

Exploring Consumers' Attitudes towards Second-Hand Book Sharing in China:

Motivations and Barriers

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Abstract

The traditional linear business model, together with the throw-away mentality, will accelerate the use of virgin resources. In contrast, growth in a circular economy will alleviate the use of finite resources in both production and consumption phases. On the side of consumption, the collaborative consumption/sharing economy is one of the solutions for reducing resource use. Consumers are important in the thriving of sharing economy. However, little knowledge is known about consumers' attitudes toward sharing models, particularly for books and other physical goods. China is one of those underexplored regions for such sharing models. Thus, the aim of this study is to investigate consumers' attitudes, motivations and barriers relating to sharing economy, with particular emphasis on second-hand books. Empirical data was collected through an online survey and following deeper interviews.

The results observed that though the overall attitude is positive for consumers engaging in second-hand book sharing, the trend that barriers outweigh motivations appears. And how motivations and barriers work may be case-dependent.

Keywords: Consumer Attitudes, Motivations, Barriers, Sharing Economy, Second-Hand Books

Executive Summary

Problem Definition and Research Questions

The traditional linear business model, together with the throw-away mentality, will increase the consumption level, continually consuming virgin resources and adding pressure on waste management at the same time (Gullstrand et al., 2016). In contrast, a circular economy will alleviate the use of finite resources in both production and consumption phases by applying and promoting the idea of reuse, repair, recycling, upcycling and etc. (Geissdoerfer et al., 2017).

In these consumption models, the collaborative consumption model/sharing economy is an emerging phenomenon that reduces resource use in the use phase of the products by sharing, swapping, exchanging, and bartering (Botsman and Rogers, 2010). To make the sharing economy possible to achieve, consumers' willingness to accept and use products via this model is one of the key factors. However, little knowledge is currently known about consumers' attitudes towards sharing economy.

Though increasing focus and research on sharing economy in recent years, the gap between theory and implementation still remain obvious, and this happens to be stronger when it is implemented in a different context (Catulli et al., 2017).

China is one of the underexplored regions for sharing economy. Particularly, the peer-to-peer-based sharing model, compared to the prevailing B2C sharing model in China, is less researched. And second-hand book sharing is one of the representative sharing models of peer-to-peer-based sharing.

This study aims to fill these gaps by addressing the following research questions:

RQ1: What are consumers' attitudes towards second-hand book sharing in China?

RQ2: What are the motivations and barriers perceived by consumers towards second-hand book sharing?

RQ3: Why do consumers have such attitudes, and why do they value these motivations and barriers?

Research Design and Methodology

To answer the research questions exhibited in earlier section, both the inductive and the abductive approach were adopted. To answer RQ1, the inductive approach was used to generalize what consumers' attitudes towards second-hand book sharing via literature review. The items identified in the literature review section are then used to form survey questions, in which RQ2 will be further answered. To answer RQ3, the abductive approach was used through conducting consumer interviews based on the results of the survey.

In this study, the empirical data collection was finalized through an explanatory sequential mixed method approach, including a quantitative survey and subsequent qualitative semi-structured interviews. The sequence for collecting empirical data is as follows.

- Literature reviews to get relatively sufficient knowledge on consumers' attitudes towards second-hand book sharing.
- Online survey to the consumers to further explore and validate consumers' attitudes, especially the motivations and barriers perceived by consumers for second-hand book sharing.

- Follow-up interviews to examine the reasons and/or meanings behind the consumers' attitudes.

This sequence includes the procedure of item generation, item purification, and item validation suggested by prior researchers (Churchill, 1979; Hollebeek et al., 2014).

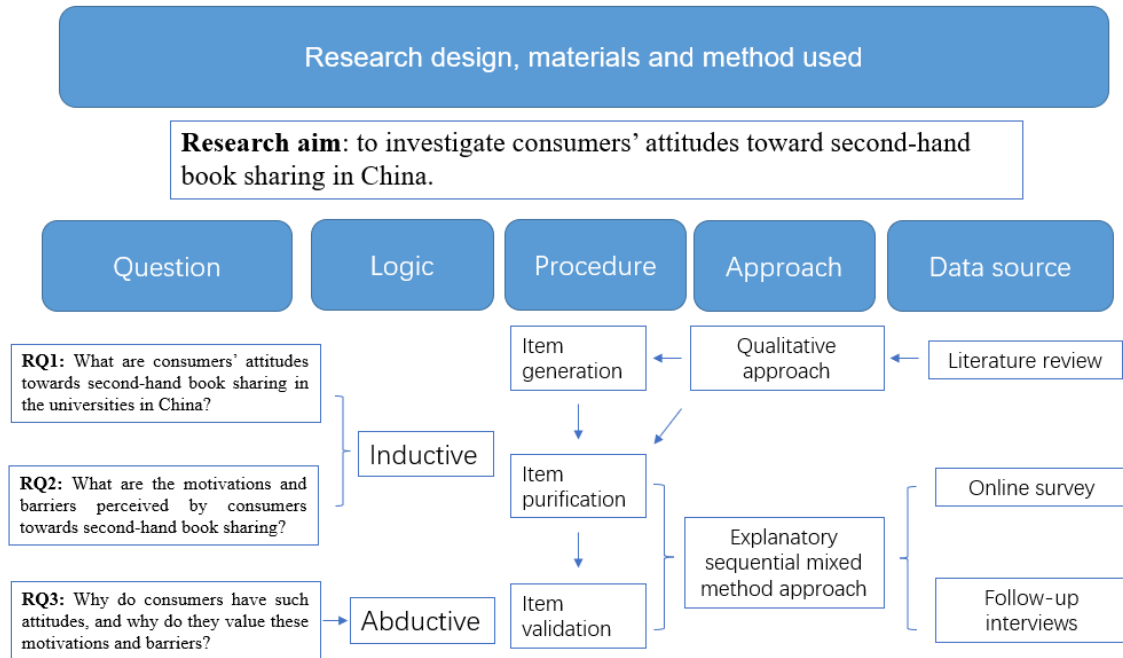


Figure I. Research Design and Methodology

Source: the author

Conclusions and Recommendations

The results of this study indicate an overall positive attitude for consumers in engaging in second-hand book sharing in the future. However, it seems that the barriers outweigh the motivations currently.

The two main barriers observed are the desire to own and a lack of trust in strangers. Many would perhaps turn to online second-hand book sharing platforms to avert these barriers, but still, they remarked that the impractical and complicated processes involved in the online platform are another critical obstacle.

While conducting this study, some knowledge gaps were identified that need further research in the future. Research on second-hand book sharing or other sharing models are still in their infancy. It would be useful to conduct similar research, perhaps on other product groups, in other context in China or different countries to compare consumers' attitudes towards sharing models, as well as their motivations and barriers.

The notion of ownership is an interesting topic and is worth further research; for example, its changing or updating along with people's participation in various consumption models.

The intention of consumers got from this study can not fully reflect consumers' behavior. As the discrepancy between consumers' intention and behavior, especially for circular

consumption, is noted by other research (Lydia Zepeda and David Deal, 2009; Marie von Meyer-Höfer et al., 2015). Further study to fill this gap is worthwhile.

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Abbreviations

ANOVA Analysis of variance

B2B Business to business

B2C Business to consumer

SD Standard deviation

SDG Sustainable Development Goal

1 Introduction

Together with the rapid growth in the economy, in the past decades, the rapid development of globalization and the productivity of consumer goods has greatly accelerated the level of consumption worldwide (Murray et al., 2017). This dramatic growth in consumption has added significant pressure to the exploitation of natural resources and thus caused various environmental problems (Kaza et al., 2018). In the traditional linear model of production, many resources are simply converted to waste, such as ending in landfills (Geissdoerfer et al., 2017). Also, the mindset of “take and throw” was working to increase the consumption level, continually consuming virgin resources and adding pressure on waste management at the same time (Gullstrand et al., 2016).

In contrast to the linear model, the idea of a circular economy is based on slowing or even closing the material loop or having more sustainable product designs to maximize the utilization of materials and minimize the energy used and waste generated within the production process (Geissdoerfer et al., 2017). In other words, by applying and promoting the idea of reuse, repair, recycling, upcycling and etc., a circular economy makes it alleviated from the exploitation of finite resources.

On the side of consumption, several models work to reduce the resource use can be identified, for instance, consumption of second-hand products, access-based consumption (e.g. renting and leasing), and collaborative consumption (e.g. sharing) (Mont and Heiskanen, 2015; Gullstrand et al., 2016).

In these consumption models, the collaborative consumption model/sharing economy is an emerging phenomenon that reduces resource use in the use phase of the products by sharing, swapping, exchanging, and bartering (Botsman and Rogers, 2010). Collaborative consumption is a fast-growing movement around the world, and in its practice, not only physical products (e.g. cars, bikes, tools, and clothing) can be shared, but also space (e.g. accommodations), skills, services, time and etc. (Botsman and Rogers, 2010).

To make the sharing economy possible to achieve, consumers' willingness to accept and use products via this model is one of the key factors. However, little but slowly growing knowledge and literature available on consumers' attitudes towards the collaborative consumption model/sharing economy.

Focusing on the sharing economy, this study aims to fill the research gaps about the consumers' acceptance and attitudes towards it.

1.1 Background

The collaborative consumption model, or named sharing economy, usually refers to the peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services (Botsman and Rogers, 2010). With the emergence and the burgeoning of sharing businesses such as Airbnb and Uber happened in the US, sharing economy has attracted great attention around the world (Belk, 2019). Under this trend of expansion of sharing economy, the sharing business in China is also under rapid growth; the data from the State Information Center showed that in 2019 the transactions of the sharing economy in China accounted for 3.28 trillion Chinese yuan (China State Information Center, 2020).

The sharing economy in China has its own unique character because the landscape of the sharing economy may differ from the contexts of countries or urban due to various factors such as culture, social norms, values and etc. (Waes et al., 2020). In China, the B2C sharing models tend

to be dominant, for example, in the segment of mobility sharing the B2C sharing is dominant and the cars for sharing are owned by the company because of the short of ownership of personal cars in China (Mont et al., 2020). And B2C sharing model in China showed that the ownership often belongs to the company and the goods or services are often provided through IT solutions/services (Mont et al., 2020). In other product groups, for example, sharing of physical goods such as umbrellas, portable power banks, and household products are also mainly supported by the B2C sharing model in China (Mont et al., 2020). And accordingly, the literature about sharing economy in China mainly focuses on these B2C sharing models.

Compared to the prevailing B2C sharing model in China, the peer-to-peer sharing model is in the minority and is less researched. Sharing of books is a typical peer-to-peer sharing model in China. Sharing of used books/ second-hand books often happens in local communities (Zhou, 2015), on university campuses (Li et al., 2020; Yi et al., 2020), and via online sharing platforms (Zheng et al., 2019; Wang, 2021) in China.

Though less influence on the resource-saving compared to the car-sharing or bike-sharing, second-hand book sharing still has its value in contributing to a more sustainable lifestyle and has the potential to make the local communities more connected. The global book publishing industry accounts for \$112.5 billion in 2022 (IBISworld, 2021). And according to the data disclosed in 2010 by WWF, about 50% of the commercially harvested wood worldwide had finally turned into a paper product and was mainly driven by the global publishing industry (WWF, 2010). To apply more circular business models in the book publishing industry became increasingly important, and some idea of circularity has already been applied/ designed in the sector along the supply chain, for example, raising the efficiency of the material use, being responsible for chemical use, closing the loop of the production, and etc. Further, along with the basic rationale in the waste hierarchy that “reuse” is greener than “recycle”, a circular consumption model like sharing business also plays an important role within the supply chain of the book publishing industry. It is difficult to find data on how much wood of equal value is saved through the sharing of used books, but we can assume the potential environmental benefits of sharing of books from the waste hierarchy. In this regard, sharing such used books will bring them back from the waste to the resource again and thus extend their use-value, and this will to some extent, decrease the cost of waste management as well (Wang, 2018).

It should be noted that in this paper, the second-hand book sharing followed the rationale in Muñoz and Cohen’s paper “*A socioeconomic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of sub-utilized resources in society (2017)*”, and the key attributes of the concept second-hand sharing in this paper include both B2B, B2C, for -low-profit and non-profit initiatives, exchange, reuse, reselling, gifting. More details of this concept will be discussed in the literature review section.

1.2 Problem Definition

Though increasing focus and research on sharing economy in recent years, the gap between theory and implementation still remain obvious, and this happens to be stronger when it is implemented in a different context (Catulli et al., 2017). In China, on the governmental side, the circular economy as a key topic has been incorporated into the government’s Five-year Development Plan since 2006 (Zhu, 2017). On the market side, the relatively fast growth in the economy and the huge market potential make the Chinese market willing to apply circular business models. From a decision makers’ point of view, sharing economy is thus worthy of support.

To enable sharing economy, it is vital that future consumers are willing to accept and use products through various sharing business models. However, little knowledge is now available

on consumers' attitudes towards such sharing models. Exploring them helps reduce the knowledge gap and adds to the academic discourse regarding the consumers' acceptance and attitudes toward sharing economy.

The peer-to-peer-based sharing model, compared to the prevailing B2C sharing model in China, is less researched. And second-hand book sharing is one of the currently happening peer-to-peer-based sharing phenomena in China, which often happens on university campuses, in neighboring communities, or via online sharing platforms. Doing research on second-hand book sharing may gain more knowledge on people's reflections especially on the peer-to-peer-based sharing model in the Chinese context.

1.3 Aim and Research Questions

Firstly, this study is aimed to investigate consumers' acceptance and attitudes toward second-hand book sharing in China. Secondly, by combining the quantitative and qualitative research methods, this study will then investigate what are the underlying motivations and barriers relevant to changing consumers' consumption intention and behavior towards second-hand book sharing, as well as the possible reasons behind these motivations and barriers. Broadly speaking, this study will also contribute to adding the knowledge for the gap of sharing economy between theory and implementation, and will also add understanding to the non-mainstream peer-to-peer-based sharing model in China. Also, it aims to create better awareness within the sector among different stakeholders for better implementation and management of this sharing market.

Thereby the RQs are as follows,

RQ1: What are consumers' attitudes towards second-hand book sharing in China?

RQ2: What are the motivations and barriers perceived by consumers towards second-hand book sharing?

RQ3: Why do consumers have such attitudes, and why do they value these motivations and barriers?

1.4 Scope and Delimitations

The focus of this study falls under the sharing model for second-hand books or so-called used books. In this study, the rationale for second-hand book sharing follows the definition of "*A socioeconomic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of sub-utilized resources in society* (Muñoz and Cohen, 2017)." Plus, though "reuse" and "exchange" are the ideal circumstances of second-hand book sharing in this regard, other non-profit or low-profit second-hand shopping or reselling are also included. Gifting is also regarded as part of second-hand book sharing in this study.

As mentioned earlier, second-hand book sharing in China often happens on university campuses (Li et al., 2020; Yi et al., 2020), in local communities (Zhou, 2015), and via online sharing platforms (Zheng et al., 2019; Wang, 2021). University campuses are the easiest to gain access to, and the university students are chosen as the target group to do research in this study. It also should be pointed out that the sharing platforms mentioned here mainly work for quality inspection of books and delivering books between sharers and users without owning the books (Zheng et al., 2019).

1.5 Ethical Considerations

This study is not funded by any agencies or businesses; Thus, the results of the study will not be impacted by any stakeholders who might have an interest in this study. All the participants involved in this study were voluntary and retained the right and freedom to quit the survey or interview at any time. Permissions were got prior to the start of the survey and interview from the participants. And the non-business purpose (only for Master Thesis) was well disclosed and how the participant will contribute to the research was clearly stated. Before the interview officially started, allowances were requested from the interviewees on recording the session and the recordings will only be kept by the author. It needs to be pointed out that since the interviewees came from the answers where they filled in their contacts in the last question in the survey about their willingness to be interviewed, their anonymity was respected and was accordance with the survey. So, the personal information was not asked during the interview; only the questions testing/probing why they have chosen such motivations or barriers were asked. Plus, the interviewees were allocated a specific identifier (Ix) through the paper and thus the anonymity was kept. The material collected from the participants both on the survey and the interview will be kept on the author's own PC and cloud account for five years after graduation; and these will only be used for this research.

