

FACTORS INFLUENCING CONSUMER INTENTION  
TO ELECTRIC CAR SHARING PROGRAM  
IN CHINA

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## Abstract

Time-shared rental has been developed as an emerging model in the area of sharing economy in recent years in China. Since the technology of Internet of Things (IoT) and new energy automobile evolved, there are more and more people paying attention to innovative transportation such as eco-car sharing. As attitude towards eco-car, which may profoundly influence the industry, is on the turning point, the purpose of this dissertation is to examine what influence consumers' intention on e-car sharing and to understand how to better increase consumer intention to use time-shared rental.

A 14-item survey was cited and developed to collect data from China delivered through Internet. Responses were collected from 183 participants. The results show that PEOU, GSI and CID have positive impact on intention to use time-shared rental while PE doesn't associate with it. At the same time, the analysis of moderating roles indicates that neither age nor gender has moderating effect on the relationships between intention and the predicted variables. However, the income level of participants was identified to be the moderator of PE to intention, which is slightly positive.

**Key words:** Time-shared rental, intention, China, moderating roles

**JEL classification:** L94; M10

## Resumo

O aluguel de time-shared foi desenvolvido como um modelo emergente na área de economia compartilhada nos últimos anos na China. Com a evolução prosseguida da tecnologia da Internet of Things (IoT) e da nova energia automóvel, há cada vez mais pessoas a prestar atenção ao transporte inovador, tal como a eco-car sharing. Como a atitude em relação ao eco-car poderá ter grande impacto na indústria, este novo transporte ainda está num ponto de viragem. O objetivo desta dissertação é examinar o que é que influencia a intenção do consumidor em e-car sharing e entender como melhorar a intenção do consumidor em uso o aluguel de time-shared.

Uma pesquisa de 14 itens foi citada e desenvolvida para recolher os dados que são transmitidas pela Internet. As respostas foram obtidas de 183 participantes. Os resultados mostram que PEOU, GSI e CID têm um impacto positivo na intenção de uso do aluguel time-shared enquanto o PE não se associa a ele. Ao mesmo tempo, a análise dos papéis moderadores indica que nem a idade nem o gênero têm efeito moderador nas relações entre a intenção e as variáveis previstas. No entanto, o nível de rendimento dos participantes foi identificado como sendo o moderador da PE para intenção, o que é ligeiramente positivo.

**Palavras-chave:** Aluguel de time-shared, Intenção, China, Moderadores indica

**Classificação JEL:** L94; M10

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## List of Abbreviations

B2C - Business to Costumer

BI - Behavioral intention

CID - Community identification

EV - Electric vehicles

FF - Free Floating

GSI - Green self-identity

IoT - Internet of Things

NBSC - National Bureau of Statistics of China

OEM - Original Equipment Manufacturer

P2P - Peer to peer

PE - Perceived enjoyment

PEB - Pro-environmental behavior

PEOU - Perceived ease of use

SAV - Shared Automated Vehicle

SB - Station Based

S.D. - Standard deviation

TAM - Technology acceptance model



## **1. Introduction**

### **1.1 Background**

BI is defined as an indication of an individual's readiness to perform a given behavior (Ajzen, 2002). Although it has been evolved and formed for many years, the intention to use eco-car sharing is a new perspective in the context of Chinese society and economy. Eco-car sharing, which has already existed in many developed countries for decades, just arrived China since the year of 2010. As the opportunity to introduce new energy cars to Chinese market, eco-car sharing is mainly consisted of electric-energy cars. It is, more significantly, a proper approach to advocate green travel. According to National Bureau of Statistics of the People's Republic of China, by 2015, there has been more than 280 million people with car-driving licenses and about 140 million had their own private cars. Particularly in the cities struggling with population growth and increasing density, eco-car sharing is committed to reduce inner-city traffic, congestion and pollution problems (Hiroyuki, Yoshihiro & Misuzu, 2013; Cohen & Kietzmann, 2014).

