A STUDY OF FACTORS INFLUENCING TOURISTS' BICYCLE MODE CHOICE IN THAILAND

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A STUDY OF FACTORS INFLUENCING TOURISTS' BICYCLE MODE CHOICE IN THAILAND

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วัตถุประสงค์ของงานวิจัยนี้ เพื่อศึกษาปัจจัยที่มีอิทธิพลต่อการเลือกใช้จักรยานเพื่อการท่องเที่ยวในประเทศไทย เพื่อเป็นแนวทางในการกำหนดนโยบายเพื่อกระตุ้นให้มีการใช้จักรยานในสถานที่ท่องเที่ยวได้ โดยแบ่งการศึกษาออกเป็น 3 ส่วน ผลการศึกษาในส่วนแรกเป็นการศึกษาปัจจัยที่มีอิทธิพลต่อพฤติกรรมความตั้งใจในการใช้จักรยานเพื่อการท่องเที่ยวของคนไทย โดยประยุกต์ใช้ทฤษฎีแบบจำลองพฤติกรรมการมุ่งสู่เป้าหมาย (Model of Goal-Directed Behavior) ซึ่งปัจจัยที่พิจารณาประกอบด้วยทัศนคติที่มีต่อพฤติกรรม บรรทัดฐานของบุคคล การรับรู้ความสามารถในการควบคุมพฤติกรรม อารมณ์ที่คาดหวังด้านบวก พฤติกรรมในอดีต ความต้องการ ความเสี่ยงและโครงสร้างพื้นฐาน ข้อมูลที่ใช้ในการศึกษาครั้งนี้คือนักท่องเที่ยวคนไทยจำนวน 983 คน วิเคราะห์โดยใช้โมเดลสมการโครงสร้าง จากการศึกษาพบว่าทุกตัวแปรส่งผลโดยตรงทางบวกต่อพฤติกรรมความตั้งใจอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.01 ยกเว้นการรับรู้ความเสี่ยงที่มีอิทธิพลโดยตรงทางลบต่อพฤติกรรมความตั้งใจที่ระดับนัยสำคัญทางสถิติ 0.01 และพบว่าความต้องการเป็นปัจจัยที่มีอิทธิพลต่อพฤติกรรมความตั้งใจสูงกว่าปัจจัยอื่นๆ

สำหรับการศึกษาส่วนที่ 2 ซึ่งเป็นการศึกษาโมเดลการวัดแรงจูงใจในการใช้จักรยานเพื่อการท่องเที่ยวของคนไทยเปรียบเทียบระหว่างสถานที่ท่องเที่ยว โดยประยุกต์ใช้การวิเคราะห์องค์ประกอบเชิงยืนยัน ซึ่งตัวอย่างในการศึกษาคือนักท่องเที่ยวชาวไทยจำนวน 798 คน แบ่งเป็นสถานที่ท่องเที่ยวประเภทภูเขาจำนวน 510 คน และสถานที่ท่องเที่ยวประเภททะเลจำนวน 288 คน ปัจจัยที่พิจารณามี 6 ปัจจัยได้แก่ การพัฒนาความสามารถของตนเอง (self-development) ความสันโดษ (contemplation) การสำรวจ (exploration) การเปลี่ยนแปลงของร่างกาย (physical challenge) การหลีกหนี (stimulus seeking) และการมีปฏิสัมพันธ์กับสังคม (social interaction) จากผลการวิเคราะห์พบว่าทั้ง 6 ปัจจัยเป็นตัวบ่งชี้ที่บ่งบอกถึงแรงจูงใจในการใช้จักรยานเพื่อการท่องเที่ยวในสถานที่ท่องเที่ยวทั้งสองอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.01 และเมื่อเปรียบเทียบโมเดลการวัดแรงจูงใจการใช้จักรยานเพื่อการท่องเที่ยวระหว่างพื้นที่พบว่ามีค่าแตกต่างกันระหว่างสถานที่ท่องเที่ยวที่ระดับนัยสำคัญทางสถิติ 0.01

และการศึกษาในส่วนสุดท้ายนี้เป็นการศึกษาค่าความพึงพอใจที่จะจ่ายสำหรับการเช่าจักรยานในสถานที่ท่องเที่ยวโดยพิจารณาปัจจัยด้านเศรษฐกิจและสังคม ได้แก่ เพศ อายุ ระดับการศึกษา รายได้เฉลี่ยต่อเดือนของครัวเรือน ประเภทของสถานที่ท่องเที่ยว การใช้จักรยาน และ

ประเภทของจักรยาน วิเคราะห์โดยใช้การทดสอบที กรณีกลุ่มตัวอย่าง 2 กลุ่มเป็นอิสระกัน (Independent sample t-test) และการวิเคราะห์ความแปรปรวน (Analysis of Variance : ANOVA) การทดสอบเอฟ จากผลการวิเคราะห์พบว่าค่าความพึงพอใจที่จะจ่ายสำหรับการเช่าจักรยานแตกต่างกันระหว่างเพศ อายุ และประเภทของจักรยานอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05

สาขาวิชา วิศวกรรมขนส่ง ลายมือชื่อนักศึกษา _____

ปีการศึกษา 2558 ลายมือชื่ออาจารย์ที่ปรึกษา _____

DUANGDAO WATTHANAKLANG : A STUDY OF FACTORS INFLUENCING TOURISTS' BICYCLE MODE CHOICE IN THAILAND : ASSOC. PROF. VATANAVONGS RATANAVARAHA, Ph.D., 128 PP.

BICYCLE USE / TOURISM / MOTIVATION / WILLINGNESS TO PAY/ TOURIST ATTRACTIONS

The objective of this research was to study the factors having influence on choosing bicycle use for tourism in Thailand in order to be guidelines for the determination of bicycle use for tourism policy encouragement. This study was divided into three sections including the result of the first section which studied the factors influencing behavioral intention of bicycle use for tourism in Thailand by applying the theory of the Model of Goal-Directed Behavior of which the factors comprising attitudes, subject norm, perceived behavioral control, positive anticipated emotion, past behavior, desire, perceived susceptibility and infrastructure. The data used in this study were from 983 Thai tourists analyzed by using structural equation modeling. From the study, it was found that every variable positively affected behavioral intention at statistical significance 0.01 except perceived susceptibility which had directly negative influence on behavioral intention at statistical significance 0.01. It was also found that desire was the factor which had more influence on behavioral intention than the others.

For the second section, it was the study of Measuring the Motivation to Ride Bicycles for Tourism through a Comparison of Tourist Attractions by applying Confirmatory factor analysis. The samples used in this study were 798 Thai tourists

divided into 510 from mountainous tourist attractions, and 288 from sea tourist attractions. The six factors to be considered were self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction. From the data analysis, it was found that all six factors were the indicators pointing out the motivation of bicycle use in both tourist attractions at statistical significance 0.01 When comparing the model of motivation for bicycle use for tourism between the two areas, it was found that the values of difference between those areas were at statistical 0.01.

And the last section was the study of willingness to pay (WTP) for bicycle hire by considering socio-economic factors including sex, age, levels of education, average family income, attractions, bicycle use, and types of bicycles. The data were analyzed by using Independent sample t-test and Analysis of Variance (ANOVA) F-test. From the data analysis of independent sample t-test, it was found that the values of WTP were different between sexes, ages, and types of bicycles at statistical significance 0.05.

School of Transportation Engineering Student's Signature_____

Academic Year 2014 Advisor's Signature_____

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SYMBOLS AND ABBREVIATIONS

α	=	Statistically significant level
β	=	Structural coefficient
λ	=	Factor loading coefficient
χ^2	=	Chi-square
df	=	Degree of freedom
RMSEA	=	Root mean square of approximation
SRMR	=	Standardized root mean residual
CFI	=	Comparative fit index
TLI	=	Tucker Lewis Index
SEM	=	Structural equation modeling
CFA	=	Confirmatory factor analysis
CR	=	Composite reliability
AVE	=	Average variance extracted

CHAPER I

INTRODUCTION

1.1 Rationale for the research

1.1.1 The interest in bicycle use

At present, the trend of bicycle use interests society to a large extent as it is useful for health, reduces possible sickness and benefits good mentality (Toker and Biron, 2012). This includes energy-consuming and does not cause pollution to surroundings. In the past, transport sector is one of main causes of global warming(Aßmann and Sieber, 2005; Ceylan, Ceylan, Haldenbilen, and Baskan, 2008; Meyer, Leimbach, and Jaeger, 2007). In 2030, Thailand has tendency to release carbondioxide from transport sector reaching the maximum 225.33 millionton (Ratanavaraha and Jomnonkwao, 2015). The support of bicycle use is accepted as a strategy enhancing sustainable travel in country (Thailand Transport Portal, 2015). In the past, there were campaigns promoting bicycle uses in the manner of activities for health and tourism in both local and national levels. It was found that most of Thai people have not popularly used bicycles. It was also found that one of main obstacles making bicycle non-users not wanting to use bicycles was the far destination (Thaihealth, 2012). Actually, bicycle use in tourist attractions is accepted as an activity relevant to the strategy promoting bicycle use which is short-distance travelling. This also attracts travelling (Weston et al., 2012). Thus, searching factors which help motivate and encourage Thai people to use bicycles for tourism is

deserved to pay attention to because these factors can be used as guidelines for determining right policies promoting and increasing bicycle uses at significance in the future.

1.1.2 Factors influencing intention in bicycle use for Tourism

As in the past, there was no study about factors influencing bicycle use intention in specified places. Thus, the researcher used related results of study such as bicycle use during vacation, bicycle use in urban and bicycle use of teenagers as shown as follows;

Kaplan et al.(2015) studied intentional behavior of bicycle use during vacation by considering social psychological factors including attitudes, subjective norm, perceived behavior control and habitual according to the Theory of Planned Behavior (TPB) to be analyzed by using Structural Equation Model (SEM).

Passafaro et al.(2014) studied the desire for bicycle use in urban by considering factors of attitudes, subjective norms, perceived control, positive and negative anticipated emotions and past behavior which were analyzed by SEM.

Sigurdardottir et al.(2013) studied behavioral intention of bicycle use of teenagers by considering the factors including subjective norm of car ownership, negative attitudes towards cars, willingness to accept car travel restrictions, positive cycling experience and bicycle-oriented future vision which were developed by TPB and analyzed by SEM.

Regarding relevant researches involved in bicycle use for tourism, most of them considered infrastructure and facilities (Chen and Chen, 2013; Ritchie, 1998). But most of them were qualitative researches which have never studied the influence of infrastructure to the statistical level of bicycle use (i.e., Pucher et al. (1999),

Martens(2007)) and most tourists need safe routes because using bicycles is risky for example using bicycles with other vehicles on the streets. Thus, the factor of perceived susceptibility is quite essential as it acknowledges the factors negatively affecting intention, especially in the areas where there is no infrastructure for bicycles.

Hence, the factors affecting intention in bicycle use for tourism were developed from related research based on TPB including desire, affective, habitual factors and the model was specially developed to use bicycle for tourism by adding the factors of infrastructure and perceived susceptibility to increase the ability of explaining tourists' behavior of bicycle use appropriately.

1.1.3 Motivation for bicycle use in tourist attractions

Motivation is the drive making people have efforts to serve the needs for target achievement (Iso-Ahola, 1982). For tourism, motivation is accepted as an important variable explaining tourism behavior and taken to explain decision-making (Bansal and Eiselt, 2004). It helps identify tourists' needs which had to be promoted relevant to target groups' needs.

In the past, most studies emphasized the studies of motivation in Nature-based tourism (Beh and Bruyere, 2007; Mehmetoglu, 2007; Raadik, Cottrell, Fredman, Ritter, and Newman, 2010; Skår, Odden, and Inge Vistad, 2008; Tangeland and Aas, 2011; Tangeland, Vennesland, and Nybakk, 2013) such as Beh and Bruyere (2007) measured the motivation for the tourism in Kenya from the factors of escape ,culture, personal growth, mega-fauna, adventure, learning, nature and general viewing. Regarding the motivation for bicycle uses for tourism, there was only the study of Ritchie (1998) who has classified the group of motivation by using Principal components factor (PCA) including the factors of competence mastery, solitude,

exploration, physical challenge, stimulus seeking/avoidance, social encounter and social escapism.

Thus, the indicators of motivation for bicycle use for tourism were developed from related research both general tourism and bicycle use for tourism by adding Confirmatory factor analysis (CFA) in order to confirm that the indicator in previous studies can be the indicators of motivation for bicycle use for tourism, and compare the motivation between tourist attractions in order to determine right policies supporting bicycle uses which are suitable for those areas.

1.1.4 Willingness to pay for bicycle use in tourist attractions

The availability of bicycle for hire service standpoints in tourist attractions is accepted as facility supporting tourists' bicycle uses. From the past, there have never been studies regarding willingness to pay (WTP) for bicycles. But recently, there have been studies about willingness to pay (WTP) for public buses and cars as follows;

Drevs et al.(2014) studied the effect of government's supporting money on WTP for public system service analyzing the influence of socio-economic attitudes, and passengers' behavior on the average of WTP Mean by using regression Analysis.

Erdem, Şentürk and Şimşek (2010) studied willingness to pay for Hybrid cars in Turkey. The variables to be considered were income, sex, level of education, worry about global warming, the number of cars, the importance of cars, risks, and attitudes towards alternative energy by using ordered Probit model.

Thus, studying the value of WTP for bicycle hire in tourist attractions was to study WTP value between socio-economic groups including sex, age, level of

education, average family income, tourist attractions, bicycle choosing, and the types of bicycles to comprehend WTP for bicycles in tourist attractions of different groups of society in order to determine appropriate fee for bicycle hire which is suitable for target groups.

1.2 Purposes of the research

This research has the following objectives as follows;

1.2.1 To study the factors influencing Thai people to choose bicycle use for tourism.

1.2.2 To study how to measure motivation of riding bicycles for tourism through a comparison of tourist attractions.

1.2.3 To study the value of WTP for bicycle hire in tourist attractions of Thailand.

1.3 Scope of the research

This research has the following scopes;

1.3.1 The areas to be studied cover the areas throughout Thailand.

1.3.2 The study is conducted in tourist attractions in Thailand.

1.3.2 This study specifically considers Thai tourists.

1.4 Research questions

1.4.1 What factors make more Thai people choose bicycle use for tourism?

1.4.2 The parameter model of motivation for bicycle use in tourist attractions between different places are different or not?

1.4.3 Is the value of willingness to pay for bicycle hire in tourist attractions between socio – economic groups different or not?

1.5 Contribution of the research

1.5.1 Government sectors and interested organizations could use this study as guideline for relevant policy determination to promote using bicycles and increase bicycle use significantly in the future.

1.5.2 Motivations for bicycle tourism in each setting can be identified, a more appropriate policy can be determined for each geographic area.

1.5.3 Government sectors or involved organizations can use this study to inform guidelines around suitable bicycle hire for target groups.

1.6 Organization of the research

This research is divided into 5 chapters as follows;

Chapter I: The rationale and the importance of the problem objectives, research objectives, scope of the study, research questions and contribution of the research are mentioned in Introduction.

Chapter II: Influences on Behavioral Intention by Thai people to Use bicycles for tourism: This chapter seeks for the factors enhancing Thai people to use bicycles by applying the Model of Goal-Directed Behavior (MGB). The factors were analyzed by structural equation modeling (SEM).

Chapter III: Measuring the Motivation to Ride Bicycles for Tourism through a Comparison of Tourist Attractions: This Chapter develop model of motivation for bicycle use in tourist attractions by applying Confirmatory factor analysis (CFA).

Chapter IV: The study of WTP for bicycle use in tourist attractions in Thailand. This Chapter analyzes the value of WTP for bicycle hire between the groups of socio-economic by using Independent sample t-test and Analysis of Variance (ANOVA) F-test.

Chapter V: Conclusion and recommendations. This section concludes the results from Chapter 2 to Chapter 5 and offers recommendations from the results of research.

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CHAPTER II

INFLUENCES ON BEHAVIORAL INTENTION BY THAI PEOPLE TO USE BICYCLES FOR TOURISM

2.1 Abstract

Historically, local and national campaigns have promoted using bicycles for health and tourism. However, using bicycles has not been popular among most Thai people. Therefore, by applying the model of goal-directed behavior (MGB) to predict behavioral intention, this study searched for factors enhancing Thai people's motivation to ride bicycles. The factors considered were attitudes, subject norms, perceived behavioral control, positive anticipated emotion, past behavior, desire, perceived susceptibility, and infrastructure. This study employed data from 983 Thai nationwide tourists, analyzed using structural equation modeling (SEM). The study found that attitudes, subject norms, perceived behavioral control, and positive anticipated emotion influenced the desire to use bicycles for tourism and transferred influences on behavioral intention. The study also found that every predictable variable (desire, perceived behavioral control, past behavior, and infrastructure) directly and positively affected behavioral intention at a statistically significant level, with the exception of perceived susceptibility, which directly and negatively affected behavioral intention at a statistically significant level. Furthermore, desire influenced behavioral intention more than any other factor. Government sectors and interested

organizations could use this study as a guideline for relevant policy determination to promote using bicycles and increase bicycle use significantly in the future.

2.2 Introduction

The trend of using bicycles currently interests many in society for health reasons. If people ride bicycles regularly, both their physical and mental health will be enhanced (Toker and Biron, 2012). In addition, because bicycles provide non-motorized and non-polluting transport, energy will be saved, thus improving the environment because the transportation sector is one of the main causes of global warming. By 2030, Thailand's release of carbon dioxide from the transportation sector could increase to 225.33 million tons.(Ratanavaraha and Jomnonkwao, 2015) Thus, encouraging bicycle use is relevant to the strategies of Transportation 2011–2015 in promoting fuel-saving rides.

For the last several years, many organizations have campaigned for bicycle use for both health and tourism, but most Thai people have not used bicycles very much. The greatest obstacle to using bicycles is distant destinations (Thaihealth, 2012). However, Weston et al. (2012) found that the ability to use bicycles at tourist attractions in Europe, including those in Italy, Spain, Hungary, and Poland, interested and attracted many tourists. Thus, this study aimed to discover factors establishing tourists' motivation to use bicycles at attractions requiring travel only for short distances.

Previous bicycle studies have emphasized cycling routes and networks. For instance, Ritchie (1998) analyzed cycling routes for relaxation and found that cyclists in New Zealand liked beautiful routes with high safety and low traffic volume (Chen

and Chen, 2013). In Taiwan, cyclists were fond of cycling routes with tourist attractions and refreshment and maintenance areas. Such studies on infrastructure were mostly qualitative and analyzed cycling route features, but no study has been conducted on infrastructure's influence on statistical levels of bicycle use (e.g., Pucher et al.], Martens]). Furthermore, studies have found that most tourists need safe routes because riding bicycles is risky in some situations, especially when other types of vehicles are also on the road. Thus, the factor of perceived susceptibility was extremely important because it has not previously been studied and because it acknowledges issues with negative influence, especially in areas without any infrastructure for bicycles.

In the past, the study of bicycle use for tourism emphasized the consideration of social and psychological factors, including attitudes, subjective norms, perceived behavior control, and habitual behavior (Kaplan, Manca, Nielsen, and Prato, 2015). However, the affective factor, which is important for individual decision-making, was not considered (Conner and Armitage, 1998). Most previous studies emphasized individual behavior intention (Gatersleben and Haddad, 2010) without considering desire, which should especially be considered for "difficult bicycle users," i.e., people who have positive attitudes about bicycles but no real intention to use them (Gatersleben and Appleton, 2007). Significantly beneficial, the analysis of desire will provide insightful data for comprehending ways in which to increase bicycle use and effect positive intention. Before this, no research has investigated the desire factor and the behavioral intention to use bicycles for tourism. If a study is available, policy determination will be more pertinent.

This study aimed to provide information for government sectors and involved organizations regarding tourists using bicycles by determining pertinent policies through the model of goal-directed behavior (MGB) and by considering the factors of attitude, subjective norms, perceived behavior control, habits, and affective (emotional) desire in behavioral intention. In addition to those factors, infrastructure and perceived susceptibility were added to increase the ability to explain bicycle users' behavior when no fundamental infrastructure for bicycles exists.

2.3 Literature review

Table 2.1 shows related previous literature on bicycle use. In the past, studies on using bicycles for tourism have emphasized behavioral intention without considering the factor of desire. However, desire has recently been used to explain the behavior of using bicycles in urban areas (Passafaro et al., 2014). However, the influence of desire on positive behavior intention has not been studied. Therefore, according to the theoretical framework of the MGB, this study considered both desire and behavior intention by examining desire as a moderator variable between psychosocial factors and affect (emotion) with behavioral intention. Furthermore, the factor of infrastructure has also been studied. In the past, such studies were qualitative and included analyses of cycling route features, but no studies have examined infrastructure's influence on statistical levels of bicycle use. In contrast, this study used structural equation modeling (SEM) to analyze infrastructure's influence on behavioral intention. Importantly, bicycle use in the past may have induced risk from various other types of vehicles. A lack of infrastructure for bicycles might constitute an obstacle causing behavioral errors that no one has previously studied.

Consequently, this study added the factor of perceived susceptibility into the model by developing the model and hypotheses discussed in 2.3.1 and 2.3.2

2.3.1 Behavioral Model

Figure 2.1 presents this study's behavioral model, emerging from the theory of planned behavior (TPB) and theory of social psychology and using the MGB to explain the intention to use bicycles for tourism. Issues influencing behavioral intention consisted of three factors: attitudes toward the behavior, subjective norms about the behavior, and perceived behavioral control (Ajzen, 1991). However, the limitation of TPB affected misunderstandings, overt attitudes, explanations, and behaviors. Perugini and Bagozzi, (2001) presented the MGB by adding motivational, affective, and habitual factors. Motivation is explained by desire, an important factor that is in turn explained by human decision (Perugini and Bagozzi, 2001). The affective factor took the form of anticipated emotions, which were important variables for decision-making procedures (Conner and Armitage, 1998). Habit could be explained by past behavior, which influences future individual behaviors to happen in a statistically significant way. The addition of the factors of motivation, anticipated emotions, and past behavior into the TPB affects the explanation of human behavior more appropriately (Bagozzi and Dholakia, 2006; Prestwich, Perugini, and Hurling, 2008; Richetin, Perugini, Adjali, and Hurling, 2008; Taylor, 2007; Taylor, Ishida, and Wallace, 2009).

Therefore, the MGB has been applied to comprehend tourists' behaviors in various research, including "Behaviors of international travel during the pandemic influenza", "Behavioral intention of casino guests", "Behavioral intention of Oriental Medicine Festival visitors", and "Behavioral intention of the Boryeong

Mud Festival spectators" (C. K. Lee, Song, Bendle, Kim, and Han, 2012; H. Song, G.-J. You, Y. Reisinger, C.-K. Lee, and S.-K. Lee, 2014; Song, Lee, Kang, and Boo, 2012; Song, Lee, Norman, and Han, 2012; H. J. Song, G. J. You, Y. Reisinger, C. K. Lee, and S. K. Lee, 2014). In terms of issues involving bicycle use, Passafaro et al. (2014) used MGB which predicts desire of bicycle use and the TPB which explains behavioal intention (Kaplan et al., 2015; Sigurdardottir, Kaplan, Møller, and Teasdale, 2013).