1.6 Audience

As this thesis is part of the EMP (Environmental Management and Policy) Master's Program, thus the International Institute for Industrial Environmental Economics faculty at Lund University may be my initial audience. As this study is going to provide a literature review and related summary of motivations and barriers as well as the consumers' attitudes toward the second-hand book sharing attitude in the Chinese context, especially for the university campus, thus, this study might be of interest to the academia who would like to explore the consumers' acceptance in sharing economy, especially for the peer-to-peer sharing business model in China (the mainstream sharing business model in China is B2C sharing). Also, this study could be relevant to the online second-hand book sharing platforms that would like to explore consumers' acceptance of this sharing model, especially among university students in China. Plus, this study could also serve as market research for the organizations or student groups within the universities, external green organizations and sharing companies, and even some physical stores having some business related to the second-hand book sharing to have a better understanding of consumers' thoughts on the second-hand book sharing in China, which perhaps could contribute to their initiative in implementing sharing activities or businesses.

This study might also be relevant to the consumers in bridging the connections between consumers and academia and business. And as the sharer and user could be the same person in the second-hand book sharing, it is beneficial to let them to have a better understanding of this sharing model, especially on the acceptance of consumer, which could be of help to increase the overall acceptance of this sharing model.

1.7 Disposition

This thesis progresses as follows,

Section 1 introduces the backdrop of this research and defines the research question. The aim of the research, the research questions, and the research scope are also stated in this section.

Section 2 provides a literature review on the perception of the concept of sharing economy, its terminologies, characteristics, benefits, etc. This chapter also includes the implementation of the

sharing business on second-hand book sharing. In accordance with the aim and flow of this research, the literature of the summary of the motivations and barriers for consumers towards second-hand book sharing is conducted followingly, which is the base of the designing for the following online survey and interview method to collect empirical data.

Section 3 describes how this research was designed and the rationale behind it. It explains why the methods - literature review, online survey and the following interview are used in finalizing this research, as well as the methods and basic statistical tools for analyzing the data collected by such methods.

Section 4 discloses the results and analysis of the methodes of interviews and surveys. It draws a big picture of the attitudes of consumers within the university campus in China towards second-hand book sharing. Further, the vital motivations and barriers, as well as the analyses of the correlation between these factors and different data groups that author chose (e.g. gender group).

Section 5 discusses the main findings of the study. The implications and overall reflections of this study are included by connecting the results of section 4 and section 2. The reflections about the limitations to this study is also included in this section.

Section 6 concludes the main findings of this research and also provides recommendations for future study.

2 Literature Review

2.1 Theoretical Foundation

It is common sense that natural resources are the fundamental support for human productivity and other economic activities. However, such resources are scarce and limited. In the traditional linear model of production, many resources are simply converted to waste, such as ending in landfills (Geissdoerfer et al., 2017). Also, the mindset of “take and throw” was working to increase the consumption level, continually consuming virgin resources and adding pressure on waste management at the same time (Gullstrand et al., 2016).

In contrast to the linear model, a circular economy makes it alleviates from the exploitation of finite resources. On the consumption side, for example,

sharing economy works under the primary mechanism of the circular economy, especially for slowing the loop, closing the loop, and extending the utilization phase of the product to raise the resource efficiency (Mentink, 2014, p. 24; Mont et al., 2017, p. 12; Bocken et al., 2016, p. 5).

2.1.1 Sharing Economy

Terminologies

Before the sharing business burgeoned over past decade, researchers had already discussed the definitions or terminologies of the sharing economy, and this issue kept concern and discussed by researchers continuously. Some possible terminologies discussed by researchers over past two decades were: “product-service system (Mont, 2002)”, “collaborative consumption (Botsman and Rogers, 2010)”, “transactions without transfer of ownership,” or so-called “ access-based consumption (Belk, 2019)”, “peer-to-peer based activities of exchange (Dąbrowska & Gutkowska, 2015)”, “resources circulation system (Ertz et al., 2016)”, and etc. Further, some scholars had also discussed the vague boundary of this concept and further raised a more comprehensive framework - they positioned the sharing economy into three foundational cores: (1) access economy; (2) platform economy; (3) community-based economy (Acquire et al., 2017).

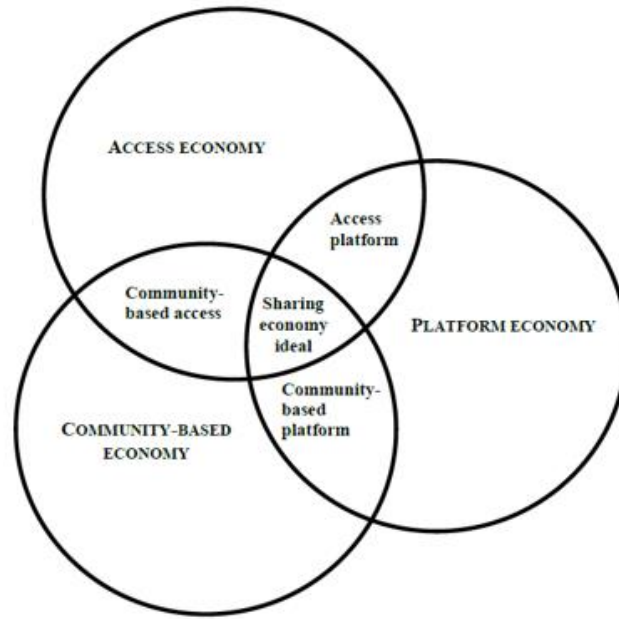


Figure 2-1. Three foundational cores of sharing economy

Source: adapted from Acquire et al. (2017)

In this regard, the ideal sharing economy combines the three cores mentioned above and falls in the mix set in the middle of the Figure 2-1 (see Sharing Economy Ideal). However, in practice, a certain implementation of a sharing model may fall into one specific area or one intersection area between two cores in Figure 2-1; for example, accommodation sharing businesses like Airbnb or car-sharing businesses like Didi in China are the examples of the Access Platform. When it comes to the sharing of second-hand books, the typical sharing model in which people share the used books among peers falls into the intersection area of the Access Economy and Community-based Economy – see Community-based Access area in Figure 2-1. In this regard, people share the idling books and extend their utilization value (Access Economy) with a non-contract and non-monetization (Community-based Economy) aim and way among peers (Acquire et al., 2017). Interestingly, with the support of Internet Technology, the emerging second-hand book sharing online platform (mentioned in the introduction section) added new understanding to this sharing model in the Chinese sharing context within the past decade, which makes the second-hand book sharing model into the middlemost set area in the Figure 2-1 as the Sharing Economy Ideal.

In regard of the vague boundary of the concept of sharing economy, various researchers also discussed the spectrum of this concept from a narrow perspective to a broader perspective (Acquire et al., 2017). For example, Benkler deemed that the sharing economy should happen in the social sharing systems rather than the market (2004); Thus the sharing models happened in the marketplace is excluded from this concept but gifting is accepted as sharing (Benkler, 2014). However, Belk raised the concepts of true sharing and pseudo-sharing, and although the true sharing concept in this research exclude the commercial exchange happened in the market place similarly as Benkler put (2004), Belk's true sharing excludes gifting (2014). Many researchers agreed that the sharing economy promotes access instead of ownership (Stephany, 2015; Cockayne, 2016; Eckhardt and Bardhi 2016; Frenken and Schor 2017). Stephany (2015) and Cockayne (2016) emphasized that the process in the sharing model without transferring the ownership should be happening via the online digital platforms. And Cockayne (2016) further restricted the online digital platforms into the peer-to-peer ones, but the

conceptualization in Stephany (2015) showed that both the peer-to-peer platforms and B2C platforms like Zipcar work for the concept of sharing economy. On the monetary side, Stephany (2015) and Cockayne (2016) also somewhat disclosed the profit-driven characteristics of the concept of sharing economy in their researches, however, Eckhardt and Bardhi (2016) and Frenken and Schor (2017)'s research did not specifically emphasize on this point and showed the non-profit driven ways are acceptable in this concept.

In a broader perception of the concept of sharing economy, many scholars emphasized the vague boundary of this concept and various forms included in this concept (Lessig, 2008; Botsman, 2013; Schor, 2014; Habibi et al., 2017; Muñoz and Cohen, 2017). For example, in Habibi's (2017) hypothesis, the author disclosed that the diverse field with hybrid forms is one of the characteristics of the sharing economy and that the sharing economy includes the continuum area between "true sharing" and "pseudo-sharing" instead of the binary classification "true sharing" and "pseudo-sharing" mentioned in Belk (2014). A broader perception of sharing economy often showed relatively loose restrictions on the conceptualization, especially on whether it is profit-driven or non-profit-driven. Schor (2014) summarized that the sharing activities basically have the following characteristic: recirculation of the goods, increased utilization of the durable assets, exchange of the services, and sharing of productive assets. It needs to be pointed out that besides the physical goods, Schor (2014) disclosed the sharing of services and Botsman (2013) disclosed the sharing of place and skills or time to stuff as part of the diverse field with hybrid forms within the sharing activities in their researches.

This study adheres to the conceptualization of the sharing economy in a broader way of understanding as disclosed in Muñoz and Cohen's paper "*A socioeconomic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of sub-utilized resources in society (2017)*", and the key attributes of the concept second-hand sharing in this paper include both B2B, B2C, for -low-profit and non-profit initiatives, exchange, reuse, reselling, gifting. By applying this conceptualization, the author intended to cover most of the common sharing methods happening in the current Chinese sharing business. Also, it is also needed to point out that B2B and B2C methods of sharing models were included here because in the real practice of sharing business in the Chinese market, there exists more than one single method of sharing economy. In other words, even a peer-to-peer leading sharing model may have some B2C or B2B elements. For example, in this study, the online second-hand book sharing platforms still included some B2C services (Wang, 2021).

Besides the advantages of sharing economy that could promote financial benefit, societal experience, and improve the life quality of people, it also may have some positive environmental externalities by using the sharing economy platform (Albinsson et al., 2019). For example, the sharing economy provides opportunities for the reduction of the total resource use and carbon footprints (Mi & Coffman, 2019) and the reduction of pollutants, emissions, and energy expenditure (Albinsson et al., 2019), and the promotion of the resource efficiency in the production (Leismann et al., 2019). And the sharing economy also has the benefit to achieving the UN's SDG goals by increasing economic efficiency and information transparency (Mi & Coffman, 2019). Though the potential of the sharing economy in sustainability is praised, we cannot hastily regard all the sharing models to be sustainable because sustainability would be case-dependent (Albinsson et al., 2019). Acquire et al. (2017) also disclosed the sharing economy's contested nature; for example, the sustainable motivation would perhaps finally become the secondary motivation in the sharing case in which it aimed initially at sustainable promise. Other cases or phenomena that happened in sharing economy also remarked the gap

between theory and implementation regarding sustainability (Fishman et al., 2014; Tussyadiah & Pesone, 2016; Parguel et al., 2017).

2.2 Understanding What the Consumers' Attitudes Are about: Motivations and Barriers Perceived by Consumers for the Second-Hand Book Sharing

Consumers' attitudes towards second-hand book sharing are, as well as their motivations and barriers, diverse in the literature. Some motivations and barriers in the following small sections also came from the motivations and barriers for second-hand shopping or renting. Still, they could also apply to the case of second-hand book sharing conceptualized in this study.

2.2.1 General consumer attitude

Research on consumers' attitudes and behavior showed that discrepancies existed between attitudes and behaviors; for example, consumers' actual behaviors might not be positive though they retain the positive attitudes (Anja Kollmuss & Julian Agyeman, 2002). Such discrepancies are more evident in the cases of environmentally significant behaviors, for example, purchasing green products (Lydia Zepeda and David Deal, 2009; Marie von Meyer-Höfer et al., 2015). Similarly, under these circumstances, consumers would finally choose a traditional consumption model rather than a sharing business model even though they have positive attitudes toward sharing economy; in other words, the positive attitudes toward sharing economy do not necessarily lead to the resulting participation in sharing economy (Armstrong et al., 2015). Further, consumers' attitudes toward sharing economy do not stay stable or constant but are influenced by their personal factors and social factors, such as life stage, economic conditions, and etc. (D'Agostin et al., 2020). Also, though the sharing businesses could be free or cheap, still large amounts of consumers would be hesitant or reluctant toward sharing economy due to various reasons (Tukker, 2015).

In general, though the concept of sharing economy has been gradually well known among people in the recent decade and has been applied into several product groups such as car sharing, bike sharing, and clothes sharing, its market share remained low compared to the whole consumer goods market (Borg et al., 2020). And the overall acceptance of sharing business also remained low among consumers (Tunn et al., 2019). Also, even though internet technology spurred the sharing market and more diverse modes of sharing in the past ten years, such as sharing of services and skills, consumers' attitudes towards the sharing economy changed dramatically (Gullstrand et al., 2016).

2.2.2 Motivations

Although not sufficient knowledge on consumers' acceptance on second-hand book sharing can be found, generally some motivations from the research of the broader second-hand product market can be summarized, such as economic reason (e.g. money-saving), convenience reason (e.g. time and effort savings), and ideology reason (e.g. need for uniqueness and recreation) (Padmavathy et al., 2019); and the environmental awareness (e.g. resources saving) (Liu et al., 2021).

As mentioned above, internet technology spurred the growth of sharing economy in the past decade. The internet platform played a rather important role in both monetary sharing (e.g. car-sharing businesses and accommodation sharing businesses) and non-monetary sharing (e.g. non-monetary hospitality sharing platform) basically by reducing the transaction cost of matching sharers and users and making it easier in sharing their resources among the peers

(Gullstrand et al., 2016). Also, convenience (Zheng et al., 2019), good quality of services and promotion (Wang, 2021) are regarded as advantages and motivations of the online book sharing platforms in China. Gullstrand et al. (2016) note that the motivations for sharing or exchange vary greatly, depending on whether the purpose of the sharing is monetary or not. The need for contact and reciprocity, the desire to belong to a community, and pro-sustainability reasons are deemed as motivations for the non-commercial sharing platforms (Gullstrand et al., 2016). And for commercial sharing platforms, the economic interest and convenience are the motivations that outweigh the reciprocity mentioned above (Zvolska, 2015). Further, the motivations for sharing or exchange also vary greatly depending on the types of products; for example, small products like films, toys, and books are more likely to be shared because their value decreases dramatically after first use (Botsman and Rogers, 2010). Also, researchers found that for the products only have temporary use, for example, children's products (e.g. crib), sharing of such products might be more environmentally beneficial than purchasing or owning the products (Mont et al., 2006).

For the aspect of environmental awareness, the willingness to reduce consumption-related waste is regarded as a motivation for participating in sharing activities (Burgio et al., 2014). Guiot and Roux (2010) note that some consumers see the benefits in consuming less and would like to express their personality via purchasing second-hand products. And in the ideology considerations, some people are motivated by sharing economy because they can have fun using it and feel cool (Gullstrand et al., 2016). And in practice, the opportunity to test the products (Rexfelt and Hiortaf Ornäs, 2009) and the opportunity to change the products more frequently (Borg et al., 2020; Gullstrand et al., 2016) are identified as motivations for sharing economy. The possibility of getting access to the products that no longer available in shops motivated consumers (Gullstrand et al., 2016). And the possibility of finding rare books through online book sharing platforms also motivated a group of users in China (Wang, 2021).