Eco-car sharing sprouts rapidly as a new business model in many cities like Beijing, Shanghai, Guangzhou, Shenzhen, Nanjing, along with the development of bike sharing. At present, although there are some barriers including driving range limitation, long charging time, technological error and vehicle features (Rachel, Bradley, Sanya & John, 2016) for consumers to adopt electric car sharing, its market in China is considerable and prosperous. According to a report of Chinese Auto Purchasers in New Generations (2017) posed by McKinsey Center for Future Mobility, conceptual change is taking place on behalf of auto consumption amongst the next generation in China. More than half of the interviewees showed less sense of ownership of private vehicles and more people from young generations shed light on car-sharing than elder generations. An interesting phenomenon is pointed out in the report that eco-car is given increasing attention by the market and is believed to be

welcomed with technology and function updated.

## **1.2. Research Purpose**

In order to figure out factors that may influence the prevailing electric car-sharing in China, we did extensive literature review of previous relative studies. This dissertation is our research statement with purposes listed below:

- 1) Examining which factors influence consumers' intention on e-car sharing.
- 2) Understanding whether there is moderating effect between factors and intention
- 3) Understanding how to better increase consumer intention to use e-car sharing in China

## **1.3. Research Questions**

Intention to participate in e-car sharing program may be not only a convenient commuting for city dwellers, providing business value for enterprises, but also beneficial to the environment by reducing CO2 emission. Besides attitude, social norm and perceived behavioral control are three key elements that influence an individual's behavioral intention (Wan&Shen, 2015), BI to eco-friendly consumption may be also influenced by many ways on psychological perspectives.

Personal value is one of the important psychological characteristics (Parks-Leduc, L., Feldman, G., & Bardi, A., 2015), which was indicated to have strong correlation with BI. Research on BI to participate into e-car sharing program is crucial to understand what propensity of consumers is towards e-car sharing according to their values or attitudes, so as to, make progress on its market targeting and product image.

This study tends to demonstrate factors influencing consumer intention to discuss the following questions:

1. What are the main factors influencing consumer intention to use e-car sharing in China?
2. Can socio-demographic characteristics affect consumer intention and how?

#### **1.4 Structure of Dissertation**

In the following chapters of this dissertation, we will do an unfold discussion about the determinants influencing intention to use electric car sharing in China. We will also analyze the probably existing moderating role of several individual factors among our study objectives. Moreover, this dissertation attempts to understand how to better motivate potential consumers and improve the efficiency of marketing strategy.

There are totally six sections in this dissertation. In the first section, we already introduced the background and structure of our study and came out with research questions as well as purposes. In Section 2, we will discuss the literature review including the trend of car-sharing, e-car sharing in China and major policies. Pro-environmental behavior, technology acceptance method, sense of community and hedonic value will also be introduced before our research model and hypotheses are provided.

Section 3 discusses the methodology of study, the responses of questionnaire and samples and the analysis tool. Section 4 presents the results and interpretation of our hypotheses, analyzes, and discusses them. Section 5 concludes our findings from the study while in Section 6, we discuss the limitation and possible further research according to our statement and conclusion.

## **2. Literature review**

### **2.1. Car sharing**

Date back to between 1940s and 1980s, car sharing appeared in Europe as a flexible alternative of transportation. However, until the early 1990s in the US, the concept of car sharing has become popularized (Diana & Gonçalo, 2013). Although the experience of car sharing originated in Europe, this new pattern expanded worldwide and became the mainstream of transportation.

#### **2.1.1. History of car sharing**

The history of car sharing is not long but with lots of attempts. We can see it from the research of Shaheen and his colleagues (Shaheen, S., Sperling, D. & Wagner, C., 1999), the first experiment of car sharing was a cooperative known as Sefage in Zurich, Switzerland in 1948, which was mainly motivated by economic reasons. Later on in Europe, many countries began to try car sharing. In 1971, Procotip was initiated in Montpellier, France to experiment “public car”. Two years later, another one, which was called Witkar, was also deployed in Amsterdam. However, both of them turned out to be failures. In 1980s, thanks to the advance of communication technology, several successful programs launched including Mobility Carsharing in Switzerland and Stattauto in Germany.

With these experiences and the advancement of technology, car sharing proceeded and expanded in not only Europe but also the US and Japan and gradually, all round the world (Jorge & Correia, 2013). By October of 2010, car sharing has been operated in more than 1100 cities in 26 countries on five continents (Susan & Adam, 2013). Currently, the biggest car sharing company in the world is Zipcar, which was found in 2000.

