EXPLORE THE IMPACT FROM CHATBOT COMMUNICATION ON THE CUSTOMER SATISFACTION: THE CASE OF THAI TELECOM SERVICES

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ABSTRACT

In the present day, the technology had dramatically developed during pandemic especially the communication between consumers to the brands. Chatbots (one type of communication assistance technology) has implemented in Thai telecom industry as the high internet penetration in Thailand. The study objectives are identifying affect to user satisfaction and understand the mutual users' direction as the purpose of developing better customer experiences which has the scope of study on Thai telecom brands (AIS, TRUE, DTAC) market.

In this study, the quantitative methodology is applied; the method begins with the past research review relating to chatbot field to construct the framework based on the five independent variables (information quality, perceived usefulness, perceived risk, perceived ease of use and anthropomorphism) to customer satisfaction.

The survey includes 108 samples from the survey and utilize the output to run the statistical analysis. The analysis indicates that information quality, perceived ease of use and anthropomorphism have the relationship with satisfaction. Chatbots could provide the type of services which don't have complexity such as pay bill and check balance. Furthermore, majority of samples tend to call the human agent and use the chatbot by once a month; therefore, the users partly satisfy the chatbot service and overall provided service in chatbot could not properly fulfill the users' expected.

KEY WORDS: CHATBOT / TELECOMMUNICATION / CUSTOMER
EXPERIENCE/ CUSTOMER PERCEPTION/ SATISFACTION

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CHAPTER I

INTRODUCTION

Technology in the present day has been developed. COVID-19 pandemic is the significant factor that has especially affected societies and economics. The technology shapes people's behaviours to enable more connectedness. According to the McKinsey Global Survey of executives, the companies have accelerated the digitalization to meet the customers' demand (LaBerge et al., 2021). The change due to the digitalization isn't temporary but the digitalization seems to be more long-lasting. In the upcoming G20 summit in Indonesia 2022, Digital Economy Working Group (DEWG) sets the theme "Recover Together, Recover Stronger"; which aims to support the world's pandemic recovery, the group will discuss three important agenda including digital-based transformation. Communications and Informatics Minister Johnny Gerard Plate under the Government of Indonesia highlighted the rapid growth of data consumption (cloud computing) and the growth of the world's digital economy (Plate, 2022). The growth comes about in the area of economic, finance, commerce, education, health and government sectors.

Therefore, businesses offer various online services to serve the changing behaviours of people such as video conferences, streaming service, eCommerce etc. Consequently, internet users globally increase with the rise of digital transformation. According to Kepios analysis, the number of global internet users has increased by double in the decade from 2.18 billion at the beginning of 2012 to 4.95 billion at the beginning of 2022 (Kemp, 2022)

1.1 Micro background of Thai telecom industry

According to the NBTC executive summary on behaviour survey (2018-2019), the report indicates in total 6 Thai telecom providers; AIS group, True group, DTAC group, TOT and CAT. In 2019, the market share of Thai telecom providers will

be stated as follows; Advanced Info Service Public Company Limited (AIS): 44%, True Corporation Public Company Limited (True): 31%, Total Access Communication Public Company Limited (DTAC): 23%, TOT Public Company Limited (TOT): 0.192% and CAT Telecom Public Company Limited (CAT): 0.0028% (NBTC, 2020).

In 2022, TRUE and DTAC announced the planned merger in which the both entities combining together exceeds the entity of current leading telecom company (AIS) by 7.5billion USD (Parpart, 2022).

In the same year, TOT and CAT also merged to become one entity which the plan was done in January and the name is called the National Telecom Public Company Limited (NT) Although Thai telecommunication providers have dramatic changes compared with 2019 (The Nation, 2021). This study still insists on using the previous brand identity; TRUE, DTAC, TOT and CAT separately.

In the case of Thailand, although internet users have increased by 0.2 percent from 2021; however, the percentage of internet penetration in Thailand is at 77.8 percent of total population at the beginning of 2022 which is currently 54.5 million internet users in Thailand (Kemp, 2022). Therefore, Thai telecom service providers have to deal with the larger internet users leading to lack of human resources available for customer relationship/after sales services.

Consequently, Thai telecommunication service providers decided to look for automation technology that could be utilized for serving the influx of customers on the after-sale services. For example, AIS indicates the number of customers reaching the Call Centre for 7 million calls per month in 2018 (Positioning Magazine, 2019).

1.1.1 What are Chatbots?

The technology could stimulate and process human conversion and offer assistance in the particular situation immediately. According to Engati, Chatbot is categorized into six types (Engati Team).

1.1.1.1. Menu/Bottom Based Chatbots: this type is the basis which the companies apply in the market, it provides the decision tree as the form of buttons which help the customers easily make the decision to reach the goals but this type could not deal with the complex questions from customers.

1.1.1.2. Linguistic Based (Rule-Based Chatbots): if the user defines the language condition for Chatbots such as the system receives word, synonym etc., it could predict the conversion and respond to customers in the form of conversational automation but it has to develop when the Chatbot receives the new customer input.

1.1.1.3. Keyword recognition-based chatbots: as the name states that this type of Chatbot recognizes the keywords, it is applied with Natural Language Processing (NLP) and utilizes both input and system to respond to the customers appropriately.

1.1.1.4. Machine Learning chatbots: this type of Chatbot is superior compared with the previous types in terms of technological advancement, it is built with Machine Learning and Artificial Intelligence which help the Chatbots learn the conversation and automatically grow overtime.

1.1.1.5. The hybrid model: the model could have two definitions. The first definition is combining Chatbot and Human agent, if Rule-Based Chatbots could not satisfy the customers, human agent will work after previous conversation. Secord definition is combining the Rule-Based Chatbot and Ai Based Chatbot in the case of limited data storage.

1.1.1.6. Voice bots: this type works similarly to Machine Learning Chatbot but it could speak to customers which is designed for conveniences when people feel comfortable to speak rather than typing.

As a result, Thai telecom companies begin to apply these types of Chatbots. AIS applies AI chatbot names `Aunjai" to reduce the workload for human agents (Positioning Magazine, 2019). Another telecom service provider also implements the Chatbot technology which is TRUE (Mari) (Positioning Magazine, 2021). DTAC created the Agent Assistance on LINE and Facebook Messenger (Dtacblog, 2022). Consequently, customers initially encounter the Chatbot when they contact Call Centre services in the present day. The aim of the study is to identify the impact of Chatbots which share the work from the human agents on the satisfaction of customers.

1.2 Problem Statement

The digital transformation has been growing rapidly worldwide, the digital consumption trend is important even some global summits such as G20 hold seminars on this topic. The trend has had an effect on the support of digital infrastructure development and increasing internet users worldwide. However, the internet users still continuously grow and the number of users. The rapid internet user growths also create According to Statista statistics, top issue among online issues which annoy Thai internet users in 2021 is slow internet connection, there are other two issues from top five online issues apart from slow internet connection which are poor internet coverages and unstable internet connection (Statista, 2022). Therefore, concerning the large number of internet users, Thai telecom providers have to deal with an influx of users to the after services within a day, human agents could not serve with the large number users in a time. Chatbots are installed via online channels to ease these issues.

Users encounter Chatbots more frequently when they use the services and the role of human agents have declined. The reason leads to the question of how Chatbot could satisfy customers when they have to encounter this technology more often and the case of satisfaction should identify what factors affect the customers' satisfaction towards Chatbot's installation for after sale/customer services.

Research Questions
- What are the factors that impact customer satisfaction towards the chatbots?
- Which direction customers perceive towards the chatbot services?

Research Objectives
- Identify the variables which impact on customers' satisfaction from chatbots
- Understand the mutual direction of customers using the chatbot services in order to develop better customer experience

CHAPTER II
LITERATURE REVIEW

This chapter includes a theoretical framework for the research question in this study, this chapter means for summarizing and comparing the relevant past literature which the purpose is to understand the context from the literature to this study. This chapter composes of the topic of chatbot, also including dependent variable (Satisfaction) and five independent variables (Information Quality, Perceived Usefulness, Perceived Risk, Perceived Ease of Use and Anthropomorphism) and theoretical framework at the end of chapter.

2.1 Chatbot: Definition

Chatbot is the umbrella term to the other similar concepts such as virtual agents, chatter bots and conversational agents (Parcelas & Quintino, 2019). These similar concepts which might be mentioned in this study meant to refer to the chatbot. This technology is designed as a software program to stimulate the smart conversation to the users in the type of voice and texts (Gümüş & Çark, 2021). Companies apply this technology in order to serve customers 24/7, it could help to reduce the cost of labor and time effectiveness to the companies (Gümüş & Çark, 2021). The role of a chatbot is to provide real-time information to respond to each user who asks the question, and provides suggestions to users (Moon, 2003).