The literature review revealed that various studies extended or improved the TPB and the MGB by adding new constructs (Han, Hsu, and Sheu, 2010; Kaplan et al., 2015; Perugini and Bagozzi, 2001; H. Song et al., 2014; Song, Lee, Kang, et al., 2012; H. J. Song et al., 2014), including an extended model of goal-directed behavior (EMGB) developed by adding important variables to the MGB to explain changes in behavioral intention (Ajzen, 1991; C. K. Lee et al., 2012; Taylor, 2007). The present study applied the MGB by adding the factors of infrastructure and perceived susceptibility as well as additional indicators of desire to increase proficiency in explaining relationships to behavioral intention of using bicycles for tourism.

Table 2.1 Summary of Researches Related to Bicycle Uses

Author (year)	Theory	Dependent variable	Independent variable.	Analysis method	Significant variables
Using Bicycles for Tourism					
Kaplan et al. (2015)	TPB	Behavioral Intentions	-favorable attitudes toward cycling -interest in bicycle technology -favorable subjective norms toward cycling -perceived cycling ease	SEM	- favorable attitudes toward cycling -favorable subjective norms toward cycling -perceived cycling ease
Chen & Chen. (2013)	-	bicycle route choice behavior (3 choice)	facilities	multinomial legit model/ stated preference	-Routes with tourist attractions -bathrooms & simple maintenance equipment -tourist Information Center
Ritchie (1998)	-	travel behavior (5-level)	Infrastructure	Performance-importance matrices	-beautiful routes -High safety roads -Low traffic volume
Common bicycle use					
Passafaro et al. (2014)	MGB	Desire (6-level)	-attitudes -subjective norms, -perceived control -positive and negative anticipated emotions -past behaviour	SEM	- positive anticipated - past behavior
Sigurdardottir et al.(2013)	TPB	Behavioral Intentions (5-level)	socio-ecological constructs	SEM	-positive cycling experience -negative attitudes towards cars -bicycle-oriented future vision -subjective norm of car ownership
Martens (2007)	-	Measures Bicycle use Promotion	Bicycle master plan (BMP)	-Content Analysis	arrange facilities In the parking areas to be efficiently and interestingly
Pucher, et al., (1999)	-	Assess the alternative policy of bicycle use promotion	-Case studies in 6 cities - European experience	-Content Analysis	Factors of Infrastructure including cycling routes, And facilities

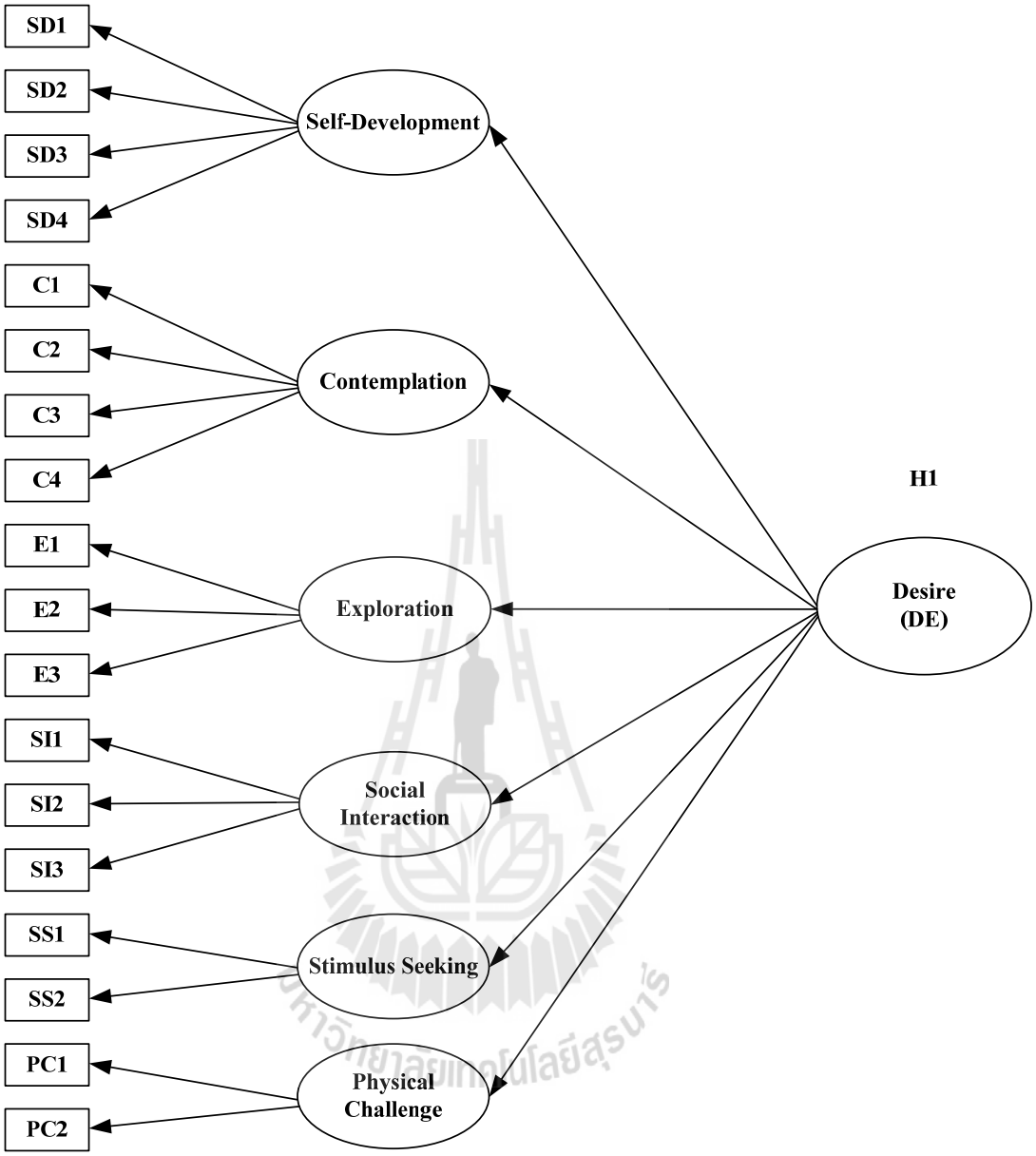


Figure 2.1 Behavioral framework

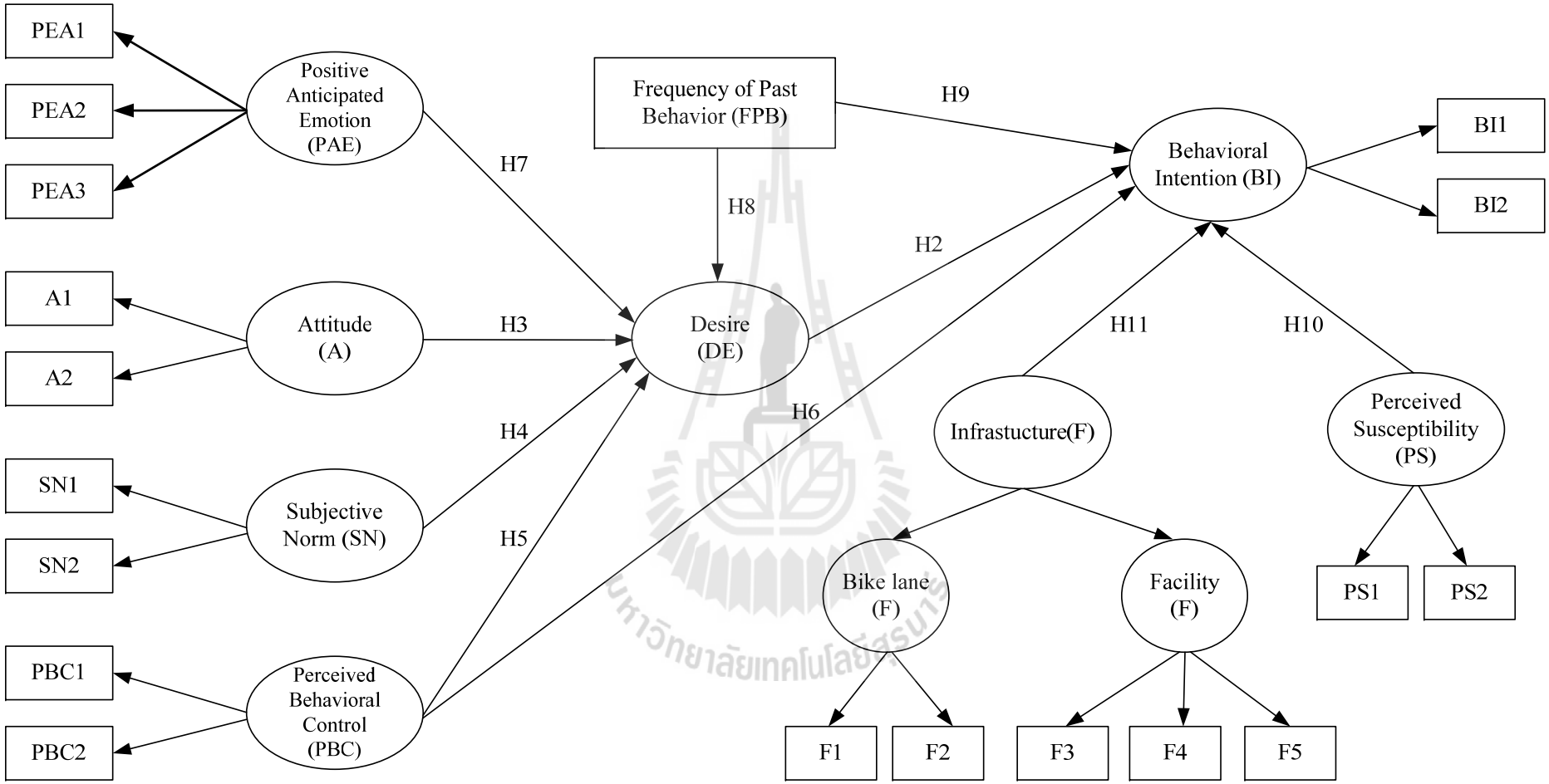


Figure 2.1 Behavioral framework (cont.)

2.3.2 Hypothetical relationships

2.3.2.1 Desire

Desire as a motivation variable. According to the literature review, these six factors are as follows:

(1) Self-development (Beh and Bruyere, 2007; Luo and Deng, 2008; Raadik, Cottrell, Fredman, Ritter, and Newman, 2010; Tangeland, Vennesland, and Nybakk, 2013)

(2) Contemplation (Ritchie, 1998; Tangeland et al., 2013)

(3) Exploration (Raadik et al., 2010; Ritchie, 1998; Tangeland et al., 2013)

(4) Social interaction (Eagles, 1992; Ritchie, 1998; Skår, Odden, and Inge Vistad, 2008; Tangeland and Aas, 2011; Tangeland et al., 2013)

(5) Stimulus seeking/avoidance (Beh and Bruyere, 2007; Mehmetoglu, 2007; Ritchie, 1998; Skår et al., 2008)

(6) Physical challenge (Luo and Deng, 2008; Mehmetoglu, 2007; Raadik et al., 2010; Ritchie, 1998; Skår et al., 2008; Tangeland et al., 2013)

From the literature review, a hypothesis can be established:

H1: For bicycle use in tourism, desire can be measured using six indicators, including self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction.

In addition, desire has been found to influence behavioral intention more so than any other factor, including attitudes, subjective norms, and perceived behavioral control, by having a direct, positive influence on behavioral

intention (Perugini and Bagozzi, 2001). From this concept, the following hypothesis can be established:

H2: Desire directly and positively affects the behavioral intention to use bicycles for tourism.

2.3.2.2 Attitude

Attitudes toward behavior are individuals' assessments of either positive or negative behaviors. In other words, a positive assessment result shows that individuals have good attitudes toward behaviors. In contrast, a negative assessment result shows that individuals do not have good attitudes toward behaviors (Ajzen, 1991). Desire is added to the MGB to increase the efficiency of behavioral intention (Bagozzi and Phillips, 1982). It also functions as a mediator influencing attitudes, subjective norms, perceived behavioral control, and anticipated emotions (Bagozzi and Phillips, 1982; Leone, Perugini, and Ercolani, 1999). Thus, it can be concluded that attitudes indirectly influence behavioral intention by transferring through desire (Perugini and Bagozzi, 2001; Prestwich et al., 2008). From the literature review, the following hypothesis can be established:

H3: Good attitudes toward bicycle use directly and positively affect the desire to use bicycles in tourism.

2.3.2.3 Subjective norms

Subjective norms are individuals' perceived social expectations of individuals behaving or not behaving (Ajzen, 1991) according to the needs of their closed circle of friends and family members (Cheng, Lam, and Hsu, 2006). In the MGB, subjective norms do not affect behavioral intention directly but affect it indirectly through desire (Perugini and Bagozzi, 2001). Many studies using the MGB

indicate that subjective norms influence desire at a statistically significant level (Carrus, Passafaro, and Bonnes, 2008; Prestwich et al., 2008; Song, Lee, Norman, et al., 2012; H. J. Song et al., 2014). From this concept, the following hypothesis can be established:

H4: Subjective norms directly affect the positive desire to use bicycles for tourism.

2.3.2.4 Perceived behavioral control

Perceived behavioral control is the sentiment in the difficulty or ease of expressing any activity (Ajzen, 1991). In other words, individuals perceive the behavioral expressions under determined situations and can control various factors (for example, individual abilities and facilities) that cause them to express such behaviors, with their perception originating from beliefs that might promote or obstruct behavioral expressions. Many studies have found perceived behavioral control to influence individual desire and behavioral intention. Furthermore, behavioral control directly influences real behaviors in the MGB (Carrus et al., 2008; Perugini and Bagozzi, 2001; H. J. Song et al., 2014).

Kaplan et al. (2015) studied behavioral intention to use bicycles in a group, finding that perceived cycling ease has a direct, positive influence on bicycle use during holidays. From the literature review and this concept, the following hypotheses can be established:

H5: Perceived behavioral control directly and positively affects the desire to use bicycles for tourism.

H6: Perceived behavioral control directly and positively affects the behavioral intention to use bicycles for tourism.

2.3.2.5 Positive anticipated emotion

One limitation of the TPB, which is used to explain attitudes and behaviors with errors, is that it does not consider the factor of affect (Perugini and Bagozzi, 2001), which in turn significantly influences the human decision-making process (Conner and Armitage, 1998). Affect is both positively and negatively related to individual anticipated emotions that predict desire in the MGB (Leone, Perugini, and Ercolani, 2004). However, this study did not consider the relation between negative anticipated emotions and desire because negative anticipated emotions did not influence desire with any statistical significance (Song, Lee, Kang, et al., 2012) or have a rather minor influence on tourism behaviors (M. Lee, Han, and Lockyer, 2012; Song, Lee, Kang, et al., 2012). In a related study about bicycle use in urban areas, Passafaro et al. (2014) found that positive anticipated emotion has a direct, positive influence on desire. Thus, from the literature review and this concept, Hypothesis 7 can be established as follows:

H7: Positive anticipated emotion directly and positively affects the desire to use bicycles for tourism.

2.3.2.6 Past behavior

Regularly practiced past behavior that becomes habitual is an important factor influencing human behavior. The important factor that makes them distort was the implementation of the TPB to explain behavioral expressions. According to the principles of the TPB, behavioral intention is initiated by the thinking process and decision-making based on factors through subconscious control, while behavioral expressions are influenced by automatic, habitual behavior without the decision-making process (Gärling, Fujii, and Boe, 2001; Verplanken and Aarts,

1999). Thus, past behavior significantly influences individuals' future behaviors (Aarts, Verplanken, and van Knippenberg, 1998; Bentler and Speckart, 1981). According to the MGB, the frequency of past behavior can predict desire, behavioral intention, and behavioral expressions (Bagozzi and Dholakia, 2006). In Passafaro et al.'s (2014) study on bicycle use in urban areas, past behavior directly and positively influenced desire. Along with Sigurdardottir et al. (2013), they found that daily bicycle use directly and significantly affected the intention to use bicycles. Therefore, from the literature review and this concept, the following hypotheses can be established:

H8: Past behavior directly and positively affects the desire to use bicycles for tourism.

H9: Past behavior directly and positively affects the behavioral intention to use bicycles for tourism.

2.3.2.7 Perceived susceptibility

Perceived susceptibility is an individuals' direct belief that forecasts their level of risk for a health problem by relating a behavior to avoiding the illness condition. Perceived risk is an important factor in individual behavior and the components of the health belief model (HBM), which is widely used to explain factors influencing individual health (Maiman and Becker, 1974). A variety of previous research used the HBM to study transportation safety, such as wearing a helmet while riding a bicycle (Brijs et al., 2014; Lajunen and Räsänen, 2004; Ross, Ross, Rahman, and Cataldo, 2010). Brijs et al. (2014) found that perceived susceptibility influenced behavioral intention at a statistically significant level with a direct, negative influence on behavioral expressions. Thus, this study adds the previously unstudied factor of

perceived susceptibility to the MGB to explain behavioral intention better. From the literature review, the following hypothesis can be established:

H10: Perceived susceptibility directly and negatively affects behavioral intention to use bicycles for tourism.

2.3.2.8 Infrastructure

Related research has studied the influence of infrastructure on bicycle use. For example, Martens (2003) found that level bicycle parking spots affected users' satisfaction ratings. This stimulated greater cooperative use of bicycles and public transportation. Pikora et al. (1999) found that the continution of routes influenced bicycle use. Furthermore, Pucher et al.(1999) found that cycling infrastructure, including special cycling routes, lanes marked for cycling, and facilities in standard parking areas, attract people who do not use bicycles. However, increasing levels of bicycle use have not been studied statistically. Every city in Europe with high bicycle use has special cycling routes and lanes marked for cycling, including nearby traffic calming routes. In Thailand, no study has considered basic infrastructure when explaining bicycle use behaviors. Therefore, this study added the factor of basic infrastructure to study its influence on behavioral intention. From the literature review, the following hypothesis can be established:

H11: Infrastructure directly and positively affects behavioral intention to use bicycles for tourism.

2.4 Materials and Methods

The research methodology in this study aimed to explain Thai behavioral intention to use bicycles for tourism through 21 steps (Figure 2.2). The following sections provide information about the population and samples, questionnaire development, data collection, data analysis, and model inspection.

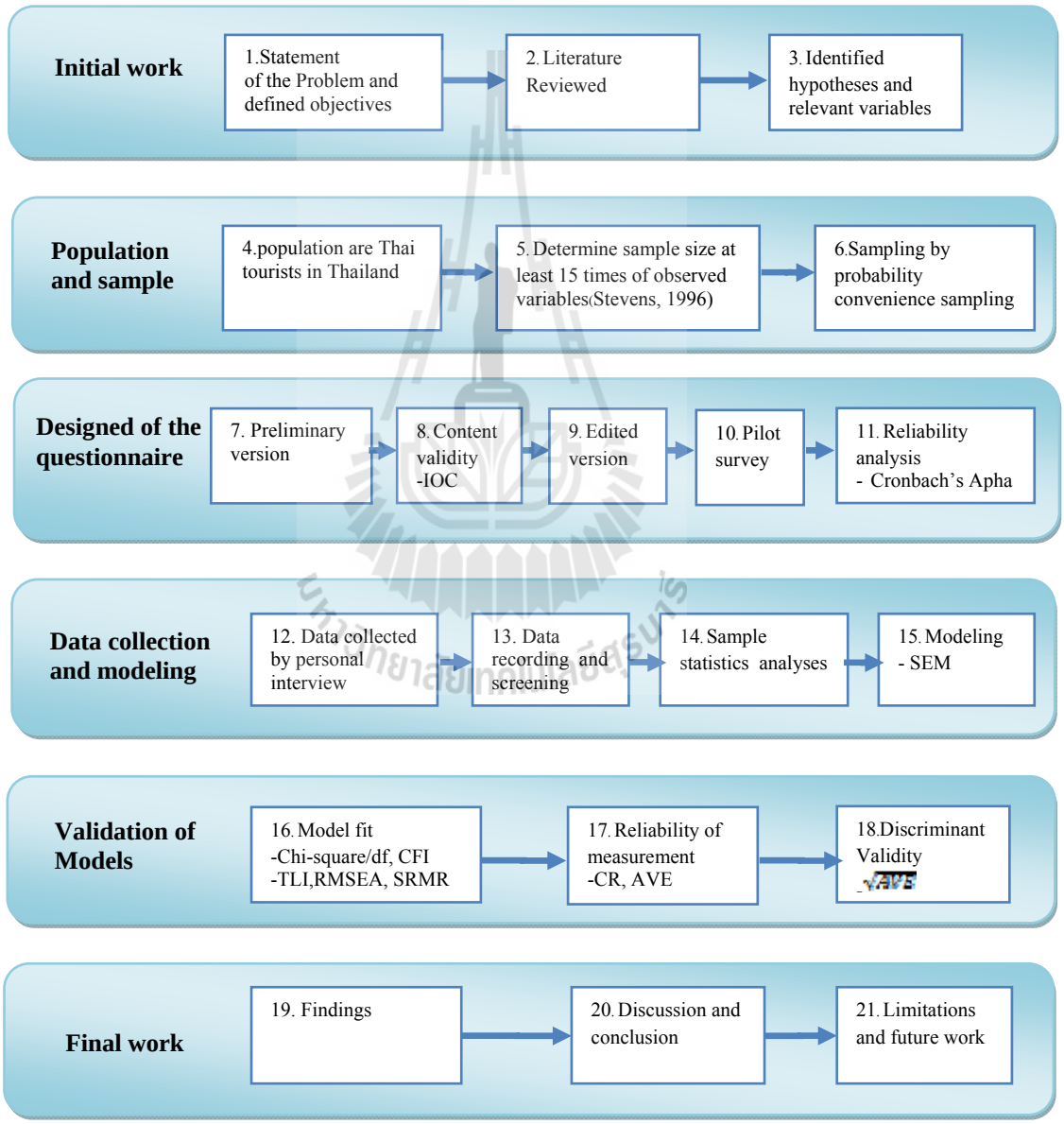


Figure 2.2 Research Methodology

2.4.1 Participants

Samples in this study were Thai tourists who took tour trips in Thailand. The samples were chosen and samples sizes were determined through probability convenience sampling. This study used a sample size deemed suitable for model analysis by many methods of structural equation modeling (SEM) suggested by the researchers including Loehlin (1998). Golob suggested the following suitable size for analyzing a structural equation model is 200 Samples in this study were Thai tourists who took tours in Thailand. The samples were chosen and the sample sizes were determined through probability convenience sampling (Kline, 2011; Stevens, 1996); (2) the sample size used to estimate maximum likelihood (ML) should be at least 15 times the observable variables (Stevens, 1996); (3) the sample size used to estimate ML should be at least 5 times the free parameters, including error term (Tavakol and Dennick, 2011); and (4) the sample size used to estimate ML should be at least 10 times the free parameters (Hoogland & Boomsma, 1998). From these suggestions, the sample size calculated for this study involved 36 observed variables. Sufficient samples for model construction were at least 15 x 36, equaling 540. This study used 983 samples, which is sufficient for SEM analysis.

