การศึกษาปัจจัยที่มีผลต่อการตัดสินใจไม่ใช้บริการจักรยานสาธารณะในกรุงเทพมหานคร (ประเทศไทย)

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บทคัดย่อ

ในปัจจุบัน หลายเมืองเต็มไปด้วยการให้บริการขนส่งสาธารณะที่ก่อให้เกิดมลพิษหลากหลายรูปแบบ ทั้งก่อให้เกิดการจราจรติดขัด ความไม่ปลอดภัย และปัญหามลภาวะทางอากาศ ซึ่งส่งผลกระทบต่อคุณภาพชีวิตของประชาชนและสิ่งแวดล้อมทั่วโลก การให้บริการจักรยานสาธารณะจึงได้รับความสนใจอย่างกว้างขวาง ด้วยการเป็นบริการสาธารณะทางเลือกในการแก้ไขปัญหาดังกล่าว ถึงแม้ว่าจะมีการให้บริการจักรยานสาธารณะที่เป็นไปอย่างมีประสิทธิภาพ และมีงานวิจัยที่ได้ชี้ให้เห็นถึงประโยชน์ของบริการนี้ แต่ในกรุงเทพมหานครกลับมีการใช้งานของบริการดังกล่าวอยู่ในระดับที่ต่ำ อีกทั้ง ยังไม่มีงานวิจัยเกี่ยวกับการศึกษาปัจจัยที่มีส่วนทำให้การใช้บริการจักรยานสาธารณะในระดับที่ต่ำในประเทศไทย ดังนั้น งานวิจัยนี้จึงมีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีผลต่อการตัดสินใจไม่ใช้บริการจักรยานสาธารณะในกรุงเทพมหานครจากมุมมองของผู้ใช้งาน ซึ่งการเข้าใจปัจจัยดังกล่าวจะเป็นประโยชน์ต่อการพัฒนาการให้บริการ ที่จะสามารถยกระดับคุณภาพชีวิตของประชาชน สังคม และสิ่งแวดล้อม ผู้วิจัยได้ใช้แบบสอบถาม และการสัมภาษณ์ในการเก็บข้อมูลที่สถานีบริการจักรยานสาธารณะ ลุมพินี 3 และ เอ็มบีเค เซ็นเตอร์ โดยข้อมูลที่ได้จะถูกนำไปวิเคราะห์เชิงปริมาณ และเชิงคุณภาพ ผลลัพธ์ที่ได้ชี้ให้เห็นว่าปัจจัยหลักที่ส่งผลกระทบต่อการตัดสินใจไม่ใช้บริการ คือ ลักษณะการให้บริการจักรยานสาธารณะ (ได้แก่ จำนวนสถานีบริการจักรยานสาธารณะมีจำนวนน้อยเกินไป และ จำนวนที่จอดจักรยานสาธารณะมีจำนวนไม่เพียงพอ) โครงสร้างพื้นฐาน (ได้แก่ ทางจักรยานไม่เหมาะสมต่อการขับขี่ และทางจักรยานไม่มีแสงสว่างเพียงพอในตอนกลางคืน) สภาพอากาศไม่เหมาะสมต่อการขับขี่จักรยาน (ได้แก่ อากาศร้อนและมลภาวะทางอากาศ) และมีการประชาสัมพันธ์บริการจักรยานสาธารณะน้อย

คำสำคัญ: จักรยานสาธารณะ บริการขนส่งสาธารณะ กรุงเทพมหานคร

Identifying Factors Affecting the Decision Not to Use Bike Sharing Service in Bangkok, Thailand

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Abstract

Nowadays, many cities are overwhelmed with various polluted transportation modes which cause traffic congestion, unsafety, and air pollution that affect people's lives and the environment all over the world. Currently, bike sharing has gained attention worldwide as an alternative to public transportation to address such issues. Although bike sharing was implemented effectively in many countries and many studies have illustrated benefits of bike sharing, it appears to have low usage in Bangkok as well as a lack of studies investigating factors that account for the low usage of bike sharing in Thailand. Thus, this study aimed to investigate factors affecting the decision not to use bike sharing service in Bangkok from the users' perspectives. Understanding the factors can help improve bike sharing service which could enhance the quality of life, society, and environment. Questionnaires and semi-structured interviews were employed to collect data at Lumpini 3 and MBK Centre bike sharing stations. Quantitative analysis and content analysis were applied to analyze the data. The findings showed that the decision of not using bike sharing was mainly affected by bike characteristics (a small number of stations and insufficient dockings), bike infrastructure (insufficient lights, improper conditions, and unavailability of bike lanes), bad weather (high temperature and air pollution), and little effort to introduce such service.