2.2 Keywords/Variables

2.2.1. Satisfaction

The customers' Satisfaction has been talked about in the area of research for decades, many studies bring this construct to relate with various contexts and several

critical factors (Rizomyliotis et al., 2022). Satisfaction is the concept to measure the degree/level to particular products or services based on the customer's expectation in the business field (Chung et al., 2020). According to the customer-confirmation model, if the customer's expectations have been exceeded towards the products or services, the satisfaction will occur in the mind of customers (Oliver, 1980). Satisfaction could efficiently measure the situation of face-to-face encounters, technology-based self-service encounters and also include the encounters in online environments (Quintino, 2019). There is the study relating customer satisfied evaluation on the online chat operator of mobile internet providers in United Kingdom, the result indicates that the perceived ease of use and perceived usefulness are the most crucial in customers' perspective and the information quality is also one of variables which support the customers' decision (McLean & Osei-Frimpong, 2017). Satisfaction is also the indirect result from anthropomorphism influence (Tsai et al., 2021). However, customer satisfaction could be interpreted as the expression of disappointment by the customers' product or service comparing perception, they could possibly feel disappointed when the service didn't meet their expectation (Mulyono & Sfenrianto, 2022).

2.2.2. Information Quality

Information is delivered as texts, pictures and videos, it was one of basic functions for the chatbot in the past (Cheng & Jiang, 2020). Talking about the content of Chatbot, information is more up-to-date on the customer side) but there is a challenge when the Chatbot receives the deep information in the business perspective (Quintino, 2019). Information Quality is the output from the information system, the output could be measured by the elements of completeness, accuracy, understandability, usefulness, timely and reliability which refers to the offered products or services, relevant infers to serve customer's need, completeness and accuracy are the measurement of assisting customers to make decision, understandability measure the quality of information to meet the level of understanding of customers, timeliness measures the punctuality of information delivery, if the delivery is delayed, it impact on customer dissatisfaction (Mulyono & Sfenrianto, 2022). Poor information quality could affect customer trust and tend to be negative (Mithas et al., 2011). There is evidence from a study of "AI chatbots leading to higher customer satisfaction than human frontline employees in online

shopping assistance" that information quality has a positive relationship with customer satisfaction (Ruan & Mezei, 2022).

H1: Information Quality of chatbots has positively affect customer satisfaction

2.2.3. Perceived Usefulness

The Perceived Usefulness is how information systems (IS) could help customers to receive better efficiency, productivity and overall performance (Davis et al., 1989). This construct together with perceived ease of use affects the technology adoption (Selamat & Windasari, 2021). The study of "impact of chatbot technology in the case of telecom" also agrees with the similar direction that the Perceived Usefulness towards a new technology influencing customers that the users have the expectation of probability that using the specific system would increase the users' performance (Quintino, 2019). The evidence of study indicates that users have Perceived Usefulness towards the chatbot that it could efficiently perform in the given specific tasks; for example, it could provide the recommendation to users instantly (Selamat & Windasari, 2021). Customer attitudes on chatbots depend on the degree of Perceived Usefulness from customers (Gümüş & Çark, 2021). Therefore, Perceived Usefulness is found to have a positive relationship with satisfaction in the context of information technology (Dhiman & Jamwal, 2022). Therefore, this study argues that Perceived Usefulness causes the positive bond between customer satisfaction and chatbot.

H2: Perceived Usefulness of chatbots has positively affect customer satisfaction

2.2.4. Perceived Risk

The concept of Perceived Risk is "the customer's" perception of the uncertainty of adverse consequences from purchasing products and services which comprises five types of risk: financial, time, performance, psychological and social risks (Lai-Ming Tam, 2012). Perceived Risk is directly related with customer evaluation regarding financial gain, performances and functionalities of product and services, psychological thought and social values (Marakanon & Panjakajornsak, 2017). Perceived Risk has a significant impact on customer experience by the Chatbot (Kushwaha et al., 2021). Especially, customers have the privacy risk in the case of using Chatbot, they are concerned about the uncertainty of revealing personal information

such as phone number, name and address for misused by third parties (Cheng & Jiang, 2020). The study of chatbot in Thailand emphasizes on time risk and privacy between chatbot and customers, the perceived risk has an effect on the frequency of uses and considers that chatbot causes time consuming than the human agents leading to the degree of perceived risk (Kwangsawad & Jattamart, 2022). There is evidence of study of "influence of service recovery types on consumer perceptions of recovery satisfaction" confirming that Perceived Risk reduces the aspect of customer satisfaction (Song et al., 2022). Thus, these studies explain that the higher perceived risk causes decreasing customer satisfaction.

H3: Perceived Risk of chatbots has negatively affect satisfaction

2.2.5. Perceived Ease of Use

Perceived Ease of Use is defined as "the degree to which the prospective user expects that system to be free effort" (Davis et al., 1989). This construct also integrates together with Perceived Usefulness based on the technology acceptance model (TAM) (Selamat & Windasari, 2021). Perceived Ease of Use and Usefulness also associated with Information Quality in terms of attitude in continued use of chatbot (Kwangsawad & Jattamart, 2022). Moreover, this construct plays a crucial role to drive the intrinsic motivation of customers, when the chatbot works in the working environment, it is ranked as the most important factor (Zarouali et al., 2018). Ease of Use could importantly reduce the time and effort for consumers in order to wait for a service queue from human agent operators which means to avoid the particular issues produced by human employees (Song et al., 2022). Overall, developers have to make sure that Chatbots should be easy-to-use for a large number of customers, unless it's easy-to-use, customers will find the technology in the way of hard-to-use which turns to negative perception for customers.

H4: Perceived Ease of Use of chatbots has positively affect satisfaction

2.2.6. Anthropomorphism

This term refers to "human tendency attributed to human-like characteristics such as motivations, intentions and emotions to non-human agents" (Seeger & Heinzl, 2017). This factor is the crucial element to bridge the bond between Chatbots and

customers (Crolic et al., 2021). Many brands create the characteristic persona for chatbots such as Coca Cola: Hank, IKEA: Anna by setting human profile pictures in their profile design (Tsai et al., 2021). Anthropomorphism in the context of technology could boost the marketing outcomes; for example, Anthropomorphic chatbot could increase the customer purchase-intention and digital messenger could work more persuasively than human agents in some contexts (Touré-Tillery & McGill, 2015). There is a study supporting the benefits of Anthropomorphic chatbot that Chatbots' languages style and name as the point which could increase customers' attitude, satisfaction (Araujo, 2018) and strengthen the bond between customers and corporate brands (Nyagadza et al., 2021). On the other hand, in deducting meaning, Chatbot could produce kinds of errors such as failing to maintain the contextual awareness which is simply found in Chatbot performance; the errors result in decreasing the bond between the Chatbot and human (Sheehan et al., 2020).

H5: Anthropomorphism of chatbots has positively affect satisfaction
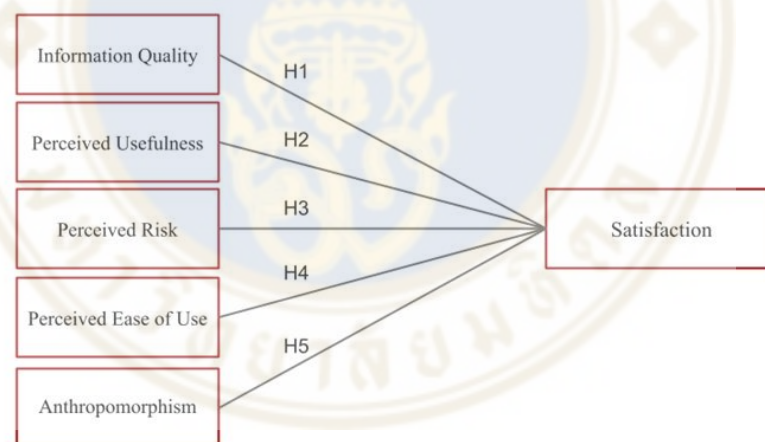
Figure 2.1: theoretical framework

For the figure 2.1, as illustrated above the constructs are aligned based on the review from past studies, the independent variables are created to be as driver (+) or barrier (-) to the one independent variable "customer satisfaction to Thai telecom chatbot service".

CHAPTER III
RESEARCH METHODOLOGY

This chapter explains the methodology to answer the purpose of study which intends to identify the variables which have effect on customer satisfaction after encountering chatbots, understanding the collective direction of customer perception towards chatbot and aims to test the hypotheses of the theoretical framework as illustrated in the second chapter. In this regard, the study uses the quantitative method to capture the collective scope of data collection in order to include all complexity of information for further data analysis.