Catulli et al. (2013) noted that flexibility is one of the motivations for sharing economy, in which the users might feel a sense of freedom for not owning the product but only having access to the product when it is necessary to use it. Similarly, Lu et al. (2016) also identified flexibility as a good motivation for textbook sharing in the context of universities in Shanghai China, in which it will save physical space for the students. However, the definition of flexibility varied in the research on sharing economy, for example, Bardhi and Eckhardt (2012) in the similar rationale mentioned above, noted that people regarded car-sharing as more flexible than owning a car. But Baumeister (2014) mentioned that people considered the private ownership of the car as more flexible than car-sharing.

2.2.3 Barriers

Deep rooted in the modern consumer culture, the ownership or the desire to own (Wallendorf and Arnould, 1988), is one of the strong barriers for sharing (Mont,2004a). Ownership, in some cases, is the guarantee for consumers' sense of safety and could ease their anxiety about not owning (Gullstrand et al., 2016). Also, owning the products means complete control over them; consumers could do whatever they want to the products without worrying about the sanction fees that happened in renting or sharing (Gullstrand et al., 2016). Ownership could also add value to consumers' social status or their emotional value (Tunn et al., 2019).

Though unfamiliarity with the concept was not highly discussed in the research on second-hand book sharing, but has been identified as an obstacle for other products in sharing (Mont, 2004b). And whilst economic reasons, which are free or cheap, are often regarded as motivations for sharing, Besch (2005) and Gullstrand et al. (2016) also disclosed that these could be obstacles under some circumstances, for example, for long term use renting or sharing could be more expensive (Gullstrand et al., 2016).

The initial sharing economy happened mostly among immediate family (Belk, 2010), and though it gradually developed and expanded into sharing among strangers, many people feel uncomfortable sharing their resources outside the family members. Lack of trust is one of the strong barriers to sharing (Botsman, 2012; Schor, 2014).

People are not willing to be involved in sharing because it would be impractical and complicated (Gullstrand et al., 2016). Similar barriers are noted for second-hand book sharing both online and on-site in China (Lu et al., 2016; Teng et al., 2019). Concern for hygiene (Gullstrand et al., 2016; Teng et al., 2019), low quality of books or services and unclear channels and insufficient promotion (Teng et al., 2019) are also identified as barriers for second-hand book sharing. Last but not least, the overlap of local library and book sharing in function would be identified as an obstacle.

2.2.4 Summary

The motivations and barriers are summarized in the tables below, which provide a framework to form survey questions, as well as the backdrop for the follow-up interviews.

Table 2-1. Motivations identified in the literature

Economic reasons	Free or cheap; money-saving
Environmental reasons	Resource-saving
Ideological reasons	To express my personality
	To be unique
	Feel fun and cool
	Feel freedom and flexibility
Online platforms	Convenience
	Efficiency in logistics
Personalized purpose	To change books more frequently
	To read more
	To test before purchasing
	Searching for rare books no longer in the sale or out of print
Connection to community	To associate with people or group
	To find people with similar reading interests
Library related reasons	To find the books not involved in the library

Source: the author

Table 2-2. Barriers identified in the literature

Unfamiliarity	Not familiar with second-hand book sharing and sharing economy
Ideological reasons	Desire to own
Connection to community	Low trust for sharing with strangers
Online platforms	Impractical and complicated steps involved
Services	Low quality of sharing services
	Low hygiene condition of books
	Low physical state of books
Library related reasons	Unwilling to share because books can be borrowed from library

Source: the author

3 Research Design, Materials and Method

This chapter will present how this research is designed and the processes for collecting and analyzing data toward the final outcome. It will explain the logic between each step within the research and will justify the author's design for those steps.

3.1 Research Design

To answer the research questions exhibited in earlier section, both the inductive and the abductive approach were adopted. According to (Blaikie & Priest, 2019), an inductive approach often aimed at establishing descriptions which are built on the data of characteristics and/or regularities collected for “What” question; and an abductive approach could incorporate the meanings, interpretations, motivations, intentions and so on, and works for answering both “What” and “Why” Questions. Due to the characteristic of each approach, they were accordingly designed into the related part of the research processes (See Table 3-1). To answer RQ1, the inductive approach was used to generalize what consumers' attitudes towards second-hand book sharing via literature review. The items identified in the literature review section are then used to form survey questions, in which RQ2 will be further answered. To answer RQ3, the abductive approach was used through conducting consumer interviews based on the results of the survey. This could offer the consumers an opportunity for expressing their deep thoughts on motivations and barriers questions based on the survey, or the intentions behind their attitudes.

To fulfill the above processes, the design is basically going to finalize the procedures including item generation, item purification, and item validation suggested by prior researchers (Churchill, 1979; Hollebeck et al., 2014). In the item generation procedure, the items are selected from the review of literature. The item purification procedure was partly included in the literature review, in which 7 Mandarin-based papers were added to test the item generated whether fits the local Chinese context. In this process, items will be modified or removed. Also, the survey has part of the function in item purification, if one factor does not fit in its group, this will be observed by the reliability test later. The item validation procedure in this study basically refers to both the online survey and the follow-up interviews. In the online survey, the items generated were converted into survey questions. The author used Wenjuanxing platform to design the survey and collect the responses online. A link to the survey was originally designed to be posted for a 15-day timeline, but it was extended for one week time in order to get more sufficient amount of answers. In-depth interviews after the collection of the data from the earlier online survey were then conducted, in which the author investigates the reasons why consumers have such attitudes based on the outcome of the online survey.

In this study, the empirical data collection was finalized through an explanatory sequential mixed method approach, including a quantitative survey and subsequent qualitative semi-structured interviews. The aim of applying this mixed-method approach is to get a more in-depth and comprehensive understanding to the research questions, compared to simply applying an individual qualitative or quantitative data (Creswell, 2014). The logic of this mixed method approach is also in accordance with the design, first, items generated will be exhibited with the validation of a designed online survey for exploring consumers' attitude on second-hand book sharing; Second, there would be in-depth interviews designed based on the earlier surveys. And the relevant sequence in this study to collect empirical data can be put as follows:

- Literature reviews to get relatively sufficient knowledge on consumers' attitudes towards second-hand book sharing.

- Online survey to the consumers to further explore and validate consumers' attitudes, especially the motivations and barriers perceived by consumers for second-hand book sharing.
- Follow-up interviews to examine the reasons and/or meanings behind the consumers' attitudes.

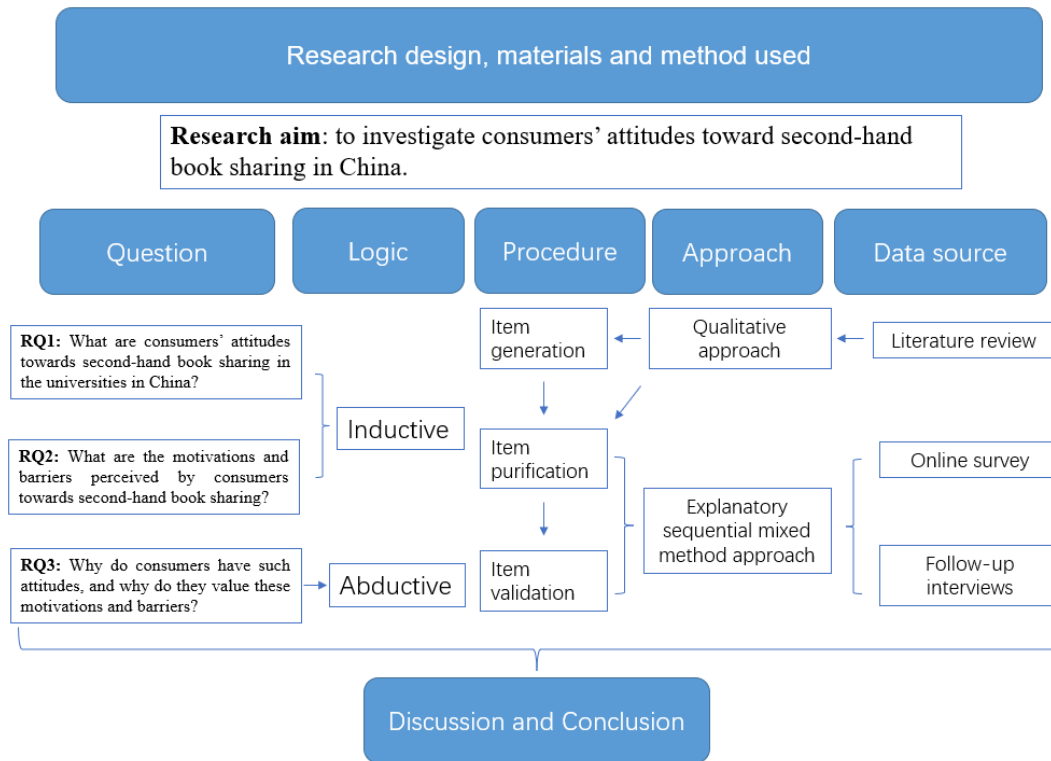


Figure 3-1. The research framework

Source: the author

3.2 Method Used to Collect Data

3.2.1 Literature Review

Firstly, the review of the literature was exhibited to get an initial and fundamental understanding of the concept of the sharing economy and to gather what is known or what is yet not known about the consumers' attitude towards the second-hand book sharing in China, which is also the imperative step in the item generation procedure.

As mentioned earlier, sharing economy varies in different culture, social norms, values and etc. thus a group of literature reviews in Mandarin are designed to be added in this section. This will double-check the items that generated from the literature review step fits the local context well, and will perhaps supply a few missing items or modify some items. This step is indispensable, because it will also double-check whether the literature reviews which are mostly focused on western backdrop fits the Chinese context.

In order to access pertinent research on this topic, the author identified and grouped the keywords into the following groups: sharing economy, second-hand book sharing, used book sharing, and consumer attitude. Further, the above groups of keywords were then explored through the online database called Scopus. Scopus is Elsevier's database which incorporates a sufficient amount of peer-reviewed high-quality literature in the top-level subject field such as

Social Science. The search was firstly conducted by using the option of searching within article title, abstract, keywords. And the initial searching for “sharing economy+concept” led to 1229 documents, “sharing economy+consumers attitude” led to 131 documents, and searching for “sharing economy+second-hand” led to 25 documents. The literature was then ranked by the “highest cited” option and the author scanned the titles, key words, abstracts of the paper to define whether this paper is of relevant, which were then further categorized according to the keywords. Also, the similar terminology has been used for searching, for example, collaborative consumption and sharing economy. More papers were further added via the method of snowballing (Wohlin, 2014), in which the bibliography of some key literature, especially the highly cited ones on this topic were consulted and more relevant papers were identified. Plus, 7 Mandarin-based paper were also added here to test whether the item generated fits the local Chinese context. They were searched from the Mandarin literature database CNKI (CNKI, n.d.), in which “second-hand book” as a key word to search from “theme” option, which lead to 228 academic papers. Similarly, the author finally selected 7 related paper to complement the literature review in Chinese context by scanning cited numbers, titles, key words, and abstracts.

3.2.2 Survey

Based on the motivations and barriers items generated from the literature review, the following survey was implemented in order to examine consumers' attitudes toward second-hand book sharing in China and, accordingly, to verify the items generated. The survey was designed and published with the support of the Mandarin survey platform Wenjuanxing. The survey questions were mainly quantitative, but also some qualitative questions, which was a suggested setup for large sample size (Trost, 2007). The survey was anonymous and was implemented in Chinese, and the English version of the survey questions will be provided for transparency reason (See Appendix A). The survey was designed into three sections. The core of the survey is section 2 in which two Likert scale questions are included. A Likert scale question is one of the most commonly used methods to gather scaled responses in survey research, and it works suitably to the research which aims to investigate respondents' acceptance and attitudes and their agreeing level on specific statements (Sachdev & Verma, 2004). This study used a five-point scale to examine consumers' attitudes towards second-hand book sharing. The choice of each question, “strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree” are identified for points 1-5 for the respondents to choose. Such scaling could provide enough options to distinguish among various attitudes without raising the burden and tiredness of respondents to describe (Sachdev & Verma, 2004). And to simplify the questions, not all the factors identified from the literature review are included, and some factors are grouped into one question. Also, to alleviate the impact of social-desirability in answering the survey questions, the items for motivations and barriers generated from literature review are then randomly ordered in the survey, not like they are categorized in several types in the literature review section. Social-desirability bias happens when the respondents are more likely to choose the answer which is more favorable (Podsakoff & Organ, 1986).

In total, three sections were included in the survey with 21 questions. Section 1 would ask the respondents about the general backdrop questions, including their general attitudes on second-hand book sharing and related backdrop characteristics such as their reading habit (the number of books read per year) and their cost of purchasing printed books during a certain period of time. The backdrop characteristics would also be added to the cross-tabulation analysis and statistical analysis in the data analysis section, to test whether a certain backdrop characteristic would have stronger impact on consumers' motivations or barriers for second-hand book sharing.

Section 2 includes 6 questions about motivations and barriers, in which a Likert scale question is used to investigate their agreeing level of the identified motivations and barriers. Q9 is a Likert

Scale question and asks about consumers' agreeing level of 12 different motivations identified from the literature review. Q10 is a ranking question and the respondents are asked to vote for their top 3 motivations from the list in Q9. Q11 is a following supplement question to Q9 and Q10, which is an open-ended, and the respondents could input the factors that they valued important but not included in Q9. Similarly, Q12-Q14 followed the similar flow but the questions are about the barriers. Section 2 was designed, in other words, the data collected from this section is expected as the main body for the following statistical analysis.

Section 3 includes the basic demographic questions. And it needs to be pointed out here that the last question of the survey Q21 asked about the respondents' willingness to participate in the following interviews. If they answered yes and filled in their contacts in this question, the author will try to reach out to them in this way.

The survey was designed as a cross-sectional survey and the data would be collected during one specific time point, in which 15 days were expected in this study. The survey was published online via an online survey platform called Wenjuanxing. The survey platform could accelerate the efficiency of collecting data via both links for online website and QR links for social media, and since it is based on Mandarin so it would distribute the survey more fluently in the Chinese context. The link of the survey would be promoted on some universities campus forum, and/or be distributed by the people that the author known in the university campus.

The information on potential environmental benefits of second-hand book sharing will be avoided in the survey, neither in the description nor in the questions, thus to reduce the social-desirability bias from answering the survey by the respondents.

When it comes to the sample size, since the large population of the university students (on progress) in China currently, approximately 35 million for 2021 (Chinese Ministry of Education, 2022), this study follows Fowler's (2009) strategy in which the following parameters are regarded important in accessing the appropriate sampling size: margin error, confident level for margin error, standard deviation (SD). The outcome of accessing the sampling size in this study is around 300, and the rationale and related formula can be found in the Appendix (see Appendix C).

3.2.3 Interviews

The interviews are aimed at generating a deeper understanding and perception of the results of the online survey, for example, to examine the reasons behind consumers' attitudes towards the second-hand book sharing. And the questions prepared for the interviewees are mainly focused on the motivations and barriers questions (section 2) in the survey. The interviews were all semi-structured interviews. And an interview guide was prepared (see Appendix B). In implementing a semi-structured interview, interviewees are allowed to reflect in a way that is deviated from the prepared guiding questions, and the nuances might be gained from this process (Bryman, 2008).

The interviewees were selected and reached out to by the following steps. The last question in the survey (Q21) was designed to ask respondents' willingness to participate in the follow-up interviews. The author will reach out to the answers who showed their interest in second-hand book sharing and left their contacts in this question. The interviewees were selected intentionally in this way, the respondents who answered yes to this question and left their contacts are more likely to be the person who has an interest in second-hand book sharing or perhaps had related experiences. And the anonymity in the interview was respected in accordance with the survey.

3.3 Method Used to Analyze Data

3.3.1 Literature Review

In this study, the approach of content analysis was applied to analyze the information obtained from the literature review process via a method of Synthesis Matrix. This method worked both for the item generation and item purification steps mentioned above. The author went through relevant papers and found out contents that are most related to this topic and put them into the matrix in excel. Sub-topics for categorizing the contents are: definition of sharing economy, benefits of sharing economy, motivations and barriers for sharing economy, etc. This method of Synthesis Matrix enables the author to gather useful information from the target papers in a more efficient way and make it more organized and easy to sort out for the further writing process. The review of 7 Mandarin-based paper were also added here to test whether the item generated fits the local Chinese context.