2.4.2 Questionnaire development

Questionnaire development consisted of the five procedures. First, the literature and involved theory were reviewed to select variables for an appropriate measurement model according to the MGB, including variables measuring infrastructure and perceived susceptibility, which are also included in this study. Second, the content validity of the questionnaires was tested using the Index of Item Objective Congruency (IOC), which was developed by seven experts involved in

content, evaluation, and language. Every item should have an IOC value greater than 0.50. The research tool assessment showed that items have IOC values ranging from 0.50 to 1.00, so the items could be used in the measurement model. Third, the questionnaires were corrected and improved according to the experts' suggestions. Subsequently, the questionnaires were piloted with 30 samples. Finally, the questionnaires' reliability was tested with Cronbach's alpha, which should be greater than 0.70 (Kline, 2011). Testing shows that items have Cronbach's alpha values ranging from 0.700 to 0.947, as in the suggested criteria.

2.4.3 Data collection

The tool used to collect data was an interview questionnaire designed to acquire primary data. The questionnaire consisted of six sections: (1) respondents' general information; (2) behavior of using bicycles in daily life, which is a variable of past experience; (3) infrastructure; (4) attitudes, including those toward behavior, subjective norms, perceived behavioral control, positive anticipated emotion, and perceived susceptibility; (5) desire; and (6) behavioral intention to use bicycles for tourism. Items were rated on a five-point scale (5 = strongly agree to 1 = disagree) to survey Thai tourists representative of most nationwide tourists. Data was collected from June 1, 2014 to October 31, 2014. The 983 completed and returned questionnaires were sufficient to conduct SEM.

2.4.4 Analysis

2.4.4.1 Structural Equation Modeling (SEM)

To test the hypotheses related to the model's variables (as shown in Figure 2.1), SEM was used to establish relationships between latent variables and between latent and observed variables. This model was used to

synthesize the data analysis using three methods: factor analysis, path analysis, and estimation of parameters in regression analysis. The SEM consisted of two sub-models: the measurement model and the structural model.

2.4.4.2 Validation of Models

To test model fit, we used chi-square (χ^2), where χ^2 (df) should have $p > 0.05$ (Hu and Bentler, 1999) and the root mean square of approximation (RMSEA) should be 0.06 or less. The comparative fit index (CFI) should be 0.90 or greater (Hooper, Coughlan, and Mullen, 2008). The Tucker Lewis index (TLI) should be 0.80 or greater (Hu and Bentler, 1999), and the standardized root mean residual (SRMR) should be 0.08 or less (Kasantikul, 2002a).

For validity and reliability testing, the following scales were used. The reliability scale was based on composite reliability (CR), which should not be below 0.70, and average variance extracted (AVE), which should not be below 0.50 (Kasantikul, 2002a). Discriminant validity is considered on the squared root AVE of each construct. If the squared root AVE is in a column considered higher than the cross-construct correlation of every value in the column, the scale has discriminant validity.

2.5 Results

2.5.1 Descriptive statistics

The 983 samples were divided into 425 males (43.2%) and 558 females (56.8%). Most had completed a bachelor's degree (50.2%), 39.5% did not have a bachelor's degree, and 10.4% had advanced degrees. Further, 30% used bicycles at tourist attractions, while 70% did not.

Table 2.2 presents the basic statistical analysis results for the observed variables; in all, 38 questions were used to analyze the mean, standard deviation, skewness, and kurtosis. The observed variable with the greatest mean value was A1 “Using bicycles is useful to health and strengthens health” (M = 4.37, SD = 0.812), followed by A2 “Riding bicycles for tourism provides pure air, making the brain active” (M = 4.21, SD = 0.861). The observed variable with the lowest score was PAE1 “Using bicycles makes me feel cool, chic, and smart” (M = 3.26, SD = 1.117).

This study used maximum likelihood estimation to determine normal data distribution based on skewness and kurtosis. As shown in Table 2, skewness ranged from −.280 to 0.028, while kurtosis ranged from −0.567 to 1.464. The findings that skewness was less than 3.0 and kurtosis was less than 10 showed normal data distribution (Kline, 2011), which was suitable for SEM analysis.

Table 2.2 Mean, Standard Deviation, Skewness, and Kurtosis of variables in Model

	Variables Used in Research	$\overline{X}$	SD	Sk	Ku
	Positive Anticipated Emotion (cronbach α = 0.707)				
PAE1	Using bicycles makes me feel cool , chic, and smart	3.26	1.117	-0.192	-0.559
PAE2	Using bicycles makes me recognize environmental love	3.48	1.059	-0.311	-0.427
PAE3	Using bicycles makes me feel relaxed	3.96	0.933	-0.560	-0.248
	Attitude (cronbach α = 0.829)				
A1	Using bicycles is useful for health. It strengthens health.	4.37	0.812	-1.280	1.464
A2	Riding bicycles for tourism provides pure air making brain active.	4.21	0.861	-0.931	0.433
	Subjective norms (cronbach α = 0.831)				
SN1	If family members such as father, mother, brothers, sisters, husband or wife use bicycles for tourism, I will use it too.	3.73	0.986	-0.591	0.096
SN2	If my colleagues, friends in the same group or closed friends use bicycles for tourism, I will use it too.	3.78	0.998	-0.509	-0.220
	Perceived behavioral control (cronbach α = 0.836)				
PBC1	I am able to use bicycles for traveling by myself.	3.69	1.031	-0.418	-0.415
PBC2	I think that using bicycles is very easy for me.	3.77	1.009	-0.421	-0.468
	self-development (conbach α = 0.878)				
SD1	Learning to ride bicycles for a longer distance	3.76	0.973	-0.558	0.085
SD2	Showing the abilities to ride a bicycle for tourism by myself	3.74	0.943	-0.481	0.034
SD3	Trying new things in life	3.89	0.916	-0.491	-0.205
SD4	Developing skills and learning abilities in adjusting to surroundings	3.81	0.945	-0.497	-0.048
	Contemplation (cronbach α = 0.875)				
C1	Riding bicycles is exciting and challenging	3.94	0.928	-0.666	0.029
C2	Being one's own with freedom without any others' controlling ideas	3.86	0.941	-0.532	-0.058
C3	Being able to touch nature closely	4.00	0.955	-0.695	-0.120
C4	Fleeing from the crowded in urban communities	3.89	0.944	-0.462	-0.438
	Exploration (conbach α = 0.881)				
E1	Exploring various things in surroundings	3.96	0.942	-0.599	-0.263
E2	Surveying routes in tourist attraction zones	3.97	0.944	-0.609	-0.261
E3	Discovering new things in traveling	3.98	0.955	-0.613	-0.259

$\overline{X}$ = Mean, SD = Standard deviation, Sk = Skewness, Ku = Kurtosis

Table 2.2 Mean, Standard deviation, Skewness, and Kurtosis of variables in the model (cont.)

	Variables used in Research	$\overline{X}$	SD	Sk	Ku
	Physical challenge (cronbach α = 0.882)				
PC1	Exercising during tour trips	4.08	0.944	-0.785	-0.045
PC2	Developing body health to be stronger.	4.08	0.957	-0.764	-0.132
	Stimulus seeking(conbach α = 0.718)				
SS1	Taking a leave from work/ duty for relaxation	3.89	0.963	-0.589	-0.197
SS2	Adding value to one's own for the praise and admiration in society	3.65	1.064	-0.487	-0.358
	Social interaction (cronbach α = 0.894)				
SI1	Having opportunities to meet new people	3.80	0.984	-0.559	-0.159
SI2	Having interaction with local people	3.82	0.988	-0.515	-0.318
SI3	Staying with people who having the same likes	3.82	0.988	-0.509	-0.326
	Bike lane (cronbach α = 0.757)				
F1	The width of bike lanes is suitable for utility.	3.85	0.964	-0.603	0.006
F2	There are specific bike lanes.	3.98	0.985	-0.700	-0.128
	Facility (cronbach α = 0.865)				
F3	There are lockers at the beginning of routes.	3.59	1.101	-0.379	-0.567
F4	There are dressing rooms for service in tourist attractions.	3.59	1.035	-0.308	-0.517
F5	There are bathrooms for service in tourist attractions.	3.72	1.023	-0.437	-0.423
	Perceived susceptibility (cronbach α = 0.752)				
PS1	Using bicycles is risky to danger because it may be crashed by cars.	3.71	1.005	-0.450	-0.228
PS2	Using bicycles for tourism on the roads with other vehicles is not practical due to accidental awareness.	3.97	0.991	-0.735	-0.031
PS3	Using bicycles for tourism is riskier than any other vehicles.	3.63	1.060	-0.446	-0.332
	Frequency of past behavior				
FPB	The frequency of riding bicycles in daily lives	2.64	1.098	0.228	-0.655
	Behavioral Intention (cronbach α = 0.874)				
BI1	I intend to use bicycles for tourism most frequently	3.70	0.976	-0.405	-0.234
BI2	I want to use bicycles in tourist attractions next time.	3.68	0.955	-0.428	-0.135

$\overline{X}$ = Mean, SD = Standard deviation, Sk = Skewness, Ku = Kurtosis

2.5.2 Structural equation modeling

2.5.2.1 Goodness-of-fit statistics

According to the SEM of the intention to use bicycles for tourism based on the theory of MGB (Figure 2.3), the model showed the following statistical values for goodness-of-fit: chi-square (χ^2) = 2544.441; degree of freedom (df) = 590; p-value < 0.001; χ^2/df = 4.31; RMSEA = 0.058; CFI = 0.919; TLI = 0.908; and SRMR = 0.067. When comparing these results with the suggested criteria, χ^2 (df) should have p > 0.05 (Hu and Bentler, 1999); RMSEA should be 0.06 or less; CFI should be 0.90 or greater (Hooper et al., 2008); TLI should be 0.80 or greater (Hu and Bentler, 1999); and SRMR should be 0.08 or less (MacCallum, Browne, and Sugawara, 1996). Every statistic for this measurement model had values according to the criteria except the chi-square test, χ2, which was sensitive to large samples (n > 200), leading to a tendency to reject the hypothesis (Delbosc and Currie, 2012; Kline, 2011). Thus, it can be concluded that the model for the intention to use bicycle for tourism was relevant to the empirical data (Chung, Song, and Park (2012), Van Acker and Witlox (2010), Kasantikul (2002a)).

2.5.2.2 Measurement model

This study considered 16 measurement models comprising 44 indicators; the lowest value of loading was between 0.623 and 0.963. The indicator of perceived susceptibility had the lowest loading: PS1 “Using bicycles is risky and dangerous because they may be crashed by cars” (0.623). The indictor with the highest loading was contemplation (0.963), which indicated desire and for which every indicator had a statistically significant, positive value (p < 0.001). Thus, the components of latent variables were confirmed as shown in Table 2.3.

Table 2.4 presents the validity and reliability results from the measuring scale (0.971 to 0.989), while the AVE was between 0.506 and 0.781. When compared with suggested criteria, CR should not be lower than 0.70 and AVE should not be lower than 0.50 (Kasantikul, 2002a). Every value was relevant to the criteria. This showed the measuring scale's reliability. The discriminant validity test found that the squared root AVE in the considered column had a higher value than every cross-construct correlation value in the same column. This showed that the measuring scale had discriminant distribution in every construct and thus was suitable for the measurement model.

2.5.2.3 Hypothesis testing

The hypotheses testing results are as follows: Hypothesis 1) Desire can be measured using six indicators, including self-development, contemplation, exploration, physical challenge, stimulus seeking, social interaction, and social interaction at a statistically significant level ($p < 0.001$); Hypothesis 2) Desire directly and positively affects the behavioral intent to use bicycles for tourism at a statistical significance level of 0.01 ($\beta = 0.418$, $t = 8.368$, $p < 0.001$). Thus, H1 and H2 were supported by the results. Further, the desire model found that every predicted variable except frequency of past behavior directly affected desire at statistically significant levels: positive attitudes toward bicycles ($\beta = 0.421$, $t = 13.561$, $p < 0.001$), subjective norms ($\beta = 0.159$, $t = 3.938$, $p < 0.001$), perceived behavioral control ($\beta = 0.302$, $t = 8.049$, $p < 0.001$), and positive anticipated emotion ($\beta = 0.138$, $t = 4.398$, $p < 0.001$). The results show that H3, H4, H5, and H7 were supported because frequency of past behavior ($\beta = 0.004$, $t = 0.195$, $p < 0.001$) had a

direct, positive influence on desire but showed no statistically significant difference; thus, H8 was not supported as shown in Table 2.5.

For hypotheses involved in behavioral intention to use bicycles for tourism, it was found that perceived behavioral control ($\beta = 0.251$, $t = 5.175$, $p < 0.001$) and frequency of past behavior ($\beta = 0.202$, $t = 6.750$, $p < 0.001$) had a direct, positive influence at a statistical significance of 0.01. Likewise, infrastructure ($\beta = 0.148$, $t = 3.039$, $p = 0.002$) had a direct, positive influence on behavioral intention at a statistical significance of 0.01. In terms of perceived susceptibility ($\beta = -0.263$, $t = -5.553$, $p < 0.001$), it was found that the direct, negative influence on behavioral intention to use bicycles for tourism was at the 0.01 significance level. Based on these results, H6, H9, H10, and H11 were supported.

Table 2.3 Parameter estimates of Measurement Model

Variable	Standardized estimates	Standard Error (S.E.)	p -value	R-square
Self-development				0.712
SD1	0.669	0.020	<0.001	0.448
SD2	0.778	0.015	<0.001	0.606
SD3	0.829	0.013	<0.001	0.688
SD4	0.844	0.012	<0.001	0.712
Contemplation				0.928
C1	0.750	0.016	<0.001	0.562
C2	0.788	0.014	<0.001	0.622
C3	0.787	0.015	<0.001	0.619
C4	0.777	0.015	<0.001	0.604
Exploration				0.783
E1	0.861	0.012	<0.001	0.742
E2	0.846	0.011	<0.001	0.716
E3	0.882	0.012	<0.001	0.779
Physical challenge				0.717
PC1	0.897	0.010	<0.001	0.804
PC2	0.880	0.011	<0.001	0.775
Stimulus seeking				0.839
SS1	0.817	0.017	<0.001	0.668
SS2	0.686	0.020	<0.001	0.471
Social Interaction				0.710
SE1	0.854	0.011	<0.001	0.729
SE2	0.887	0.009	<0.001	0.787
SE3	0.839	0.012	<0.001	0.705
Desire				0.705
Self-development (SD)	0.844	0.014	<0.001	0.712
Contemplation (C)	0.963	0.009	<0.001	0.928
Exploration (E)	0.885	0.010	<0.001	0.783
Physical Challenger (PC)	0.847	0.013	<0.001	0.717
Stimulus seeking (SS)	0.916	0.016	<0.001	0.839
Social Interaction (SI)	0.843	0.013	<0.001	0.710

Table 2.3 Parameter estimates of Measurement Model (cont.)

Variable	Standardized estimates	Standard Error (S.E.)	p-value	R-square
Bike lane				0.689
F1	0.743	0.022	<0.001	0.553
F2	0.820	0.022	<0.001	0.672
Facility				0.587
F3	0.793	0.015	<0.001	0.629
F4	0.915	0.011	<0.001	0.837
F5	0.788	0.015	<0.001	0.621
Infrastructure				
Bike lane	0.830	0.032	<0.001	0.689
Facility	0.766	0.030	<0.001	0.587
Positive Anticipated Emotion				
PAE1	0.742	0.029	<0.001	0.551
PAE2	0.678	0.025	<0.001	0.460
PAE3	0.796	0.030	<0.001	0.634
Attitude				
AT1	0.845	0.015	<0.001	0.714
AT2	0.841	0.015	<0.001	0.707
Subjective norms				
SN1	0.824	0.016	<0.001	0.679
SN2	0.862	0.015	<0.001	0.744
Perceived behavioral control				
PBC1	0.850	0.015	<0.001	0.722
PBC2	0.832	0.016	<0.001	0.693
Perceived susceptibility				
PS1	0.623	0.029	<0.001	0.388
PS2	0.791	0.029	<0.001	0.626
Behavioral Intention				0.414
BI1	0.850	0.016	<0.001	0.722
BI2	0.902	0.016	<0.001	0.813

Table 2.4 Reliability and validity of the measurement model

Construct	CR	AVE	correlation of construct							
			PAE	AT	SN	PBC	DE	IF	PS	BI
PAE	0.983	0.547	**0.740**							
AT	0.989	0.710	0.400	**0.843**						
SN	0.989	0.711	0.349	0.506	**0.843**					
PBC	0.989	0.707	0.310	0.520	0.684	**0.841**				
DE	0.997	0.781	0.417	0.734	0.659	0.694	**0.884**			
IF	0.976	0.637	0.307	0.523	0.440	0.370	0.456	**0.798**		
PS	0.971	0.506	0.297	0.594	0.360	0.325	0.457	0.523	**0.711**	
BI	0.989	0.768	0.219	0.358	0.417	0.510	0.540	0.291	0.087	**0.876**

Remarks : Figure in main diagonal of correlation of construct is $\sqrt{AVE}$

CR=Composite reliability; AVE=average variance extracted; PAE= Positive Anticipated Emotion; AT= Attitude; SN = Subjective norms; PBC= Perceived behavioral control; DE=desire; IF=Infrastructure; PS= Perceived susceptibility; BI= Behavioral Intention.

Table 2.5 Parameter estimates of structural model

Hypothesis	Standardized estimates	Standard Error (S.E.)	p-value	Conclusion
1.Attitude→ Desire	0.421	0.031	<0.001**	Supported
2.Subjective Norms → Desire	0.159	0.040	<0.001**	Supported
3.Perceived behavioral control → Desire	0.302	0.038	<0.001**	Supported
4.Positive Anticipated Emotion → Desire	0.138	0.031	<0.001**	Supported
5.Past behavior → Desire	0.004	0.022	0.195	Not supported
6.Desire → Behavioral Intention	0.418	0.049	<0.001**	Supported
7.Perceived behavioral control → Behavioral Intention	0.251	0.048	<0.001**	Supported
8.Past behavior → Behavioral Intention	0.202	0.030	<0.001**	Supported
9.Perceived Susceptibility → Behavioral Intention	-0.263	0.048	<0.001**	Supported
10.Infrastructure → Behavioral Intention	0.148	0.049	0.002**	Supported

Model fit statistics: $\chi^2 = 2544.441$, df = 590, p<0.001, RMSEA = 0.058, CFI = 0.919, TLI = 0.908, SRMR = 0.067

*p<0.05,**p<0.01***

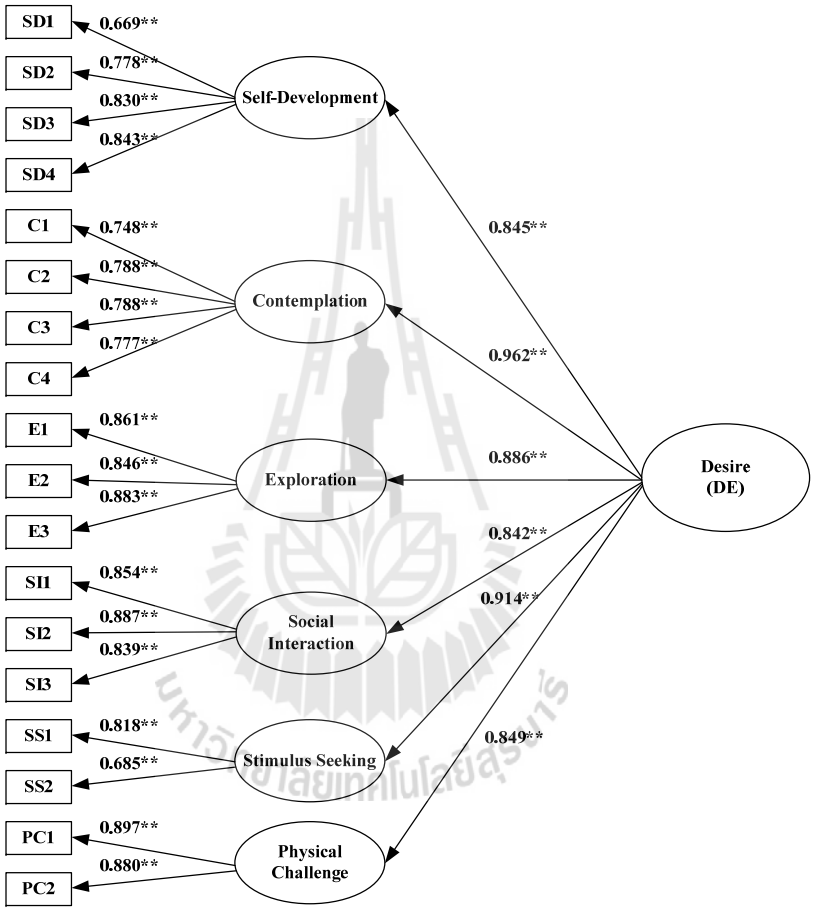
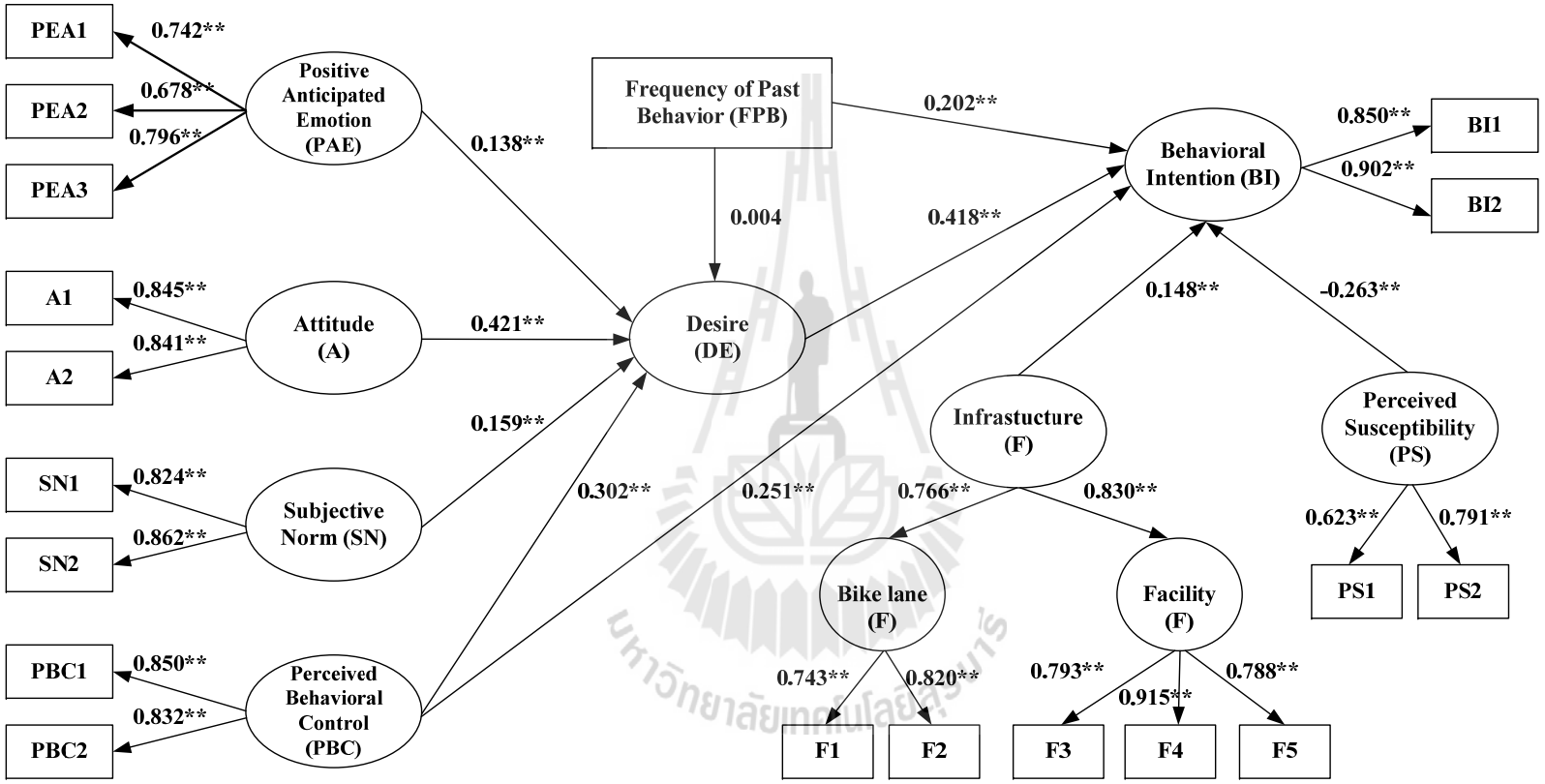


Figure 2.3 Structural Equation Model of Behavioral Intention of Bicycle Use for Tourism



χ^2=2544.441 ,df = 590 ,χ^2/df=4.31 P<0.001 ,CFI = 0.919 ,TLI = 0.908 ,SRMR = 0.067 ,RMSEA =0.058
*p <0.05 , **p <0.01 (Mplus 7.12 Standardized estimates)

Figure 2.3 Structural Equation Model of Behavioral Intention of Bicycle Use for Tourism (cont.)