3.1 Quantitative Approach

As mentioned, objectives that the study aim to identify the variables which impact on customers' satisfaction from chatbots and understand the mutual direction of customers using the chatbot services in order to develop better customer experience, the study utilizes the quantitative approach. The approach initially refers to the review of literatures into the five independent variables (Information Quality, Perceived Usefulness, Perceived Risk, Perceived Ease of Use and Anthropomorphism) and a dependent variable (Satisfaction) which could develop to the study's theoretical framework as displayed in the second chapter. Next step is about developing the measurement based on the reviewing variables and distribute in the type of survey collecting the samples (primary data), this methodology involves with statistical analysis, the researcher has to recode the data and run statistical analysis the relationships between variables and measure the degree in each measurement (Ghauri et al., 2020).

3.2 Sampling Plan

Sampling plan are specified based on the users (all ages and genders) who currently use one of Thai Telecommunication services (the study specifies three Thai telecommunication providers brands; AIS, TRUE and DTAC) for more than 3 months, the survey has the focus on the users who have experiences the online after sale/call center services in particular Thai telecommunication providers which include the choice from one of 3 Chatbots available from each providers Three chatbots composes of "Aunjai" via Facebook Messenger or myAIS (AIS), "Mari" via Call and LINE (TRUE) and "DTAC Agent Assistance" via LINE and Facebook Messenger. The respondents could voluntarily decide to participate in the survey and could withdraw the participation at any time. The sample size includes at least 100 respondents. The study aims to evaluate the customer satisfaction from Telecom chatbots to ensure the respondents have experiences of Thai telecommunication chatbots.

3.3 Questionnaire

This study conducts a questionnaire including two languages; Thai and English which could reach potential Thai and foreign speakers who experience the chatbots and the questionnaire is distributed to social media platforms (Facebook public group, Instagram and LINE private groups), the survey is distributed in the type of Google form line to acquire the samples in various online communities, the questionnaire distribution is between 14th October 2022 and 20th October 2022. The questionnaire design is divided into four main parts; screening questions, general questions, specific questions and demographic questions respectively. Regarding the online form of questionnaire, the first page before the screening question indicates the research objective, illustrates the purpose to the respondents why the research is conducted and also includes the follow of Thailand's Personal Data Protection Act (PDPA) (PDPA Thailand, 2022). This survey aims not to violate any personal privacy and aims to collect the data for academic purposes. After the respondents pass the introduction page of the questionnaire, they reach the first part "screening questions". Screening questions are created to filter out the unmatched sample according to the criteria of the sampling plan, the purpose of screening questions is to acquire the sample

which have the understanding of chatbots' characteristics compared with the human agents when the chatbots and human agents share the same communication channel and also have to experience Thai telecommunication chatbots. The second part is general questions, the respondents would provide the answers of their use behaviors in chatbots in this part. The third part is specific questions, these questions are created to test the level of satisfaction from customers. Specific questions regarding the 5 independent variables from the theoretical framework in the second chapter. The last part is demographic questions, this session is designed for acquiring respondents' demographic information. The questions are conducted to illustrate the respondent's agreement level by using the 4 level of Likert Scale. As a result, the questionnaire could help to understand the level of satisfaction of customers towards chatbots in various dimensions.

3.4 Data Collection

The survey collects in total of 158 responses, there are 108 valid responses from the total due to the reason that the eliminated samples in the screening questions don't fit to the sample frame. 2 samples are eliminated in the item "Your age is over 15 years old", 6 samples are eliminated in the item "Have you currently used Thai Telecom service for more than 3 months? (AIS, TRUE and DTAC)" and 42 samples are screened by the item "Have you ever experienced Thai Telecom Chatbot services (Aunjai: AIS, Mari: TRUE and DTAC)'. Therefore, there are total valid 108 responses for the study's analysis and interpretation.

3.5 Analysis and interpretation

The result from the online questionnaire (regarding to quantitative approach) would be inputted in the further analysis step. The respondents' responses are decoded to numerical data and transferred to further quantitative analysis by SPSS Statistics software. The software could potentially provide the results of correlation, multiple regression, reliabilities, the statistical T-Test method, One-way ANOVA method (including the analysis from Post Hoc Bonferroni Tests) which potentially

provides the outcomes of significant differences between variables according to the theoretical framework and testing the theoretical framework's reliability.

After the software possesses the quantitative results, the data would transfer to the interpretation phase where the purpose is to answer the research question and eventually to define the recommendation based on the degree of satisfaction compared with the general use dimension. After analysis and interpretation, the data from the survey would be destroyed to ensure that the data of respondents would be secured and not be delivered for further misuses.

Table 3.1: Items Adaptation of all constructs in the study

Construct	Items	Reference
Information Quality	IQ1: I think chatbot provides the complete information IQ2: I think chatbot provides the information with few errors IQ3: I think chatbot provides the credible information IQ4: I think chatbot provides the information which is sufficient volume for my needs IQ5: I think chatbot provides the information which is relevant to my decision making IQ6: I think chatbot provides understandable information	Mulyono & Sfenrianto, 2022; Ruan & Mezei, 2022
Perceived Usefulness	PU1: I think chatbot improve my performance to find the information PU2: I think chatbot improve my performance to find the needed service PU3: I think the information which chatbot provide is useful PU4: I think chatbot is useful to solve the customers' telecom issues PU5: I think chatbot is useful to improve service experience	Kwangsawad & Jattamart, 2022; Parcelas & Quintino, 2019; Selamat & Windasari, 2021
Perceived Risk	PR1: I'm worry about misuse of my personal information	

	PR2: I'm worry about my personal information be sold to third parties	Cheng & Jiang, 2020;
	PR3: I think there is uncertainty to use chatbot service agent	Kwangsawad & Jattamart, 2022;
	PR4: I acknowledge that the chatbot conversation has time consuming than conversation with human agent	Song et al., 2022
	PR5: I think chatbot can cause the negative impact to me	
Perceived Ease of Use	PE1: I get the information easily by using chatbot service	Kwangsawad & Jattamart, 2022;
	PE2: I can make the decision easily by using chatbot service	Parcelas & Quintino, 2019;
	PE3: I think chatbot technology is easy-to-use	Selamat & Windasari,
	PE4: I think it is easy to learn how to use the chatbot	2021
	PE5: I able find the information quickly by using chatbot	
Anthropomorphism	AT1: The conversation between me and the chatbot doesn't seem to be artificial.	Balakrishnan et al., 2022; Lu et al., 2019;
	AT2: I think chatbot behave humanlike	Selamat & Windasari,
	AT3: I think chatbot have conscious in their actions in moment of conversation	2021
	AT4: I think chatbot are smart in engaging during conversation	
	AT5: I think chatbot have a mind of their own	
	AT6: I think chatbot can experience emotion of human	
Satisfaction	ST1: I feel satisfied with the performance of this company chatbot	Ruan & Mezei, 2022

For Table 3.1, it indicates the items from the past studies which table covers five independent variables and a dependent variable according to the theoretical framework.

CHAPTER IV
FINDING AND DATA ANALYSIS

4.1. Demographic and respondents' behavior output

For the output from the online survey, a total of 158 samples were collected. The screening questions filtered the unlikely targeted respondents on this study by 50 samples; consequently, a total of 158 samples declined to the amount of 108 samples responding to the survey questions.

The next paragraph indicates the frequency information in each demographic (gender, age range, marital status, education degree and income range) aspects.
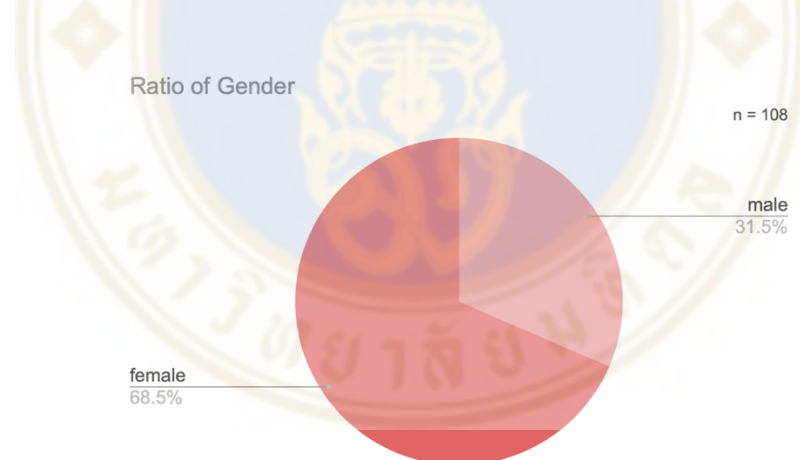
Figure 4.1: Ratio of Gender

According to figure 4.1, the gender of a total 108 respondents is identified in the ratio of 31.5% (34 respondents) male and 68.5% (74 respondents) female.