Section 2 of the survey (Q9 – Q13, see Appendix A) was then designed and generated based on this step by using the outcome of the literature review especially on the motivations and barriers of consumers' acceptance of second-hand book sharing in China. For example, one of the barriers would be the low hygiene conditions of the used books (e.g. dirty books).

3.3.2 Survey

This part acts as the main part of the data analysis in this research. Finally, 296 answers were received in total, not including the testing ones. By double checking the validity of the answers, the author manually screened out 15 invalid answers, thus leads 281 valid answers, which would work for the following analysis. The basic screening standards applied by the author are as follows: 1) time for filling the survey less than 180s (the suggested answering timing is 300s from pilot testing, and it is perhaps not realistic to finalize the survey in a reasonable way less than 180s) will be double-checked; 2) if further the answers in section 2 showed extreme high consistency, e.g. all strongly agree; 3) if the open answer questions were answered off-topic, then such answers will be excluded from the following statistical analysis from this initial manually screening. Data of all the answers are downloaded as an excel format, and the descriptive variable which decided to be applied with further statistical analysis will be transformed into a numerical variable in a way such as 1 for male, 2 for female, and 3 for non-binary.

Section two of the survey includes the motivations and barriers questions, and is the core part of the survey. As said earlier, after the initial screening conducted by the author manually, 281 valid answers were prepared for the following process of analysis. And the author chooses the basic statistical parameters Mean Value and standard deviation (SD) to examine the data from motivations and barriers questions and try to find out the most vital factors. Then the author would like to see the significance between various groups of variables via the statistical method T-test and ANOVA analysis. Detailed steps are as follows.

Reliability

As said above, the 281 valid answers passed the initial screening will be applied a Cronbach ' α ' analysis on motivation questions and barriers questions (Q9 and Q12, Likert scale questions) to examine the reliability of the answers. Cronbach ' α ' is a parameter to measure how closely related a set of items are, and often used to test the reliability of Likert scale questions in the surveys (Glen, n.d.). If Cronbach ' α ' is above 0.8, it indicates that the reliability of the set of items (here is answers to Q9 and answers to Q12) is good and is proper for following statistical analysis, and Cronbach ' α ' 0.6 often seen as the baseline (Tavakol & Dennick, 2011). Further, since the

motivations questions (Q9) and barriers questions (Q12) were originally formed from literature review respectively, thus it is logical to do two separate Cronbach ' α ' on Q9 and Q12.

Most vital Motivations and Barriers

After reliability test, Mean Value and standard deviation (SD) are used to analyse the outcome. Since the Likert scale questions were designed with five separate values 1-5, then 3 is chosen as a standard to examine the mean value. SD is used to measure the dispersion degree of a set of data. These two parameters are often going hand in hand and are often used to find out the central tendency (Mean Value) and dispersion extent (SD Value) of data groups and fit well for the data type and data volume in this study. For example, a higher Mean Value with a smaller spread of SD (\pm) is more likely to be an important factor.

Correlations of Descriptive Questions and Demographic Questions.

In order to examine if some consumer groups have a stronger influence on a certain motivation or barrier, a Student's T-test (hereinafter T-test) and Analysis of variance (ANOVA) are used to analyze the correlations between some chosen descriptive questions and demographic questions and motivations or barriers. These analysis were conducted via R language version 4.1.3 (R Core Team, 2022).

A T-test is used to analyze the correlations between two variables. In this study the gender data was chosen to do the T-test with motivations and barriers. It needs to be pointed out that although the non-binary is a choice designed in the survey, no answer had chosen it.

ANOVA analysis is used to analyze the correlation among multiple variables. In this study, it needs to be pointed out that since the target group is university students in China, which means the sampling itself has its own characteristics. This situation leads to some demographic characteristics not random variables for statistical analysis, and has its autocorrelation. For example, the data on salary condition, education level, and age group in this study are clustered in a certain area and is not randomly distributed. Thus, the answers to Q1 (Q1: How many printed books have you obtained on average per year during your studies at the university?) and Q2 (Q2: What is the average amount of money do you expect to spend on average for purchasing books per *month*?) were transformed into numerical variables for the ANOVA analysis towards the motivations and barriers.

For the results of T-test and ANOVA analysis, if $P < 0.01$, difference was extremely significant; if $P < 0.05$, difference was significant; if $P > 0.05$, difference was not significant.

Further, for voting questions in section two of the survey, frequency analysis by comparing the means is used to analyze the answers. A bar chart to show the top motivations and barriers in ranking will be presented.

In section 1 of the survey, questions were asked about the general attitudes and the related backdrop, and section 3 focused on demographic questions. A descriptive method is applied to analyze the data for those two sections in order to have a big picture of consumers' general attitude towards second-hand book sharing. A cross-tabulation method is used to analyze such intuitive data, and the internal connections within such descriptive data can be disclosed by charts with the percentage in the results section. For example, the gender ratio in the group who are satisfied with second-hand book sharing.

However, one thing needs to be pointed out here for the cross-tabulation analysis in this study. Consumers' attitudes could be impacted by various external factors, for example, monthly income, educational level, etc. However, as mentioned in the former section, some demographic

characteristics in this study have special patterns or characteristics; for example, a large amount of the respondents were undergraduate students and were in the similar age group, which makes it perhaps not effective to use these non random distributed data to do the cross-tabulation analysis. Thus, in this study, the author chooses three data groups gender, reading habits (Q1 in the survey), and cost for book per month (Q2 in the survey) as 3 variables to do the cross-tabulation analysis here and later for correlation analysis in the statistical analysis part.

3.3.3 Interviews

The language for conducting the interviews is Mandarin. All the interviews were recorded with the permission of the interviewees and notes were saved as well. Each interview section has two copies of recordings, however, interview 4 and 5 only recorded the sound of the author and very little sound of the interviewees due to the technical problems. Thus the record of I4 and I5 were mainly based on the notes taken by the author. As mentioned in section 3.2.3, the interviews are aimed at generating a deeper understanding and perception based on the respondents' answers to the survey questions, especially on the motivations and barriers questions. Following the abductive logic mentioned above, the author will discuss and categorize them into a part after the statistical analysis outcome in the next section to further complement the observed outcome. These interviews were partly transcribed, and the author categorized them mainly based on the category of motivations and barriers to further support the findings of the survey analysis. The outcome of the content analysis of interviews will be discussed in the discussion section together with other outcomes.

4 Results and Analysis

4.1 Demographic Characteristics

281 valid answers were generated from all the 296 answers received (not including the testing ones), with 15 invalid answers screened out through double-checking the validity of the answers by the author manually. As mentioned earlier, the basic demographic characteristics are included in section 3 of the survey, and the relevant analysis is based on the answers to this section of the survey, and see results of demographic characteristics in Figure 4-1. Among all the respondents, 278/281 valid answers showed that their status of education is progressing in the university, with the other 2 alumni and 1 answered rather not say. This outcome made sure that the role of our respondents fitted the target group that the author expected in this study as university students. And the majority, 73.31% (206/281) of the respondents' education level are Bachelor's Degree. As for age, the two main age groups are 47.33% (133/281) of 15-20 years old and 29.89% (84/281) of 21-25 years old. And for salary, 87.89% of the respondents' answers to the salary question finally fell between the area of 1000-3000 CNY, where three main groups 1000-1500 CNY, 1500-2000 CNY, and 2000-2500 CNY, with few answers falling in other choices. And when it comes to the gender question, 48.75% (137/281) identified themselves as female, and 51.25% (144/281) identified themselves as male, and 0% (0/281) identified themselves as non-binary.

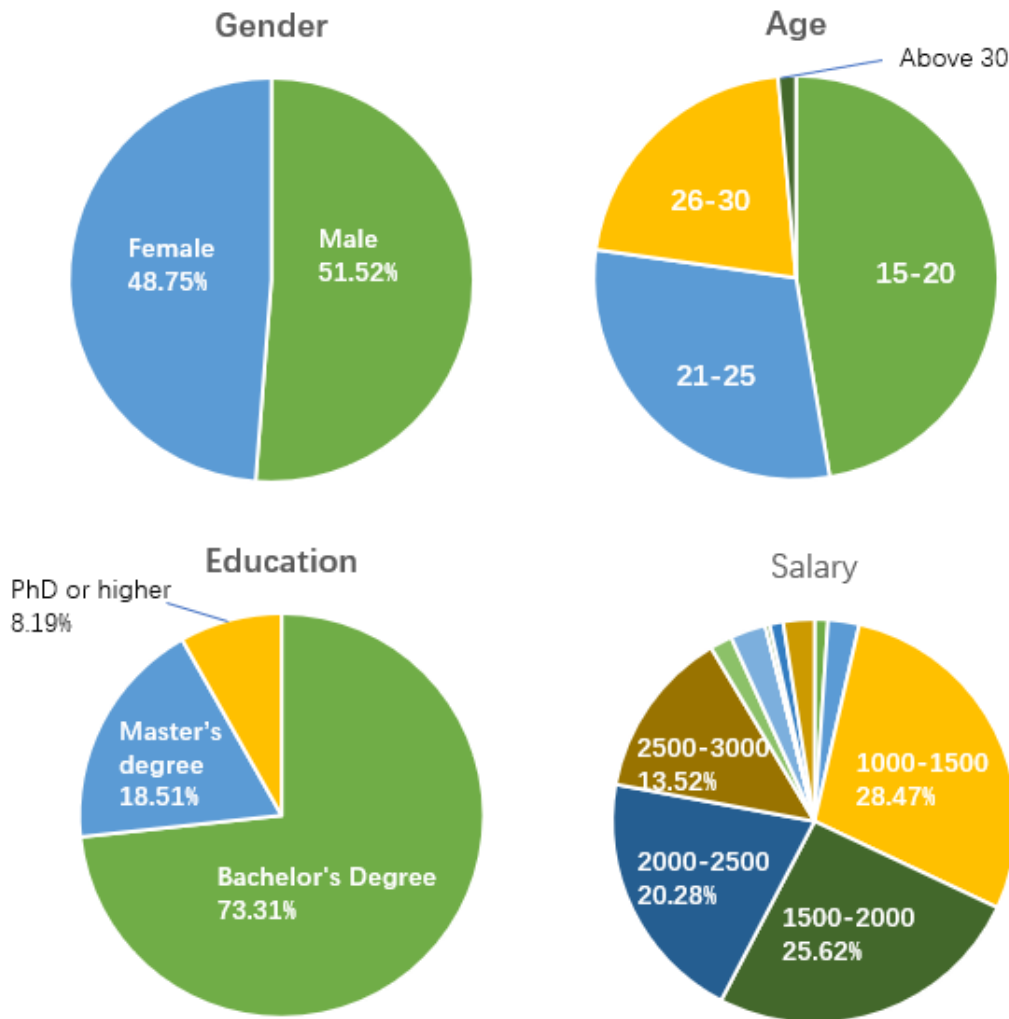


Figure 4-1. Demographic characteristics of sampling

Source: the author

4.2 Backdrop Characteristic of Consumers' General Attitudes

4.2.1 General Attitudes for Second-Hand Book Sharing

This part of the data is collected mainly from the section 1 of the survey. First of all, it should be noted that due to technical issue, only 72 valid answers collected for question 7 (Q7) in the survey. Thus the answer to Q7 will be analyzed separately based on the 72 valid answers and will not be linked to other data in analysis as the author originally expected.

The basic situation on general attitudes toward second-hand book sharing gained from the survey showed that 17.44% of the respondents had never heard about second-hand book sharing and the other 2.14% of respondents showed that they do not have any interest to the second-hand book sharing at all. Positively, 82.92% of respondents had participated in the second-hand book sharing at least once, and of which 39.86% as users (at least once) and 43.06% as sharers (at least once). In the group of students who have participated in the second-hand book sharing before, the majority showed their satisfaction, with few skipped this

question. In the group of students who have not participated in the second-hand sharing before, 58.33% showed that they had an interest in trying, the groups of “no interest at all” “no idea” and who skipped this question are at similar proportion, around 10% (based on 72 valid answers). The big picture showing the general attitudes of consumers towards the second-hand book sharing are as follows in Figure 4-2.

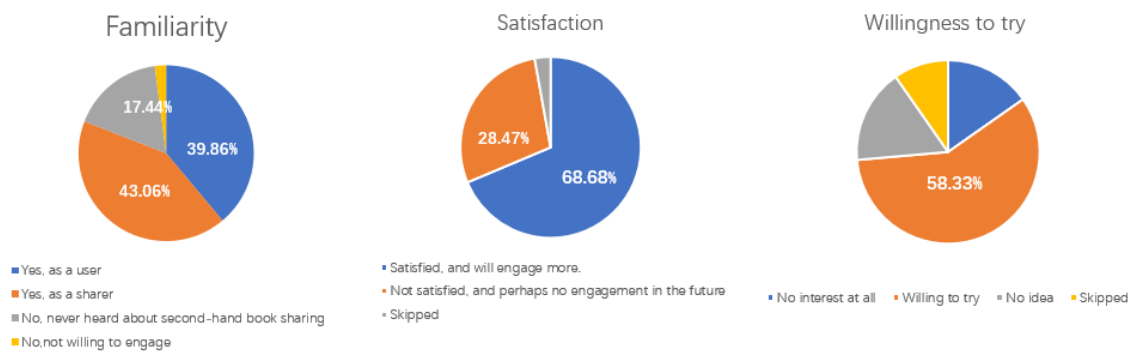


Figure 4-2. General attitudes of consumers

Source: the author

4.2.2 Correlations of Demographic Characteristics and General Attitudes

As mentioned in the methodology section, gender, reading habits (Q1 in the survey), and cost for book per month (Q2 in the survey) are 3 variables to do the cross-tabulation analysis. In the cross-tabulation analysis, the questions related to their past experience and future willingness will be focused. And only evident and obvious differences and patterns in cross-tabulation will be disclosed as outcome here in this section.

Gender

Between male and female respondents, there were no significant differences. For example, for past experience, 81.94% of male respondents had at least once participated in the second-hand book sharing, and 83.95% of female respondents for this choice. The only slight difference was that 34.47% and 47.22% of male respondents were more likely to be the users and sharers; however, the results in the female group were 45.26% and 38.69%. It seemed that the females were more likely to be the users and the males were more likely to be the sharers in this slightly different result.

Reading habits

This part of the analysis was based on the question Q1: How many printed books have you obtained on average per year during your studies at the university? For sharing experience, the results did not show significant differences among different groups. Only slight differences between the group of 30-50 books year and above 50 book per year. 37.5% as a user and 45% as a sharer in the group of 30-50 books per year and 37.5% as a user and 42.5% as a sharer in the group of above 50 books per year. It seemed that the more books you obtained, the more willing you would like to be a sharer.