Keywords: Bike sharing, Public bike, Bangkok

1. Introduction

In many countries, problems from transportation cause numerous issues such as traffic congestion, unsafety, and air pollution. These issues affect people's lives and their environment, especially in Bangkok, Thailand. The increasing number of vehicles causes lots of traffic and pollution in the city. The Economic Intelligence Center of SCB reported that the proportion of car's possession in 2018 was around 227 cars for 1,000 populations, and the car market in Thailand tends to expand (Pantaweesak & Iampichaimongkol, 2017). In addition, in 2016, Bangkok was ranked the worst for traffic congestion out of 1,064 cities in the world (Inrix, 2016). Many studies have been conducted on solving transportation issues to help enhance quality of life, society, and environment. Recently, the bike sharing idea has gained a huge popularity all over the world and has spread worldwide as an alternative transportation, which produces low carbon for short-distance transit (Shaheen et al, 2011). It has been viewed as a healthy and efficient transportation mode in populated cities (Guo et al, 2017). Bike sharing is a shared use of a bicycle fleet among people in a certain area. It provides abundant benefits that could improve the quality of life, preserve environment, and develop the economy

(Shaheen, 2010). In addition, bike sharing was implemented effectively in many countries such as Brazil, Chile, New Zealand, South Korea, Taiwan, and the U.S., especially in China where there were 858,000 bicycles and was recognized as the largest bike sharing market (Mateo-Babiano et al, 2017). Although many studies have shown plenty benefits of bike sharing, it appears to have low usage in Bangkok after it was introduced a few years ago. According to service annual report by the Office of Transport and Traffic Policy and Planning, the bike sharing project 'Pun Pun' launched by the Bangkok Metropolitan Administration (BMA) was used only 50,156 times in 2018. In addition, other studies about bike sharing that have been conducted in Thailand mostly focused on facility management and its characteristic (Raha, 2015; Ueasangkomsate, 2014). However, few attempts have been done to investigate factors that affect the use of the service in Thailand.

Therefore, this study aimed at investigating factors affecting the decision not to use bike sharing service in Bangkok from the users' point of view to gain a better understanding of the low usage of bike sharing in Bangkok. By understanding those factors, it will help improve the service. People in Bangkok will have more choices of transportation mode that are healthier, more effective, and more environmentally friendly to the city. Furthermore, the study seeks to answer a research question: What are the factors affecting the decision not to use bike sharing in Bangkok, Thailand?

2. Literature review

2.1 Overview of Bike Sharing Program

Bike sharing is the system that provides public access to pick up and drop off bikes at numerous bike stations (Wang et al., 2018). There are four generations of bike sharing programs (Shaheen et al., 2011; DeMaio, 2009). The first generation of bike sharing programs was commonly known as the 'White Bikes System'. These bikes were painted in white and placed unlocked in the city center for public use in Amsterdam, the Netherlands. Unfortunately, this program was unsuccessful as most bicycles were stolen and damaged. The second generation of bike sharing programs was introduced in Denmark (DeMaio, 2009). The service provider improved many features of the system such as a new design for intense functional use (i.e. solid rubber tires and wheels) and coin deposit system. Users could insert a coin deposit for unlocking a bicycle throughout the city. However, this system also failed due to theft from anonymous users and the lack of usage time limit (Shaheen et al., 2011). The third generation, widely known as an IT-based system, was designed to prevent theft and raise the number of bicycle returns by adding several technological improvements for bike check-in and checkout including telecommunication systems, smart cards, and mobile phone access (DeMaio, 2009). One of the most recognized bike sharing services in this generation was 'Vélib' launched in Paris, France (Shaheen et al., 2011). It has expanded its service from 7,000 bikes to 23,600 bikes. Bike sharing has gained significant interest around the globe since then. Later, it had led to the fourth generation of bike sharing systems, known as 'Demand Responsive or Multi-Modal Systems'. A key feature of this generation is having smart cards that link users to a variety of public transportation modes for convenience (i.e. public bus or metro system) (Shaheen et al., 2011).