In the aspect of age, there are six groups of age range in the survey, the age range begins with 15-19 years with 2.8% (3 respondents), group of 20-29 years is counted by 69.4% (75 respondents), group of 30-39 years is counted by 6.5% (7 respondents), group of 40-49 years is counted by 2.8% (3 respondents), group of 50-59 years is counted by 14.8% (16 respondents) and group of over 60 years is counted by 3.7% (4 respondents). The ratio of age range groups is illustrated in the pie chart below.
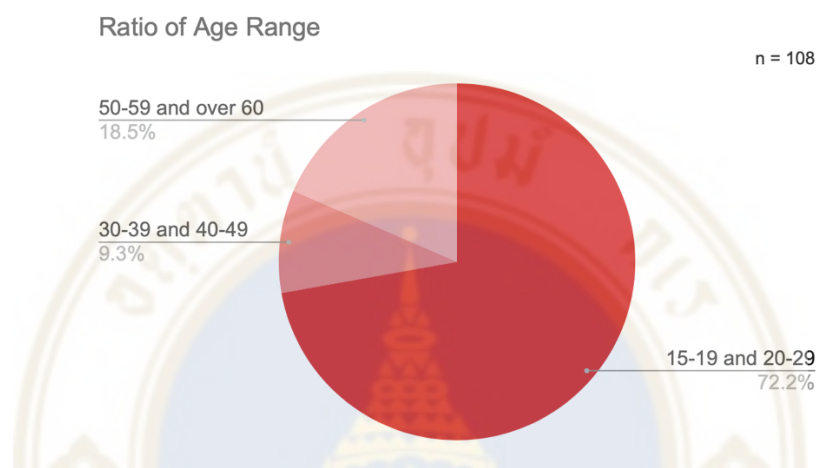
Figure 4.2: Ratio of Age Range

According to the result from the age range aspect, the data of the group of 20-29 years exceeds more than half of total respondents and the other groups of age range seem to be minority compared with the group of 20-29 years. To reduce the gap between majority and minority, the group of 15-19 years and 20-29 years are merged together to 72.2% (78 respondents), the group of 30-39 years and 40-49 years are merged together to 9.3% (10 respondents) and the group of 50-59 years and group of over 60 years are merged together to 18.5% (20 respondents). Therefore, there are three groups of redefined age ranges (15-19 years and 20-29 years, 30-39 years and 40-49 years, 50-59 years and over 60 years) which the data would be utilized in the part of analysis.

Ratio of Marital Status

n = 108

Married
17.6%
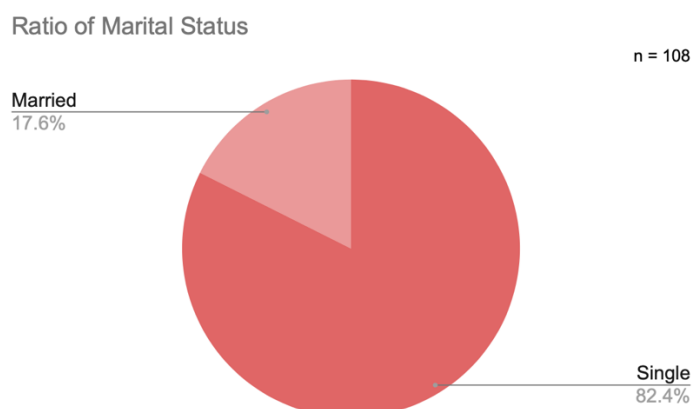
Single
82.4%

Figure 4.3: Ratio of Marital Status

According to figure 4.3, marital status is divided into two main groups: 82.4% (89 respondents) of singles and 17.6% (19 respondents) of married.

Ratio of Education Degree

n = 108

High school or below
10.2%

Master degree or higher
21.3%

Bachelor degree
68.5%
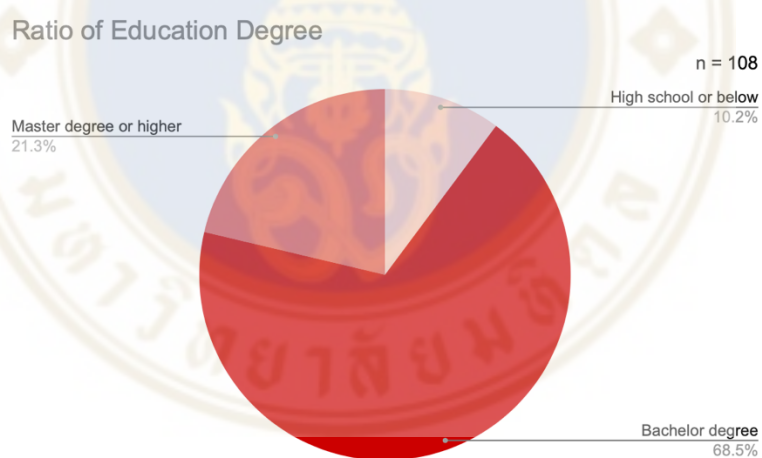
Figure 4.4: Ratio of Education Degree

The education degree of respondents in this study is categorized into three groups; High school or below is 10.2% (11 respondents), Bachelor degree is 68.5% (74 respondents) and Master degree or higher is 21.3% (23 respondents).

Ratio of Income Range

n = 108

More than 45,000 baht
23.1%

Below 15,000 baht
18.5%

30,001 - 45,000 baht
12.0%

15,001 - 30,000 baht
46.3%
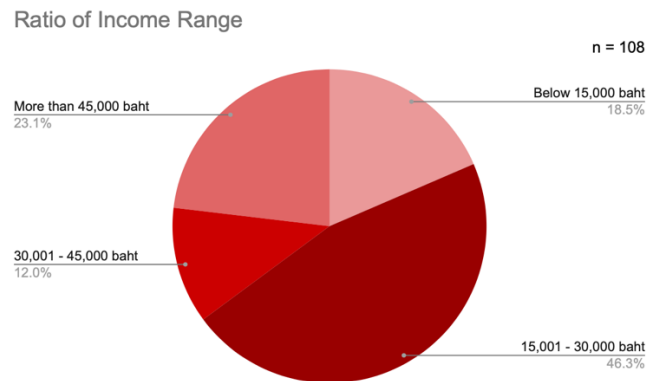
Figure 4.5: Ratio of Income Range

The last of aspect of demographic data is about income, the income range are separated to five groups following by below 15,000 Baht is counted by 18.5% (20 respondents), 15,001-30,000 Baht is counted by 46.3% (50 respondents), 30,001-45,000 Baht is counted 12% (13 respondents) and more than 45,000 Baht is counted by 23.1% (25 respondents).

General questions comprise with 3 factors (the current use of brand chatbot service, the type of service and frequency of chatbot usage in a month)

Ratio of Brand Chatbot Use

n = 108

DTAC's LINE and…
19.4%

Aunjai: AIS
44.4%
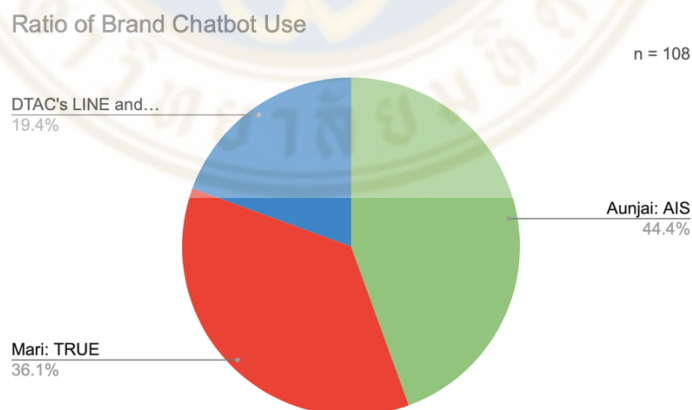
Mari: TRUE
36.1%

Figure 4.6: Ratio of Brand Chatbot Use

The data begins with the current use of telecom chatbot services, the result indicates the ratio of three brand chatbot (Aunjai; AIS, Mari; TRUE and DTAC). Aunjai (AIS) is accounted for by 44.4% (48 respondents), Mari (TRUE) is accounted for by 36.1% (39 respondents) and DTAC's LINE and Facebook Messenger is accounted for by 19.4% (21 respondents).
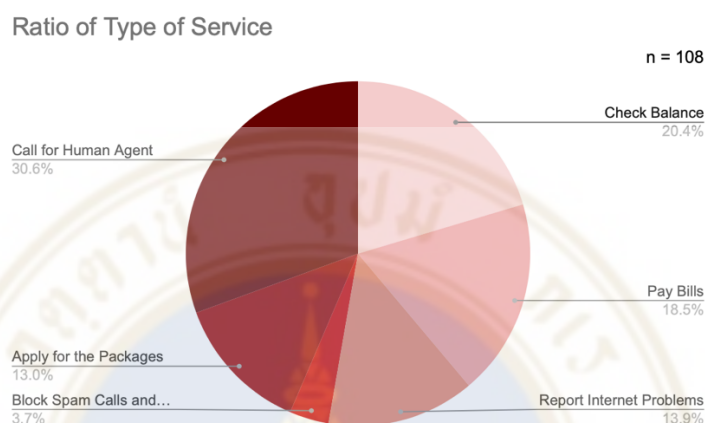
Figure 4.7: Ratio of Type of Service

For the data of type of service use via chatbot, there are 6 types of services (check balance, pay bills, report internet problem, block spam calls and text messages, apply for the packages and call for human agents), check balance has 20.4% (22 respondents), pay bills has 18.5% (20 respondents), report internet problems has 13.9% (15 respondents), block spam calls and text messages has 3.7% (4 respondents), apply for the packages has 13% (14 respondents) and call for human agents has 30.6% (33 respondents).

