❑
I often think about being involved in the co- creation phase of new service development activities with Facebook.	❑	❑	❑	❑	❑
I will probably look for opportunity to be involved in	❑	❑	❑	❑	❑

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
the co- creation phase of new service development activities with Facebook.					
I have a high intention to be involved in the co- creation phase of new service development activities with Facebook.	❑	❑	❑	❑	❑

APPENDIX 2: Instrument for Post-test before the experimentation process

(Facebook Context)

Part 5: Post-Survey

If you had better been directly involved with employees of the Facebook, do you think that:

The survey scale from 1 (strongly disagree) – 5 (strongly agree)

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
This co- creation process increased my level of customer engagement toward Facebook	❑	❑	❑	❑	❑
This co- creation process strengthened my relationship with Facebook better.	❑	❑	❑	❑	❑
This co- creation process made me feel that I am truly a part of Facebook	❑	❑	❑	❑	❑
This co- creation process has increased my level of intention to be involved in Facebook activities.	❑	❑	❑	❑	❑
This co- creation process, increased my willingness to be involved in the co- creation phase with Facebook.	❑	❑	❑	❑	❑
Next time, if there is any co-creation process like this time, I will look for opportunity to be involved in this activity again.	❑	❑	❑	❑	❑

APPENDIX 3: Instrument for Pre-test before the experimentation process (Private University Context)

Research Experimentation

Please Fill in your information as following

Gender: ❑ Male ❑ Female
Occupation _____ Company_____

Position_____ Nationality_____

Age_____

Introduction

- Thank you for accepting to be part of this research study looking at the relationship between customer engagement and co-creation process efficiency during the design phase of new service development.
- You were selected as participant for this research as we are looking for graduate students.
- Please read this form and ask any questions that you may have before agreeing to be part of this study.

Description of the Study Procedures

- If you agree to be part of this study, you will be asked to answer a pre-survey before experimentation, involve in experimentation and a post- survey after the experimentation. The process won't take longer than 2 hours.

Confidentiality

- The records of this study will be kept strictly confidential. We will not include your personal information in any report. We may publish information that would make it impossible to identify you.

Questions about the research?

- If you have any questions about this process, or about your rights as a participant in the study, you may contact Voravee Ruengaramrut e-mail:voravee.r@gmail.com

Consent

2. Your signature below indicates that you agree to volunteer as a research participant for this study, and that you have read and understood the information provided above.

Subject's Name

(Full Name): _____

Subject's Signature: _____ Date: _____

Part 1: Customer Engagement Survey

3. What grade are you in (University's Name) _____

4. How many years have you been a student at (University's name) _____

The survey scale from 1 (strongly disagree) – 5 (strongly agree)

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
When someone criticizes (University's Name) it feels like a personal insult.	❑	❑	❑	❑	❑
I am very interested in what others think about (University's Name).	❑	❑	❑	❑	❑
When I talk about (University's Name), I usually say "we" rather than "they".	❑	❑	❑	❑	❑
(University's Name)'s successes are my successes.	❑	❑	❑	❑	❑
When someone praises this (University's Name), it feels like a personal compliment.	❑	❑	❑	❑	❑
I spend a lot of my discretionary time thinking about (University's Name).	❑	❑	❑	❑	❑
I am heavily into (University's Name).	❑	❑	❑	❑	❑
I am passionate about (University's Name).	❑	❑	❑	❑	❑
My days would not be the same without (University's Name).	❑	❑	❑	❑	❑
I am enthusiastic about (University's Name).	❑	❑	❑	❑	❑
I feel excited about (University's Name).	❑	❑	❑	❑	❑
I like to learn more about (University's Name).	❑	❑	❑	❑	❑
I pay a lot of attention to anything about (University's Name).	❑	❑	❑	❑	❑
Anything related to (University's Name) grabs my attention.	❑	❑	❑	❑	❑
I concentrate a lot on (University's Name).	❑	❑	❑	❑	❑

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
I spend a lot of time thinking about (University's Name).	❑	❑	❑	❑	❑
I focus a great deal of attention on (University's Name).	❑	❑	❑	❑	❑
When I am interacting with (University's Name), I forget everything else around me.	❑	❑	❑	❑	❑
Time flies when I am interacting with (University's Name).	❑	❑	❑	❑	❑
When I am interacting with (University's Name), I get carried away.	❑	❑	❑	❑	❑
When interacting with (University's Name), it is difficult to detach myself.	❑	❑	❑	❑	❑
In my interaction with (University's Name), I am immersed.	❑	❑	❑	❑	❑
When interacting with (University's Name) intensely, I feel happy.	❑	❑	❑	❑	❑
In general, I like to get involved in (University's Name) community discussions.	❑	❑	❑	❑	❑
I am someone who enjoys interacting with like-minded others in the (University's Name) community.	❑	❑	❑	❑	❑
I am someone who likes actively participating in (University's Name) community discussions.	❑	❑	❑	❑	❑
In general, I thoroughly enjoy exchanging ideas with other people in (University's Name) community.	❑	❑	❑	❑	❑
I often participate in activities of the (University's Name) community.	❑	❑	❑	❑	❑

Part 2: Intention to be involved in new service development process

According to part 1 please take no more than 5 minutes to answer the survey below. Please think about (University's Name).