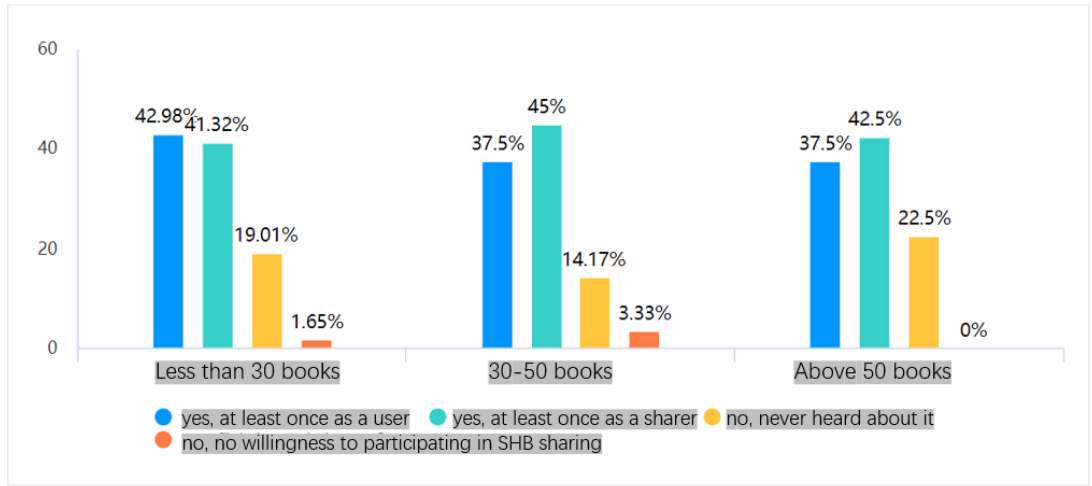


Figure 4-3. Cross-tabulation: reading habit – sharing experiences

Source: the author

For willingness in the future, there is no big difference among three groups. The majority are willing to try again in the future.

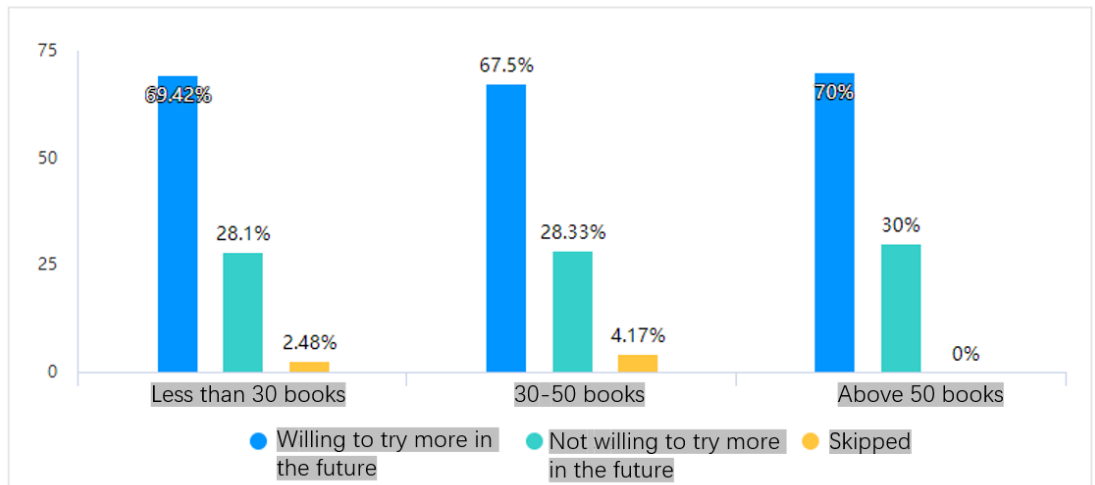


Figure 4-4. Cross-tabulation: reading habit - willingness in the future

Source: the author

Cost for Books per Month

This part of the analysis is based on the Q2: What is the average amount of money do you expect to spend on average for purchasing books per *month*? Firstly, responses choosing group “more” is not considered as only one responder were insufficient for meaningful analysis. It seemed that groups “100-150” “150-200” and “200-250” have a slightly higher rate in participating in the second-hand book sharing activities no matter as a user or a sharer, with rates of 84.84%, 85.29%, 91.31% respectively.

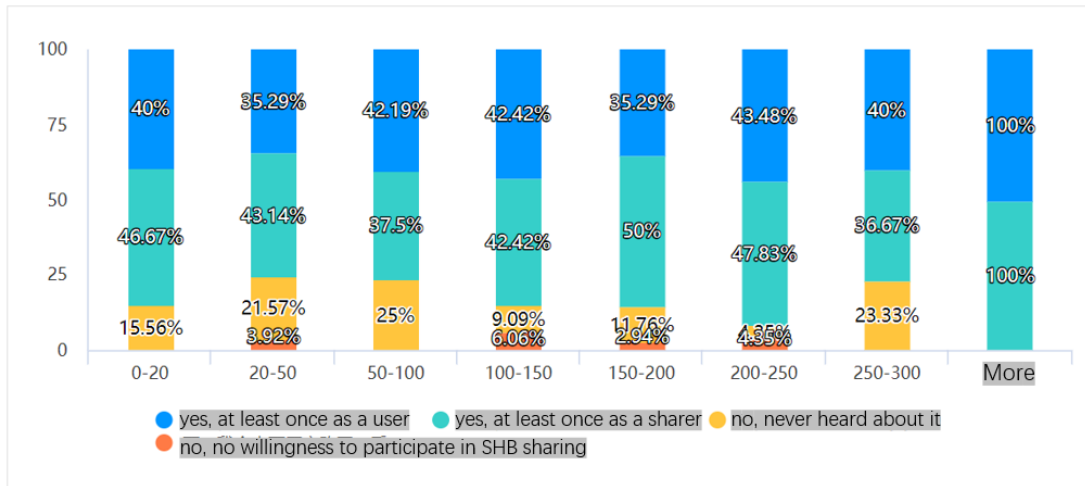


Figure 4-5. Cross-tabulation: cost for book per month – sharing experiences

Source: the author

Further, when it comes to their future attitudes, though all above 60% for willingness to participate in the second-hand sharing, a slight difference happened in the first two groups “0-20” “20-50” CNY per month, which are the only two groups higher than 70%, with the rates of 71.11% and 70.59%. It seemed that students who spent less on book purchasing per month showed more satisfaction with the second-hand book sharing and had more willing to participate more in the second-hand book sharing activities in the future.

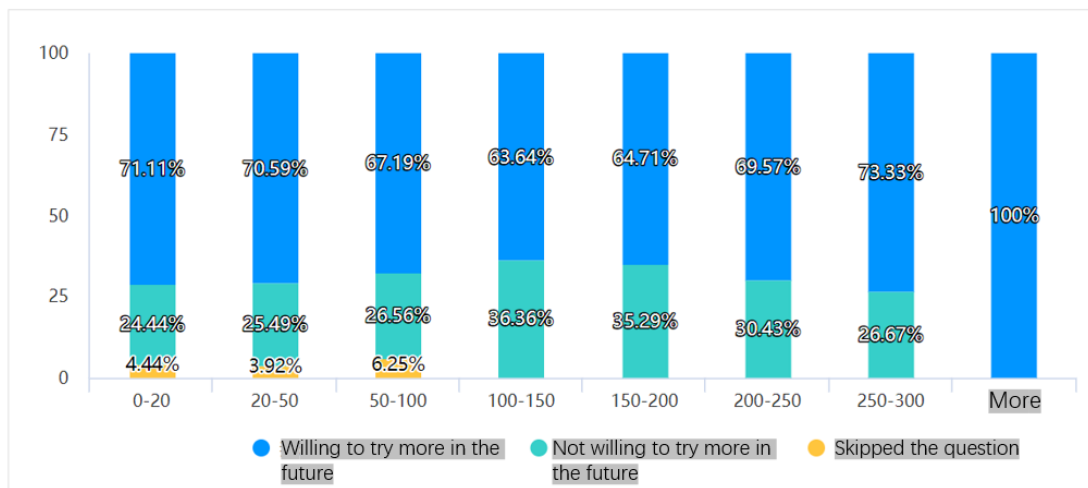


Figure 4-6. Cross-tabulation: cost for book per month – willingness in the future

Source: the author

4.3 Motivations for the Second-Hand Book Sharing

In this section, the analysis is based on questions 9-11 in the survey, including the Likert Scale question for motivations, a ranking question for top 3 motivations, and an open question for the respondents to fill in the other motivation factors that not included in the question 9 but they regard important in their decision-making. The core of these questions is the motivation question (Q9), where the respondents reflected on various motivation factors with a degree of 1-5, which indicated from strongly disagree to strongly agree. As can be seen from the survey,

1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree.

4.3.1 Descriptive Analysis for Motivations (based on Q9-Q11)

Reliability

As put in the former section, the reliability of the data will be first tested and prepared as a front setting for the following statistical analysis. In this study, all the answers to Q9 were first grouped into 12 data groups (M1-M12) classified by the 12 sub-questions within Q9. The Cronbach ' α ' test was first applied to these data groups (M1-M12) for the reliability test, and the coefficient calculated out was 0.9658, which was above 0.8 and indicated the reliability of these group of data was good and further analysis can be more reliable based these data. And the data groups (M1-M12) identified from this step will be continuous to finalize the following statistical analysis.

Consumers' Agreeing Level of Motivation in Q9

Mean value and the SD are applied to analyze the agreeing level of motivation factors of consumers in this step. The results were as follows. 2 digits after the decimal point were used to present data, and the full value can be found in Appendix (hereafter the same).

Table 4-1. Mean Value and SD for motivations

Data Group	Related statements in Q9	Mean Value	SD (\pm)
M1	In the second-hand book sharing I could find books that that are not included available in libraries.	3.74	1.28
M2	The second-hand book sharing could save me a certain amount of money.	3.83	1.27
M3	The second-hand book sharing makes it possible for me to change books more frequently and read more.	3.81	1.20
M4	The second-hand book sharing makes it possible for me to get associated with people or groups which share the common interest with me in reading within the campus/community/neighborhoods.	3.85	1.19
M5	Participating the second-hand book sharing makes myself to be unique and could express my personality.	3.69	1.25
M6	I feel a sense of freedom and flexibility when sharing the second-hand books.	3.86	1.16

M7	I feel the second-hand book sharing especially practical for the textbooks which will no longer be used after the course exams.	3.82	1.34
M8	I like second-hand book sharing because it could save resources and reduce the cost on waste management – it makes more sense to share than to abandon, and it could be one of the sustainable lifestyles.	3.86	1.27
M9	Online platforms for second-hand book sharing make it more efficient on quality inspection and delivering to the receiver.	3.83	1.22
M10	Second-hand book sharing seems fun and cool, and I am willing to have a try.	3.79	1.23
M11	Second-hand book sharing offers me the opportunity to test the books whether I really want to read.	3.74	1.28
M12	The second-hand book sharing makes it possible to find books that are no longer on sale in the shops or online shopping platforms.	3.99	1.13

Source: the author

All the data from M1 to M12 are all above 3, which means the respondents basically agreed with all the factors involved in question 9 in the survey. Top 3 important factors are: M12, M6, and M8. Finding books that are no longer on sale in the shops or online shopping platforms (M12) was regarded as the first important factor in second-hand book sharing motivations from the results. The factor related to freedom and flexibility (M6) and the factor related to the environmental benefit (M8) are also important factors. Besides, the factor related to online second-hand book sharing platform (M9), the factor related to making connections with the people/group have common interest on reading (M4), and the factor related to saving money (M2) are also good motivations identified by the respondents in which the Mean Value are all above 3.82.

Consumers' Ranking for Motivations

This part of the analysis is based on the answers collected to question 10 (Q10) in the survey. We allowed the respondents to vote for 3 motivation factors out of all 12 motivation factors they regard more important than the others, and abstaining for voting is acceptable for this question. Of 281 answers in total, 280 were valid. The outcome of the overall voting was summarized in the chart below.

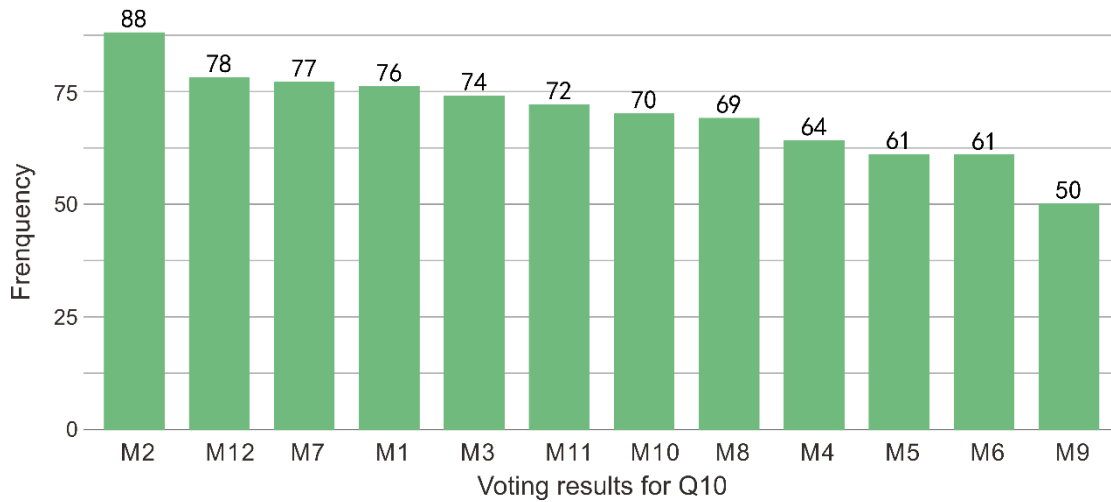


Figure 4-7. Voting for motivations

Source: the author

As shown in the chart, M2, M12, M7 gained the most votes from the respondents compared to the ranking M12, M6, M8 from the former outcome of Mean Value and SD Value analysis. While saving money (M2) was not among the top five factors identified by the mean Value and SD Value analysis, it ranked first here in the voting section. A similar phenomenon can be seen from the interviews –the majority of the interviewees regarded money-saving a good motivation for them towards second-hand book sharing. The possibility of second-hand book sharing to find books that are no longer on sale in the shops or online shopping platforms (M12) ranked among the top 3 both in voting section and in the outcome of Mean Value and SD Value analysis. The motivation “*I feel the second-hand book sharing especially practical for the textbooks which will no longer be used after the course exams. (M7)*” ranked third here in the voting, however, it was not in top 5 factors in the outcome of Mean Value and SD Value analysis. Plus, some answers from the open-ended question echoed the high ranking of M7 here, for example, several respondents mentioned that they are happy to share the used text book to the following batch. The overall voting results here were almost above 60, however, the ranking of votings here varied to the ranking outcome of Mean Value and SD Value analysis in several motivations. The motivation “*Online platforms for second-hand book sharing make it more efficient on quality inspection and delivering to the receiver. (M9)*” ranked last here with only 50 votes, but it was in top 5 of factors in the outcome of Mean Value and SD Value analysis. And 4/6 interviewees disclosed that digital platforms acted as good motivation in their experience in the interview section. Plus, the motivation “*In the second-hand book sharing I could find books that that are not included available in libraries. (M1)*” ranked the second to last in the outcome of Mean Value and SD Value analysis, but it gained top 3 votes here in this section.

Important Motivations Understood by the Interviewees

7 interviewees were reached out in the interview section and 1 of them rejected the interview finally, which led to 6 interviews being implemented. Though rejected, the reason this person gave might add as input to this section as well.