The frequency of chatbot service usage is initially divided into three ranges (once a month, 2-3 times a month and more than 3 times a month); once a month has 77.8% (84 respondents), 2-3 times a month has 16.7% (18 respondents) and more than 3 times a month has 5.6% (6 respondents). The group of 2-3 times a month and more than 3 times a month are dramatically smaller than the group of once a month.
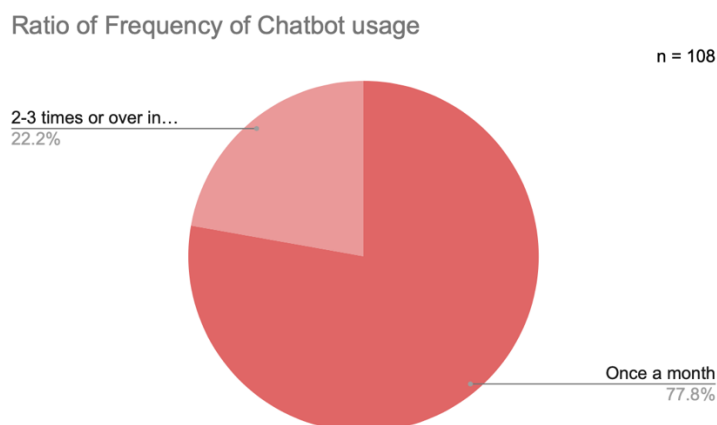
Figure 4.8: Ratio of Frequency of Chatbot usage

According to the chart of frequency of chatbot usage in a month, I regroup from three groups into two groups; once a month would remain unchanged but 2-3 times a month and more than 3 times a month are merged to 2-3 times or over in a month (22.2%; 24 respondents).

The next section displays the data reliabilities of all dependent constructs which aim to test the research instruments consistency, the test output displays as the table below.

Table 4.1: Cronbach's Alpha scores of all constructs in the study

Constructs	Number of Items	Cronbach's Alpha
Perceived Usefulness	5	0.88
Information Quality	6	0.85
Anthropomorphism	6	0.84
Perceived Ease of Use	5	0.82
Perceived Risk	5	0.63

According to the reliability test, Information Quality, Perceived Usefulness, Perceived Ease of Use and Anthropomorphism has the Cronbach's Alpha exceeds 0.8; the general rule of Cronbach's Alpha considers as 0.6-0.7 is the acceptable reliability, the score 0.8 is considered as very good level (Ursachi et al., 2015). Perceived Risk has the Cronbach's Alpha at 0.6 which is still considered an acceptable level of reliability (Ursachi et al., 2015).

According to the study theoretical framework, there are five independent variables (Information Quality, Perceived Usefulness, Perceived Risk, Perceived Ease of Use and Anthropomorphism) and one dependent variable (Satisfaction). The below bar chart illustrates the mean scores of all constructs in the study.
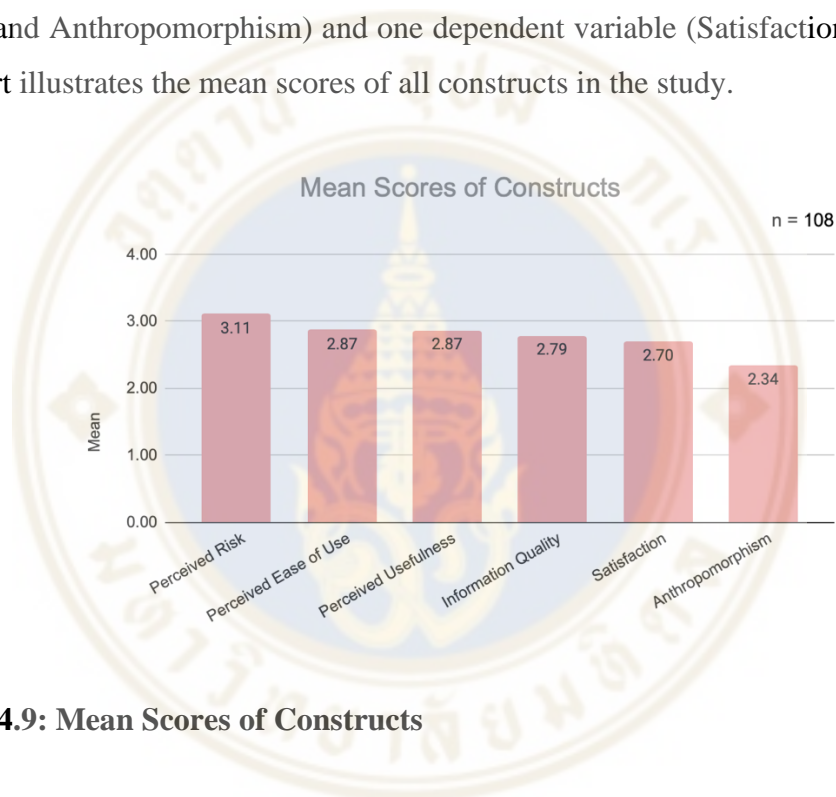
Figure 4.9: Mean Scores of Constructs

As the figure 9 illustrates, all constructs have the mean scores exceeding the mean of 2 from the scale of 4. Perceived Risk has the highest mean score by 3.11 which is only one construct having mean score more than 3, Anthropomorphism has the lowest mean score by 2.34 and Satisfaction has the mean score by 2.7.

4.2. Test of Difference

This chapter includes the results of the test (T-Test and ANOVA), the results include the respondent group from Gender, Education, Income, Brand of Chatbot, Type of Service and Frequency of Use. From the test, there is no evidence of significant differences between groups in the aspect of Age and Marital Status.

As regards the previous paragraph, the results of the test of difference are divided by the test from T-Test and the test from ANOVA. The result of the test of difference begins with the result of the T-Test.

4.2.1. T-Test finding

In the study, I applied the statistical T-Test method to compare the mean between two groups (Bevans, 2022). Therefore, the sample in the aspects of Gender (male; female), Marital Status (single; married) and Frequency of Use (Once a month;2-3 times or over in a month) are tested by the statistical T-test method. In the matter of the test, we found significant differences in the aspect of Gender and Frequency of Use, the output shows no evidence of significant difference in the aspect of Marital Status.

Table 4.2: Gender in T-Test analysis

Construct	Item	Please state your gender	Mean	F	Sig. (2-tailed)
Perceived Usefulness	I think the information which chatbot provide is useful	male	2.68	3.91	0.009
		female	3.09		

According to Table 4.2, one construct of Perceived Usefulness (the statement of chatbot provides useful information) displays the difference (sig.<0.05 in the column of Sig. (2 tailed)) between Male and Female think that the information from the chatbot is useful by having a mean of 3.1 over the mean of 2.7 from the group of Male.

Table 4.3: Frequency of Use in T-Test analysis

Construct	Statement	How many times in a month do you use Chatbot service?	Mean	F	Sig. (2-tailed)
Information Quality	I think chatbot provides the complete information	Once a month	2.64	0.89	0.011
		2-3 times or over in a month	3.13		
	I think chatbot provides the information with few errors	Once a month	2.79	0.14	0.001
		2-3 times or over in a month	3.38		
	I think chatbot provides the credible information	Once a month	2.94	1.61	0.026
		2-3 times or over in a month	3.33		
	I think chatbot provides the information which is sufficient volume for my needs	Once a month	2.35	0.19	0.007
		2-3 times or over in a month	2.92		
	I think chatbot provides the information which is relevant to my decision making	Once a month	2.48	0.02	0.001
		2-3 times or over in a month	3.17		
	I think chatbot provides understandable information	Once a month	2.83	0.30	0.007
		2-3 times or over in a month	3.29		
Perceived Usefulness	I think chatbot improve my performance to find the information	Once a month	2.81	0.03	0.012
		2-3 times or over in a month	3.25		
	I think chatbot improve my performance to find the needed service	Once a month	2.76	0.85	0.039
		2-3 times or over in a month	3.13		
	I think the information which chatbot provide is useful	Once a month	2.86	1.14	0.008
		2-3 times or over in a month	3.33		
	I think chatbot is useful to solve the customers' telecom issues	Once a month	2.69	0.95	0.004
		2-3 times or over in a month	3.25		
	I think chatbot is useful to improve service experience	Once a month	2.70	0.02	0.014
		2-3 times or over in a month	3.17		

Table 4.3: Frequency of Use in T-Test analysis (cont.)