2.6 Discussion and Conclusion

By using SEM based on the MGB theory, this research studied factors influencing the behavior of using bicycles for tourism. The study participants were 983 Thai tourists nationwide. The eight factors considered were attitudes, subjective norms, perceived behavioral control, positive anticipated emotion, past behavior, desire, perceived susceptibility, and infrastructure. These factors were tested in terms of the behavioral intention to use bicycles for tourism, while desire functioned as a moderator variable between attitudes, subjective norms, perceived behavioral control, positive anticipated emotion, past behavior, and behavioral intention.

In this study, the desire to use bicycles for tourism was measured by six indicators: self-development, contemplation, exploration, physical challenge, stimulus seeking, social interaction, and social interaction. Self-development included trying new things in life, learning to ride bicycles for longer distances, and showing the ability to ride a bicycle by myself (Beh and Bruyere, 2007; Luo and Deng, 2008; Raadik et al., 2010; Tangeland et al., 2013). Contemplation included being on one's own with freedom, being able to touch nature closely, and fleeing from the crowd in urban communities (Devesa, Laguna, and Palacios, 2010; Ritchie, 1998). Exploration such as discovering new things in traveling, exploring various things in surroundings, and surveying routes in tourist attraction zones (Devesa et al., 2010; Luo and Deng, 2008; Raadik et al., 2010; Ritchie, 1998; Skår et al., 2008). Physical challenge included exercising during tour trips and developing body health to be stronger (Luo and Deng, 2008; Mehmetoglu, 2007; Raadik et al., 2010; Ritchie, 1998; Skår et al., 2008). Stimulus seeking included taking leave from work/duty for relaxation and adding value to oneself through praise and admiration in society (Beh and Bruyere,

2007; Mehmetoglu, 2007; Ritchie, 1998; Skår et al., 2008). Social interaction included having interactions with local people, having opportunities to meet new people, and staying with those who like the same things (Eagles, 1992; Ritchie, 1998; Skår et al., 2008; Tangeland and Aas, 2011; Tangeland et al., 2013).

The SEM results revealed that attitudes, subjective norms, perceived behavioral control, and positive anticipated emotion had a direct, positive influence on the desire to use bicycles for tourism at a statistical significance of 0.01. Relevant to Passafaro et al.'s (2014) study, in MGB, desire is the mediator receiving influences from previously mentioned factors transferring to behavioral intention (Bagozzi and Phillips, 1982; Leone et al., 1999). Examining the details of each factor first revealed that attitude was the factor that most influenced desire. In the measurement model, the indicator "Using bicycles is useful for health. It strengthens health" provides the most standardized factor loading value (0.845). In other words, emphasis on the importance of health will affect higher use of bicycles for tourism. Second, subjective norms, of which the most important indicator is "If colleagues in workplaces and friends in the same group use bicycles, I will too", had the most standardized factor loading value (0.862). These results indicate that society or travel partners riding bicycles is important for encouraging tourists to use bicycles. Third, the perceived behavioral control indicator "I am able to use bicycles for traveling by myself" had the most standardized factor loading value (0.850). In other words, emphasizing tourists' confidence in riding bicycles by themselves will increase their need for bicycles. Fourth, the positive anticipated emotion indicator "Using bicycles makes me feel relaxed" had the most standardized factor loading value (0.796). This means that if

tourists perceive relaxation in the activities organized for them, their need for bicycles will increase.

When considering the behavioral intention to use bicycles for tourism, this study found that all factors, including desire, perceived behavioral control, past behavior, perceived susceptibility, and infrastructure, influenced the behavioral intention to use bicycles for tourism at a statistical significance of 0.01. Desire most directly and positively influenced behavioral intention to use bicycles for tourism (β = 0.418, t = 8.368, p < 0.001), which was relevant to Perugini and Bagozzi's (2001) theory. Examining the measurement model of desire revealed that contemplation had the most standardized factor loading value (0.963). This means that tourists who want peace, independence, and freedom without any controlling ideas are more likely to use bicycles for tourism than are others. Second, perceived behavioral control (β = 0.251, t = 5.175, p < 0.001) has a direct, positive influence on behavioral intention to use bicycles for tourism, which is relevant to Kaplan et al. (2015). Third, past behavior (β = 0.202, t = 6.750, p < 0.001) is relevant to the theories presented in Aarts et al. (1998) and Bentler and Speckart (1981), who stated that if tourists use bicycles in their daily lives, they will be more likely to use bicycles for tourism. Fourth, in terms of standardized factor loading, the infrastructure indicator "bike lane" had the highest value (β = 0.148, t = 3.039, p = 0.002), which is relevant to Pucher et al. (1999). This suggests that the government sector should prioritize infrastructure, including the availability of cycling routes. Such a policy would lead more tourists to use bicycles. However, accommodations and facilities, including lockers, dressing rooms, and bathrooms, in tourist attractions are needed because facilities are statistically significant infrastructure components. Fifth, perceived susceptibility (β =

−0.263, t = −5.553, p < 0.001) had a direct, negative influence on behavioral intention to use bicycles for tourism, which is relevant to Brijs et al. (2014), who found that "Using bicycles for traveling on roads with other vehicles is not practical due to accident awareness" had the highest standardized factor loading value (0.791). Tourists who perceive risk in riding with other vehicles on roads will be less likely to use bicycles. Therefore, the government sector or involved organizations must emphasize the safety of tourists using bicycles by providing cycling routes or traffic calming in areas near cycling routes (Stevens, 1996).

As previously mentioned, if the promotion of bicycle use for tourism is to be enhanced, good attitudes toward bicycle use must be established by helping tourists recognize bicycle riding's importance to their health, encouraging them to use bicycles regularly in their daily lives, and helping them perceive their ability to use bicycles for tourism by themselves. More importantly, the best motivation for bicycle use is tourists' feelings of freedom; this will lead to increased bicycle use. However, family and friends are just as important. If colleagues in workplaces, acquaintances in the same group, or close friends use bicycles, tourists will too. Thus, for infrastructure, the government sector should build bicycle lanes and facilities in tourist attractions. Tours should not be arranged on roads with other vehicles because the risk of accidents will reduce bicycle use.

The study of factors affecting bicycle use for tourism considered factors including attitudes, behaviors, motivations, and infrastructure. Other potential factors not considered here include attraction features, policies in each area, and climate conditions or seasons affecting various tourist attractions. Furthermore, this study

focuses on Thai tourists. In the future, it would be interesting to study foreign tourists travelling in Thailand.

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Appendix 2.1 The questionnaire for this study of an English version.

1. Demographic item:

1.1) Sex ❍1) Male ❍2) Female
1.2) Age _____ years
1.3) Hometown village_____sub-district_____province _____
1.4) Highest education level
❍1) Upper Secondary / Vocational Certificate ❍2) Diploma/ High Vocational
❍3) Bachelor's degree ❍ 4) Master's degree ❍ 5) Doctor's degree
1.5) Occupation
❍ 1) Government employee/State Enterprises ❍ 2) Business owner
❍ 3) Company Employee ❍ 4) Farmer ❍ 5) Student
❍ 6) Employee ❍ 7) Others _____
1.6) Number of member in household _____ person
1.7) Average income _____THB/ month
1.8) Average income per household_____ THB/ month
1.9) Number of car in household _____ vehicle
1.10) Number of motorcycle in household _____ vehicle
1.11) Number of bicycle in household _____ vehicle

2. Attitude item:

The following statements are part of a survey on attitudes. please rate the following on a scale 1-5 (5 = strongly agree, 1 = disagree)**.**

Code	Parameters	Score
	Positive Anticipated Emotion	
PAE1	Using bicycles makes me feel cool , chic, and smart.	-------
PAE2	Using bicycles makes me recognize environmental love.	-------
PAE3	Using bicycles makes me feel relaxed.	-------
	Attitude	
A1	Using bicycles is useful for health. It strengthens health.	-------
A2	Riding bicycles for tourism provides pure air making brain active.	-------
	Subjective norms	
SN1	If family members such as father, mother, brothers, sisters, husband or wife use bicycles for tourism, I will use it too.	-------
SN2	If my colleagues, friends in the same group or closed friends use bicycles for tourism, I will use it too.	-------
	Perceived behavioral control	
PBC1	I am able to use bicycles for traveling by myself.	-------
PBC2	I think that using bicycles is very easy for me.	-------

Desire item:

Code	Parameters	Score
	self-development	
SD1	Learning to ride bicycles for a longer distance.	-------
SD2	Showing the abilities to ride a bicycle for tourism by myself.	-------
SD3	Trying new things in life.	-------
SD4	Developing skills and learning abilities in adjusting to surroundings.	-------
	Contemplation	
C1	Riding bicycles is exciting and challenging.	-------
C2	Being one's own with freedom without any others' controlling ideas.	-------
C3	Being able to touch nature closely.	-------
C4	Fleeing from the crowded in urban communities.	-------
	Exploration	
E1	Exploring various things in surroundings.	-------
E2	Surveying routes in tourist attraction zones.	-------
E3	Discovering new things in traveling.	-------
	Perceived behavioral control	
PBC1	I am able to use bicycles for traveling by myself.	-------
PBC2	I think that using bicycles is very easy for me.	-------
	Physical challenge	
PC1	Exercising during tour trips.	-------
PC2	Developing body health to be stronger.	-------
	Stimulus seeking	
SS1	Taking a leave from work/ duty for relaxation.	-------
SS2	Adding value to one's own for the praise and admiration in society.	-------
	Social interaction	
SI1	Having opportunities to meet new people.	-------
SI2	Having interaction with local people.	-------
SI3	Staying with people who having the same likes.	-------

Infrastructure item:

Code	Parameters	Score
	Bike lane	
F1	The width of bike lanes is suitable for utility.	-------
F2	There are specific bike lanes.	-------
	Facility	
F3	There are lockers at the beginning of routes.	-------
F4	There are dressing rooms for service in tourist attractions.	-------
F5	There are bathrooms for service in tourist attractions.	-------

Perceived susceptibility item:

Code	Parameters	Score
	Perceived susceptibility	
PS1	Using bicycles is risky to danger because it may be crashed by cars.	-------
PS2	Using bicycles for tourism on the roads with other vehicles is not practical due to accidental awareness.	-------
PS3	Using bicycles for tourism is riskier than any other vehicles.	-------

Behavioral Intention item:

Code	Parameters	Score
	Behavioral Intention	
BI1	I intend to use bicycles for tourism most frequently.	-------
BI2	I want to use bicycles in tourist attractions next time.	-------

Frequency of past behavior:

How often do you ride a bicycles in daily lives. (5 = always, 1 = never)**.**

Code	Parameters	Score
	Frequency of past behavior	
FPB	The frequency of riding bicycles in daily lives.	-------

Appendix 2.2 : The questionnaire for this study of a Thai version.

<u>ตอนที่ 1</u> ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

คำชี้แจง: โปรดทำเครื่องหมาย √ ใน ○ (วงกลม) หน้าคำตอบที่ตรงกับความเป็นจริง

1.1) เพศ ❍ 1) ชาย ❍ 2) หญิง

1.2) อายุ _____ ปี

1.3 ท่านมีภูมิลำเนาอยู่ใน หมู่บ้าน_____ตำบล_____จังหวัด_____

1.4) ระดับการศึกษาสูงสุด ❍ 1) ม.3 ❍ 2) ม. 6/ ปวช. ❍ 3) อนุปริญญา / ปวส.
❍ 4) ปริญญาตรี ❍ 5) ปริญญาโท ❍ 6) ปริญญาเอก

1.5) อาชีพ ❍ 1) ราชการ/รัฐวิสาหกิจ ❍ 2) บริษัทเอกชน ❍ 3) ธุรกิจส่วนตัว
❍ 4) เกษตรกร ❍ 5) นักเรียน/นักศึกษา ❍ 6) รับจ้างทั่วไป
❍ 7) อื่นๆ โปรดระบุ.....

1.6) จำนวนสมาชิกในครัวเรือน_____ คน

1.7) รายได้ต่อเดือนของท่านประมาณ _____ บาท/เดือน

1.8) รายได้ต่อเดือนของครัวเรือนประมาณ_____ บาท/เดือน

1.9) จำนวน<u>รถยนต์</u>ในครัวเรือน _____ คัน

1.10) จำนวน<u>จักรยานยนต์</u>ในครัวเรือน _____คัน

1.11) จำนวน<u>จักรยาน</u>ในครัวเรือน _____ คัน

<u>ตอนที่ 2</u> ข้อมูลพฤติกรรมการเดินทางท่องเที่ยว

คำชี้แจง: ให้ทำเครื่องหมาย✓ ใน ○ (วงกลม) โดยให้ระบุคำตอบที่เกี่ยวข้องกับสถานที่ท่องเที่ยว ที่ท่านได้เดินทางไปครั้งล่าสุด

2.1) สถานที่ท่องเที่ยว

❍ 1) แหล่งท่องเที่ยวเชิงธรรมชาติ ภูเขา เช่น อุทยานแห่งชาติเขาใหญ่

❍ 2) แหล่งท่องเที่ยวเชิงธรรมชาติ ทะเล เช่น หัวหิน

❍ 3) แหล่งท่องเที่ยวเชิงวัฒนธรรม วิถีชุมชนคนในชนบท เช่น เชียงคาน ,ปาย

❍ 4) แหล่งท่องเที่ยวเชิงประวัติศาสตร์ เช่น อยุธยา

❍ 5) แหล่งท่องเที่ยวในเมือง เช่น เกาะรัตนโกสินทร์

❍ 6) อื่นๆ (โปรดระบุ).....

2.2) ท่านใช้จักรยานในสถานที่ท่องเที่ยวแห่งนี้หรือไม่

❍ 1) ใช้ (ทำข้อ 2.3 ต่อ) ❍ 2) ไม่ใช้

2.3) ท่านใช้จักรยานในการท่องเที่ยวมากน้อยเพียงใด

❍ 1) ไม่เคยเลย ❍ 2) นานๆครั้ง ❍ 3) เป็นบางครั้ง

❍ 4) บ่อยครั้ง ❍ 5) ทุกครั้ง

2.4) ท่านจะใช้จักรยานประเภทใดในการท่องเที่ยว

❍ 1) จักรยานที่ใช้งานทั่วไป เช่น จักรยานแม่บ้าน

❍ 2) จักรยานที่ใช้ในการแข่งกีฬา เช่น จักรยานเสือหมอบ

❍ 3) จักรยานที่ใช้ออกกำลังกาย เช่น จักรยานไฮบริด

<u>ตอนที่ 3</u> ข้อมูลพฤติกรรมการใช้จักรยานในชีวิตประจำวัน

คำชี้แจง: ให้ทำเครื่องหมาย✓ ใน ❍ (วงกลม) โดยให้ระบุคำตอบที่เกี่ยวข้องกับการใช้จักรยานในชีวิตประจำวัน

3.1) ปัจจุบันท่านใช้จักรยานในชีวิตประจำวันหรือไม่

❍ 1) ใช้ ❍ 2) ไม่ใช้

3.2) ท่านใช้ยานพาหนะเหล่านี้เดินทางในชีวิตประจำวันมากน้อยเพียงใด

ที่	การเดินทางในชีวิตประจำวัน	ความถี่				
		ทุกครั้ง 100%	บ่อยครั้ง 80%	บางครั้ง 50%	นานครั้ง 25%	ไม่เคย 0%
	รถจักรยาน	5	4	3	2	1

<u>ตอนที่ 4</u> โครงสร้างพื้นฐาน

คำชี้แจง: ให้ท่านทำเครื่องหมาย ✓ ในช่องที่ตรงกับความคิดเห็นของท่านเกี่ยวข้องกับสถานที่ท่องเที่ยวที่เดินทางไป

ที่	ฉันจะใช้จักรยานเดินทางท่องเที่ยวก็ต่อเมื่อ....	ระดับความคิดเห็น				
		เห็นด้วยมากที่สุด 100%	เห็นด้วยมาก 80%	เห็นด้วยปานกลาง 50%	เห็นด้วยน้อย 25%	ไม่เห็นด้วย 0%
4.1	ความกว้างของทางจักรยานมีความเหมาะสมกับการใช้งาน	5	4	3	2	1
4.2	มีทางเฉพาะของจักรยาน	5	4	3	2	1
4.3	มีตู้ล็อกเกอร์ ที่ต้นทาง	5	4	3	2	1
4.4	มีห้องแต่งตัวให้บริการในสถานที่ท่องเที่ยว	5	4	3	2	1
4.5	มีห้องอาบน้ำให้บริการในสถานที่ท่องเที่ยว	5	4	3	2	1

<u>ตอนที่ 5</u> ทัศนคติของนักท่องเที่ยวที่มีต่อการใช้จักรยานเพื่อการท่องเที่ยว (Attitudes)

คำชี้แจง: ให้ทำเครื่องหมาย ✓ ในช่องที่ตรงกับความคิดเห็นของท่าน

ที่	ท่านมีความคิดเห็นอย่างไรเกี่ยวกับการใช้จักรยานเพื่อการท่องเที่ยว	ระดับความคิดเห็น				
		เห็นด้วยมากที่สุด 100%	เห็นด้วยมาก 80%	เห็นด้วยปานกลาง 50%	เห็นด้วยน้อย 25%	ไม่เห็นด้วย 0%
5.1	การใช้จักรยานมีประโยชน์ต่อสุขภาพทำให้สุขภาพแข็งแรง	5	4	3	2	1
5.2	การขี่จักรยานในการท่องเที่ยวจะทำให้ได้รับอากาศบริสุทธิ์และส่งผลให้สมองทำงานได้ดี	5	4	3	2	1
5.3	การใช้จักรยานเป็นเรื่องที่เสี่ยงอันตราย เพราะอาจถูกรถเฉี่ยวชนได้	5	4	3	2	1
5.4	การใช้จักรยานในการท่องเที่ยวบนถนนร่วมกับพาหนะประเภทอื่นๆ ไม่คล่องตัว เพราะต้องระวังอุบัติเหตุ	5	4	3	2	1
5.5	การใช้จักรยานเดินทางท่องเที่ยวเสี่ยงอันตรายกว่ายานพาหนะประเภทอื่นๆ	5	4	3	2	1
5.6	การใช้จักรยานทำให้ฉันดูดี เก๋ เท่ห์	5	4	3	2	1
5.7	การใช้จักรยานทำให้ฉันเป็นคนที่มีจิตสำนึกรักสิ่งแวดล้อม	5	4	3	2	1
5.8	การใช้จักรยานทำให้ฉันรู้สึกผ่อนคลาย	5	4	3	2	1
5.9	ถ้าคนในครอบครัว อาทิ พ่อ แม่ พี่น้อง สามี หรือภรรยา ใช้จักรยาน เดินทางท่องเที่ยว ฉันก็จะใช้ด้วยเช่นกัน	5	4	3	2	1
5.10	ถ้าเพื่อนที่ทำงาน เพื่อนในกลุ่ม หรือคนสนิท ของฉันใช้จักรยาน ฉันก็จะใช้ด้วยเช่นกัน	5	4	3	2	1
5.11	ฉันสามารถใช้จักรยานเดินทางท่องเที่ยวได้ด้วยตนเอง	5	4	3	2	1
5.12	ฉันคิดว่าการใช้จักรยานเป็นเรื่องที่ง่ายมากสำหรับฉัน	5	4	3	2	1

<u>ตอนที่ 6</u> แรงจูงใจของนักท่องเที่ยวที่มีต่อการใช้จักรยานเพื่อการท่องเที่ยว (Motivations)