### **2.1.2. Business model of car sharing**

As the scale of car sharing market increased, a variety of business models occurred, providing significant value to people and influencing profoundly on local transportation networks (Cohen & Kietzmann, 2014). It is necessary to mention that the contribution of Information System (IS) with three functions of information, automation and transformation, drives the substantial business model change towards sustainable mobility (Björn, Andre, Everlin, Lutz M., Tim, 2015). There are many researchers discussing and generalizing different car sharing business models. Cohen and Kietzmann (2014) summarized different existence of car sharing in their study. They listed three unique car sharing business models: Business to Consumer (B2C), Nonprofit/Cooperative and Peer-to-Peer (P2P). Each of them was elaborated with examples and further categorization, which is shown as FIG. 1 below. As well, Adam Stocker and Susan Shaheen (2016) discussed three business models of current shared mobility including B2C Service Model, P2P Service Model and For-Hire Service Model. For-Hire Service Model means that a passenger or consumer hires a driver by reservation or booked on-demand when he/she is on need for transportation service. They even shed light on the shared automated vehicle (SAV) and its potential business model in the future, which is illustrated below in Fig. 2.



Fig. 1. Summary of car sharing business models

Segment	Value proposition	Supply chain	Customer interface	Financial model	Examples
B2C point to point	Reduces emissions and congestion  A vehicle when you want/need one and no requirement to return to same location	OEM vehicles; some programs using EVs and hybrids	Shift from vehicle acquisition to shared use	More affordable access to a vehicle than owning and maintaining  Potential for profitability and exit	Car 2 Go
B2C roundtrip	Reduces emissions and congestion  A vehicle when you want/need one	OEM vehicles; some programs using EVs and hybrids	Shift from vehicle acquisition to shared use	More affordable access to a vehicle than owning and maintaining  Potential for profitability and exit	Zipcar
Nonprofit/cooperative	Reduces emissions and congestion  A vehicle when you want/need one	OEM vehicles; some programs using EVs and hybrids	Shift from vehicle acquisition to shared use	More affordable access to a vehicle than owning and maintaining  Member revenue, sponsorship, government subsidies/grants	Modo
P2P	Reduces emissions and congestion	P2P models are unique in that they require virtually no additional production or suppliers; instead P2P firms serve as intermediaries between owners and renters; that is, generally more environmentally sustainable than B2C models	P2P models encourage vehicle owners to share a resource	Provides additional income to vehicle owners to offset the high cost of ownership	Relay Rides
	A vehicle when you want/need one and no requirement to return to same location  Usually more variety of vehicle types for renters		For the renter it also shifts from acquisition to shared use	For renters it provides more affordable access to a vehicle for than owning and maintaining a personal vehicle  Scalable revenue model based on a percentage of transaction without need to acquire vehicles	Flight Car
	For the owner, a way to generate extra income from a subutilized resource				

Note. EV = electric vehicle; OEM = original equipment manufacturer; B2C = business to consumer; P2P = peer-to-peer.

Source: B. Cohen & J. Kietzmann (2014) Ride On! Mobility Business Models for the Sharing Economy. *Organization & Environment*, Vol. 27(3) 279–296.

**Fig.2. Potential SAV Business Models**

<b>Vehicle Ownership</b>	(1) Business (B2C)	(2) Individuals (P2P)	(3) Hybrid Business/Individuals
<b>Network Operations</b>	(a) Same entity owns and operates (b) Different entity owns than operates	(a) Third-party entity operates (b) Decentralized peer-to-peer operations	(a) Same entity that owns (some) vehicles operates (b) Third-party entity operates

Source: Adam & Susan. (2016). Shared Automated Vehicles: Review of Business Models.