Perceived Ease of Use	I get the information easily by using chatbot service	Once a month	2.69	2.07	0.002
		2-3 times or over in a month	3.25		
	I can make the decision easily by using chatbot service	Once a month	2.45	2.16	0.000
		2-3 times or over in a month	3.13		
	I think chatbot technology is easy-to-use	Once a month	2.88	0.15	0.007
		2-3 times or over in a month	3.38		
	I think it is easy to learn how to use the chatbot.	Once a month	3.06	0.35	0.005
		2-3 times or over in a month	3.54		
	I able find the information quickly by using chatbot	Once a month	2.67	0.11	0.003
		2-3 times or over in a month	3.21		
Anthropomorphism	I think chatbot behave humanlike	Once a month	2.10	0.17	0.000
		2-3 times or over in a month	2.92		
	I think chatbot have conscious in their actions in moment of conversation	Once a month	2.26	0.14	0.001
		2-3 times or over in a month	3.00		
	I think chatbot are smart in engaging during conversation	Once a month	2.42	0.04	0.050
		2-3 times or over in a month	2.83		
	I think chatbot can experience emotion of human	Once a month	1.87	4.79	0.031
		2-3 times or over in a month	2.46		
Satisfaction	I feel satisfied with the performance of this company chatbot.	Once a month	2.60	0.90	0.006
		2-3 times or over in a month	3.08		

According to Table 4.3 about Frequency of Use, the result covers in total five variables; Information Quality (all six attributes in construct), Perceived of Usefulness (all five attributes in construct), Perceived Ease of Use (all five attributes in construct), Anthropomorphism (chatbot behave humanlike, chatbot have conscious during conversation, chatbot are smart in engaging conversation and chatbot can experience emotion of human) and Satisfaction. The significant differences (sig.<0.05 in the column of Sig. (2 tailed)) between the groups of Once a Month and 2-3 times or

over in a month would display in the same pattern by the group of 2-3 times or over in a month have higher degree of agreement over the group of Once a month in all five constructs.

4.2.2. One-way ANOVA finding

This statistical test is used to test the mean difference of more than two groups (Bevans, 2022). In the study, I use One-way ANOVA in the aspect of Age Range (15-19 and 20-29 years, 30-39 and 40-49 years, 50-59 and over 60 years), Education (High School or below, Bachelor degree, Master degree or higher), Income Range (Below 15,000 baht, 15,001 - 30,000 baht, 30,001 - 45,000 baht and More than 45,000 baht), Brand of Chatbot (Aunjai : AIS, Mari : TRUE and DTAC's LINE and Facebook Messenger) and Type of services (Check Balance, Pay Bills, Report Internet Problems, Block Spam Calls and Text Messages, Apply for the Packages and Call for Human Agent). The significant differences between groups in One-way ANOVA are found on Education, Income, Brand of Chatbot and Type of Service, there is no significant difference between groups in the aspect of Age.

Table 4.4: Education in ANOVA analysis

Construct			Mean	ANOVA F	Sig.	Post Hoc Tests Mean Difference (I-J)	Sig.
Information Quality	I think chatbot provides the complete information	High school or below	3.36	3.59	0.031		
		Bachelor degree	2.68			0.68796*	0.028
	I think chatbot provides the information which is sufficient volume for my needs	High school or below	3.09	3.30	0.041		
		Bachelor degree	2.35			.73956*	0.041

Table 4.4: Education in ANOVA analysis (cont.)

Anthropomorphism	I think chatbot have a mind of their own	High school or below	2.91	3.28	0.042		
		Master degree or higher	2.00			.90909*	0.038
	I think chatbot can experience emotion of human	High school or below	2.82	6.26	0.003		
		Bachelor degree	2.01			.80467*	0.034
		Master degree or higher	1.57			1.25296*	0.002
Satisfaction	I feel satisfied with the performance of this company chatbot.	High school or below	3.18	3.65	0.029		
		Master degree or higher	2.43			.74704*	0.025

According to the table 4.4, it indicates the significant difference (sig.<0.05 in the column of Post Hoc Tests) between the education groups, the result relates to three constructs of theoretical framework which are Information Quality (two attributes), Anthropomorphism (two attributes) and Satisfaction. As indicated in Table 2, the results from three constructs illustrated by the group of High School or below have higher mean scores than the group of Bachelor Degree and Master Degree or higher; the group of High School or below has the mean score of 3.4 (chatbot provides the complete information) and 3.1 (chatbot provides the information which is sufficient volume for my needs) over the group of Bachelor Degree. Furthermore, High School or Below has the mean score of 2.9 (chatbots have the mind of their own) over the group of Bachelor Degree and 2.8 (chatbot can experience emotion of human) over the group of Bachelor Degree and Master Degree or higher. Lastly, the degree of satisfaction of the High School or below group is higher than Master Degree or higher by having a mean score of 3.2 to 2.4.

Table 4.5: Income in ANOVA analysis

Construct			Mean	ANOVA F	ANOVA Sig.	Post Hoc Tests Mean Difference (I-J)	Post Hoc Tests Sig.
Information Quality	I think chatbot provides the information with few errors	Below 15,000 baht	2.90	2.84	0.042		
		15,001 - 30,000 baht	3.06				
		30,001 - 45,000 baht	2.38			.67538*	0.026
		More than 45,000 baht	2.92				
Perceived Usefulness	I think chatbot is useful to improve service experience	Below 15,000 baht	3.25	3.17	0.027		
		15,001 - 30,000 baht	2.76				
		30,001 - 45,000 baht	2.85				
		More than 45,000 baht	2.52			.73000*	0.018
Perceived Ease of Use	I get the information easily by using chatbot service	Below 15,000 baht	3.20	3.31	0.023		
		15,001 - 30,000 baht	2.82				
		30,001 - 45,000 baht	2.85				
		More than 45,000 baht	2.48			.72000*	0.013
Anthropomorphism	I think chatbot behave humanlike	Below 15,000 baht	2.80	3.47	0.019		
		15,001 - 30,000 baht	2.16				
		30,001 - 45,000 baht	2.46				
		More than 45,000 baht	2.00			.80000*	0.024
	I think chatbot have conscious in their actions in moment of conversation	Below 15,000 baht	3.05	4.12	0.008		
		15,001 - 30,000 baht	2.32			.73000*	0.031
		30,001 - 45,000 baht	2.54				
		More than 45,000 baht	2.08			.97000*	0.007
	I think chatbot have a mind of their own	Below 15,000 baht	2.80	4.73	0.004		
		15,001 - 30,000 baht	2.08			.72000*	0.03
		30,001 - 45,000 baht	2.69				
		More than 45,000 baht	1.92			.88000*	0.015
	I think chatbot can experience emotion of human	Below 15,000 baht	2.60	4.96	0.003		
		15,001 - 30,000 baht	1.90				
		30,001 - 45,000 baht	2.31				
		More than 45,000 baht	1.56			1.04000*	0.003

According to Table 4.5, the result from significant differences (sig.<0.05 in the column of Post Hoc Tests) covers four constructs which are Information Quality (1 attribute), Perceived Usefulness (1 attribute), Perceived Ease of Use (1 attribute) and Anthropomorphism (4 attributes). To begin with Information Quality, the group of 15,001-30,000 baht have the mean score of 3 exceeding the group of 30,001-45,000 baht in the aspect of chatbot providing information with few errors, the group of below 15,000 baht agree on the attribute that chatbot improve service experience (Perceived Usefulness) and chatbot help to get information easily (Perceived Ease of Use) comparing with the group of More than 45,000 baht. Eventually, group of Below 15,000 baht agree with four attributes (chat behave humanlike, chatbot have conscious during the conversation, chatbot have a mind of their own and chatbot can experience emotion of human) in the Anthropomorphism, the degree of agreement of Below 15,000 baht is higher comparing with 15,001 - 30,000 baht and more than 45,000 baht groups.

Table 4.6: Brand of Chatbot in ANOVA analysis

Construct			Mean	ANOVA		Post Hoc Tests	
				F	Sig.	Mean Difference (I-J)	Sig.
Information Quality	I think chatbot provides the complete information	Aunjai: AIS	2.75	3.89	0.023		
		Mari: TRUE	2.54			.60440*	0.019
		DTAC's LINE and Facebook Messenger	3.14				

Referring to Table 4.6, there is one significant difference (sig.<0.05 in the column of Post Hoc Tests) in the construct of Information Quality, the group of DTAC users agree with the attribute of "chatbots provide the complete information" to compare with Mari: True users.