First, in accordance with the trend from the outcome of Mean Value and SD analysis, in which M12 happened to be the most vital motivation factor, 4/6 interviewees (I1, I3, I4, I5) expressed that the possibility of finding books that are no longer on sale in the shops or online shopping

platforms (M12) would be one of the important motivations for second-hand book sharing due to their own experience. I1 I3 I4 all mentioned the term “*books that out of print*” in this situation, and I5 used the term “*old books published long ago*”. As for the second important motivation (M6) identified from the former statistical analysis step, 2/6 interviewees also disclosed their thoughts on freedom and flexibility issues of this factor. “*My initial consideration for using the second-hand book sharing is to spare the physical space in my corridor and lighten the burden of mailing the books after graduation (I1).*” “*Doing second-hand book sharing could save us space for storing the items in the corridor (I2).*” As for the third important motivation identified earlier (M8) on sustainable benefit and lifestyle, all the interviewees agreed that second-hand book sharing is a green activity, but only two of them provided concrete examples. “*Like my hometown, a small town without on-site channels for second-hand book sharing, it is a pity that sometimes teaching aids books (exercise book affiliated to the course book) would be sold for paper recycling; but the common books would be kept and knowledge should be respected (I1).*” “*For example, recently I saw green collection hold by some student groups in front of the university stadium for reuse of used books and clothes (I2).*”

5/6 interviewees mentioned that second-hand book sharing was cheap or free, which acted as a good motivation factor (I1 I3 I4 I5). However, two of them also disclosed the situation that the fee they paid in the second-hand book sharing was higher than the original price. “*Out of print books will be higher than the original price (I1).*”, “*Rare books are expensive. Out of print books will be higher than the original price on Confucius Old Book online platform (I3).*” Several digital second-hand book sharing platforms were mentioned as a relatively high-frequency words by some interviewees, for example, Duozhuayu (I1, I5, I6), Manyoujing (I1), Confucius Old Book online platform (I3), Xianyu (I1). And these interviewees also agreed that Online platforms for second-hand book sharing make it more efficient for quality inspection and delivery to the receiver (M9), for example, “*The disinfection of the Duozhuayu platform is very good, and the books would be sealed with plastic packaging; Some second-hand book store did not good on this point (I1).*” “*Such platform has a certain guarantee. If the sharing was not satisfied, you can choose to return or get refund in a easier way (I6).*”

Though it seemed to be convenient, especially for delivering the books via sharing platform, interviewee 2 worried about the online platforms, “*the logistic shut down during the Covid time, so the online platform did not work smoothly (I2).*” Two of the interviewees mentioned the book-crossing activity as a way of second-hand book sharing, and the strengthening of the connection between people and the chance to get interacted with the people who have similar reading interests with them (M4) were regarded as an important motivation by them. “*This book-crossing is a relatively private activity more likely to be happening among my private friend's circle; we swapped or exchanged few books we chose and mailed them directly to my friend's place, and this is usually inter provincial, at least inter city activities (I2).*” “*I have participated in a public book-crossing activity hold by our library and a morning reading activity hold by student groups where people could exchange books of their interest. It was a nice idea, but the pity was that the same book finally went back to my side after the exchanging process in my experience (I3).*”

Besides the motivation factors included in the former section, interviewee 1 contribute another factor in her own experience, “*The sharing information in my social media chatting group for my corridor building is important to me for book sharing or sharing of other kinds of stuff, especially at a special timeline, for example, at the end of a semester (I1).*” “*Some student groups will organize green collection for used book under the corridor building or nearby streets on some special days for example, the World Book Day, which is a driver for me to participate book sharing (I2).*” Similarly, “*In my college, the student group will collect used text book from the newly graduated students for students who will possibly use these book in the next semester (I5).*”

Last but not least, some personal habits or niche experiences also lead to motivations for second-hand book sharing. For example, interviewee 5 disclosed, “*I like to visit the second-hand book market, both online and onsite. I have been to online book sharing platform Duozhuayu's physical stores in Beijing and Shanghai (I5).*” “*I have been to a live house in Xiamen city which include book shairing activities*

in their building. And it is interesting that they way of becoming their member is gifting them 10 art related books. It was attractive (I1).” For the motivation that “Second-hand book sharing offers me the opportunity to test the books whether I really want to read (M11).” interviewee 4 put that “For the expensive professional books, I will consider to do the book sharing and see whether the content such as charts and figures are what I expected before purchasing that book (I4).” Last but not least, besides all the motivation factors listed above in this study, interviewee 3 expressed that gifting is one of the motivations he does the

book sharing, “Personally, I like sending books as a gift to my friend, especially at the graduation seasons (I3).”

4.3.2 Relevance of motivations and backdrop characteristic

As mentioned in the methodology section, three variables were chosen to test whether the motivations (M1-M12) were influenced significantly by certain variables. The T-test is often applied for groups that have only two variables, and ANOVA is often applied to solve the question where groups that have over two variables. Accordingly, in this study, the T-test was applied to test the relevance of motivations and gender data. ANOVA analysis was applied to test the relevance of motivations with the reading habit (based on Q1 in the survey) and cost for book per month (based on Q2 in the survey). The results are presented as follows.

T-test

As put in the methodology section, T-test often works for analyzing a group of data which has two variables. In this case, since no one answered non-binary choice for the gender question, thus led to female and male variables in the data of gender group. The results including the p-value are presented as follows. See the full results in Appendix.

Table 4-2. Results of T-test for motivations

Motivation Factors	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
P-value	0.33	0.12	0.12	0.12	0.41	0.001	0.0003	0.0001	0.12	0.88	0.55	0.18

Source: the author

The results shows that gender group variables towards M6 M7, M8 difference is extremely significant in difference. In other words, gender group may, as a demographic characteristic, have a stronger influence on consumers' choice on motivation factors especially for freedom and flexibility aspect (M6), idling textbooks aspect (M7), and environmental and resources-saving aspect (M8). The remaining 9 factors (M1-M5, M9-M12) seemed to be not influenced much by the gender of the respondents.

ANOVA Analysis

ANOVA analysis is used to analyze the correlation among multiple variables. In the ANOVA analysis, the answers to Q1 was identified as reading habit and were transformed into a group of data called variable 1, the answers to Q2 was identified as cost for book per month and were transformed into a group of data called variable 2. Two groups of data variable 1 and variable 2 were implemented ANOVA analysis towards motivation factors (M1-M12) respectively via the R language version 4.1.3 (R Core Team, 2022). The results including the p-value are presented as follows. See the full results in Appendix.

Table 4-3. Results of ANOVA for motivations

Data Group	Related questions in Q9	Group of Variables	P Value
M1	In the second-hand book sharing I could find books that that are not included available in libraries.	Variable1	0.51
		Variable 2	0.51
M2	The second-hand book sharing could save me a certain amount of money.	Variable1	0.75
		Variable 2	0.83
M3	The second-hand book sharing makes it possible for me to change books more frequently and read more.	Variable1	0.61
		Variable 2	0.82
M4	The second-hand book sharing makes it possible for me to get associated with people or groups which share the common interest with me in reading within the campus/community/neighborhoods.	Variable1	0.61
		Variable 2	0.89
M5	Participating the second-hand book sharing makes myself to be unique and could express my personality.	Variable1	0.88
		Variable 2	0.24
M6	I feel a sense of freedom and flexibility when sharing the second-hand books.	Variable1	0.46
		Variable 2	0.94

M7	I feel the second-hand book sharing especially practical for the textbooks which will no longer be used after the course exams.	Variable1	0.92
		Variable 2	0.76
M8	I like second-hand book sharing because it could save resources and reduce the cost on waste management – it makes more sense to share than to abandon, and it could be one of the sustainable lifestyles.	Variable1	0.58
		Variable 2	0.88
M9	Online platforms for second-hand book sharing make it more efficient on quality inspection and delivering to the receiver.	Variable1	0.71
		Variable 2	0.55
M10	Second-hand book sharing seems fun and cool, and I am willing to have a try.	Variable1	0.34
		Variable 2	0.80
M11	Second-hand book sharing offers me the opportunity to test the books whether I really want to read.	Variable1	0.83
		Variable 2	0.49
M12	The second-hand book sharing makes it possible to find books that are no longer on sale in the shops or online shopping platforms.	Variable1	0.58
		Variable 2	0.61

Source: the author

As we can see in the chart above, all p-values for group of variable 1 and group of variable 2 towards 12 motivations (M1-M12) are above 0.05, which means the difference between these two groups of variables towards the motivation was not significant. In other words, neither the reading habits nor the book purchasing frequency identified in this study have a strong influence on consumers' motivation towards the second-hand book sharing, specifically on M1-M12. However, the results for barriers all showed significant differences. This discrepancy showed that in general the barriers outweigh the motivations, and this will be further discussed in the discussion section.

4.3.3 Text Analysis for the Open-Ended Question (Q11) in the Survey

Several respondents mentioned that they are happy to share the used text book to the following batch. And one respondent who perhaps had received the sharing book from the former batch wrote that the note on these shared books was helpful to me. Whilst this open-ended question was expected to gather new ideas of factors besides M1-M12 listed earlier, several open answers still put the answer within the range of M1-M12, for example, limited space and space-saving in the corridor, and money-saving. One respondent mentioned e-book in this answer, and put that though shared-book and e-book both might be free or cheap, e-book is not easy for him/her to remember the content, which is one of his/her motivations towards second-hand book sharing.

4.4 Barriers for second-hand book sharing

In this section, the analysis is based on questions 12-14 in the survey, including the Likert Scale question for barriers, a ranking question for top 3 barriers, and an open question for the respondents to fill in the other barrier factors that not included in the question 12 but they regard important in their decision-making. The core of these questions is the motivation question (Q12), where the respondents reflected on various barrier factors with a degree of 1-5, which indicated from strongly disagree to strongly agree. As can be seen from the survey, 1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree.

4.4.1 Descriptive Analysis for Barriers (based on Q12-Q14)

Reliability

As described in the previous section, the reliability of the data will be first tested and prepared as a front setting for the following statistical analysis. In this study, all the answers to Q12 were first grouped into 8 data groups (B1-B8) classified by the 8 sub-questions within Q12. The Cronbach ' α ' test was first applied to these data groups (B1-B8) for the reliability test, and the coefficient calculated out was 0.9368, which was above 0.8 and indicated the reliability of these group of data was good and further analysis can be more reliable based these data. And the data groups (B1-B8) identified from this step will be continuous to finalize the following statistical analysis.

Consumers' Agreeing Level of Motivation Factors in Q12

Mean value and the SD are applied to analyze the agreeing level of barrier factors of consumers in this step. These two parameters are often going hand in hand and are often used to find out the central tendency (Mean Value) and dispersion extent (SD Value) of data groups and fit well for the data type and data volume in this study. For example, a higher Mean Value with a smaller spread of SD (\pm) is more likely to be an important factor. The results are presented in table 4-2.

Table 4-4. Mean Value and SD for barriers

Data Group	Related statements in Q12	Mean Value	SD (\pm)
B1	I am not familiar with the second-hand book sharing and how it really works.	3.89	1.08
B2	I regard it no need to participate in the second-hand book sharing, because all the printed book I need can be borrowed from the library.	3.82	1.19
B3	I have low trust in sharing books with others.	3.92	1.21
B4	I find it impractical or complicated in some steps in the second-hand book sharing, for example, information exchange and delivering.	3.99	1.09
B5	The second-hand books for sharing perhaps are often books with low quality in physical state (e.g. missing pages).	3.86	1.12
B6	The second-hand books for sharing perhaps are often books with low hygiene condition (e.g. dirty books).	3.99	1.05
B7	I would prefer to keep the ownership of the books.	3.96	1.20
B8	The service supporting the second-hand book sharing perhaps are often with low quality.	3.93	1.14

Source: the author

All the data from B1 to B8 are all above 3.7, which means the respondents basically agreed with all the barriers involved in question 12 in the survey, and the agreeing level is relative high. Top 3 important barriers are: B6, B4, B7. Hygiene conditions (B6) and impractical or complicated steps in the second-hand book sharing (B4) are the top 2 barrier factors identified by the respondents, with little difference between each other. Ownership (B7) is regarded as a third top barrier factor by the respondents. Low trust between the sharer and user (B3) and low quality services supporting the second-hand book sharing (B8) are also regarded as important barrier factors which Mean Value are above 3.9.

Consumers' Ranking for Barriers

This part of the analysis is based on the answers collected to question 13 (Q13) in the survey. We allowed the respondents to vote for 3 barrier factors out of all 8 barrier factors they regard more important than the others, and abstaining for voting is acceptable for this question. Of 281 answers in total, 280 are valid. Plus, respondent 27 voted 4 barriers to this question, then the last vote will be regarded as invalid based on the question that voting for 3 most important factors. The outcome of the overall voting was summarized in the chart below.



Figure 4-8. Voting results for barriers

Source: the author

As shown in the chart, B4, B2, B1 gained the most votes from the respondents compared to the ranking B6, B4, B7 from the former outcome of Mean Value and SD Value analysis. The factor of impractical or complicated steps in the second-hand book sharing (B4) occupied a high position both in the voting results and the results of Mean Value and SD Value analysis. Alternative in borrowing from the library (B2) and not familiar with second-hand book sharing (B1) are two key factors identified by the respondents in the voting section, which ranked second and third. 5/8 factors gained votes above 100, and the last one (B3) still held the votes of 87, and the difference of votes between each factor is not that much. Though ranking last in the voting section, factor B3 had a better performance in the outcome of Mean Value and SD Value analysis, which is in top 5. The factor that not familiar with second-hand book sharing (B1) which ranked last 3 in the outcome of Mean Value and SD Value analysis, however, was a third high factor here in the voting section.

Important Motivations Understood by the Interviewees

7 interviewees were reached out in the interview section and 1 of them rejected the interview finally, which led to 6 interviews being implemented. Though rejected, the reason this person gave might add as input to this section as well. First, in accordance with the trend from the outcome of Mean Value and SD analysis, in which hygiene conditions (B6) ranked top 1 among all the barrier factors, B6 was also a highly mentioned factor in the interview. 4/6 interviewees expressed their concerns on hygiene conditions (B6) and regarded it as a key barrier factor, but the extent and situation varied (I1, I3, I5, I6). “I am willing and curious to read other’s notes, but I really mind the oil stain and the odor of others; I am sensitive to the odor (I1).” “I cannot stand the colorful markers on the book; but if the notes were good, it would be the icing on the cake (I3).” Interviewee 5 and interviewee 6 had similar thoughts both on hygiene condition (B6) and the physical state (B5) barriers, “I will not mind the hygiene condition and physical state of the book that much if the book only stays with me for a short period of time; but if I decide to collect this book, then I will pay much attention to its hygiene condition and physical state (I5, I6).” Specifically, interviewee 6 explained, “I will not accept and cannot stand the oil stain on the book or the disconnected book; I can accept markers on the book, but I cannot accept unpleasant hand-writing of notes (I6).”

Ownership of the book (B7) ranked top 3 from the outcome of Mean Value and SD analysis and was also the barrier factor that interviewees focused. 4/6 interviewees mentioned this barrier factor (I3, I4, I5, I6), and the scenenario were likely to be similar. *“The rare books, books out of print, and the books took lots of efforts to get, I would keep the ownership of such books (I3).”* *“I would like to collect and keep the ownership of the books that is rare to me without sharing; even if it is shared in some circumstances, I will get the book returned (I4).”*

The barrier *“I regard it no need to participate in the second-hand book sharing, because all the printed book I need can be borrowed from the library. (B2)”* ranked second top in the voting section, and was discussed by several interviewees, as well as the issue of e-book. *“For textbook or books of bestsellers, I will not consider to go for book sharing first. Though not big inventory in the library, I could easily find e-book for such kinds of books. But it may be due to the insufficient awareness on copyright at my place, if the awareness raises, perhaps I will go for sharing on such books (I1).”* *“It depends, for coursebook, I will go for library or e-book, but for the light reading which might be hardly found in the library I will go for book sharing (I6).”*

Also, a potential interviewee who left contacts but finally rejected the interview reflected reason that *“I hardly participated second-hand book sharing and almost read e-books. Perhaps it will not contribute to your interview much (IR).”* Besides all the barrier factors listed in this study, some new factors popped up during the interview, for example, interviewee 2 said *“Some second-hand book sharing lacks transparency, for example, I cannot make sure the books I shared finally distributed to the mountain areas as they advertised. This will make me hesitate to join such kind of book sharing (I2).”*

It also needs to be pointed out here that though the factor that not familiar with second-hand book sharing (B1) ranked third top in the voting section, but no one in the interviewed reflected or made comments on this points. This bias came from the author's design and implementation for reaching out the interviewees. The last question in the survey (Q21) was *“Are you interested in the follow-up interviews related to this survey or you would like to discuss this topic with the author?”* The interviewees answered this question with yes and filled in their contacts. This implementation process perhaps made all the interviewees were the people who are interested in the second-hand book sharing and familiar with this topic, thus made the people not familiar with second-hand book sharing to be interviewed and generated bias.