2.2 Factors Affecting Bike Sharing Service from Previous Research

Previous studies have discovered factors affecting the use of bike sharing around the world. Many researchers found that the bike sharing service demand was affected by the facilities of bike sharing. For example, bike sharing that used smart systems (electronically-locking racks and smartphone access) seemed

to gain more popularity and increase the use of bike sharing service (DeMaio, 2009). Also, the weather condition (El-Assi et al., 2015), trip distance (Keijer, Rietveld & Rietveld, 2000), and bike sharing transit (Nair et al., 2013) were important factors which played as key elements in determining the bike usage of customers. The characteristics of land use and built environment were also the factors. According to the Institute for Transportation and Development Policy (2014), it is shown that bike sharing users were more likely to walk to the closest docking station, when the stations were within 300 meters (Institute for Transportation and Development Policy, 2014). The same went for safety and convenience from roadway design. The well-built roadway design could help improve the bicycling environment and could affect the use of bike sharing (Buck & Buehler, 2012). According to the Seattle Department of Transportation (SDOT), bike route length, street lights, and street trees were also important factors. Even though many studies investigated the factors affecting the use of bike sharing in many cities and regions all over the world including Toronto, Paris, and the Netherlands, there is scant attention to investigating such factors in Bangkok.

2.3 Instruments Used in Previous Studies

Questionnaire survey was mostly used in the previous research on bike sharing programs. Using an on-site survey could help prevent respondents' misinterpretation of the questionnaire items. However, due to the fact that the respondents on-site were in a hurry and had a little amount of time to answer the questionnaire, they might refuse to give responses (Borecki et al., 2012). An online based survey approach can help researchers reach participants in a great distance region more easily and save time and cost. However, the online-based surveys work best with the Internet users who know how to respond back in a particular way such as email, website or mobile questionnaire (Mateo-Babiano et al., 2017).

2.4 Overview of Bike Sharing Program in Bangkok

Thailand has faced various issues such as traffic and pollution caused by the increasing number of cars. To improve the quality of life, a bike sharing program in Bangkok called 'Pun Pun Project' was launched in October 28, 2012, by the Bangkok Metropolitan Administration (BMA). Pun Pun was a non-motorized travel mode that served as a shared service. Users rented a bicycle for short distance transportation by checking out a bicycle from one docking station and returning it at a station near their destination. As an alternative way to travel within the city, Pun Pun helped people save time and fares, avoid traffic, reduce pollution, and improve health. Under the direction of BMA, there were only 100 bicycles and 12 docking stations with 8 parking lots. In the next step of the operation, the number of bicycles and stations would be increased up to 500 and 50 in the city, respectively. To register as a member of Pun Pun, the registration fee (320 Baht) was required, and the member must be over 16 years old. To encourage people to use the service, Pun Pun granted a free registration at the beginning which resulted in a rapid growth of memberships from 7,405 people in 2013 to approximately over 20,000 people in 2014. Moreover, Pun Pun also promoted their service through newspapers, social platforms, advertisements, and social activities. (Ueasangkomsate, 2014; Raha, 2015)

3. Research Methodology

In this research, there were two instruments used: questionnaire and semi-structured interview. The face-to-face questionnaire method was employed as the researchers were around to assist the respondents to fill out the questionnaire, while a Google form questionnaire was also prepared as an alternative. Before

conducting a survey on site, the questionnaire was reviewed and validated by an expert to ensure the content validity of the questionnaire and to reduce the ambiguity of the questions. It was also field-tested by a group of peers who had similar characteristics to the target participants. The questionnaire items were revised, accordingly. The questionnaire contains three parts with 29 items asking about demographic information, travel characteristics, and participants' opinions about factors affecting their decision on not using the bike sharing service in Bangkok, using five-likert scales (1 = strongly disagree and 5 = strongly agree). In addition, the participants were provided with an open-ended question to freely express their reasons why they did not want to use the service. After finishing completing the questionnaire, the participants were randomly selected to be interviewed. The questionnaire and the interview were conducted at two bike sharing stations, Lumpini 3 and MBK Centre. Conducting a questionnaire in the area that was closed to the bike sharing stations, researchers could reach the target participants which were both people who preferred to travel by using public bikes and those who preferred not to travel by using public bikes. The stations were selected by the use of a simple random approach to pick one of the top ten most-used and one of the top ten least-used stations according to the bike sharing (Pun Pun) usage data in 2018, from the Office of Transport and Traffic Policy and Planning. The data were analyzed by using IBM SPSS Statistics version 22 and content analysis.