Table 4.7: Type of Service in ANOVA analysis

Construct			Mean	ANOVA		Post Hoc Tests	
				F	Sig.	Mean Difference (I-J)	Sig.
Information Quality	I think chatbot provides the complete information	Check Balance	3.05	3.92	0.003		
		Pay Bills	3.20				
		Report Internet Problems	2.60				
		Block Spam Calls and Text Messages	3.00				
		Apply for the Packages	2.64				
		Call for Human Agent	2.36			.68182*, .83636*	0.026, 0.003
	I think chatbot provides the information which is sufficient volume for my needs	Check Balance	2.95	5.09	0.000		
		Pay Bills	3.00				
		Report Internet Problems	2.33				
		Block Spam Calls and Text Messages	2.25				
		Apply for the Packages	2.21				
		Call for Human Agent	2.03			.92424*, .96970*	.002, .002
	I think chatbot provides the information which is relevant to my decision making	Check Balance	3.09	5.65	0.000		
		Pay Bills	3.20				
		Report Internet Problems	2.47				
		Block Spam Calls and Text Messages	2.50				
		Apply for the Packages	2.43				
		Call for Human Agent	2.15			93939*, 1.04848*	0.001, 0.000

Table 4.7: Type of Service in ANOVA analysis (cont.)

	I think chatbot improve my performance to find the information	Check Balance	3.32	5.82	0.000		
		Pay Bills	3.35				
		Report Internet Problems	2.87				
		Block Spam Calls and Text Messages	2.25				
		Apply for the Packages	2.64				
		Call for Human Agent	2.58			.74242*, .77424*	0.003, 0.002
	I think chatbot is useful to solve the customers' telecom issues	Check Balance	2.91	3.66	0.004		
		Pay Bills	3.40				
		Report Internet Problems	2.67				
Perceived Usefulness		Block Spam Calls and Text Messages	3.25				
		Apply for the Packages	2.50			.90000*	0.027
		Call for Human Agent	2.55			.85455*	0.005
	I think chatbot is useful to improve service experience	Check Balance	3.14	3.72	0.004		
		Pay Bills	3.25				
		Report Internet Problems	2.47				
		Block Spam Calls and Text Messages	3.00				
		Apply for the Packages	2.57				
		Call for Human Agent	2.55			.70455*	0.028

Table 4.7: Type of Service in ANOVA analysis (cont.)

Perceived Ease of Use	I can make the decision easily by using chatbot service	Check Balance	2.86	7.93	0.000		
		Pay Bills	3.30				
		Report Internet Problems	2.47			83333*	0.007
		Block Spam Calls and Text Messages	2.25				
		Apply for the Packages	2.36			.94286*	0.002
		Call for Human Agent	2.21			.65152*, 1.08788*	0.01, 0.000
	I think chatbot technology is easy-to-use	Check Balance	3.36	2.60	0.030		
		Pay Bills	3.15				
		Report Internet Problems	3.13				
		Block Spam Calls and Text Messages	3.00				
		Apply for the Packages	2.71				
		Call for Human Agent	2.70			0.66667*	0.035
	I able find the information quickly by using chatbot	Check Balance	3.23	4.82	0.001		
		Pay Bills	3.05				
		Report Internet Problems	2.93				
		Block Spam Calls and Text Messages	2.75				
		Apply for the Packages	2.21			1.01299*, .83571*	0.002, .022
		Call for Human Agent	2.52			.71212*	0.010

Table 4.7: Type of Service in ANOVA analysis (cont.)

Anthropomorphism	I think chatbot behave humanlike	Check Balance	2.36	3.04	0.013		
		Pay Bills	2.90				
		Report Internet Problems	2.13				
		Block Spam Calls and Text Messages	2.50				
		Apply for the Packages	2.07				
		Call for Human Agent	1.97			.93030*	0.006
	I think chatbot can experience emotion of human	Check Balance	2.18	3.48	0.006		
		Pay Bills	2.65				
		Report Internet Problems	1.67			0.98333	0.051
		Block Spam Calls and Text Messages	2.00				
		Apply for the Packages	2.07				
		Call for Human Agent	1.61			1.04394*	0.003

Table 4.7 indicates the result of significant differences (sig.<0.05 in the column of Post Hoc Tests) between the groups who use the type of service via chatbot, the significant differences occur on total 4 constructs as Information Quality (3 attributes), Perceived Usefulness (3 attributes), Perceived Ease of Use (3 attributes) and Anthropomorphism (2 attributes). In the aspect of Information Quality, the groups who prefer to use Check Balance and Pay Bills agree that chatbot provides the complete information, sufficient volume for their needs and relevant to their decision making which is in contrast with the group of Call for Human Agent by the group of Pay Bills has the highest degree in the aspect of Information Quality. For the aspect of Perceived Usefulness, groups of Check Balance and Pay Bills agree with the chatbot to improve the performance to find information compared with Call for the Human Agent. Furthermore, a group of Pay Bills think the chatbot is useful to solve telecom issues in contrast with Apply for the Package and Call for the Human Agent and think the chatbot is useful for improving service experiences. In the aspect Ease of Use, the statement of "I can make the decision easily by using chatbot service" have two pair of significance relationship by group Check Balance agree on the statement comparing Call for Human

Agent and Pay Bills agree with the statement comparing with Report Internet Problems, Apply for the Packages and Call for Human Agent. Group of Check Balance also agree that the chatbot is easy-to-use compared with Call for Human Agent and group of Check Balance also agree that the chatbot helps the users to find information easily. For the part of anthropomorphism, the group of Pay Bills agree that the chatbot behave human like with difference to group of Call for Human Agent and Pay Bills group also agree that chatbot can experience the emotion of human which is different with the groups of Report Internet Problem and Call for Human Agent.

4.3. Regression Analysis

The analysis refers to the theoretical framework in the second chapter which illustrates the relationship of all independent variables (information quality, Perceived Usefulness, Perceived Risk, Perceived Ease of Use and Anthropomorphism) to the dependent variable (satisfaction).

Table 4.8: ANOVA Table in regression analysis

Sum of Squares	df	Mean Square	F	Sig.
40.418	5	8.084	34.212	.000[a]

According to the ANOVA table, the significant difference is below 0.05 (.000); thus, the model is usable, there is the casual relationship of independent variables to the satisfaction.

Table 4.9: Model summary in regression analysis

R	R Square	Adjusted R Square	Std. Error of the Estimate
.791[a]	.626	.608	.48609

According to the model summary, all independent variables could explain the changes in overall satisfaction by 60.8% (Adjusted R Square: 0.608).

Table 4.10: Coefficients Table in regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	Information Quality	.296	.111	.239	2.672	.009
	Perceived Ease of Use	.478	.126	.369	3.793	.000
	Anthropomorphism	.184	.073	.174	2.521	.013

The regression analysis indicates that there are three independent variables which have a significant relationship with satisfaction referring to the Sig. below 0.5 in the Coefficients table.
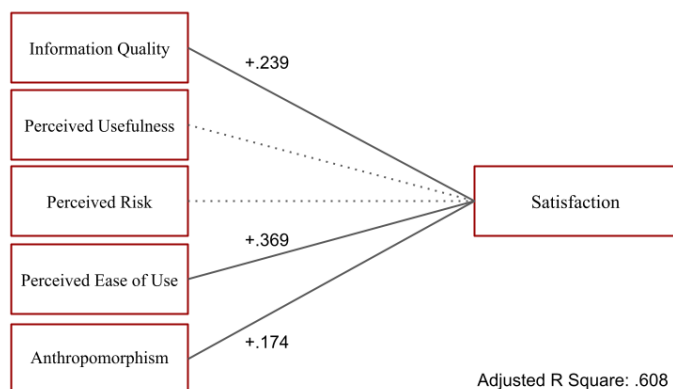
Figure 4.10: the relationships in theoretical framework

As regards the figure 4.10, three independent variables (Information Quality, Perceived Ease of Use and Anthropomorphism) have positive relationships on the satisfaction. Information quality has the Beta score with 0.239, Perceived Ease of Use has the Beta score with 0.369 and Anthropomorphism has the Beta score with 0.174. As Perceived Ease of Use has the most significant impact on satisfaction and Anthropomorphism has the lower-level impact on satisfaction. Perceived Usefulness and Perceived Risk did not find the significant relationship with satisfaction.

CHAPTER V
CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

The study objectives are to identify the variables which impact on customers' satisfaction from chatbots and to understand the mutual direction of customers using the chatbot services in order to develop better customer experience which I utilize the quantitative method to answer the research objectives.

In accordance with the first objective, the result from regression analysis displays the positive relationship between independent variables and satisfaction that Information Quality, Perceived Ease of Use and Anthropomorphism have the impact on customers' satisfaction of chatbot usage. Referring to technology acceptance model (TAM), Perceived Ease of Use has significant effect on satisfaction; however, Perceived Usefulness doesn't have the effect on satisfaction and Perceived Risk also affects the customers' satisfaction in this study.