4.4.2 Relevance of barriers and backdrop characteristic

As mentioned in the methodology section, three variables were chosen to test whether the barriers (B1-B8) were influenced significantly by certain variables. The T-test is often applied for groups that have only two variables, and ANOVA is often applied to solve the question where groups that have over two variables. Accordingly, in this study, the T-test was applied to test the relevance of barriers and gender data. ANOVA analysis was applied to test the relevance of barriers with the reading habit (based on Q1 in the survey) and cost for book per month (based on Q2 in the survey). The results are presented as follows.

T-test

See results of T-test for barriers in table 4-5.

Table 4-5. Results of T-test for barriers

Barrier Factors	B1	B2	B3	B4	B5	B6	B7	B8
P-value	0.002	0.0002	0.00	0.00	0.00	0.00	0.00	0.00

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Source: the author

From the results of the indicator p-value we can see that the p-values of gender group variables towards all the barrier factors are less than 0.01, which means the difference is extremely significant. In other words, gender group may, as a demographic characteristic, have a stronger influence on consumers' choice on all the barrier factors summarized in this study. In this situation, more factors are strongly influenced by the gender group compared to the motivation factors that only 3 factors are influenced.

ANOVA Analysis

In the ANOVA analysis, the answers to Q1 was identified as reading habit and were transformed into a group of data called variable 1, the answers to Q2 was identified as cost for book per month and were transformed into a group of data called variable 2. Two groups of data variable 1 and variable 2 were implemented ANOVA analysis towards barrier factors (B1-B12) respectively via the R language version 4.1.3 (R Core Team, 2022).

Table 4-6. Results of ANOVA for barriers

Data Group	Related questions in Q9	Group of Variables	P Value
B1	I am not familiar with the second-hand book sharing and how it really works.	Variable1	0.38
		Variable 2	0.004
B2	I regard it no need to participate in the second-hand book sharing, because all the printed book I need can be borrowed from the library.	Variable1	0.94
		Variable 2	0.04
B3	I have low trust in sharing books with others.	Variable1	0.21
		Variable 2	0.001
B4		Variable1	0.32

	I find it impractical or complicated in some steps in the second-hand book sharing, for example, information exchange and delivering.	Variable 2	0.41
B5	The second-hand books for sharing perhaps are often books with low quality in physical state (e.g. missing pages).	Variable1	0.99
		Variable 2	0.15
B6	The second-hand books for sharing perhaps are often books with low hygiene condition (e.g. dirty books).	Variable1	0.91
		Variable 2	0.21
B7	I would prefer to keep the ownership of the books.	Variable1	0.31
		Variable 2	0.24
B8	The service supporting the second-hand book sharing perhaps are often with low quality.	Variable1	0.62
		Variable 2	0.03

Source: the author

As we can see in the chart above, 2 p-values are less than 0.05 and 2 p-values are less than 0.01. It is interesting to find that all these p-values which indicated significant are belonging to the data group of variable 2 (cost for book per month). The difference is significant to B2 and B8, and it is extremely significant to B1 and B3. In other words, for the barrier “*I regard it no need to participate in the second-hand book sharing, because all the printed book I need can be borrowed from the library (B2).*” and low quality services supporting the second-hand book sharing (B8), the variable group “cost for book per month” had a strong influence on consumers’ choice for barriers, while the variable group “reading habit” had no such influence. Similarly, for not familiar with second-hand book sharing (B1) and low trust between the sharer and user (B3) factors, the variable group “cost for book per month” had a extremely strong influence on consumers’ choice for barrier factors, while the variable group “reading habit” had no such influence. The overall results of this ANOVA analysis showed that people’s average cost for purchasing books per month might have stronger influence on consumers’ agreeing level towards the barrier

factors in this study, while how many books one can obtain in a year does not matter in this situation.

4.4.3 Text Analysis For the Open-Ended Question (Q14) in the Survey

For barriers, some respondents said that they have no interest in second-hand book sharing themselves or they are not active in participating in second-hand book sharing. Some respondents answered that the types of books were limited in the second-hand book sharing which hinder them to participate the sharing activities. Though included in the factor B4, some respondents expressed their concerns on information asymmetry, and one respondent put that *“I felt still few of such book sharing activities in China. And if they are offline activities, you should pay special attention to relevant information.”*

5 Discussion

The aim of this study is to examine consumers' attitudes toward second-hand book sharing in China, especially on university campuses, and to investigate motivations and barriers influencing how people engage in second-hand book sharing.

5.1 Results Reflections

This study shows that, to some extent, the overall barriers outweigh motivations in influencing consumers' choice in second-hand book sharing. This phenomenon may be caused by several barriers which have a stronger influence.

The desire to keep ownership is one major barrier. It was also highlighted in other product groups for sharing (Mont, 2004a; Gullstrand et al., 2016). This study showed that it depends on circumstances. For instance, some individuals mentioned they were reluctant to share the books that are rare, expensive or the books that took a lot of time and energy to get. Some of them were only willing to share such books within immediate family or working group and hoped to get the books returned finally.

In this regard, though the motivation about "finding books that are no longer on sale in the shops or on online shopping platforms" identified as one major motivation in the study, it will be turned into a barrier as the desire to own in the end. That means the sharing business model for second-hand books will be proactive less or only once until the user gets the book under this circumstance. Or we can see that this motivation for finding rare books perhaps motivated only users rather than sharers.

In other circumstances, for example, in the circumstances that books are cheap or the consumers do not mind giving up the ownership of the books, second-hand book sharing more easily happens. This also follows the rationale that small products like books, films, or toys whose value will decrease dramatically after the first use are more likely to be shared (Botsman and Rogers, 2010).

One main barrier is a lack of trust in sharing with strangers. This phenomenon was also remarked in sharing by other research (Botsman, 2012; Schor, 2014). However, under some circumstances, it seemed that this barrier would be alleviated, and people get motivated. For example, another group of respondents is motivated by the possibility that second-hand book sharing might offer in association with local communities or groups which may have common interests in reading. And some respondents showed that doing the book sharing via online platforms will let them be free of worrying about trust issues because of the efficiency and services the platform could support.

Another barrier is unfamiliarity. Although the respondents show an overall positive attitude towards second-hand sharing, many still reflected that they had never heard or were not clear about the concept of second-hand book sharing or sharing economy. Similarly, the barrier of unfamiliarity also ranked highly as the result of voting questions.

The economic reason is one main motivation for second-hand book sharing. Though the free or cheap price of second-hand book sharing truly attracted a number of users, some individuals still have their own purposes in book sharing, which are not in the original nature of sharing that is based on reuse or exchange. For example, many would pay more to get a book that is out of print. In other words, they just use the channel of book sharing to fulfill their own purposes.

The respondents commonly regarded second-hand book sharing as resource-saving activity. However, other research also observed cases that consumers' negative attitude towards the environmental aspect of sharing and can hardly associate it with being an option of environmentally sound (Baumeister, 2014; Gullstrand et al., 2016). Although the negative point can not be explicitly highlighted in this second-hand book sharing case, the rebound effect should be considered. For example, the users of book sharing might consume the money saved from sharing for another unsustainable consumption and waste extra resources.

Plus, the spill-over effect on other sectors should also be paid attention to when the second-hand book sharing market increases in the future. For example, considering the large number of university students in China, the publication sector, especially for textbooks, may be easily swayed due to the change of students' way of getting access to books. Also, the spill-over effect on the e-book business sector should be considered. Some respondents also cared about copyright issue and assumed that the promotion of copyright awareness in the local area might also motivate and draw users for second-hand book sharing from e-book users group for economic reasons.

The relationship between local library and book sharing and their overlap in function plays an important role in consumers' decision makings for second-hand book sharing. In the results of voting questions, both the motivation about "in the second-hand book sharing I could find books that that are not included available in libraries" and the barrier about "all the printed book I need can be borrowed from the library" ranked highly.

But whether to be motivated or hindered, it depends on the type of the books. For example, one interviewee reflected that he/she will not consider book sharing as the first choice for textbooks or books of bestsellers; though not a big inventory in the library, he/she could easily find e-books for such kinds of books. Another interviewee also reflected that the inventory in the school library for textbooks can hardly support the whole batch, but the e-book can be easily accessed especially in some places the awareness of copyright is not sufficient.

The relationship between book sharing and library, in a broader context of consumption models, is the relationship between collaborative consumption and collective consumption, similar to the example of bike-sharing and public bikes supported by local government in some cities like Hangzhou in China. Lin (2018) noted that the sharing economy would complement the collective consumption in many aspects but would also bring new issues and challenges into urban governance or even perhaps cause the waste of resources. If the second-hand book sharing market keeps increasing in the coming future, it will influence the management of local libraries; though solid conclusions can not draw from this study, it is worthwhile to be researched in the future.

It is a highly debatable issue for the role of online sharing platforms. Although people are mostly driven by economic reasons and convenience (Zvolska,2015), many are hindered by the impractical and complicated processes of online platforms, for example, information exchange and delivery. And the voting for the convenience of onling sharing platform ranked last in this study.

In China, several online second-hand book sharing platforms have been emerging in the last decade. For example, one of these sharing businesses, called Manyoujing was founded in 2016, which was a second-hand book sharing platform based on social media (wechat) applet development. And the data in 2019 showed that the platform had more than 2 million registered users and covered nearly one million books (Wang 2021).

Though the users of such sharing platforms were still increasing these years, and some platforms had even established on-site physical stores, yet consumers complained about the platforms for example, the platforms had limited types of books and no prominent price differentiation had been made compared to common second-hand book shopping (Wang 2021).

Although the company updated their business model for lowering the price, for example, the book sharers would get the benefit of getting another book on the platform, as this study mentioned, the impractical and complicated process is an significant barrier to consumers. Also, some interviewees disclosed that the Covid situation in recent years hindered the logistics of such second-hand book sharing platforms.

5.2 Methodology Reflections

The survey is the main method used for data collection in this study. The sampling size was applied in a relatively loose way, and the valid answers collected were just around the baseline suggested (Fowler, 2009), thus will to some extent influence the degree of accuracy of the survey.

Some reflections from the survey and the interviews show that the respondents more or less cared about their roles as sharers or users in the second-hand book sharing, but such roles did not further separate in the design of the survey.

Some outcomes for the Likert scale questions in the survey varied with the ranking question; the bias could exist here because the ranking order would probably be impacted by the question order when filling the answer. For example, the respondents might rank highly the motivations or barriers listed in the front.

The way of selecting interviewees may have bias. The author will reach out to the respondents who express their interest and willingness to further interview in the survey and leave their contacts, thus lead to the interviewees almost the people who know about second-hand book sharing. Information from people who are not familiar with this concept can hardly get in following this process.

6 Conclusion

To enable sharing economy, it is important that future consumers are willing to accept and use sharing business models. By using quantitative and qualitative methods, this study provided empirical evidence to address the following research questions:

RQ1: What are consumers' attitudes towards second-hand book sharing in China?

RQ2: What are the motivations and barriers perceived by consumers towards second-hand book sharing?

RQ3: Why do consumers have such attitudes, and why do they value these motivations and barriers?

The results of this study indicate an overall positive attitude for consumers in engaging in second-hand book sharing in the future. However, it seems that the barriers outweigh the motivations currently.

The two main barriers observed are the desire to own and a lack of trust in strangers. Many would perhaps turn to online second-hand book sharing platforms to avert these barriers, but still, they remarked that the impractical and complicated processes involved in the online platform are another critical obstacle. Other concrete barriers in the book sharing processes, for example, the hygiene conditions of the book, will also largely impact consumers' decisions for second-hand book sharing. But these barriers vary from person to person.

Economic reasons, for example, for free or cheap books, are deemed as one major motivation for consumers. However, many would like to pay much higher price for getting an out of print book through book sharing and will perhaps not share this book again.

The environmental benefits of book sharing, like resource-saving, might motivate a group of respondents. But how this works depends on concrete cases on consumers' behavior, and needs further study to validate.

For ideology aspects, motivations like "to be unique" "fun and cool" or "expressing their personality" have special influences to a group of respondents. Last but not least, motivations like space-saving or reducing the pressure of mailing used books after graduation which will give consumers freedom or flexibility, also worked as a strong motivation for second-hand book sharing.

The perceptions of motivations and barriers are closely connected to consumer behavior and are strongly impacted by prevailing consumers' cultures in the local context. The desire to own, which has been rooted in modern consumer culture, will resist the development of sharing business models, especially in a market like China, where people attach great value to ownership.

Internet technology is another strong reason affecting consumers' perceptions of motivations and barriers. Online second-hand book sharing platforms will bring consumers more efficiency and convenience, but in practice, it is also a highly debatable issue among consumers. The extent of local context or area supported by internet technology and related logistics also matters for this reason.

While conducting this study, some knowledge gaps were identified that need further research in the future. Research on second-hand book sharing or other sharing models are still in their infancy. It would be useful to conduct similar research, perhaps on other product groups, in other context in China or different countries to compare consumers' attitudes towards sharing models, as well as their motivations and barriers.

The notion of ownership is an interesting topic and is worth further research; for example, its changing or updating along with people's participation in various consumption models.

Lack of trust in strangers, together with the complexity of online sharing platforms which will hinder people from joining sharing activities, is worth investigating further.

The results of this study assumed positive potential for the development of second-hand book sharing in China, also considering a large number of potential users and the prevailing digitalization on campuses. However, it should be remarked that consumers' positive attitudes towards second-hand book sharing do not necessarily lead to resulting consumer behaviors or their actual engagement in sharing.

The intention of consumers got from this study can not fully reflect consumers' behavior. As the discrepancy between consumers' intention and behavior, especially for circular consumption, is noted by other research (Lydia Zepeda and David Deal, 2009; Marie von Meyer-Höfer et al., 2015). Further study to fill this gap is worthwhile.

Another interesting area is the relationship and coordinated development of collaborative consumption and collective consumption, represented by bike-sharing and public bikes, or book sharing and the local library. How they could complement each other in function, as well as their power behind – market and local government, is worth to be researched especially in the Chinese context.

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Appendix A :The Survey

The survey will be distributed in China. It will also be translated to increase transparency.

Introductory text:

Dear consumers of the second-hand book sharing,

Thank you for opening the link and participating in the questionnaire! My name is Boyan Wei, I am from China, and I am a Master student in the program “Environmental Management and Policy” at Lund University in Sweden. Currently I am writing my Master thesis and for that I need data from the consumers who have experienced any means of second-hand book sharing like you. Here the second-hand book sharing we refer to low-profit or non-profit second-hand exchange (reuse) of books.

The following questionnaire will take around five minutes to complete. Please be aware that sometimes it would be allowed to skip some questions, for example, you only need to answer one question between Q7 and Q8. There are no right or wrong answers, please fill in what is most applicable to you.

Of course, your answers will remain anonymous. Thank you for your help! Further, if you are interested in the follow-up interviews (perhaps will take about 15min) related to this survey or you would like to discuss this topic with the author, please answer the last question with your contact information (Wechat, QQ, phone, email, etc.) The author would reply you from 8th Apr 2022 till 10 days after the survey closed.

The survey will be published online for answering between 8th Apr 2022, 7am - 22th Apr 2022, 12am; GMT+8.

I agree to the anonymized saving of my answers.

Section 1

Q1: How many printed books have you obtained on average per year during your studies at the university? (Including both the textbooks for the course and the books you bought for your own interest)

- Less than 30.
- 30-50.
- Above 50.

Q2: What is the average amount of money do you expect to spend on average for purchasing books per *month*?

(Unit: ¥ Chinese Yuan)

- 0-20
- 20-50
- 50-100
- 100-150

- 150-200
- 200-250
- 250-300
- More

Comment field: More-please enter:

Q3: What is/are **the most likely** way(s) for you to handle idling books? Multiple answers are possible.

- Discarding the idle books.
- Sending the idle books to the paper recycling or selling them as waste paper.
- Keeping them with yourself as collections.
- Second-hand book shop
- Donations
- Book sharing.
- I do not know/I have never thought about how to deal with my idle books yet.