4. Results and Discussions

4.1 Demographic profile

One hundred and twenty-one participants who either preferred not to use public bikes or experienced using public bikes answered the questionnaire. Sixteen of the participants were randomly selected to participate in the interviews. The participants who were unable to ride bicycles and who were under 16 years old were screened out as the minimum age is 16 to be eligible for registering for the bike sharing service. 58.7% was female. 40.5% was in the age group of 21-30 years, and 23.1% was in the age group of 31-40 years. The majority of the participants was made up of office workers (32.8%) and students (28.6%). 49.6% of the participants had an income between 10,001 - 30,000 baht per month, and 71.9% never used the bike sharing service.

4.2 Major findings

Table 1 illustrates the significant factors that affected the decision on not using the bike sharing service. The main factors are as follows:

4.2.1 Participant's perceptions toward bike sharing attributes

A small number of public bike sharing stations (Mean = 3.93; SD = 0.96) and insufficient dockings (Mean = 3.83; SD = 0.96) play a significant role in making the participants not use the bike sharing service. The results reveal that currently there were not enough stations to cover the users' destinations and that the participants were concerned about the availability of docking at the destination stations. When the dockings were fully parked, the riders had to return the bike at another station which was located further away, causing inconvenience. The finding of Zhao et al. (2014) pointed out that the availability of adequate number of stations accounts for an increasing number of daily ridership. The findings also suggest that the bike stations which had a very small number of uses should be relocated in the areas that have a higher demand for the bike service instead such as at BTS, MRT stations or public bus stations (Rixey, 2013). As a result, this will

increase the ridership. Unexpectedly, the factor of service costs was not the case (Mean = 2.85; SD = 1.00). This shows that the rate of service fee was reasonable.

4.2.2 Participant's perceptions toward bike infrastructure

The results reveal that insufficient lights on bike lanes at night (Mean = 4.22; SD = 0.86), unfavorable conditions of bike lanes (Mean = 4.18; SD = 0.96), and unavailability of bike lanes (Mean = 4.15; SD = 1.01) significantly affected their decision.

> "*It is very risky when I have to share the road with other vehicles. Careless drivers and reckless motorcyclists are very dangerous.*" [Interview ID 8]

> "*It is not convenient to ride a bike in Bangkok due to inappropriate bike lanes. When I ride a bike, I have to ride on unsmooth sidewalks which I have to carefully watch for pedestrians.*" [Interview ID 11]

The findings illustrate that users were concerned about safety and convenience when they travel. Thus, there is a strong possibility that people will not use public bikes if bike lanes are not properly provided. The result is consistent with the previous study done by Buck and Buehler (2012) which showed that the presence of bike lanes was positively correlated with bike sharing usage. To solve these issues, the Xfire Safety Light could help enhance the user's safety and reduce accidents by providing laser-generated bike lanes to signal other vehicles (Chant, 2012). Moreover, riding a bike at night will be safer if each bicycle attaches a head-up display (HUD) onto the bicycle (Dancu, 2015). For safety issues, using HUD projectors along with the Xfire light lanes helps a cyclist see other cyclists, pedestrians, or vehicles around them.

4.2.3 Participant's perceptions of weather as a negative factor

Most participants reported that inappropriate weather (Mean = 4.03; SD = 1.11) in terms of high temperature and air pollution is the key factor that has a negative effect on their decision on not using public bikes.

> '*Air and dust pollution*' [Comment from questionnaire ID 19]

> "*It is so hot. The weather makes me unable to stay outside for so long. Also, the air is toxic. So, it's not good to ride a bike.*" [Interview ID 7]

> "*The weather is extremely hot, so I do not want to ride (a bike) because my skin will get burned and it will cause me oily face and messy hair during a ride.*" [Interview ID 9]

Thus, it is certain that hot weather and air pollution could make riders feel uncomfortable to use the bike sharing service. The previous studies, however, presented different findings. That is, low temperature had a negative impact on the use of bike sharing due to the fact that most of the studies were conducted in cities with low temperature such as in Washington D.C., New York City, and Toronto (El-Assi et al., 2015; Martinez, 2017).