Electric vehicles (EVs) nowadays are more and more extensively used in car sharing market. Since 1966, the world's first fuel cell EV was designed by General Motor. Later, this technology has been developed globally in a large scale (Eberle Ulrich & Rittmar von Helmolt, 2010). As the increase of air pollution and oil prices, traditional fuel-energy vehicles are considered to be less sustainable for financial, ecological and political reasons. Especially after 2005, with the advancement of vehicle engine technology and consumer transportation intention, EV began to rise in organized car sharing market (E. Ulrich & R.V. Helmolt, 2010; M. Dijk, R. J. Orsato & R. Kemp, 2013). By using electric cars, it is accessible to achieve zero-emission because this solution doesn't have fuel dependency (J. Lee, J. Nah, Y.Park, & V. Sugumaran, 2011).

Therefore, EV is widely used in car sharing business in many different countries including the U.S., the U.K., France, Germany, Japan and China. Established electric car sharing service system provides technical support for e-car sharing industry, which is usually connected to mobile facility and the internet. Although electric power drastically reduces air pollution and fuel usage, EV still needs to be further developed in terms of satisfying the consumer transportation demand because of its inherent technical challenges such as limited navigation range and recharging ability (A. Jacquillat, S. Zoepf, 2017).

### 2.1.3. EV sharing program in China

The electric car sharing program started up rapidly since 2010 in China. As a newly emerging transportation model, the program is called timeshare rental. With growing heat-up of new energy vehicle, electric car plays an important role in timeshare rental. Except from Car2go using fuel energy, there are more than 95% electric cars in timeshare rental sector. By 2016, more than 30 companies work on in timeshare rental business and about 30 thousand eco-cars serving in the market. The growth rate of the market will remain 50% in the coming years (Car Sharing Business Analysis, 2017).

Nowadays, about 77% of timeshare rental are provided by OEM (Original Equipment Manufacturer), for instance, SAIC (Shanghai Automobile Industry Corporation), BAIC (Beijing Automobile Industry Corporation), and Geely Automobile. They deploy their businesses mainly in first-tier cities like Beijing, Shanghai, Guangzhou and Shenzhen. As well, some of them start to enter into and switch their focus on second and third tier cities. For example, EVCARD<sup>1</sup> landed on Nanjing and Jiangshan recently. Compared with other forms of car sharing (Car-hailing and P2P rental), timeshare rental has more advantages on flexibility and pricing (China Car Sharing Industry Report, 2016). Normally, there are two ways to calculate the fares:

- (1) Basic 10 CNY for rental, plus 1 to 1.5 CNY per kilometer;
- (2) Rental for each hour is 20 to 30 CNY.

According to the business analysis (Accenture Strategy, 2016), there are two operational models of timeshare rental in China, namely Station Based (SB) and Free Floating (FF). SB refers that customers pick up and return the cars in the same charge station circularly (A to A). FF provides a solution to customers that they can return cars to any different charge station (A to B or A to C), which maximizes the flexibility of timeshare rental. In fact, FF is more difficult to manage and invest because the quantity and density of charging stations are calculated and planned according to statistical analysis, while SB doesn't need to concern about it. However, to maximize the consumer satisfaction, FF is favorable.

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<sup>1</sup> Partnered by 34 corporate and institutes, EVACARD is a company that provides online platform and infrastructures establishment for timeshare rental. <http://www.evcardchina.com/pages/intro>

Electric car rental is believed to be an effective mode to commercialize new energy vehicle and attributes great potential for environment protection (Rui M., Jintao C., Kai Z., Boxiao C., Zhibin J. & Liya W., 2014). However, companies who are operating timeshare rental in China are scarcely profitable. Costs on parking place, car depreciation and maintenance, as well as price discount course and low utilization gradually shrink the margins. Although there are some challenges that make it hard to succeed in a short term, companies include Feezu, YiyiZuche, EVCARD, WK Zuche, Soda, and EkaZuche flood into this sector. As the authors state: “Experts in China indicated that the business market was the largest and most profitable, followed by the neighborhood residential model” (Susan A. & Adam P., 2013). Those timeshare rental companies scrupulously exert themselves to the utmost to become the market leader.