Q4: Which the following ways of getting second-hand books is most likely for you

- Second-hand book shop.
- Flee market exhibited in the university.
- On-site second-hand book sharing activities organized by the university or other organizations.
- Online platform including the transactions of second-hand books sharing.
- Obtaining/offering the used books from/to the family members, neighborhoods, or the people I knew.
- None of the above.

Q5: Have you ever participated in the second-hand book sharing activities during your study in the university? (Here the means of the second-hand book sharing activities are not limited, but it needs to be point out here that those activities are for low-profit or non-profit.)

- Yes, I have at least participated once as a sharer in the relevant activities.
- Yes, I have at least participated once as a user in the relevant activities.
- No, I have never heard such activities.
- No, I prefer not to buy the second-hand books.

Q6: How often do you participate in the second-hand books sharing activities?

- Never.
- Once per semester.
- Twice per semester.
- More than twice per semester.
- Will participate frequently as long as I got the information.

Q7: What is your current attitude towards second-hand book sharing? (for those who have not participated in the second-hand book sharing before)

- I have no interest.
- I am willing to try.
- I have no idea.

Q8: What is your current attitude towards second-hand book sharing? (for those who have already participated in the second-hand book sharing before)

- I am satisfied with second-hand book sharing and perhaps will do it more often in the future.
- I am not satisfied with second-hand book sharing and perhaps will not do it again.

Section 2

Q9: For the following potential motivations, to what extent they would influence your decision in participating in the second-hand sharing? Please indicate. (Likert scale question, 1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree)

	Extent (order number)
1. In the second-hand book sharing I could find books that that are not included available in libraries.	
2. The second-hand book sharing could save me a certain amount of money.	
3. The second-hand book sharing makes it possible for me to change books more frequently and read more.	
4. The second-hand book sharing makes it possible for me to get associated with people or groups which share the common interest with me in reading within the campus/community/neighborhoods.	
5. Participating the second-hand book sharing makes myself to be unique and could express my personality.	
6. I feel a sense of freedom and flexibility when sharing the second-hand books.	
7. I feel the second-hand book sharing especially practical for the textbooks which will no longer be used after the course exams.	
8. I like second-hand book sharing because it could save resources and reduce the cost on waste management – it makes more sense to share than to abandon, and it could be one of the sustainable lifestyles.	
9. Online platforms for second-hand book sharing make it more efficient on quality inspection and delivering to the receiver.	
10. Second-hand book sharing seems fun and cool, and I am	

willing to have a try.	
11. Second-hand book sharing offers me the opportunity to test the books whether I really want to read.	
12. The second-hand book sharing makes it possible to find books that are no longer on sale in the shops or online shopping platforms.	

Q10: Ranking, please rank the top three factors which would influence your decision in the second-hand book sharing from Q9, _____.

Q11: What other motivation factors do you consider important that are not included above?
_____.

Q12: For the following potential barriers, to what extent they would influence your decision in participating in the second-hand sharing? Please indicate. (Likert scale question, 1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree)

	Extent (order number)
1. I am not familiar with the second-hand book sharing and how it really works.	
2. I regard it no need to participate in the second-hand book sharing, because all the printed book I need can be borrowed from the library.	
3. I have low trust in sharing books with others.	
4. I find it impractical or complicated in some steps in the second-hand book sharing, for example, information exchange and delivering.	
5. The second-hand books for sharing perhaps are often books with low quality in physical state (e.g. missing pages).	
6. The second-hand books for sharing perhaps are often books with low hygiene condition (e.g. dirty books).	
7. I would prefer to keep the ownership of the books.	
8. The service supporting the second-hand book sharing perhaps are often with low quality.	

Q13: Ranking, please rank the top three factors which would influence your decision in the second-hand book sharing from Q12, _____.

Q14: What other barrier factors do you consider important that are not included above?
_____.

Section 3

Q15: What is the name of your university? _____

Q16: How old are you?

- 15-20
- 21-25
- 26-30
- 30 and older

Q17: Gender?

- Female
- Male
- Non-binary

Q18: What is the highest level of education you have completed? (ongoing education included)

- Bachelor's Degree
- Master's Degree
- PhD or higher

Q19: What is your current studying or working status in the university?

- Student of your university
- Alumni
- Exchange student
- Employed full-time
- Employed part-time
- Retired
- Rather not say

Comment field: Exchange student-please enter the name of your original university which you belong to:

Q20: What is the average amount of money you could obtained per *month*? (Unit: ¥ Chinese Yuan)

- 0-500
- 500-1000
- 1000-1500
- 1500-2000
- 2000-2500
- 2500-3000
- 3000-3500
- 3500-4000
- 4000-4500
- 4500-5000

- More
- Rather not say

Comment field: More-please enter:

Q21: Are you interested in the follow-up interviews related to this survey or you would like to discuss this topic with the author?

- No.
- Yes. please fill in your contact information (Wechat, QQ, phone, email, etc.) here _____

Thank-you message: Thank you for answering my questions. Have a nice day!

Appendix B: Interview Guide

Mode

via telephone or chatting function of social media (Wechat or QQ).

Opening (Briefly, introduce the aim and topic of the interview, introduce the anonymity of this interview)

Hi, I am happy that you showed your interests on the topic of second-hand sharing in China and thanks for participating in the earlier survey. Thank you for answering the last question in the survey with yes to show your willingness to be interviewed and filling your contacts in the last question. The anonymity will be kept in accordance with the survey.

Questions

The questions to be asked during the interview are as follows. The author will ask the questions one by one to the interviewees with **3 example questions in question 1.**

Motivations

1. In the second-hand book sharing I could find books that that are not included available in libraries.

What do you think of this factor?

Why do you regard this factor important (e.g. strongly agree in the answer) or not important?

Would you mind giving some examples or experiences to support your opinion?

2. The second-hand book sharing could save me a certain amount of money.
3. The second-hand book sharing makes it possible for me to change books more frequently and read more.
4. The second-hand book sharing makes it possible for me to get associated with people or groups which share the common interest with me in reading within the campus/community/neighborhoods.
5. Participating the second-hand book sharing makes myself to be unique and could express my personality.

6. I feel a sense of freedom and flexibility when sharing the second-hand books.
7. I feel the second-hand book sharing especially practical for the textbooks which will no longer be used after the course exams.
8. I like second-hand book sharing because it could save resources and reduce the cost on waste management – it makes more sense to share than to abandon, and it could be one of the sustainable lifestyles.
9. Online platforms for second-hand book sharing make it more efficient on quality inspection and delivering to the receiver.
10. Second-hand book sharing seems fun and cool, and I am willing to have a try.
11. Second-hand book sharing offers me the opportunity to test the books whether I really want to read.
12. The second-hand book sharing makes it possible to find books that are no longer on sale in the shops or online shopping platforms.

Barriers

1. I am not familiar with the second-hand book sharing and how it really works.
2. I regard it no need to participate in the second-hand book sharing, because all the printed book I need can be borrowed from the library.
3. I have low trust in sharing books with others.
4. I find it impractical or complicated in some steps in the second-hand book sharing, for example, information exchange and delivering.
5. The second-hand books for sharing perhaps are often books with low quality in physical state (e.g. missing pages).
6. The second-hand books for sharing perhaps are often books with low hygiene condition (e.g. dirty books).
7. I would prefer to keep the ownership of the books.

8. The service supporting the second-hand book sharing perhaps are often with low quality.

Appendix C: Calculation of the survey sampling size

As Fowler (2009) suggested, in case the population is big, the following formula helps to estimate a proper sampling size:

$$\text{Necessary Sample Size} = \frac{(Z - \text{score})^2 * \text{StdDev} * (1 - \text{tdDev})}{(\text{margin of error})^2}$$

Three main parameters to run the formula are: Confident level, SD, and the margin of error. The author follows a relative loose setting with 95%, $\pm 6\%$, 0.05 suggested in the paper.

Then the outcome of the survey sampling size is around 300.

Appendix D: Entire Outcome of the ANOVA Analysis

#(ANOVA)

#-----Motivation-----

M1 ~ variables1 + variables2:

```
aov2 <- aov(M1 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	2.3	1.137	0.686	0.505
variables2	7	10.5	1.495	0.902	0.506
Residuals	271	449.3	1.658		

M2 ~ variables1 + variables2

```
aov2 <- aov(M2 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	0.9	0.4669	0.286	0.752
variables2	7	5.8	0.8262	0.505	0.830
Residuals	271	443.1	1.6350		

M3 ~ variables1 + variables2

```
aov2 <- aov(M3 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
--	----	--------	---------	---------	--------

variables1	2	1.4	0.7139	0.489	0.614
variables2	7	5.3	0.7603	0.521	0.819
Residuals	271	395.6	1.4599		

M4 ~ variables1 + variables2

```
aov2 <- aov(M4 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	1.4	0.7075	0.493	0.611
variables2	7	4.2	0.6027	0.420	0.889
Residuals	271	388.8	1.4346		

M5 ~ variables1 + variables2

```
aov2 <- aov(M5 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	0.4	0.1986	0.128	0.880
variables2	7	14.2	2.0282	1.309	0.246
Residuals	271	419.8	1.5493		

M6 ~ variables1 + variables2

```
aov2 <- aov(M6 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	2.1	1.0631	0.781	0.459

```
variables2    7    3.1  0.4428  0.325  0.942
Residuals   271  369.1  1.3619
```

M7 ~ variables1 + variables2

```
aov2 <- aov(M7 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)
variables1     2     0.3  0.1571   0.087  0.917
variables2     7     7.6  1.0801   0.596  0.759
Residuals   271  491.2  1.8127
```

M8 ~ variables1 + variables2

```
aov2 <- aov(M8 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)
variables1     2     1.8  0.8889   0.541  0.583
variables2     7     5.1  0.7272   0.442  0.875
Residuals   271  445.4  1.6437
```

M9 ~ variables1 + variables2

```
aov2 <- aov(M9 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)
variables1     2     1.0  0.5131   0.344  0.709
```

```
variables2    7    8.8  1.2601  0.845  0.551
Residuals   271  404.0  1.4906
```

M10 ~ variables1 + variables2

```
aov2 <- aov(M10 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)
variables1     2    3.3  1.6485   1.079  0.341
variables2     7    5.8  0.8279   0.542  0.802
Residuals    271  414.1  1.5280
```

M11 ~ variables1 + variables2

```
aov2 <- aov(M11 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)
variables1     2    0.6  0.312   0.189  0.828
variables2     7   10.6  1.518   0.922  0.490
Residuals    271  446.3  1.647
```

M12 ~ variables1 + variables2

```
aov2 <- aov(M12 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)
variables1     2    1.4  0.7014   0.547  0.579
variables2     7    7.0  0.9964   0.777  0.607
```

Residuals 271 347.6 1.2825

#-----*Barriers*-----

B1 ~ variables1 + variables2

```
aov2 <- aov(B1 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	2.17	1.084	0.980	0.37677
variables2	7	23.63	3.376	3.052	0.00415 **
Residuals	271	299.78	1.106		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

B2 ~ variables1 + variables2

```
aov2 <- aov(B2 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	0.2	0.0864	0.062	0.9397
variables2	7	20.6	2.9464	2.122	0.0416 *
Residuals	271	376.3	1.3886		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

B3 ~ variables1 + variables2

```
aov2 <- aov(B3 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	4.3	2.146	1.557	0.21269
variables2	7	33.3	4.753	3.448	0.00149 **
Residuals	271	373.6	1.378		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

B4 ~ variables1 + variables2

```
aov2 <- aov(B4 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	2.7	1.329	1.130	0.325
variables2	7	8.5	1.209	1.028	0.412
Residuals	271	318.8	1.177		

B5 ~ variables1 + variables2

```
aov2 <- aov(B5 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variables1	2	0.0	0.0051	0.004	0.996

```
variables2    7    13.5  1.9322  1.543  0.153  
Residuals   271   339.3  1.2521
```

B6 ~ variables1 + variables2

```
aov2 <- aov(B6 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)  
variables1     2    0.21  0.1048   0.096  0.909  
variables2     7   10.70  1.5282   1.394  0.208  
Residuals   271  297.04  1.0961
```

B7 ~ variables1 + variables2

```
aov2 <- aov(B7 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)  
variables1     2     3.4   1.687   1.175  0.310  
variables2     7    13.1   1.872   1.303  0.249  
Residuals   271   389.2   1.436
```

B8 ~ variables1 + variables2

```
aov2 <- aov(B8 ~ variables1 + variables2, data = data)
```

```
summary(aov2)
```

```
              Df Sum Sq Mean Sq F value Pr(>F)  
variables1     2     1.2  0.6046   0.480 0.6193
```

variables2 7 20.0 2.8564 2.268 0.0294 *

Residuals 271 341.4 1.2597

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Appendix E: Entire Outcome of the T-test

T-test for motivations

A	B	C	D	E	F	G	H	I	J	K
	Motivate	.y.	group1	group2	n1	n2	statistic	df	p	p.adj
1	M1	m_value	男(Male)	女(Female)	1152	1096	1.159176	2224.522	0.247	0.329333
2	M10	m_value	男	女	1152	1096	1.853406	2214.92	0.064	0.119143
3	M11	m_value	男	女	1152	1096	1.824936	2240.051	0.0681	0.119143
4	M12	m_value	男	女	1152	1096	1.815999	2244.146	0.0695	0.119143
5	M2	m_value	男	女	1152	1096	0.95543	2134.681	0.339	0.4068
6	M3	m_value	男	女	1152	1096	3.567323	2195.709	0.000368	0.001472
7	M4	m_value	男	女	1152	1096	4.00085	2191.805	6.52E-05	0.000391
8	M5	m_value	男	女	1152	1096	4.382708	2229.878	1.23E-05	0.000148
9	M6	m_value	男	女	1152	1096	1.89853	2220.154	0.0578	0.119143
10	M7	m_value	男	女	1152	1096	0.157403	2215.045	0.875	0.875
11	M8	m_value	男	女	1152	1096	-0.66407	2208.096	0.507	0.553091
12	M9	m_value	男	女	1152	1096	1.55782	2242.935	0.119	0.1785

T-test for barriers

A	B	C	D	E	F	G	H	I	J	K
	Barrier	.y.	group1	group2	n1	n2	statistic	df	p	p.adj
1	B1	b_value	男(Male)	女(Female)	1728	1644	3.028057	3333.829	0.00248	0.00248
2	B2	b_value	男	女	1728	1644	3.689986	3278.857	0.000228	0.000261
3	B3	b_value	男	女	1728	1644	4.706158	3212.523	2.63E-06	3.51E-06
4	B4	b_value	男	女	1728	1644	5.753185	3288.858	9.56E-09	3.82E-08
5	B5	b_value	男	女	1728	1644	8.719177	3219.584	4.41E-18	3.53E-17
6	B6	b_value	男	女	1728	1644	4.764601	3318.622	1.97E-06	3.15E-06
7	B7	b_value	男	女	1728	1644	5.205205	3249.547	2.06E-07	5.49E-07
8	B8	b_value	男	女	1728	1644	4.820393	3251.359	1.50E-06	3.00E-06

Appendix F: Entire Outcome of the Mean Value and SD

	Mean	Sd
Motivations		
M1	3.740214	1.284573
M2	3.829181	1.267451
M3	3.814947	1.198775
M4	3.846975	1.186863
M5	3.686833	1.245623
M6	3.857651	1.156204
M7	3.822064	1.335107
M8	3.857651	1.270976
M9	3.829181	1.215673
M10	3.786477	1.229385
M11	3.743772	1.278324
M12	3.985765	1.127486
Barriers		
B1	3.88968	1.078326
B2	3.822064	1.190893
B3	3.918149	1.211725
B4	3.985765	1.085527
B5	3.864769	1.122595
B6	3.985765	1.048712
B7	3.964413	1.203632
B8	3.928826	1.137944