4.2.4 Participant's perceptions toward introduction of bike sharing to the public

The questionnaire results presented that little efforts were made to introduce bike sharing to the public (Mean = 3.83; SD = 1.03). This demonstrated that most people were not informed of the existence of bike sharing service which could affect the number of users because they did not know what bike sharing was

and where to use the service. There is a high possibility that people would use other transportation that they are familiar with, instead. The study done by Guo and his colleagues (2017) reported that the endeavor in introducing the service to the public resulted in growing satisfaction (17%) and usage level (8%). Therefore, to increase ridership, the service provider should focus more on promoting the service to public. As suggested by Yin et al (2016), the service provider is recommended that promoting the service in aspects of environment sustainability, social responsibility, and ethics could help raise awareness of people in the society.

Table 1: Factors Affecting Decision Not to Use Bike Sharing

	Respondents	Mean	Standard Deviation
1. The characteristics of bike sharing service		(M)	(SD)
1.1 Unsafe to use public bike	121	3.45	1.11
1.2 High cost per trip (Over 10 Baht)	121	2.85	1.00
1.3 Complicated initial registration steps	120	3.57	0.99
1.4 Unstable service system (i.e. the electric system error occurred and station closed)	119	3.33	0.87
1.5 Not enough 'public bikes' provided	120	3.53	0.99
1.6 Not enough 'docking station' provided	121	3.83	0.96
1.7 Unreadiness of bike condition	121	3.64	1.01
1.8 Improper maintenance of bike sharing stations (i.e. not hygienic, etc.)	121	3.56	1.02
1.9 Small number of bike sharing stations	121	3.93	0.96
1.10 Unattractive physical design of public bike	120	3.01	1.04
1.11 Unavailability of smartphone access	120	3.68	1.09
2. Bike Infrastructure			
2.1 NO bike lanes available	121	4.15	1.01
2.2 NO proper bike lanes provided (i.e. damaged bike lane, rough surface, blurry bike lane signs, etc.)	120	4.18	0.96
2.3 NO appropriate view along bike lanes (i.e. tree shades, etc.)	121	3.83	0.95
2.4 Not enough lights on bike lanes at night	120	4.22	0.86
3. Other Factors			
3.1 Long-distance between stations and destinations (>300 meter)	121	3.64	0.93
3.2 Existence of alternatives public transportation (within 300 meter)	121	3.72	1.00
3.3 Preferences to travel by owned vehicles (Car, Motorcycle, etc.)	121	3.68	1.18
3.4 Bad weather for biking (hot, rainy, etc.)	121	4.03	1.11
3.5 Little effort in an introduction of bike sharing service to the public	121	3.83	1.03

Note: answers were rated on five-point Likert scale (1 = strongly disagree and 5 = strongly agree)

5. Conclusion

This research explored the factors that have a negative effect on the citizens' decision on using the bike sharing service in Bangkok. Transportation issues have caused tremendous problems in Bangkok. Bike sharing which is widely used to solve the problems resulting from transportation has received little attention from people in Bangkok, which has triggered plenty of concerns to seek for the means to encourage people in Bangkok to use the service more. In this study, the results illustrate that bike infrastructure (insufficient lights, improper conditions, and unavailability of bike lanes), bad weather condition (high temperature and air

pollution), and little effort on introducing the bike sharing service to the public are major determinants affecting the decision on not using bike sharing. Based on the issues found, the service providers could develop by improving and promoting the service as discussed in the above section to solve the low usage problem along with transportation and pollution issues.

6. Suggestions and Limitations

The study was conducted in two areas of Bangkok whereas there are numerous stations operating in Bangkok. Thus, it is recommended that a further research study conducted in different parts of Bangkok be needed to gain an in-depth insight about the factors affecting the decision on not using bike sharing. Moreover, asking more interview questions to a wide range of Bangkok citizens to cover major factors from the results of this study is also recommended to gain a deeper understanding because only a few factors were clarified in this study.

Acknowledgment

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