คำชี้แจง: ให้ทำเครื่องหมาย ✓ในช่องที่ตรงกับความคิดเห็นของท่าน

ที่	ท่านมีความคิดเห็นอย่างไรเกี่ยวกับแรงจูงใจต่อการใช้จักรยานเพื่อการท่องเที่ยว	ระดับความคิดเห็น				
		เห็นด้วยมากที่สุด 100%	เห็นด้วยมาก 80%	เห็นด้วยปานกลาง 50%	เห็นด้วยน้อย 25%	ไม่เห็นด้วย 0%
6.1	เพื่อให้ฉันได้เรียนรู้ว่าฉันสามารถขี่จักรยานได้ในระยะทางไกลๆขึ้น	5	4	3	2	1
6.2	เพื่อแสดงว่าฉันสามารถขี่จักรยานในการท่องเที่ยวได้ด้วยตัวฉันเอง	5	4	3	2	1
6.3	เพื่อลองสิ่งใหม่ๆ ในชีวิต	5	4	3	2	1
6.4	เพื่อพัฒนาทักษะและความสามารถการเรียนรู้ในการปรับตัวเข้ากับสภาพแวดล้อม	5	4	3	2	1
6.5	การขี่จักรยานท่องเที่ยวเป็นเรื่องที่น่าตื่นเต้น และท้าทาย	5	4	3	2	1
6.6	สามารถเป็นตัวของตัวเองได้อย่างอิสระ ไม่ต้องอยู่ภายใต้ความคิดของผู้อื่น	5	4	3	2	1
6.7	ทำให้สามารถสัมผัสธรรมชาติได้อย่างใกล้ชิด	5	4	3	2	1
6.8	เพื่อหนีจากความแออัดของชุมชนเมือง	5	4	3	2	1
6.9	สามารถสำรวจ/สังเกต สิ่งต่างๆ ที่อยู่รอบๆ ได้อย่างละเอียด	5	4	3	2	1
6.10	ได้สำรวจเส้นทางในพื้นที่ท่องเที่ยว	5	4	3	2	1
6.11	รู้สึกค้นพบสิ่งใหม่ๆในการเดินทาง	5	4	3	2	1
6.12	เป็นการออกกำลังกายในระหว่างการเดินทางท่องเที่ยว	5	4	3	2	1
6.13	เพื่อพัฒนาสุขภาพร่างกายของฉันให้แข็งแรงขึ้น	5	4	3	2	1
6.14	ต้องการหยุดพักจากงาน/หน้าที่เพื่อความผ่อนคลาย	5	4	3	2	1
6.15	เป็นการเพิ่มคุณค่าให้กับตัวเองในสังคม เป็นที่ยกย่อง และชื่นชม	5	4	3	2	1
6.16	ได้มีโอกาสพบผู้คนใหม่ๆ	5	4	3	2	1
6.17	ได้มีปฏิสัมพันธ์กับคนในพื้นที่	5	4	3	2	1
6.18	ได้อยู่ร่วมกับคนอื่นๆ ที่มีความชอบในสิ่งที่เหมือนกัน	5	4	3	2	1

<u>ตอนที่ 7</u> ความตั้งใจในการใช้จักรยานเพื่อการท่องเที่ยว

คำชี้แจง: ให้ท่านทำเครื่องหมาย ✓ ในช่องที่ตรงกับความคิดเห็นของท่าน

ที่	ท่านมีความคิดเห็นอย่างไรเกี่ยวกับความตั้งใจในการใช้จักรยานเพื่อการท่องเที่ยว	ระดับความคิดเห็น				
		เห็นด้วยมากที่สุด 100%	เห็นด้วยมาก 80%	เห็นด้วยปานกลาง 50%	เห็นด้วยน้อย 25%	ไม่เห็นด้วย 0%
7.1	ฉันตั้งใจที่จะใช้จักรยานเดินทางท่องเที่ยวบ่อยครั้งที่สุด	5	4	3	2	1
7.2	ฉันต้องการที่จะใช้จักรยานในสถานที่ท่องเที่ยว ในครั้งต่อไป	5	4	3	2	1

Appendix 2.3 : The references of questionaire and the measurement of content validity by experts

Direction: Items and Evaluation methods are as follows;

1. The relevance of question items to the variables to be measured
   (Put ✓ in the box on the right hand side)
2. The completeness of question complements to the definitions of variables.
   (Please give your opinions below the table of each topic)
3. The appropriateness of language use, language exquisiteness, language comprehensiveness, and communicative correctness.
   (Able to correct and give suggestions in question items)

Latent variables	**Question**	**References**	**Are the question items be able to measure Latent variables, or not?**		
			Yes	**Uncertain**	**No**
Positive Anticipated Emotion	Using bicycles makes me feel cool , chic, and smart.	(Panswad et al., 2013)			
	Using bicycles makes me recognize environmental love.				
	Using bicycles makes me feel relaxed.	(Pattarachaiyakup, 1999)			
Attitude	Using bicycles is useful for health. It strengthens health.	(Panswad et al., 2013; Pattarachaiyakup, 1999)			
	Riding bicycles for tourism provides pure air making brain active.	(Pattarachaiyakup, 1999)			
Subjective norms	If family members such as father, mother, brothers, sisters, husband or wife use bicycles for tourism, I will use it too.	(Piriyawat and Narupiti, 2008)			
	If my colleagues, friends in the same group or closed friends use bicycles for tourism, I will use it too.	(Piriyawat and Narupiti, 2008)			
Perceived behavioral control	I am able to use bicycles for traveling by myself.				
	I think that using bicycles is very easy for me.	(Piriyawat and Narupiti, 2008)			
self-development	Learning to ride bicycles for a longer distance.	(Ritchie, 1998)			
	Showing the abilities to ride a bicycle for tourism by myself.	(Ritchie, 1998)			

Latent variables	Question	References	Are the question items be able to measure Latent variables, or not?		
			Yes	Uncertain	No
	Trying new things in life.	(Ritchie, 1998)			
Contemplation	Riding bicycles is exciting and challenging.	(Ritchie, 1998)			
Contemplation	Being one's own with freedom without any others' controlling ideas.	(Ritchie, 1998)			
	Being able to touch nature closely.	(Ritchie, 1998)			
	Fleeing from the crowded in urban communities.	(Ritchie, 1998)			
Exploration	Exploring various things in surroundings.	(Ritchie, 1998)			
	Surveying routes in tourist attraction zones.	(Ritchie, 1998)			
	Discovering new things in traveling.	(Ritchie, 1998)			
Physical challenge	Exercising during tour trips.	(Ritchie, 1998)			
	Developing body health to be stronger.	(Ritchie, 1998)			
Stimulus seeking	Taking a leave from work/ duty for relaxation.	(Ritchie, 1998)			
	Adding value to one's own for the praise and admiration in society.	(Ritchie, 1998)			
Social interaction	Having opportunities to meet new people.	(Ritchie, 1998)			
	Having interaction with local people.	(Ritchie, 1998)			
	Staying with people who having the same likes.	(Ritchie, 1998)			
Bike lane	The width of bike lanes is suitable for utility.	(Chaiyasat, 2007; Prisajanan, 2011)			
	There are specific bike lanes.				
Facility	There are lockers at the beginning of routes.				
	There are dressing rooms for service in tourist attractions.				
	There are bathrooms for service in tourist attractions.				

Latent variables	Question	References	Are the question items be able to measure Latent variables, or not?		
			Yes	Uncertain	No
Perceived susceptibility	Using bicycles is risky to danger because it may be crashed by cars.	(Pattarachaiyakup, 1999)			
	Using bicycles for tourism on the roads with other vehicles is not practical due to accidental awareness.	(Pattarachaiyakup, 1999)			
Perceived susceptibility	Using bicycles for tourism is riskier than any other vehicles.	(Pattarachaiyakup, 1999)			
Behavioral Intention	I intend to use bicycles for tourism most frequently.	(Sigurdardottir et al., 2013)			
	I want to use bicycles in tourist attractions next time.	(Passafaro et al., 2014)			

CHAPTER III

MEASURING THE MOTIVATION TO RIDE BICYCLES FOR TOURISM THROUGH A COMPARISON OF TOURIST ATTRACTIONS

3.1 Abstract

In Thailand, supporting bicycle riding is regarded as an essential strategy. Many organizations are developing campaigns and activities to promote bicycle riding. However, most Thai people do not enjoy riding bicycles. Thus, this study aims to understand the motivational components and compare the different motivations for bicycle riding in various areas using confirmatory factor analysis (CFA). Six factors were considered: self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction. The samples used in this study were 798 Thai tourists; of those 510 visited tourist attractions in the mountains and 288 visited tourist attractions by the sea. The results of the second-order CFA indicate that six factors indicated motivation to ride bicycles at these tourist attractions at a statistical significance of 0.01. Moreover, the invariance analysis of the model parameters for the two areas through chi-square difference testing shows that factor loadings, intercepts, and the structural path have different values for tourist attractions in the mountains and those by the sea at a statistical significance of 0.01. Thus, models for tourist attractions in the mountain and those by the sea should be developed separately

to determine suitable policies for these areas. Eventually, the measurement model for motivation indicated that the contemplation component was the most important in both tourism areas. Consequently, government sectors and other organizations should focus on the development and adjustment of a strategy to precisely and suitably promote bicycle riding at each tourist attraction.

3.2 Introduction

Riding a bicycle is a useful, health-related activity that saves energy and does not pollute the environment. Thailand recognizes the importance of bicycle riding, and the country has developed strategies to promote this activity (Thailand Transport Portal, 2015). Previously, many organizations promoted bicycle riding both locally and nationally for health and tourism reasons; however, the Thai people do not frequently ride bicycles. Thus, studying tourists' motivation to ride bicycles is beneficial for developing and adjusting suitable strategies to promote the activity.

An accurate understanding of tourists' motivations can be applied to efficiently identify and respond to tourists' needs (Awaritefe, 2003; Keng & Cheng, 1999; Poria, Butler, & Airey, 2004). Most previous research on the subject has studied the motivations for nature-based tourism (Beh & Bruyere, 2007; Mehmetoglu, 2007; Raadik, Cottrell, Fredman, Ritter, & Newman, 2010; Tangeland & Aas, 2011; Tangeland, Vennesland, & Nybakk, 2013). Ritchie (1998) studied motivations for bicycle tourism on the south island of New Zealand; Skår et al. (2008) examined motivations for mountain biking in Norway. If the motivations of various tourist groups are studied in this way, more effective strategies can be developed to serve each group (Beh & Bruyere, 2007). The present research applies a motivation

measurement model to the study of bicycle tourists visiting natural attractions in Thailand, and it further divides the sample into two categories depending on whether the tourists choose attractions in the mountains or near the sea (Department of National Parks, 2013). If the primary motivations for bicycle tourism in each setting can be identified, a more appropriate policy can be determined for each geographic area.

3.3 Literature Review

Motivation is the force that drives individuals to serve their need to achieve a goal (Iso-Ahola, 1982). In tourism, motivation is accepted as a crucial variable that explains tourism behavior, and it is employed to assist in reasoning with respect to decision making (Bansal and Eiselt, 2004), which enhances the identification of tourists' needs and their promotion to meet the needs of target groups.

Table 3.1 summarizes the related literature. As noted above, most similar research investigated motivations for nature-based tourism. These studies measured motivation in terms of some or all of the following factors: self-development (Beh and Bruyere, 2007; Raadik, Cottrell, Fredman, Ritter, and Newman, 2010), contemplation (Beh and Bruyere, 2007; Mehmetoglu, 2007; Raadik et al., 2010; Tangeland, Vennesland, and Nybakk, 2013), exploration (Raadik et al., 2010; Tangeland et al., 2013), physical challenge (Mehmetoglu, 2007; Raadik et al., 2010; Tangeland et al., 2013), stimulus seeking (Beh and Bruyere, 2007; Mehmetoglu, 2007), and social interaction(Tangeland and Aas, 2011; Tangeland et al., 2013). Ritchie's (1998) study on New Zealand is the only previous study to have examined motivations for bicycle use through principal component analysis. Ritchie found that the motivating factors

included competence, mastery, solitude, exploration, physical challenge, stimulus seeking/avoidance, social encounters, and social escapism. Furthermore, Skår et al.(2008) organized motivations for mountain biking using factor analysis; in their study, the crucial factors identified were physical exercise, contemplation, nature and place, speed and excitement, managing challenges, social relations and equipment, and appreciation. Although the particular names used for the factors have varied between studies, it appears that the six factors used in the nature-based studies (i.e., self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction) can be used to cover all the categories delineated by Ritchie and by Skår et al. as well.

The present study used these six factors as latent variables as previous studies which considered these factors examined them by using exploratory factor analyses without any clear supporting theories. Thus, this study aims to confirm that the six factors can be motivations for Thai travelers to engage in bicycle tourism. Confirmatory factor analysis (CFA) was the statistical technique used to confirm the model.

Thus, this study uses these factors to determine Thai citizens' motivation for bicycle riding in tourism. Furthermore, a comparison of tourist attractions in the mountains and tourist attractions by the sea was conducted using the following hypotheses.

Hypothesis 1: All six factors contribute to the motivation for bicycle tourism

Hypothesis 2: Based on the factor loadings, intercepts, and structural path, the motivation to ride bicycles at tourist attractions in the mountains and the motivation to ride bicycles at tourist attractions by the sea were equal.

Table 3.1 Summary of Related Research

Author (year)	Type/ Country	Analysis method	Motivation					
			self-develop-ment	contemplation	exploration	physical challenge	stimulus seeking	social interaction
Ritchie (1998)	Bicycle/ New Zealand	Principal component analysis (PCA)	✓	✓	✓	✓	✓	✓
Beh & Bruyere (2007)	North-central Kenya	Principal components analysis (PCA)	✓	✓	-	-	✓	-
Mehmeto-glu (2007)	Northern Norway	Principal components analysis (PCA)	-	✓	-	✓	✓	-
Skår et al (2008)	mountain biking/ Norway	factor analysis	-	✓	✓	✓	✓	✓
Raadik et al (2010)	Sweden	Exploratory factor analyses (EFA)	✓	-	✓	✓	-	-
Tangeland & Aas (2011)	Norway	factor analysis.	-	-	-	✓	-	✓
Tangelandet al (2013)	Norway	Reliability	✓	✓	✓	✓	-	✓

Note:✓means the variables which were used to study, - means the variables which were not used to study

3.4 Methodology

Figure 3.1 indicates the model development procedure for determining the motivation for Thais to ride bicycles for tourism purposes at attractions in the mountains and those by the sea. The research methodology included the following six steps: (1) determination of problems, objectives of the research, review of related literature, determination of research hypothesis and involved variables; (2) population and samples; (3) design and questionnaire development; (4) data collection and model development; (5) model inspection; and (6) conclusion and discussion of results.

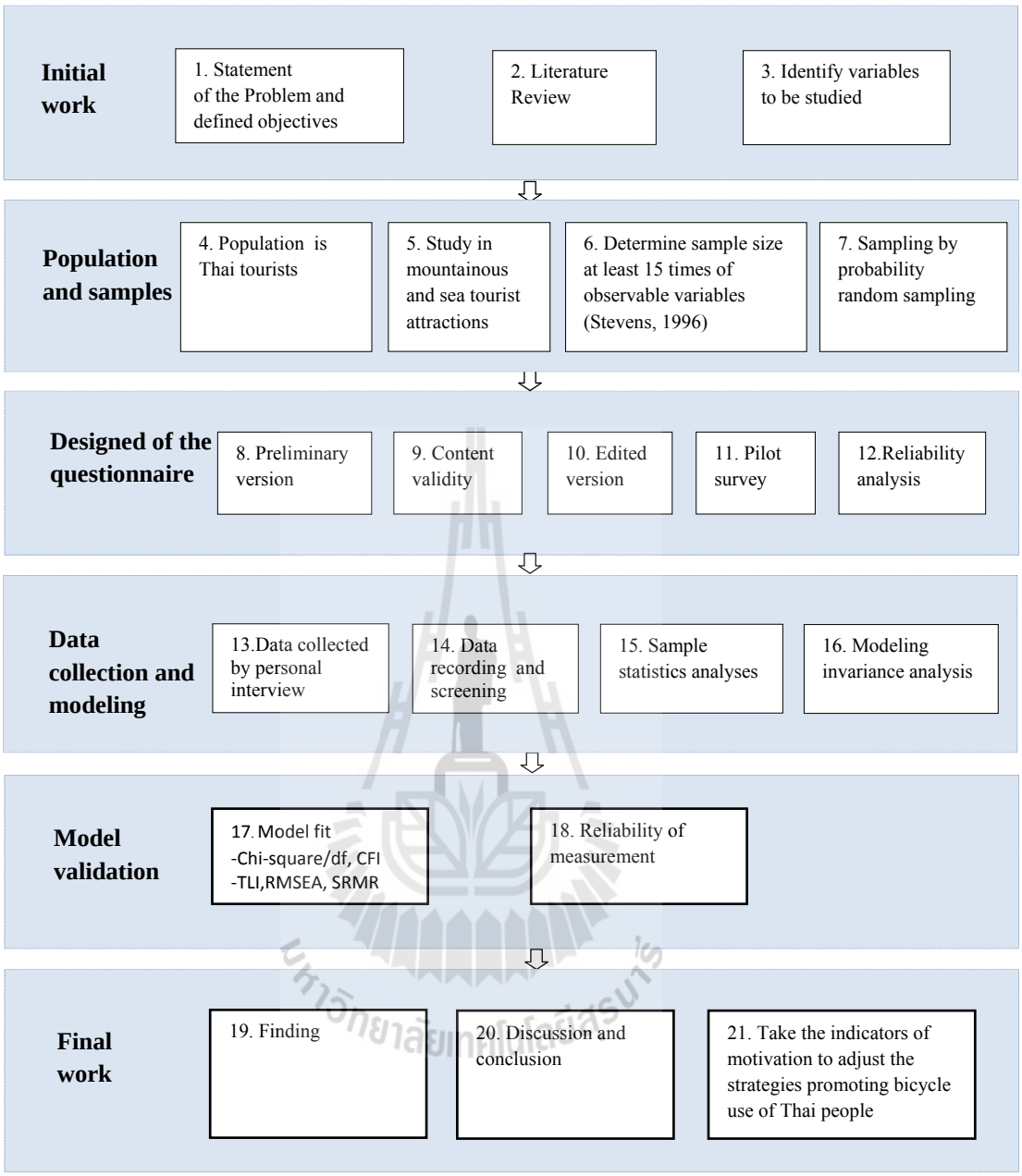

Figure 3.1 Research procedures

3.4.1 Participants and Data Collection

The samples in this study comprised Thai tourists who engaged in nature-based tourism throughout Thailand. This study aimed to establish the motivations of both current bicycle users and nonusers who could potentially become bicycle users. Hence, convenience sampling was employed to identify the participants, all of whom were Thai residents who traveled to natural (either mountain or sea) tourist attractions. The mountainous tourist attractions included Khao Yai National Park, Kaeng Krachan National Park, Doi Suthep–Pui National Park, and Khao Luang Naional Park. The sea tourist attractions were Koh Chang, and Khao Sam Roi Yod National Park. As part of the study, the participants were interviewed at these locations.

The research tool used for data collection was a questionnaire with questions adjusted in accordance with the literature review and the research objectives. The questionnaire comprised two sections. The first section contained questions related to respondents' general information and their travel behaviors. The second section contained questions related to attitudes and the motivation for traveling. The questions used a 5-point rating scale (5 = strongly agree; 1 = disagree). The researcher tested the questionnaire's reliability using Cronbach's alpha, which should have values higher than 0.70 (Tavakol and Dennick, 2011). The Cronbach's alpha values for the questions on the questionnaire were between 0.650 and 0.960.

The two methods used for factor analysis were (1) the determination of exact sample size and (2) subject-to-variable ratio. With regard to exact sample size, Comrey and Lee (1992) suggested that a sample size of 50 can be considered very

poor, 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1,000 as excellent. With regard to subject-to-variable ratio, researchers have suggested that the sample size should be not less than five times the number of variables to ensure reliability of factor analysis (Bryant and Yarnold, 1995) and that for maximum-likelihood (ML) estimation the number should be at least 15 times the number of observable variables (Stevens, 1996). Among the various sampling methods, the ML method was chosen to calculate sample size due to the normal distribution of data, skewness value less than 3, and kurtosis value less than 10 (R.B Kline, 2011). These are suitable parameters for applying CFA analysis.

The sample included 510 mountain tourists and 288 sea tourists. The larger amount of mountain tourist samples is appropriate for Thailand, which has 123 mountainous tourist attractions and 24 sea tourist attractions (Department of National Parks, 2013). Furthermore, mountainous national parks are the most popular tourist attractions among the Thai people (Department of National Parks, 2013). These sample sizes were sufficient for ML parameter estimation and multi-group CFA. The unequal number of samples was found not to affect the use of chi-square difference testing or to cause an error value of type 1 ($\alpha = 0.05$) more than normal (Koh and Zumbo, 2008). Thus, parameter invariance can be measured by chi-square difference testing.

3.4.2 Variables

In this study, indicators of the motivation to ride bicycles for tourism were reflected in 18 variables grouped into six factors: self-development, contemplation, exploration, physical challenge, stimulus seeking, and social

interaction. These factors were latent variables representing the details of the questions, as indicated in Table 3.2.

3.4.3 Analysis

3.4.3.1 Confirmatory Factor Analysis

CFA was employed to test or confirm whether the relation of the variables was as expected using construct validity analysis. CFA required an awareness of the variable relational structures or their forms, which were analyzed using structural equation modeling. CFA is known as a measurement model that explains the relation between latent variables and many observed variables, as in Figure 3.2, where ξ is an exogenous variable, X is an observed variable vector, λ represents factor loading, and δ represents error variance and covariance.

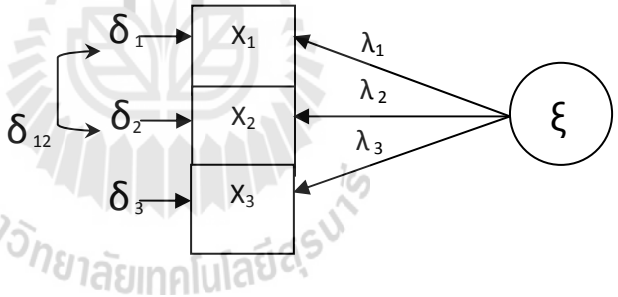

Figure 3.2 Measurement model parameters (adapted from(Brown, 2006)

3.4.3.2 Multi-group CFA

The multi-group analysis used was invariance analysis between groups, i.e., between the mountain and sea areas. This popular method of testing model validity (Brown, 2006; Koh & Zumbo, 2008) aims to examine whether the parameter values of both population groups A and B are the same. The multi-group analysis includes two types of tests: invariance testing of factors and forms and

invariance testing of parameters in the model. The assessment of invariance in the measurement model test was used to determine the differences in the chi-square or the likelihood-ratio test (LRT) by considering the statistical significance of the differences in the degrees of freedom. If the obtained results are not statistically significant, concordance exists between groups of samples (A.Bollen, 1989; Cheung & Rensvold R. B., 2002).

3.4.3.3 Model Validation

A study of the construct validity of the model using factor analysis showed that the statistical value used to test validity was relevant to the empirical data, This study employed five indicators: the ratio of chi-square to the degree of freedom (χ^2/df), the standardized root mean residual (SRMR), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker Lewis Index (TLI). In terms of scale reliability, the considered composite reliability (CR) value should not be lower than 0.70, and the average variance extracted (AVE) should not be lower than 0.50 (Hair, 2006).