According to the second objective, the study emphasizes the behavioral context to affect customer satisfaction; thus, I utilize the users' behavioral information, the data begins with the topic of type of services indicating that the majority of respondents use chatbot to call the human agents following with checking balance and paying bills. Furthermore, the ANOVA analysis also indicates the significant differences in Information Quality, Perceived Ease of Use and Anthropomorphism between the choice of calling a human agent differ to checking balance and paying bills respectively. The level agreements from both checking balance and paying bills are mostly the highest among types of service, especially compared with the service of calling human agents. Furthermore, the majority of respondents use the chatbot once a month rather than 2 times or over in a month. T-Test result of users' frequency of use supports that the samples of 2-3 times or over in a month have higher degree of agreement than the samples of once a month; therefore, the majority of respondents (call

for human agents and frequency use once a month) which are categorized according to data of chatbot uses behavior, they tend to have the experience the chatbot and lead to lower satisfaction level on chatbot than other behavioral groups.

5.2 Recommendations

Respondents agree that chatbots potentially solve the uncomplicated needs such as check balance and pay bills; the users can do it easily and don't need to travel to stores or wait for the human agents' response since the chatbots could immediately respond to the users' command. For this reason, chatbots have the strength to deliver the quality of information and ease-of-use to customers the same as the result from multiple regression analysis. However, the findings indicate the mean of satisfaction from respondents is slightly above average scale of 4 by 2.34. Moreover, respondents mostly use chatbots once a month and tend to use this function to ask human agents. I could interpret from the finding that chatbots still have limitations to respond in a more complicated context to customers. Chatbots still could not cover all of the users' problems, especially if the users need more information to help making decisions, users prefer to know the relevant information for decision making, they believe human agents could serve more complicated service than chatbot could; therefore, customers use the chatbot as another channel to reach the customer service center to fulfill their specific needs.

Furthermore, some users perceive that chatbots communicate close to human characteristics. Brand mascots such as Aunjai: AIS and Mari: True help customers to define the chatbots' identity such as profile picture, communicative style etc. Accordingly, chatbots could be the additional channel to persuade the customer to the brand.

In conclusion, chatbots still have limitations to solve complex problems but the chatbots have the strength to deliver quality information and serve as a convenient channel for users. The brands also have to keep the other services apart from checking balance and pay bills in order to encourage the ease-of-use context that chatbots could serve the various services for users, users could use at any place and any time to complete the needs.

5.3 Limitation

Although the recommendations were developed, there are some limitations in the study. There are two limitations in this study.

Firstly, there are some limitations in the demographic section. I notice that the age of respondents is clustered in the group of 20-29 years (78 samples from 108 samples). The majority of respondents are younger respondents; this group of respondents has a different point of view from other age groups of respondents; consequently, the different point of view leads to the finding based on the majority of younger respondents' opinion and may not indicate the overall user behavior on chatbot uses.

Lastly, the screening question has screened the respondents who never have experienced on chatbot, the targeted respondents would know the chatbot characteristic but this finding didn't include the degree of chatbot characteristic understanding question to measure how much knowledge of the respondent understand the chatbot characteristic. Due to the reason that the telecom brands use different types of chatbots (Menu Based Chatbot, Voice Bot, Keyword Recognition Chatbot etc.) and users also use these different types of chatbots in different communication channels to reach the services.

5.4 Direction of future research

Regarding to the limitations, the future research should focus one specific type of chatbots from overall type of chatbot which could distinguish the differences of chatbot uses that lead to the various degree of customer satisfaction in each type of chatbot.

In addition, the further research should include the qualitative methodology; the conducted paper should include in-depth customer view on chatbot uses which will not aim only the customer attitude and behavior but it also includes the understanding level of chatbot uses which affect to perceived usefulness and ease of use towards chatbots. Furthermore, the qualitative methodology also includes the telecom brands and chatbot developer sides to view the objective of the implementation and limitation of the chatbots.

Finally, the chatbot technology is the field which could apply in many industries. The future research could expand to the other industries not only telecom industry and also could compare this field to the other countries apart from the focus of Thailand.

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APPENDICES

APPENDIX A: Questionnaire

You are invited to participate in a survey "Explore the impact from Chatbot communication on customer satisfaction: the case of Thai telecom services". The aim of research is to learn the impact from the chatbot technology to customer satisfaction in the case of Thai telecommunication services. This survey is a part of my postgraduate degree study, Marketing and Management, College of Management, Mahidol University. Your participation is voluntary. I would be pleased for your participation

This survey would take time to complete approximately 5-10 minutes.

This survey comprises of 4 sections

Section 1: Screening Questions (3 questions)

Section 2: General Questions (3 questions)

Section 3: Specific Questions (28 questions)

Section 4: General Information of respondents (5 questions)

Your responses would not identify your personal information; names, email-address, data are solely used for the academic purposes and concern about your personal securities as priority according to Personal Data Protection Act, PDPA.

Section 1: Screening Questions

1. Your age is over 15 years old.
    - Yes
    - No

2. Have you currently used Thai Telecom service for more than 3 months? (AIS, TRUE and DTAC)?
    - Yes
    - No

3. Have you ever experienced Thai Telecom Chatbot services (Aunjai: AIS, Mari: TRUE and DTAC)?

- Yes
- No

Section 2: General Questions

1. What is the current use of your telecom brand chatbot service? (Select only one choice)?

- Aunjai: AIS
- Mari: TRUE
- DTAC's LINE and Facebook Messenger

2. Which type of service do you use via chatbot the most? (Select only one choice)

- Check Balance
- Pay Bills
- Report Internet Problems
- Block Spam Calls and Text Messages
- Apply for the Packages
- Call for Human Agent
- Other (Please specify_____)

3. How many times in a month do you use Chatbot service?

- Once a month
- 2-3 times a month
- more than 3 times a month

Section 3: Specific Questions

Please specify the level of your agreement on each of the following statements:

- 4 means Strongly Agree
- 3 means Agree
- 2 means Disagree
- 1 means Strongly Disagree

Questions	Strongly disagree	Disagree	Agree	Strongly agree
1.Information Quality	1	2	3	4
1.1 I think chatbot provides the complete information				
1.2 I think chatbot provides the information with few errors				
1.3 I think chatbot provides the credible information				
1.4 I think chatbot provides the information which is sufficient volume for my needs				
1.5 I think chatbot provides the information which is relevant to my decision making				
1.6 I think chatbot provides understandable information				
2.Perceived Usefulness				
2.1 I think chatbot improve my performance to find the information				
2.2 I think chatbot improve my performance to find the needed service				
2.3 I think the information which chatbot provide is useful				
2.4 I think chatbot is useful to solve the customers' telecom issues				
2.5 I think chatbot is useful to improve service experience				

Questions	Strongly disagree	Disagree	Agree	Strongly agree
3.Perceived Risk	**1**	**2**	**3**	**4**
3.1 I'm worry about misuse of my personal information				
3.2 I'm worry about my personal information be sold to third parties				
3.3 I think there is uncertainty to use chatbot service agent				
3.4 I acknowledge that the chatbot conversation has time consuming than conversation with human agent				
3.5 I think chatbot can cause the negative impact to me				
4.Perceived Ease of Use				
4.1 I get the information easily by using chatbot service				
4.2 I can make the decision easily by using chatbot service				
4.3 I think chatbot technology is easy-to-use				
4.4 I think it is easy to learn how to use the chatbot				
4.5 I able find the information quickly by using chatbot				

Questions	Strongly disagree	Disagree	Agree	Strongly agree
5.Anthropomorphism	**1**	**2**	**3**	**4**
5.1 The conversation between me and the chatbot doesn't seem to be artificial.				
5.2 I think chatbot behave humanlike				
5.3 I think chatbot have conscious in their actions in moment of conversation				
5.4 I think chatbot are smart in engaging during conversation				
5.5 I think chatbot have a mind of their own				
5.6 I think chatbot can experience emotion of human				

"Please specify the level of your agreement on each of the following statements:

- 4 means Strongly Satisfied
- 3 means Satisfied
- 2 means Dissatisfied
- 1 means Strongly Dissatisfied

Questions	Strongly Dissatisfied	Dissatisfied	Satisfied	Strongly satisfied
6.Satisfaction	**1**	**2**	**3**	**4**
6.1 I feel satisfied with the performance of this company chatbot				

Section 4: Demographic Questions

1. Please state your gender

    - Male

    - Female

2. Please select your age range

    - 15-19 years

    - 20-29 years

    - 30-39 years

    - 40-49 years

    - 50-59 years

    - over 60 years

3. Please state your marital status

    - Single

    - Married

4. Please state you're the highest degree or level of education

    - High school or below

    - Bachelor degree

    - Master degree or higher

5. Please select your income range

    - Below 15,000 baht

    - 5,001 - 30,000 baht

    - 30,001 - 45,000 baht

    - More than 45,000 baht

****** Thank you very much ******