Co- creation is *" An interactive process involving at least two willing resource integrating actors which are engaged in specific form(s) of mutually beneficial collaboration, resulting in value creation for those actors. (Frow, 2011)".* This at least two willing resources can be customer collaborate with companies or customer with other customers (Humphreys, 2008).

Example: DHL "Parcelcopter Skyport"

DHL, the world' s largest logistic specialist company had involved loyal customer participants in workshop to co- create solution to improve the experience of delivery services for everyone. From the workshop, "Parcelcopter" become one of invention that has chance to go to the test stage. The community members co-create the idea and also tested out the potential service with Parcelcopter. According from the test result, Parcelcopter spend short time to delivery package than normal delivery vehicle. Forbes reported that *Forbes*, DHL's co-creation efforts resulted in customer satisfaction scores rising to over 80 percent, on-time delivery performance increasing to 97 percent or higher and customer churn to decrease (Milbrath, 2016).

The survey scale from 1 (strongly disagree) – 5 (strongly agree)

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
I would intend to be involved in the co- creation phase of new service development activities with (University's Name).	❑	❑	❑	❑	❑
My willingness to be involved in the co- creation phase of new service development activities with (University's Name) is high.	❑	❑	❑	❑	❑
I am likely to be involved in any the co- creation phase of new service development activities with (University's Name).	❑	❑	❑	❑	❑
I often think about being involved in the co- creation phase of new service development activities with (University's Name).	❑	❑	❑	❑	❑

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
I will probably look for opportunity to be involved in the co- creation phase of new service development activities with (University's Name).	❑	❑	❑	❑	❑
I have a high intention to be involved in the co- creation phase of new service development activities with (University's Name).	❑	❑	❑	❑	❑

APPENDIX 4: Instrument for Post-test before the experimentation process (Private University Context)

Part 5: Post-Survey

If you had better been directly involved with employees of the (University's Name), do you think that:

The survey scale from 1 (strongly disagree) – 5 (strongly agree)

	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
This co- creation process increased my level of customer engagement toward (University's Name)	❑	❑	❑	❑	❑
This co- creation process strengthened my relationship with (University's Name) better.	❑	❑	❑	❑	❑
This co-creation process made me feel that I am truly a part of (University's Name)	❑	❑	❑	❑	❑
This co- creation process has increased my level of intention to be involved in (University's Name) activities.	❑	❑	❑	❑	❑
This co- creation process, increased my willingness to be involved in the co- creation phase with (University's Name).	❑	❑	❑	❑	❑
Next time, if there is any co-creation process like this time, I will look for opportunity to be involved in this activity again.	❑	❑	❑	❑	❑

APPENDIX 5: Scorecard (Both Facebook and Private University Context)

Activity	**Score**	**Total**
Identify Problem Stage		
Thinking about problems		
Received Votes to be the top problems		
Idea generation stage		
Identify the idea that can solve problem		
Received Votes to be the best idea		
Idea Screening Stage		
The best idea		
Total		

BIODATA

Name – Lastname Miss Voravee Ruengaramrut

Email: Voravee.r@gmail.com

LICENCE AGREEMENT OF THESIS PROJECT

Bangkok University

License Agreement of Dissertation/Thesis/ Report of Senior Project

Day 23 Month January Year 2018

Mr./ Mrs./ Ms. VORAEE RUENGARAMRUT now living at 698/306
Soi - Street Phaholyothin
Sub-district Samsennai District Phayathai
Province Bangkok Postal Code 10400 being a Bangkok
University student, student ID 9550200027
Degree level ☐ Bachelor ☐ Master ■ Doctorate
Program Ph.D. KIM Department IKI-SEA School Business School
hereafter referred to as "the licensor"

Bangkok University 119 Rama 4 Road, Klong-Toey, Bangkok 10110 hereafter referred to as "the licensee"

Both parties have agreed on the following terms and conditions:

1. The licensor certifies that he/she is the author and possesses the exclusive rights of dissertation/thesis/report of senior project entitled A QUASI-EXPERIMENTAL INVESTIGATION OF THE MODERATING EFFECT OF GAMIFICATION ON THE RELATIONSHIP BETWEEN CUSTOMER ENGAGEMENT AND NEW SERVICE DEVELOPMENT PROCESS INVOLVEME submitted in partial fulfillment of the requirement for the Degree Doctor of Philosophy in Knowledge and Innovation Manageme of Bangkok University (hereafter referred to as "dissertation/thesis/report of senior project").
2. The licensor grants to the licensee an indefinite and royalty free license of his/her dissertation/thesis/report of senior project to reproduce, adapt, distribute, rent out the original or copy of the manuscript.
3. In case of any dispute in the copyright of the dissertation/thesis/report of senior project between the licensor and others, or between the licensee and others, or any other inconveniences in regard to the copyright that prevent the licensee from reproducing, adapting or distributing the manuscript, the licensor agrees to indemnify the licensee against any damage incurred.

This agreement is prepared in duplicate identical wording for two copies. Both parties have read and fully understand its contents and agree to comply with the above terms and conditions. Each party shall retain one signed copy of the agreement.

_____ Licensor

(Voravee Ruengaramrut)

_____ Licensee

(Attipa Julpisit)

_____ Witness

(Assoc. Prof. Dr. Vincent Ribiere)

_____ Witness

(Supaporn Sursoongnoen)