3.5 Results

3.5.1 Descriptive Statistics

From the 798 fully completed questionnaires, it was found that 30.1 percent of respondents were bicycle users and 69.9 percent were bicycle nonusers. Among the respondents, 40.5 percent were males. Most were between 18 and 29 years old (70.8%), followed by the 30–44 age group (21.1%), those over age 45 (5.1%), and those under 18 (3.0%). In terms of education level, 39.5 percent of the respondents

had less than a bachelor's degree, 50.8 percent had a bachelor's degree, and 9.8 percent had done additional study beyond a bachelor's degree. Finally, 63.9 percent were mountain tourists and 36.1 percent were sea tourists.

Table 3.2 presents the results of basic statistical analysis of observed variables including 18 question items, showing the mean, standard deviation, skewness, and kurtosis. For respondents visiting mountainous tourist attractions, the item "Developing body health to be stronger" in the factor of physical challenge had the highest mean (M = 4.04, SD = 0.969). The highest means among the items for each of the other factors were as follows: within the factor of contemplation, "Being able to touch nature closely" (M = 3.97, SD = 0.968); for the factor of exploration, "Exploring various things in surroundings" (M = 3.96, SD = 0.970); for the factor of self-development, "Trying new things in life" (M = 3.88, SD = 0.899); for the factor of stimulus seeking, "Taking a leave off work/duty for relaxation" (M = 3.86, SD = 0.976). Finally, for the factor of social interaction, "Having opportunities to meet new people" (M = 3.81, SD = 0.952) and "Having interaction with local people" (M = 3.81, SD = 0.963) had the highest means.

Regarding sea tourist attractions, the highest mean scores for each factor were as follows: for physical challenge, "Exercising during trips " (M = 4.17, SD = 0.877); for contemplation, "Being able to touch nature closely" (M = 4.05, SD = 0.922); for exploration, "Discovering new things in traveling" (M = 4.01, SD = 0.911); for stimulus seeking, "Taking a leave off work/duty for relaxation" (M = 3.90, SD = 0.936); for self-development, "Trying new things in life" (M = 3.89, SD =

0.930); for social interaction, “Staying with others who have the same likes” (M = 3.88, SD = 0.994).

The skewness values for mountainous and sea attractions were between −0.437 and −0.797 and between −0.460 and −0.901, respectively. Kurtosis values were between −0.002 and 0.274 and between −0.377 and 0.412, respectively. The skewness and kurtosis values were found to be within the accepted criteria; that is, skewness values were less than 3 and kurtosis values were less than 10. This indicates a normal data distribution. The reliability of the questionnaire was tested with Cronbach’s alpha coefficient. Normally, the accepted criterion is at least 0.70 (Nunnally, 1978). It was found that most latent variable values were between 0.885 and 0.960, which met the criterion; the exception was stimulus seeking, for which Cronbach’s alpha had a value of 0.650. Even though this value is relatively small, it can still be accepted as shown by Lee (2014) and Juul, et al. (2012).

As shown in Table 3.3, when considering Pearson’s correlation coefficient values for the 18 observed variables in the model, the relation between 153 total pairs indicated that the values of every pair were different from zero at a statistical significance of 0.01. Moreover, the coefficient value had a positive relation with the coefficient values from 0.325 to 0.752 for tourist attractions in the mountains and from 0.207 to 0.803 for tourist attractions by the sea. We also consider the results of Bartlett’s Test of Sphericity, which is the statistical value testing hypothesis of the identity matrix for tourist attractions in the mountains. The chi-square value was found to equal 6642.433 ($df = 153$, $p < 0.0001$), which was different from zero at a statistical significance of 0.01 and was relevant to the results of the Kaiser-Meyer-

Olkin (KMO) index analysis of 0.941, which was close to 1. In terms of tourist attractions by the sea, the chi-square value of 4074.338 (df = 153, $p < 0.0001$) was different from zero at a statistical significance of 0.01 and was relevant to the results of the KMO index analysis, which was close to 1 (KMO = 0.932). Therefore, the coefficient matrix of observed variables was not an identity matrix, and it had adequate sufficient relations between CFA variables to confirm that they are factor loadings.

Table 3.2 Mean, and Standard deviation of Variables

	Variables Used in Research	Mountains (n=510)				Sea (n=288)				Total (n=798)			
		$\bar{X}$	SD	SK	KU	$\bar{X}$	SD	SK	KU	$\bar{X}$	SD	SK	KU
	Self-development (conbach α = 0.950)												
SD1	Learning to ride bicycles for a longer distance	3.78	0.949	-0.596	0.274	3.67	0.984	-0.516	0.160	3.74	0.962	-0.568	0.220
SD2	Showing the abilities to ride a bicycle for tourism by myself	3.75	0.926	-0.449	-0.002	3.65	0.973	-0.542	0.224	3.72	0.944	-0.491	0.106
SD3	Trying new things in life	3.88	0.899	-0.484	-0.200	3.89	0.930	-0.535	-0.074	3.88	0.910	-0.503	-0.155
SD4	Developing skills and learning abilities in adjusting to surroundings	3.78	0.942	-0.499	0.022	3.78	0.946	-0.528	0.084	3.78	0.943	-0.509	0.037
	Contemplation (cronbach α = 0.885)												
CT1	Riding bicycles is exciting and challenging	3.93	0.923	-0.673	0.040	3.92	0.945	-0.695	0.207	3.93	0.930	-0.680	0.097
CT2	Being on one's own	3.82	0.921	-0.499	-0.049	3.84	0.949	-0.586	0.240	3.83	0.931	-0.530	0.054
CT3	Being able to touch nature closely	3.97	0.968	-0.673	-0.174	4.05	0.922	-0.694	-0.037	4.00	0.952	-0.683	-0.124
CT4	Fleeing from the crowded in urban communities	3.86	0.950	-0.430	-0.461	3.89	0.948	-0.476	-0.377	3.87	0.949	-0.446	-0.437
	Exploration (cronbach α = 0.909)												
EP1	Exploring various things in surroundings	3.96	0.970	-0.647	-0.227	3.93	0.871	-0.477	-0.154	3.95	0.935	-0.595	-0.193
EP2	Surveying routes in tourist attraction zones	3.93	0.969	-0.575	-0.372	3.99	0.905	-0.548	-0.282	3.95	0.946	-0.571	-0.330
EP3	Discovering new things in traveling	3.93	0.971	-0.505	-0.559	4.01	0.911	-0.655	0.020	3.96	0.950	-0.558	-0.381

$\bar{X}$=Mean, SD=Standard deviation, SK= skewness, KU= kurtosis

Table 3.2 Mean, and Standard deviation of Variables (Cont.)

	Variables Used in Research	Mountains (n=510)				Sea (n=288)				Total (n=798)			
		$\bar{X}$	SD	SK	KU	$\bar{X}$	SD	SK	KU	$\bar{X}$	SD	SK	KU
	Physical challenge (cronbach α = 0.923)												
PC1	Exercising during trips	4.02	0.961	-0.685	-0.226	4.17	0.877	-0.901	0.412	4.07	0.934	-0.764	-0.033
PC2	Developing body health to be stronger.	4.04	0.969	-0.797	0.052	4.15	0.894	-0.718	-0.194	4.08	0.944	-0.783	0.020
	Stimulus seeking(cronbach α = 0.650)												
SS1	Taking a leave off work/ duty for relaxation	3.86	0.976	-0.596	-0.116	3.90	0.936	-0.602	-0.112	3.88	0.961	-0.599	-0.113
SS2	Adding value to one's own for the praise and admiration in society	3.65	1.050	-0.469	-0.334	3.66	1.070	-0.586	-0.121	3.65	1.050	-0.511	-0.261
	Social interaction (cronbach α = 0.960)												
SI1	Having opportunities to meet new people	3.81	0.952	-0.514	-0.198	3.76	1.015	-0.639	0.047	3.79	0.975	-0.568	-0.081
SI2	Interacting with local people	3.81	0.963	-0.505	-0.208	3.81	0.991	-0.460	-0.359	3.81	0.972	-0.487	-0.270
SI3	Staying with people who having the same likes	3.78	0.974	-0.437	-0.449	3.88	0.994	-0.712	0.227	3.82	0.982	-0.534	-0.225

$\bar{X}$=Mean, SD=Standard deviation, SK= skewness, KU= kurtosis

Table 3.3 Pearson correlation coefficients for the observed variables

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SEA: Kaiser-Meyer-Olkin Measure of Sampling Adequacy =0.932																		
Bartlett's Test of Sphericity = 34074.388,df = 153,p=0.00																		
1. SD1	1	0.755**	0.577**	0.545**	0.558**	0.496**	0.307**	0.309**	0.332**	0.278**	0.341**	0.207**	0.716**	0.355**	0.407**	0.435**	0.415**	0.435**
2. SD2	0.713**	1	0.691**	0.651**	0.630**	0.617**	0.405**	0.450**	0.383**	0.391**	0.380**	0.242**	0.279**	0.417**	0.494**	0.504**	0.491**	0.520**
3. SD3	0.477**	0.596**	1	0.761**	0.664**	0.564**	0.551**	0.516**	0.485**	0.495**	0.519**	0.433**	0.406**	0.488**	0.494**	0.544**	0.518**	0.554**
4. SD4	0.554**	0.657**	0.647**	1	0.640**	0.555**	0.492**	0.491**	0.465**	0.401**	0.451**	0.393**	0.344**	0.484**	0.496**	0.575**	0.593**	0.546**
5. CT1	0.469**	0.511**	0.528**	0.543**	1	0.678**	0.524**	0.512**	0.519**	0.484**	0.547**	0.432**	0.393**	0.445**	0.471**	0.529**	0.565**	0.587**
6. CT2	0.500**	0.561**	0.485**	0.534**	0.690**	1	0.610**	0.632**	0.564**	0.546**	0.517**	0.447**	0.415**	0.543**	0.534**	0.561**	0.575**	0.581**
7. CT3	0.325**	0.404**	0.527**	0.487**	0.550**	0.594**	1	0.732**	0.689**	0.652**	0.638**	0.627**	0.574**	0.490**	0.353**	0.478**	0.510**	0.509**
8. CT4	0.340**	0.416**	0.483**	0.452**	0.502**	0.603**	0.707**	1	0.646**	0.612**	0.518**	0.538**	0.497**	0.515**	0.384**	0.473**	0.539**	0.537**
9. EP1	0.360**	0.446**	0.488**	0.507**	0.451**	0.509**	0.668**	0.685**	1	0.742**	0.567**	0.539**	0.514**	0.505**	0.365**	0.459**	0.551**	0.502**
10 EP2	0.383**	0.434**	0.480**	0.489**	0.478**	0.523**	0.570**	0.628**	0.745**	1	0.715**	0.639**	0.588**	0.550**	0.353**	0.456**	0.546**	0.491**
11 EP3	0.357**	0.383**	0.538**	0.480**	0.521**	0.511**	0.615**	0.616**	0.621**	0.724**	1	0.701**	0.619**	0.561**	0.428**	0.518**	0.581**	0.578**
12 PC1	0.316**	0.406**	0.526**	0.495**	0.498**	0.483*8	0.615**	0.588**	0.616**	0.618**	0.703**	1	0.803**	0.577**	0.318**	0.425**	0.498**	0.492**
13 PC2	0.311**	0.410**	0.549**	0.473**	0.526**	0.480**	0.603**	0.569**	0.576**	0.528**	0.669**	0.771**	1	0.589**	0.305**	0.451**	0.497**	0.461**
14 SS1	0.404**	0.427**	0.465**	0.512**	0.484**	0.523**	0.518**	0.562**	0.527**	0.544**	0.581**	0.618**	0.627**	1	0.531**	0.548**	0.563**	0.519**
15 SS2	0.392**	0.484**	0.395**	0.485**	0.418**	0.450**	0.386**	0.397**	0.403**	0.399**	0.419**	0.382**	0.391**	0.531**	1	0.655**	0.568**	0.576**
16 SI1	0.350**	0.457**	0.493**	0.516**	0.445**	0.449**	0.457**	0.466**	0.483**	0.539**	0.491**	0.497**	0.441**	0.512**	0.586**	1	0.773**	0.744**
17 SI2	0.401**	0.475**	0.462**	0.536**	0.433**	0.472**	0.420**	0.446**	0.463**	0.487**	0.471**	0.526**	0.447**	0.521**	0.540**	0.752**	1	0.719**
18 SI3	0.330**	0.405**	0.462**	0.505**	0.473**	0.484**	0.531**	0.514**	0.502**	0.506**	0.566**	0.564**	0.549**	0.505**	0.497**	0.652**	0.720**	1
Mountain: Kaiser-Meyer-Olkin Measure of Sampling Adequacy =0.941																		
Bartlett's Test of Sphericity = 6642.433,df = 153, p=0.00																		

*Correlation is significant at the 0.05 level. **Correlation is significant at the 0.01 level.

3.5.2 Multi-group CFA

An analysis of the parameter invariance in the measurement model for tourist attractions in the mountains and tourist attractions by the sea, as shown in Table 3.4. The results of the concordance test of tourist attractions in the mountains showed that the proportion between the chi-square and the degree of freedom (χ^2/df) equaled 2.19 (χ^2 = 215.259, df = 98). In terms of tourist attractions by the sea, the proportion between the chi-square and the degree of freedom (χ^2/df) equaled 2.44 (χ^2 = 259.611, df = 106). Then, the invariance in the measurement model was assessed using a hypothesis stating that the values of factor loadings, intercepts, and the structural path were not different when using the simultaneous model and the strict model. The different chi-square values equaled 123.809, and the difference between the degrees of freedom equaled 24 ($p < 0.0001$), indicating that the hypothesis cannot be accepted. Therefore, the measurement model of motivation for riding bicycles for tourism purposes indicated different values of factor loadings, intercepts, and the structural path between tourist attractions in the mountains and those by the sea. Thus, motivation models for bicycle use in tourism must be developed separately for mountain attractions and sea attractions.

Table 3.4 Results of Model fit indices for invariance test between groups.

Description	χ^2	*df*	χ^2/df	CFI	TLI	SRMR	RMSEA (90% CI)	*Delta-* χ^2	*Delta-df*	*p*
Individual groups:										
Model 1: Mountain	215.259	98	2.19	0.982	0.972	0.033	0.048 (0.040- 0.057)			
Model 2: Sea	259.611	106	2.44	0.962	0.945	0.054	0.071 (0.060-0.082)			
Measurement of invariance:										
Simultaneous model	700.384	200	3.50	0.953	0.928	0.046	0.079 (0.073-0.086)			
Factor Loading, Intercepts, Structural Paths held equal across group	576.575	224	2.57	0.967	0.955	0.049	0.063 (0.057-0.069)	123.809	24	<0.0001

Note: χ^2 = chi-squared statistic; df = degree of freedom; p = level of significance; CFI = comparative fit index; TLI = Tucker–Lewis index; SRMR = standardized root mean square residual

3.5.3 Confirmatory Factor Analysis of Motivation to Ride Bicycles for Tourism at Tourist Attractions in the Mountains

According to the CFA results for the measurement model of motivation to ride bicycles for tourism, which were obtained using Mplus version 7.11, the model had the following goodness-of-fit statistical values for tourist attractions in the mountains: chi-square (χ^2) = 215.259; degree of freedom (df) = 98; p-value < 0.001; proportion between chi-square and degree of freedom (χ^2/df) = 2.19; RMSEA = 0.048; CFI = 0.982; TLI = 0.972; and SRMR = 0.033 (Figure 3.3). When the statistical values were compared with the recommended criteria, every statistical value in the measurement model complied with the mentioned recommended criteria(Hooper, Coughlan, and Mullen, 2008; Hu and Bentler, 1999; Kline, 2005; Steiger, 2007; Wu, West, and Taylor, 2009) except for the chi-square test because that test was sensitive to a large sample size (n > 200). In this study, the large sample size (n = 510) resulted in the rejection of the hypothesis (Rex B. Kline, 2011; MacCallum, Browne, and Sugawara, 1996). The conclusion was reached that the model fit the construct validity based on the above-mentioned reasons, which many existing studies used (e.g., Delbosc and Currie (2012); Chung, Song, and Park (2012); Van Acker and Witlox (2010)).

As shown in Table 3.5, the relation between the variables in the measurement model of motivation to ride bicycles for tourism as related to tourist attractions in the mountains can be explained as follows. For a first-order model, the relation between the six exogenous latent variables (self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction) and the 18

observed variables indicated that every variable has a statistically significant ($p < 0.001$) positive factor loading coefficient. Therefore, every variable can be an indicator of the motivation to ride bicycles for tourism. Details for each factor are given as follows:

(1) Self-development: The indicator with the highest factor loading coefficient value was SD4, "Developing skills and learning abilities in adjusting to surroundings" ($\beta = 0.833$), followed by SD3, "Trying new things in life" ($\beta = 0.795$).

(2) Contemplation: The indicators had factor loading coefficient values between 0.721 and 0.806; the top three were CT4, "Fleeing from the crowded in urban communities" ($\beta = 0.806$), CT3, "Being able to touch nature closely," ($\beta = 0.797$), and CT2, "Being on one's own" ($\beta = 0.753$)

(3) Exploration: Factor loading coefficient values were between 0.836 and 0.857. EP3, "Discovering new things in traveling," had the highest value ($\beta = 0.857$), followed by EP2, "Surveying routes in tourist attraction zones" ($\beta = 0.842$), and EP1, "Exploring various things in surroundings."

(4) Physical challenge was measured by two indicators; the higher coefficient was associated with PC1, "Exercising during trips" ($\beta = 0.898$), followed by PC2, "Developing body health to be stronger" ($\beta = 0.849$).

(5) Stimulus seeking had SS1, “Taking a leave off work/duty for relaxation” (β =0.832), as the higher of the two factor loading coefficient values.

(6) Social interaction had factor loading coefficient values between 0.837 and 0.869. The highest value was SI3, “Staying with people who have the same likes” (β = 0.869), followed by SI1, “Having opportunities to meet new people” (β = 0.842).

All 18 indicators had factor loading coefficient values between 0.640 and 0.898, or more than the minimum value of 0.50 required for statistical significance. All six factors had factor loading coefficient values between 0.788 and 0.935. As these six values all exceeded 0.70, the data indicated that all six factors represented components of motivation (Hair, 2006).

Regarding the second-order CFA, all six latent variables were found to be statistically significant at 0.01. This result indicates that these six latent variables are indicators of the motivation to ride bicycles for tourism at tourist attractions in the mountains at a 99% confidence level. The latent variable with the highest factor loading coefficient was contemplation (β = 0.935), followed by exploration (β = 0.900), stimulus seeking (β = 0.889), physical challenge (β = 0.876), and self-development (β = 0.821). The lowest coefficient was obtained for social interaction (β = 0.788).

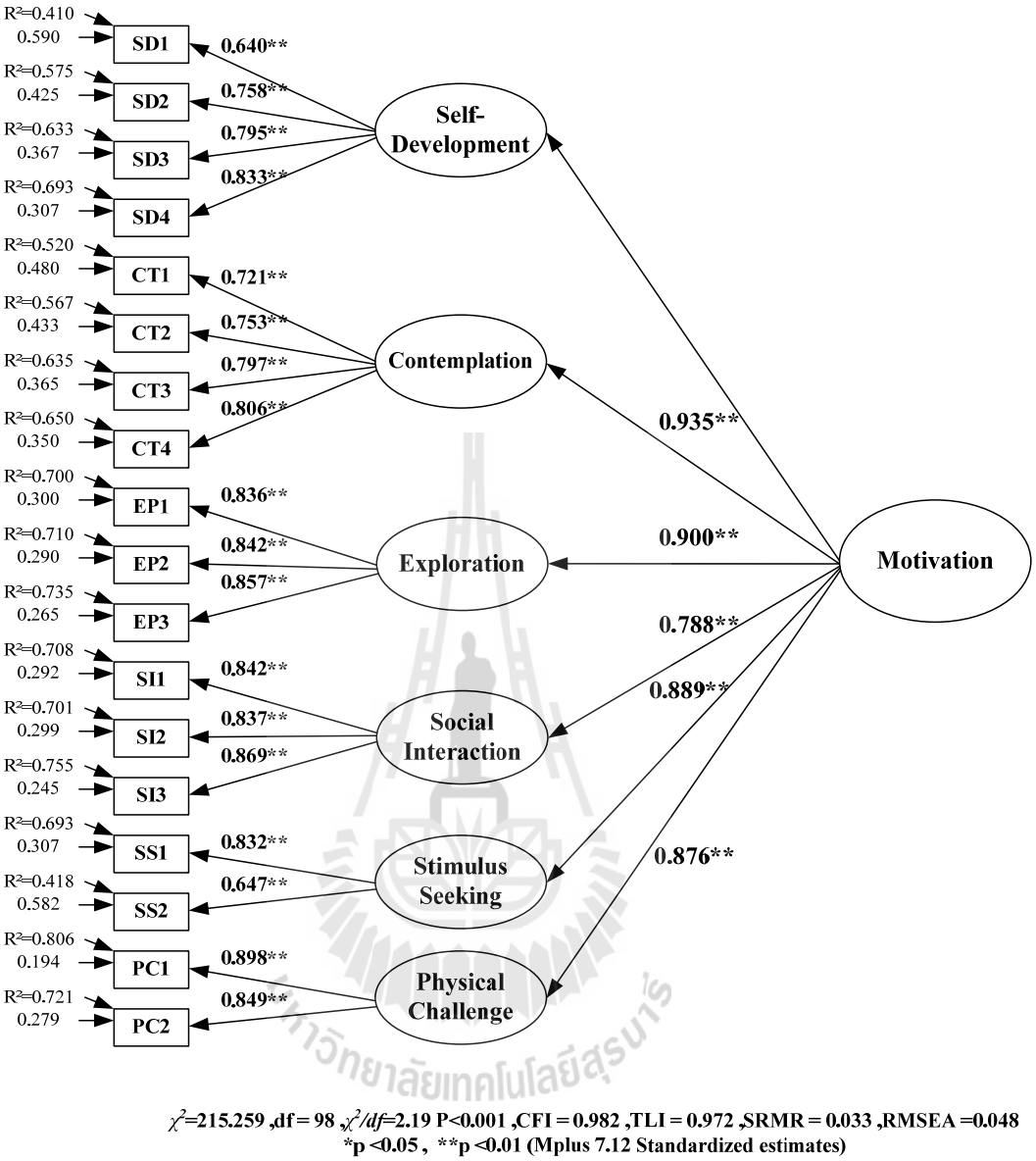

Figure 3.3 CFA model of the motivation to ride bicycles for tourism at tourist attractions in the mountains

Table 3.5 Results of Confirmatory Factor analysis (CFA) of Measurement Model for tourist attractions in the mountains

Variable	Standardized estimates	Standard Error (S.E.)	t-value	R^2	CR	AVE
Self-development					0.989	0.577
SD1	0.640	0.032	20.221	0.410		
SD2	0.758	0.023	33.013	0.575		
SD3	0.795	0.021	37.803	0.633		
SD4	0.833	0.019	43.927	0.693		
Contemplation					0.990	0.592
CT1	0.721	0.026	27.871	0.520		
CT2	0.753	0.023	33.359	0.567		
CT3	0.797	0.021	37.477	0.635		
CT4	0.806	0.022	37.141	0.650		
Exploration					0.990	0.714
EP1	0.836	0.025	33.782	0.700		
EP2	0.842	0.018	46.584	0.710		
EP3	0.857	0.017	49.476	0.735		
Physical challenge					0.989	0.763
PC1	0.898	0.015	59.709	0.806		
PC2	0.849	0.017	49.221	0.721		
Stimulus seeking					0.975	0.555
SS1	0.832	0.025	33.976	0.693		
SS2	0.647	0.031	20.892	0.418		
Social Interaction					0.976	0.721
SI1	0.842	0.030	27.664	0.708		
SI2	0.837	0.021	39.960	0.701		
SI3	0.869	0.020	44.078	0.755		
Motivation					0.995	0.756
Self-development	0.821	0.022	37.385	0.674		
Contemplation	0.935	0.016	60.044	0.874		
Exploration	0.900	0.017	54.216	0.810		
Physical Challenge	0.876	0.017	50.215	0.768		
Stimulus seeking	0.889	0.024	37.376	0.790		
Social Interaction	0.788	0.025	32.158	0.621		

3.5.4 CFA of Motivation for Riding a Bicycle for Tourism at Sea Tourist Attractions

The CFA results for the measurement model of motivation to ride bicycles for tourism at tourist attractions by the sea were as follows: chi-square (χ^2) = 259.611; degree of freedom (df) =106; p-value < 0.001; the proportion of chi-square and degree of freedom (χ^2 /df) = 2.44; RMSEA = 0.071; CFI = 0.962; TLI = 0.945; and SRMR = 0.054 (Figure 3.4). Most of these measurements were consistent with the determined criteria(Hooper et al., 2008; Hu and Bentler, 1999; Kline, 2005; Steiger, 2007; Wu et al., 2009), except for the chi-square testing given the large sample size, which tended to reject the hypothesis (Rex B. Kline, 2011; MacCallum et al., 1996). The RMSA value was higher than 0.07 and lower than 0.08, indicating good relevance (Browne and Cudeck, 1993). Thus, the model was relevant to the empirical data.

For the first-order model, when considering the six latent variables and the 18 observed variables, every variable indicated the motivation of various perspectives at statistical significance (Table 3.6) with the following statistical results:

(1) Self-development: The indicators had factor loading coefficient values between 0.645 and 0.852, with SD3, “Trying new things in life” (β = 0.898), having the highest value, followed by SD4, “Developing skills and learning abilities in adjusting to surroundings” (β = 0.852).

(2) Contemplation: CT2, “Being on one’s own” (β = 0.778), had a slightly higher value than CT1, “Riding bicycles is exciting and challenging” (β = 0.773).

(3) Exploration: These indicators had values between 0.826 and 0.85, led by EP3, “Discovering new things in traveling,” with the highest value (β = 0.857), followed by EP2, “Surveying routes in tourist attraction zones” (β = 0.833), and EP1, “Exploring various things in surroundings.”

(4) Physical challenge: Of the two indicators, PC1, “Exercising during trips” (β = 0.920), had a higher value than PC2, “Developing body health to be stronger” (β = 0.872).

(5) Stimulus seeking: SS1, “Taking a leave off work/duty for relaxation,” had the higher of the two values (β = 0.773).

(6) Social interaction: The indicators had values between 0.844 and 0.870, with SI2, “Interacting with local people” (β = 0.870), showing the highest value.

All 18 indicators had factor loading coefficient values between 0.645 and 0.920, which met the criterion for statistical significance, and all six proposed components of motivation had factor loading coefficient values between 0.722 and 0.992, exceeding the standard of 0.70. Therefore, the results showed that each component could be a good indicator of motivation (Hair, 2006).

For the second-order CFA, all six factors were indicators of motivation to ride bicycles for tourism at tourist attractions by the sea at a statistical significance of 0.01. Contemplation had the highest factor loading coefficient (β = 0.992), followed by stimulus seeking (β = 0.937), social interaction (β = 0.866), exploration (β = 0.865), self-development (β = 0.823), and physical challenge (β = 0.722).

In the examination of the model of motivation for bicycle use for tourism in mountainous tourist attractions, the Root Mean Square of Error Approximation (RMSEA) was found to be lower than 0.05, showing that the model was significantly relevant to the empirical data. The model for sea tourist attractions had a value higher than 0.07 but lower than 0.08; therefore, making it significantly relevant to the empirical data (Browne and Cudeck, 1993). Every indicator in both models had factor loading coefficient values at statistically significant levels with a few standard errors (S.E. = 0.016 – 0.038). However, indicators SD1 (“Learning to ride bicycles for a longer distance”) (R^2 = 0.410 – 0.416) and SS2 (“Adding value to one’s own for the praise and admiration in society”) (R^2 = 0.418 – 0.451) had rather small values of R-squared in both models. This may result from the lack of availability of sufficient data to provide a good explanation of these indicator values.

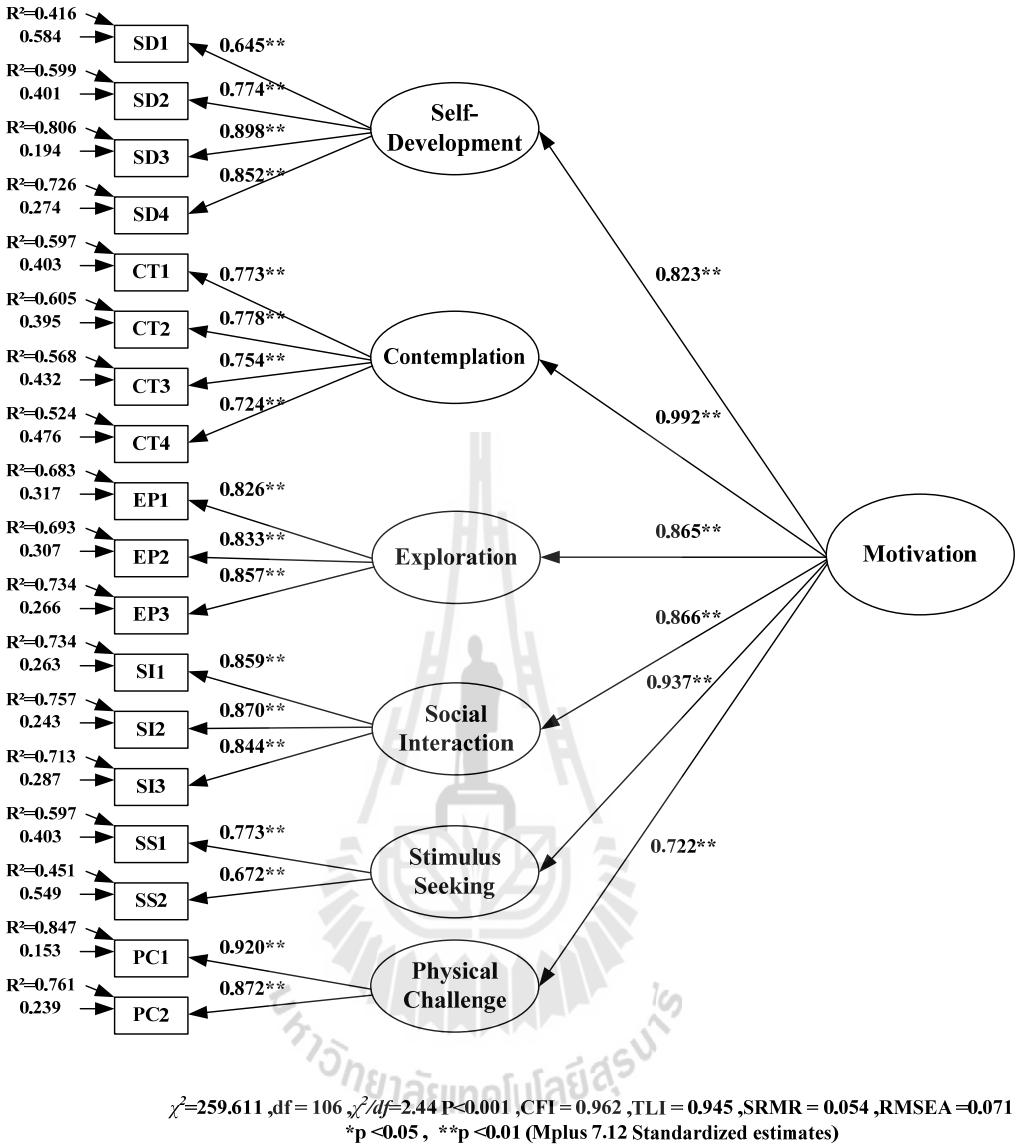

Figure 3.4 CFA model of the motivation to ride bicycles for tourism at tourist attractions by the sea

Table 3.6 Results of Confirmatory Factor Analysis (CFA) of Measurement Model for tourist attractions by the sea

Variable	Standardized estimates	Standard Error (S.E.)	t-value	R^2	CR	AVE
Self-development					0.989	0.636
SD1	0.645	0.038	17.025	0.416		
SD2	0.774	0.027	28.673	0.599		
SD3	0.898	0.017	51.320	0.806		
SD4	0.852	0.021	40.859	0.726		
Contemplation					0.986	0.573
CT1	0.773	0.030	25.973	0.597		
CT2	0.778	0.030	26.304	0.605		
CT3	0.754	0.032	25.973	0.568		
CT4	0.724	0.032	22.775	0.524		
Exploration					0.986	0.703
EP1	0.826	0.037	22.385	0.683		
EP2	0.833	0.025	32.959	0.693		
EP3	0.857	0.024	35.651	0.734		
Physical challenge					0.985	0.803
PC1	0.920	0.023	40.312	0.847		
PC2	0.872	0.024	35.873	0.761		
Stimulus seeking					0.965	0.524
SS1	0.773	0.035	22.014	0.597		
SS2	0.672	0.039	17.362	0.451		
Social Interaction					0.991	0.735
SI1	0.859	0.020	42.692	0.737		
SI2	0.870	0.019	46.208	0.757		
SI3	0.844	0.021	40.208	0.713		
Motivation					0.994	0.759
Self-development	0.823	0.026	31.103	0.673		
Contemplation	0.992	0.020	49.096	0.985		
Exploration	0.865	0.026	33.153	0.749		
Physical Challenger	0.722	0.036	20.015	0.521		
Stimulus seeking	0.937	0.032	28.988	0.878		
Social Interaction	0.866	0.022	38.783	0.750		

3.6 Discussion and Conclusion

This study aimed to confirm the motivations for bicycle use in tourism by using confirmatory factor analysis. The sample comprised 798 Thai tourists, 510 at mountain locations and 288 at sites near the sea. The questionnaire administered in the study covered 18 indicators associated with six factors: self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction.

From the consistency analysis between the measurement model and the empirical data for both mountain tourist attractions and sea tourist attractions, which was carried out using CFA, it was found that (among the goodness-of-fit statistics) chi-square (χ^2), the proportion value between chi-square and degrees of freedom (χ^2/df), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker Lewis Index (TLI), and the standardized root mean residual (SRMR) were all in accordance with the criteria with the exception of the chi-square test because testing χ^2 is sensitive to the large sample size (n>200). Thus, the hypothesis of consistency between the developed measurement model and the empirical data was accepted. From the assessment of parameter invariance in the measurement model using the chi-square difference test, it was found that there were different values between chi-square equal 123.809 and difference between degree of freedom equal 24 ($p < 0.0001$). Thus, the second hypothesis could not be accepted. This meant that the values of factor loadings, intercepts, and structural paths between mountainous and sea tourist attractions were different.

According to the CFA, the 18 indicators related to the six components of motivation for bicycle use in mountain tourism were all statistically significant at the 0.01 level, as were the six components themselves, with the values of all factor loading coefficients between 0.788 and 0.935. Whenever the factor loading coefficient has a value greater than 0.70, this indicates that the factor is a good determinant of motivation. Regarding sea tourist attractions, again all 18 indicators and six factors were confirmed as statistically significant determinants of bicycle use for tourism at statistical significance, with factor loading coefficient values between 0.722 and 0.992.

As mentioned above, it was concluded that the measurement models for mountain tourist attractions and sea tourist attractions were different. Thus, the models must be developed separately in order to determine appropriate strategies for those areas. Regarding mountain tourist attractions, the six factors of motivation can be prioritized from the highest factor loading coefficient values to the lowest as follows: contemplation, exploration, stimulus seeking, physical challenge, self-development, and social interaction. Concerning sea tourist attractions, the order from highest to lowest was contemplation, stimulus seeking, social interaction, exploration, self-development, and physical challenge.

Factor loading coefficient values from the second-order CFA can be used to rank the importance of factors affecting motivation for bicycle use. For example, since contemplation has the highest values in both mountain and sea locations, the government should give this factor top priority. As also suggested in the studies by Beh and Bruyere (2007) and Ritchie (1998), the high value associated with the indicator “Fleeing from the crowded in urban communities” calls for offering

bicycling opportunities in quiet areas separated from vehicle traffic and other disruptions. Bicycle paths through such areas enable people to fulfill their desire to be close to nature. For mountain tourism, exploration is the second-highest factor and "Discovering new things in traveling" is the indicator with the highest factor loading coefficient within the exploration factor, so bicycle planning should emphasize development of routes that enable tourists to discover new things. Regarding sea tourist attractions, since contemplation is again the top-ranked factor, activities should enable tourists to experience privacy. Overall, the results of the CFA in this study should help government representatives to develop the most suitable strategies for promoting more bicycle use in each targeted area. Furthermore, the measurement model of motivations can be applied to predict the Thai people's behavior in choosing to use bicycles for tourism.

The limitation of this study is that it uses only Thai tourists who rode or did not ride bicycles to travel to natural tourist attractions. This limitation occurs because the sample was too small to allow an analysis of the difference between the two types of tourist attractions. In the future, a study of foreign tourist groups would be interesting.

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3.7 Acknowledgements

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CHAPTER IV

THE STUDY OF WILLINGNESS TO PAY FOR BICYCLE HIRE SERVICES AT TOURIST ATTRACTIONS IN THAILAND

4.1 Abstract

Bicycles offer non-motorized transport that not only reduces energy consumption and pollution but also offers health benefits. However, most Thai people do not use bicycles. This study investigates the willingness to pay (WTP) for bicycle hire at tourist attractions in Thailand, which can inform strategies that encourage more Thai people to use bicycles. Data analysis considered socio-economic factors, such as gender, age, level of education, average household income per month, type of tourist attraction, frequency of bicycle use, and type of bicycle. The analyses included the independent sample t-test and analysis of variance F-test. The samples for the analysis comprise 704 Thai tourists. From the results, it was found that WTP for bicycle hire between respondents' gender for the age groups lower than 18 years and between 30–44 years was different. For type of bicycle, the differences were at statistical significance 0.05. The group having WTP for bicycle hire at a confidence level of 95% shared the same level of education, Average household income per month, frequency of bicycle use, and type of tourist attraction were not different. Government

sectors or involved organizations can use this study to inform guidelines around suitable bicycle hire for target groups.

4.2 Introduction

Bicycle use is non-motorized transportation. It can efficiently reduce using energy and even save it more than other types of transportation. This is considered as guidelines for sustainable development which benefits both individuals and society. For individuals, it is the door- to- door activity for health which decreases traveling expenses. In terms of society, energy conservation saves infrastructure costs, reduces noise pollution and pollution to environment (Litman, 2004; Rietveld, 2001).

Over the next 15 years, Thailand is predicted to release as much as 225.33 million tons of carbon dioxide from the transport sector alone (Ratanavaraha and Jomnonkwao, 2015); CO_2 is considered the main cause of global warming (Aßmann and Sieber, 2005; Ceylan, Ceylan, Haldenbilen, and Baskan, 2008; Meyer, Leimbach, and Jaeger, 2007). The promotion of bicycle use is one of the key strategies for encouraging sustainable transport within the country (Thailand Transport Portal, 2015). From a health perspective, cycling can reduce the risk of diseases and improve mental well-being (Toker and Biron, 2012). The study of bicycle hire services at tourist attractions is therefore relevant to the aforementioned strategy. Furthermore, cycling is an attractive of travelling. According to Weston et al. (2012), the availability of bicycle use services in Europe was unique and was thus attracting tourists. This suggests that greater attention should be given to tourist groups' bicycle hire needs to increase bicycle users in the future.

In 2013, the number of tourists in Thailand totaled 36,867,385: 22,971,395 Thai tourists and 13,895,990 foreign tourists. It can be seen that the proportion of Thai tourists was quite high (62.31%) as compared with foreign tourists, and this trend has continued. Domestic tourist numbers increased by 11.03% in 2013 as more Thai people turned to travel within the country. In this study, Thai tourists comprise the target group.

Improving the service standard to satisfy tourists requires the expenditure of work operation. Furthermore, the cost of investment in facilities is high. Accordingly, from the past, the manufacturers have not attached the importance to it (Jomnonkwao, Siridhara, and Ratanavaraha, 2015). The government sector has to determine the policy to develop service standard. This study has recognized the importance of giving tourists services. Thus, the availability of hiring bicycle spots in tourist attractions has been studied by considering the expenditure of operation or willingness to pay appropriately. No previous studies have specifically examined consumers' needs or willingness to pay (WTP) for bicycle hire. Most WTP studies have focused on public transport (Drevs, Tscheulin, Lindenmeier, and Renner, 2014). Those studies investigated the effects of the government's financial support on WTP for public transport system services using regression analysis to analyze passengers' attitudes and behaviors. The WTP for hybrid cars in Turkey was studied using the ordered probit model (Erdem, Şentürk, and Şimşek, 2010). The variables considered were income, gender, level of education, global warming concern, number of cars, importance of cars, and risks and attitudes toward alternative energy.

This study analyzed the value of WTP for bicycle use at tourist attractions between socio-economic groups using the independent sample t-test and analysis of

variance (ANOVA) F-test to comprehend the WTP for determining suitable bicycle hire services for the target groups.

4.3 Method

4.3.1 Participants and data collection

The samples in this study comprised Thai tourists traveling within the country. Random sampling was applied as per the method by (Yamane, 1973) to select the samples. According to a statistical record, there were 54,652,216 Thai tourists in 2014 (National Statistical Office, 2014). In accordance with Yamane's calculation, 385 samples were required; therefore, 704 samples were selected by face-to-face interviews for this analysis.

Data were collected using a questionnaire divided into three parts: socio-economic, bicycle use behavior, and WTP for bicycle hire. The variables were gender, age, level of education, average household income, type of tourist attraction (mountains, sea, culture, history, and urban), frequency of bicycle use (users, nonusers), and types of bicycles (bicycles for common work, bicycles for sport racing, and bicycles for exercising) With regard to WTP for bicycle hire, an open-ended question was asked about the acceptable maximum bicycle hire per day (USD/day).

4.3.2 Analysis

The difference of WTP for bicycle hire between socio-economic groups was calculated using the independent sample t-test to test the difference of means between the two groups. For the comparison of means of more than two groups, ANOVA was statistically applied by F-test, which is an overall test to check if

there was difference of at least one unidentified pair; thus, post hoc test using multiple comparisons were used to compare the differences between each pair.

4.4 Results

In this study, there were 704 samples divided into 290 males (41.2%) and 414 females (58.80%). The majority of samples (62.6%) were aged 18–29 years followed by 30–44 years (21.3%). The majority of samples held a Bachelor's degree (50.7%) and 32.1% had average household income 30,000–59,999 baht per month (USD 838–1676). Mountain tourist attractions were the most popular (52.4%), as shown in Table 4.1.

4.4.1 Average maximum WTP for bicycle hire

Table 4.2 shows the values of average minimum and maximum WTP for bicycle hire. The table presents means at 95% confidence intervals (CI) for each group as follows: (1) for WTP for bicycle hire between genders, the average maximum WTP of males (USD 3.02/day; 95% CI = USD 2.63/day, USD 3.42/day) is greater than that of females (USD 1.88/day; 95% CI = USD 1.67/day, USD 2.09/day); (2) for age, in the group of 30–44 years, the highest average maximum WTP equaled USD 2.92/day (95% CI = USD 2.40/day, USD 3.41/day) followed by that of the age range between 18–29 years (USD 2.24/day; 95% CI = USD 1.98/day, USD 2.50/day); (3) for the level of education higher than a bachelor's degree, the average maximum WTP was high (USD 2.58/day; 95% CI = USD 2.11/day, USD 3.06/day), followed by that of samples with a bachelor's degree (USD 2.51/day; 95% CI = USD 2.21/day, USD 2.82/day); (4) for average monthly family income, the group having income between 60,000–99,999 baht (USD 2.81/day; 95% CI = USD 2.27/day, USD

3.36/day) was giving the most average maximum WTP while the least average maximum WTP group was the one having income less than 5,000 baht (USD 1.60/day; 95% CI = USD 0.73/day, USD 2.47/day); (5) mountainous tourist attractions have the most average maximum WTP (USD 2.57/day; 95% CI = USD 1.71/day, USD 2.39/day), followed by cultural tourist attractions (USD 2.34/day; 95% CI = USD 1.65/day, USD 3.02/day); (6) average maximum WTP of bicycle users (USD 2.51/day; 95% CI = USD 2.13/day, USD 2.88/day) is higher than that of bicycle nonusers (USD 2.24/day; 95% CI = USD 1.99/day, USD 2.49/day); and (7) regarding types of bicycles, bicycles for sport racing having the highest average maximum WTP value (USD 3.30/day; 95% CI = USD 2.71/day, USD 3.89/day), followed by bicycles for exercising (USD 2.41/day; 95% CI = USD 2.05/day, USD 2.77/day), and bicycles for common work (USD 1.83/day; 95% CI = USD 1.60/day, USD 2.06/day).

The maximum and minimum values of average maximum WTP for bicycle hire are shown in Table 2. When considering the maximum hire price in each group, it was found that males are willing to pay the maximum bicycle hire more than females. Similarly, groups aged 18–29 years, with a Bachelor's degree, average household income per month 30000–59,999 baht (USD 838–1676), and mountain tourist attractions expected the WTP groups paying the maximum bicycle hire (USD 27.94/day). In terms of the minimum WTP for bicycle hire, it was found that every group equally accepted the minimum bicycle hire as USD 0.27/day.

4.4.2 Comparison of difference of average maximum WTP for bicycle hire among socio-economic groups

The different results of average maximum WTP for bicycle hire of two groups (gender and bicycle use) were tested using the independent sample t-test. The main hypothesis was that the average maximum WTP of the two groups was equal. Before hypothesis testing, the values of variance for the two populations were tested. In the case of more than two groups similar to this study, the comparison between groups including age, level of education, average household income per month, type of tourist attraction, and type of bicycle were analyzed by one-way ANOVA. However, before that, the Levene test was applied to test whether or not the dependent values of every group were different.

From Table 4.3, the variance test using Levene's test found that gender had a p-value less than 0.05, and thus, The main hypothesis is rejected. In other words, males and females had tendency for different variance scores at a statistical significance 0.05 and the t-test statistic (t = 5.044) had p-value less than 0.05. The difference in average maximum WTP for bicycle hire was statistically significant. Males (USD 3.02/day) had WTP values higher than females (USD 1.88/day). For bicycle use, it was found that the value of the Levene statistic equaled 0.792 ($p > 0.05$); thus, the hypothesis was accepted, implying that bicycle users and nonusers did not have different variance at significance 0.05. Regarding the test comparing average maximum WTP, it was found that the value $t = 1.153$ ($p > 0.05$). In other words, the average maximum WTP for bicycle hire of bicycle users and bicycle nonusers was USD 2.51/day and USD 2.24/day, respectively, at significance 0.05.

From Table 4.4, ANOVA using Levene's test indicates the variance. It was found that neither age, level of education, nor average household income (p-value < 0.05) impacted the variance; thus, the F-test was used. Regarding tourist attraction and type of bicycle, it was found that the variance values were different; thus, the Welch test was used, which found that age (F = 3.427) had a p-value less than 0.05. It was concluded that at least two age groups had different average maximum WTP. Similarly, for the types of bicycles, it was found that there was at least one pair (Welch = 12.287) with a different average maximum WTP at statistical significance 0.05. The groups showing no statistically different average maximum WTP for bicycle hire were level of education, (F = 2.415), average household income (F = 1.803), and type of tourist attraction (Welch = 2.293).

Table 4.5 presents results of the post hoc test using multiple comparisons between two groups: age and type of bicycle. After testing both groups for different average maximum WTP, the test showed the following results: regarding the age group, those who were younger than 18 years and those who were between 30–44 years gave importance to the average maximum WTP at significant differences 0.05; regarding the type of bicycle, it was found that bicycles for common work, sport racing, and exercising had different average maximum WTP values for each pair at significance 0.05.

Table 4.1 Respondents' demographics

	Percentage
Gender	
Male	41.2
Female	58.8
Age	
<18 years	10.5
18-29 years	62.6
30-44 years	21.3
45+	5.5
Level of Education	
Lower than Bachelor's degree	36.9
Bachelor's degree	50.7
Higher than Bachelor's degree	12.4
Average monthly income per household (bath)	
<5,000(USD 139.70)	1.14
5,000-9,999 (USD 139.70–279.37)	7.10
10,000-14,999(USD 279.40 –419.08)	9.38
15,000-24,999 (USD 419.11–698.49)	16.48
25,000-29,999 (USD 698.51–838.19)	2.98
30,000-59,999(USD 838.22–1,676.41)	32.10
60,000-99,999(USD 1,676.44–2,794.04)	13.92
100,000 (USD 2,794.07)	16.90
Tourist attractions	
Mountains	52.4
Sea	30.8
Cultural attractions	6.4
History	6.0
Urban	4.4

Note: 1 USD = 35.79 Bath (August 25, 2015)

Table 4.2 Average maximum WTP for bicycle hire.

	Mean (USD/day)	95% confidence interval		Minimum	Maximum
		Lower bound	Upper bound		
Gender					
Male	3.03	2.63	3.42	0.28	27.94
Female	1.89	1.68	2.09	0.28	25.15
Age					
<18 years	1.76	1.20	2.34	0.28	13.97
18-29 years	2.24	1.99	2.50	0.28	27.94
30-44 years	2.91	2.40	3.41	0.28	25.15
45+	2.62	1.98	3.26	0.28	11.18
Level of education					
Below Bachelor's degree	2.06	1.72	2.40	0.28	25.15
Bachelor's degree	2.52	2.22	2.82	0.28	27.94
Higher than Bachelor's degree	2.59	2.11	3.07	0.28	13.97
Average monthly income per household (bath)					
<5,000 (USD 139.70)	1.61	0.73	2.48	0.56	2.79
5,000-9,999 (USD 139.70-279.37)	2.26	1.41	3.11	0.28	13.97
10,000-14,999 (USD 279.40 - 419.08)	1.69	1.09	2.29	0.28	13.97
15,000-24,999 (USD 419.11-698.49)	1.94	1.48	2.40	0.28	13.97
25,000-29,999 (USD 698.51-838.19)	2.01	1.35	2.66	0.56	5.59
30,000-59,999 (USD 838.22-1,676.41)	2.44	2.02	2.85	0.28	27.94
60,000-99,999 (USD 1,676.44-2,794.04)	2.82	2.27	3.36	0.28	13.97
100,000 (USD 2,794.07)	2.76	2.27	3.24	0.28	19.56
Type of tourist attraction					
Mountains	2.58	2.24	2.92	0.28	27.94
Sea	2.16	1.89	2.43	0.28	13.97
Cultural	2.34	1.65	3.03	0.28	13.97
Historic	1.72	1.21	2.23	0.28	8.38
Urban	1.97	1.42	2.52	0.28	5.59
frequency of bicycle use					
Bicycle users	2.51	2.14	2.89	0.28	13.97
Bicycle nonusers	2.25	1.99	2.50	0.28	27.94
Types of bicycle					
Bicycles for common work	1.83	1.60	2.06	0.28	27.94
Bicycles for sports racing	3.31	2.72	3.89	0.28	25.15
Bicycles for exercising	2.41	2.06	2.77	0.28	13.97

Table 4.3 Independent sample T-Test

	Levene's test for equality of variances		T-test for equality of means			average maximum For bicycle hire between different groups
	Levene statistic	p-value	t	df	p-value	
Gender	27.226	<0.001**	5.044	447.45	<0.001**	Yes
frequency of bicycle use	0.792	0.374	1.153	684	0.249	No

** Significant at 95% confident

Table 4.4 ANOVA Test

	Levene's test for equality of variances		F-test[a]		Welch Test[b]		average maximum WTP for bicycle hire between different groups
	Levene statistic	p-value	F	p-value	Welch	p-value	
Age	1.374	0.250[a]	3.427	0.017**	3.694	0.021**	Yes
Level of education	1.476	0.229[a]	2.415	0.090	2.526	0.082	No
Average household income	0.871	0.529[a]	1.803	0.084	2.484	0.022**	No
Type of tourist attraction	4.237	0.002[b]	1.554	0.185	2.293	0.063	No
Types of bicycle	21.718	<0.001[b]	16.980	<0.001**	12.287	<0.001**	Yes

[a]Accepted H_0 : the value of covariance of WTP for bicycle hire of every group having equal values. The statistics used was F-test

[b]Reject H_0 : the value of covariance of WTP for bicycle hire at least two different groups .The statistics used was Welch

** Significant at 95% confident

Table 4.5 Post hoc multiple comparisons

	Mean difference			
Types of bicycle	1)Bicycles for common work	2) Bicycles for sport racing	3) Bicycles for exercising	
1) Bicycles for common work	-	-1.47*	-0.58*	
2) Bicycles for sport racing	1.47*	-	0.89*	
3) Bicycles for exercising	0.58*	-0.89*	-	
Age	1) <18 years	2) 18-29 years	30-44 years	45+
1)<18 years	-	-0.47	-1.13*	-0.85
2) 18-29 years	0.47	-	-0.66	-0.37
3) 30-44 years	-1.13*	0.66	-	0.28
4) 45+	0.85	0.37	-0.28	-

*The mean difference is significant at the 0.05 level

4.5 Discussion and conclusion

This study aimed to investigate the value of WTP for domestic tourist bicycle hire at tourist attractions in Thailand. It compared WTP values between socio-economic groups using the independent sample t-test and one-way ANOVA. The statistics used were the F-test. The samples comprised 704 Thai tourists nationwide. The factors considered were gender, age, level of education, average household income, types of tourist attractions, frequency of bicycle use, and type of bicycle.

This study found that the value of WTP for bicycle hire was different between males and females at significance 0.05. In other words, gender influenced the average maximum WTP for bicycle hire. For males, bicycle hire had an average maximum WTP of USD 3.02/day, which was greater than for females (USD 1.88/day). The WTP between age groups was also different. Those under 18 years gave more importance to the average maximum WTP, which was different from those who were 30–44 years, with an average maximum WTP of USD 2.24/day and USD 2.92/day, respectively. This is similar to the findings of Schniederjans and Starkey (2014), which showed age to have an influence on average WTP for green freight

transportation. Furthermore, it was found that the type of bicycle had an influence on the average maximum WTP. Each pair of types of bicycle uses (common work practice, sport racing, and exercising) was different at significance 0.05. In other words, tourists' WTP for bicycle hire was different based on the type of bicycle: USD 3.30/day for sport racing, USD 2.41/day for exercising, and USD 1.83/day for common work practice.

The average maximum WTP for bicycle hire was not statistically different among the education level and average household income did not influence the average maximum WTP. According to economic theory, the lower income group was expected to have lower WTP than that of the higher income group (Rienstra, Rietveld, and Verhoef, 1999; Schade and Schlag, 2003). However, in this study, it was found that income did not have influence on WTP or price determination in terms of statistical significance. This is similar to the findings of Rienstra et al. (1999), in which there was no difference in WTP between bicycle users and nonusers. This is similar also to the study by Drevs et al. (2014), who found no difference between public transport system users and nonusers regarding WTP for public subsidies. Furthermore, the average maximum WTP for bicycle hire can be determined as a single rate to benchmark among other tourist attractions.

The results of this study are limited by its focus on only Thai tourists within Thailand. Further research could consider foreign tourists and seasonality effects on WTP for bicycle hire.

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CHAPTER V

CONCLUSION AND RECOMMENDATIONS

The conclusion of this study is summarized according to research objectives as follows; (1) to search for the factors influencing bicycle use for tourism, (2) to study the measurement of the motivation to ride bicycles for tourism through a comparison of tourist attractions, and (3) to study the willingness to pay for bicycle use for tourism in tourist attractions in Thailand as the following details;

5.1 Factors influencing the choice of bicycle use for tourism

From the study of the factors influencing bicycle use for tourism by applying the theory of the Model of Goal-Directed Behavior (MGB) including attitudes, subject norm, perceived behavioral control, positive anticipated emotion, past behavior, desire, perceived susceptibility, and infrastructure. The test of mentioned factors influencing behavioral intention by using structural equation modeling (SEM) as the following hypotheses;

H1: For bicycle use in tourism, desire can be measured using six indicators, including self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction.

H2: Desire directly and positively affects the behavioral intention to use bicycles for tourism.

H3: Good attitudes toward bicycle use directly and positively affect the desire to use bicycles in tourism.

H4: Subjective norms directly affect the positive desire to use bicycles for tourism.

H5: Perceived behavioral control directly and positively affects the desire to use bicycles for tourism.

H6: Perceived behavioral control directly and positively affects the behavioral intention to use bicycles for tourism.

H7: Positive anticipated emotion directly and positively affects the desire to use bicycles for tourism.

H8: Past behavior directly and positively affects the desire to use bicycles for tourism.

H9: Past behavior directly and positively affects the behavioral intention to use bicycles for tourism.

H10: Perceived susceptibility directly and negatively affects behavioral intention to use bicycles for tourism.

H11: Infrastructure directly and positively affects behavioral intention to use bicycles for tourism.

From the results of data analysis, it was found that the model had good-of-fit statistic values including chi-square (χ^2) = 2544.441, degree of freedom (df) = 590, p-value<0.001, χ^2 /df = 4.31, Root Mean Square of Approximation (RMSEA) = 0.058, Comparative Fit Index (CFI) = 0.919, Tucker Lewis Index (TLI)=0.908, Standardized Root Mean Residual (SRMR) = 0.067. These statistic values were based on the criteria of model measurement except chi-square test. As χ^2 was sensitive to large-scale

sample size (n>200), the hypothesis tended to be rejected (Kline, 2011; MacCallum, Browne, and Sugawara, 1996). Thus, it was concluded that Behavioral intention model of bicycle use for tourism was relevant to empirical data.

The results of the analysis showed that H1, H2, H3, H4, H5, H6, H7, H9, H10 and H11 were supported by the results of study while H8 was not supported. Hence, desire was measured by 6 indicators including self-development, contemplation, exploration, physical challenge, stimulus seeking, social interaction, and social interaction and they directly had positive influence on behavioral intention (H1 and H2). Besides, it was also found that desire directly and positively influenced by attitude, subject norm, perceived behavioral control and positive anticipated emotion (H3, H4, H5 and H7) and transferred to behavioral intention. It was found that every variable directly and positively affected behavioral intention, perceived behavioral control, past behavior and infrastructure (H6, H9, H11) except perceived susceptibility which had directly negative influence on behavioral intention (H10).

This is an early research searching for the factors influencing bicycle use for tourism. Actually, they have never been studied before. The benefits obtained from this study can be taken to determine the policies encouraging bicycle uses in tourist attractions.

5.2 Measuring the motivation to ride bicycles for tourism through a comparison of tourist attractions

From the analysis of the model of motivation for bicycle use for tourism between two fields of tourist attractions which include mountainous tourist attractions and sea tourist attractions by using second-ordered confirmatory factor analysis (CFA)

to confirm being the composition of 18 indicators of 6 factors including self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction. According to invariance analysis of parameter of measurement model of motivation for bicycle use for tourism, it was found that factor loadings, intercepts, structural path had different values between mountainous tourist attractions and sea tourist attractions at statistical significance. Thus, the motivation for bicycle use for tourism should be separately developed.

The results of separately developed models between the areas, it was found that sea tourist attractions have the values of χ^2 = 212.259, *df* = 98, *p*< 0.001, root mean square of approximation (RMSEA) = 0.048, comparative fit index (CFI) = 0.982, Tucker Lewis Index (TLI) = 0.972, standardized root mean residual (SRMR) = 0.033 while mountainous tourist attractions have the values of χ^2 = 259.611, *df* = 106, *p*< 0.001, root mean square of approximation (RMSEA) = 0.071, comparative fit index (CFI) = 0.962, Tucker Lewis Index (TLI) = 0.945, standardized root mean residual (SRMR)=0.054. Both statistic values were as criteria except chi-square test due to the sensitivity to large-scale samples. (n>200) (Kline, 2011; MacCallum et al., 1996) so it was concluded that model was relevant to empirical data. And from the validity and reliability of measurement scale, it was found that average variance extracted (AVE) value was more than 0.50 and composite Reliability (CR) value was more than 0.70 (Hair, 2006). Hence, the measurement scale was valid and reliable.

From first-ordered CFA analysis of model of motivation for bicycle use for tourism, it was found that all 18 indicators pointed out bicycle use for tourism in both areas were at statistical significance 0.01. Regarding mountainous tourist attractions,

there were two observed variables having the highest coefficient factor loading: PC1, “exercising during tour trips” (β = 0.898), and SI3, “staying with others who have the same likes” (β = 0.869)while sea tourist attractions PC1, “exercising during tour trips” (β= 0.920),was the observed variable with the highest coefficient value, followed by SD3, “trying new things in life” (β = 0.898).

Regarding second-order CFA analysis, it was found that all 6 factors were indicators signifying motivation for bicycle use for tourism in mountainous and sea tourist attractions at a 99% confidence level. In terms of mountainous tourist attractions, the factors that most indicated the motivation for bicycle use was contemplation (β = 0.935) followed by exploration (β = 0.900), stimulus seeking (β = 0.889), physical challenge (β = 0.876) and self-development (β = 0.821).The lowest coefficient was obtained for social interaction (β = 0.788). For sea tourist attractions, it was found that contemplation (β = 0.992) was the best factor indicating the motivation for bicycle use for tourism, followed by stimulus seeking (β = 0.937), social interaction (β = 0.866), exploration (β = 0.865), self-development (β = 0.823), and physical challenge (β = 0.722).

The obtained benefit from this research title is that government and manufacturers can properly determine the appropriate factors encouraging tourists to ride bicycles for tourism according to the fields of tourist attractions. Heretofore unstudy in this maner.

5.3 Willingness to pay for bicycle hire in tourist attractions

The study of WTP for bicycle hire in tourist attractions by considering the socio-economic factors including sex, age, level of education, average family income

per month, tourist attractions, bicycle use, and types of bicycles. Independent sample t-test was used to analyze the data and Analysis of Variance (ANOVA) F-test is as follows;

From the data analysis of independent sample t-test, it was found that the values of average maximum WTP for bicycle hire were different at significance 0.05. In other words, they influenced average maximum WTP for bicycle hire with the males' value average maximum WTP equal 3.02 US$/day higher than those of females equal 1.88 US$/day. Regarding the choice of bicycle use, it was found that the values of average maximum WTP for bicycle hire of bicycles' users (2.51 US$/day) and bicycles' nonusers (2.24 US$/day) were not different at significance 0.05.

When doing Analysis of Variance (ANOVA), it was found that age influenced average maximum WTP at statistical significance 0.05. After post hoc test, it was found that the values of average WTP were different at significance between samples aged below 18 years (2.24 US$/day) and those who were between 30-44 years (2.92 US$/day). It was also found that the types of bicycles had influence on average maximum WTP at statistical significance 0.05. That is, the tourists had different WTP for each type of bicycles at significance. The average maximum WTP for bicycles for sports was the most at 3.30 US$/day, followed by bicycle use for exercising 2.41 US$/day, and bicycle use for common work equal 1.83 US$/day. In terms of level of education, average family income, and tourist attractions, it was found that the values of average maximum WTP for bicycle hire were not different at degree of freedom 95%. In other words, the mentioned factors had no influence on WTP for bicycle hire in tourist attractions.

5.4 Recommendation for further actions

1) From the study of factors influencing the choice of bicycle use for tourism, the analysis of factor loading coefficient value can be taken to rank the priority of factors influencing bicycle intention use. It was found that the most important factor firstly ranked was desire. When considering its components, contemplation was the most important indicator. This shows that the government sector or involved departments should set the activities using bicycles on natural routes which provide the close touch of nature with challenge and peace, followed by Perceived behavioral control factor and Frequency of past behavior factor, for example, the importance of bicycle use ability perception for tour trip on his or her own should be given, and using bicycles in daily lives should be promoted.

2) The study of Measuring the Motivation to Ride Bicycles for Tourism through a Comparison of Tourist Attractions, it was found that the motivation of bicycle use was different based on geographical areas. Thus, the motivation of mountain and sea tourist attractions was separately measured. Concurrently, the motivation for bicycle use in each area can be used to identify or determine the policies suitable for each geographical area. For mountain tourist attraction, Contemplation, firstly ranked factor, showed that the government sector should build the activities providing bicycle use on natural routes with challenge and peace, followed by exploration discovering new things on journey and surveying routes. In other words, the example of activities of bicycle use in mountain tourist attraction should focus on surveying routes. Regarding sea tourist attractions, it was found that contemplation was the most important factor. Thus, the activities in sea tourist attractions should be built with seclusion keeping in close touch with nature, followed

by stimulus seeking requiring the work leave for relaxation. Accordingly, the activity providing relaxation should be set such as bicycle use for strolling.

3) The study of Willingness To Pay for Bicycle Hire in Tourist Attractions can be taken to be guidelines for the government sector determining appropriate pay for bicycle hire for target groups as follows; (1) WTP for bicycle hire was different between males and females; WTP for males equals 3.02 US$/day higher than females whose WTP equals1.88 US$/day. Consequently,(1) the price determination for bicycle hire may be reduced for females in accordance with their needs and the stimulation of increasing bicycle use, (2) WTP for bicycle hire was different between those lower than 18 years and those between 30-44 years with WTP equal 2.24 US$/day and 2.92 US$/day respectively. From the study, the reduction of bicycle hire for students below 18 years should be promoted, (3) WTP for bicycle hire value was different according to types of bicycles including sport bikes 3.30 US$/day, bicycles for exercise , 2.41 US$/day, and bicycles for common use 1.83 US$/day. Thus, the pay for bicycle hire should be differently determined for each type of bicycles.

5.5 Recommendations

From the study of factors influencing the tourists' choice of bicycle use in Thailand, the researcher has recommendations as follows;

1) To encourage more Thai people to change to use bicycle for tourism, the motivation should be emphasized by indicating that using bicycles helps closely touch the nature and independently feel one's own individual, and it is easy. Furthermore, using bicycles in daily lives and building its good attitudes to health should be promoted. Another important factor is friends and families. Regarding infrastructure,

special bicycle lanes should be built and the facilities in tourist attractions such as lockers, dressing rooms, and bathrooms should be provided.

2) In studying the factors involved in bicycle use for tourism in Thailand, the researcher considered the factors of attitudes, behavior, infrastructure and perceived susceptibility. The other factors including physical tourist attractions, climate, or seasons potentially differently affect the model between tourist attractions. These issues are interesting for doing the further research.

3) To develop the appropriate strategies promoting bicycle use for target groups, the measurement of motivation should be separately considered by the fields of tourist attractions because from the measurement, it was found that the model of motivation for bicycle use was different between tourist attractions (mountainous tourist attractions and sea tourist attractions)

4) In measuring Thais' motivation for tourism, it can be measured from 18 indicators of 6 factors including self-development, contemplation, exploration, physical challenge, stimulus seeking, and social interaction.

5) The price determination of bicycle hire in tourist attractions should be considered from the factors of sex, age, and types of bicycle use.

6) The price determination of bicycle hire is not different between tourist attractions. Thus, the single price should be determined and applied in other tourist attractions. For the further study in the future, the consideration for foreign tourists should be supplemented in order to provide the guidelines determining covering policies promoting bicycle use internationally for involved organizations.

5.5 References

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APPENDIX I

LIST OF PUBLICATIONS

List of Publications

Watthanaklang, D., & Ratanavaraha, V. (2016). Influences on Behavioral Intention by Thai People to Use Bicycles for Tourism.**Transportation Research Part D : Transport and Environment**.

Watthanaklang, D., Ratanavaraha, V., Chatpattananan, V., & Jomnonkwao, S. (2016). Measuring the Motivation to Ride Bicycles for Tourism through a Comparison of Tourist Attractions. **Transport Policy**.

Watthanaklang, D., Ratanavaraha, V., & Jomnonkwao, S. (2016). The Study of Willingness to Pay for Bicycle Hire Services at Tourist Attractions in Thailand. **Lowland Technology International Journal**.

BIOGRAPHY

Mrs. Duangdao Wattanaklang was born on 9 November 1984 at Nonsung District Nakhon Ratchasima. She started her elementary school at Ban Wamg Muang School and her secondary school at Tarn Prasartwitthya. She graduated from Suranaree University of Technology with a bachelor's degree in Engineering (Transportation Engineering) in 2006. After that, she worked for Bangkok Chonlakit Company Limited in the position of Transport operation officer. Then, she returned to study for a master's degree and a doctor's degree at the same university.

At present, she is a lecturer of Construction Technology Program, Faculty of Industrial Technology, Nakhon Ratchasima Rajabhat University. Her interest is in transportation research including energy use in transport sector, transport safety, and tourism logistics.