## **2.2. Major policy enforcement in China**

Timeshare rental is believed to be an effective mode to commercialize the electric car and attribute great potential for environmental protection (Rui M., Jintao C., Kai Z., Boxiao C., Zhibin J. & Liya W., 2014). In order to encourage environmental-friendly consumption and support the use of new energy vehicle, the central and local governments in China provide many favorable policies. Since 2009, the government set a very specific goal for the development of alternative energy vehicles that by 2020, alternative energy vehicles will be increased to about 50% of all vehicles in operation (Wang J, 2012). To achieve it, the central government distributed 10 billion CNY from 2009 to 2011. We can see from these years that the spent on car industry and energy has increased constantly. According to the study (Tagscherer, Ulrike, Frietsch, Rainer, 2014) of Tagscherer and his colleagues, the current strategy is mainly at three major fields including support for research and development (R&D), support for the related industry and the support of private and public consumption. Since 2001, the Chinese government intended to develop electric car technology and launched a special program named “863 Project” under the 10<sup>th</sup> national Five-Year-Plan from 2001 to 2005(Huang & Wu, 2007). They offer generous subsidies to electric car purchase, providing sales tax exemption in certain cities like Shanghai (Changzheng L. & Zhenhong L., 2017). Meanwhile, R&D of new energy cars are also part of the "Mid-to-long Term plan for Science and Technology (2006-2020)", which is China's

most important policy document regarding science and technology (Yun, 2011).

The policy character of license plate is another important incentive for consumers to choose electric cars or e-car rental. To alleviate the severity of traffic congestion and air pollution, a restriction of license plate issuing is executed in many Chinese cities. There are two car-ownership policies, namely license plate auction and license plate lottery, to limit the number of cars on road (Jiang H., Shen W., Han W., 2017). In license plate lottery, residents get their license plates through taking part in a monthly draw. Although residents don't need to pay extra money for one plate, the competition is so ferocious that they need to wait for a very long time to get their plates, which always induces a complaint. For example, in August 2017 in Beijing, only 13,923 license plates were handed out although there were 2,859,200 individuals in the lottery (Beijing Municipal Commission of Transport, 2017). License plate auction means residents should pay for the driving license plate through an auction. In an auction recently in Shanghai that took place in January 2017, 232,101 residents bid for 12,215 license plates and the price for one single plates hit the utmost 87,685 Chinese yuan, or 12,761 US dollars (China News Network, 2017). As the cost of obtaining car ownership increases, people is to change their ownership attitude and consider electric car sharing as a feasible transportation in their daily life. In cities like Beijing, Shanghai, Guangzhou, Chengdu implement an odd-even license plate rule during holidays and some special period that only private vehicles with regulated odd or even plate number can be driven on road. By this, traffic flow in downtown is effectively alleviated and public transportation is encouraged to use by more people.

### **2.3. Pro-environmental Behavior**

Nowadays, sustainable lifestyle is becoming more and more a normative existence among people. An individual persisting green value has different behaviors from others who have less attention to pro-environmental objectives. Pro-environmental behavior, which is abbreviated to PEB, has already been discussed and enriched in definition for decades. In 1970s, researchers used to explain PEB with only environmental knowledge of an individual, which was later proven to be wrong and extended to environmental values, situational factors and psychological variables by Price and Pitt (2011).

Jan Krajhanzl (2010) thought that all human behaviors constantly interacting with the environment could be called environmental behavior. In his study, PEB was considered to judge whether an impact on the environment could be labeled as environmentally friendly, or a tribute to the healthy environment. Dian R. Sawitri, H. Hadiyanto and Sudharto P. Hadi (2014) refined the concept of PEB as the conscious actions performed to alleviate the negative impact of human activities on the environment from previous researchers. PEB was also given multiple definitions from purpose- and fact- oriented dimensions (Kiyo K., 2016). By summarizing and classifying behaviors proposed by various environmental agencies, the researcher specified 12 categories under different targets, and unveiled the relationship between each target and users.

Extensive studies at the areas of psychology and sociology have sprouted to figure out influential elements that are consistent with the performance of PEB. Christopher F. Clark (2002) and his colleagues used to study the internal and external influences concerning PEB. In order to understand the participation in a green electricity program, they focused on participants' specific motives and finally considered biocentric motive, altruistic motive and egoistic motive as major variables significant to people's behavior. PEB is also effectively promoted by a high level of environmental concern and positive attitude towards frugality (S. Fujii, 2007). He investigated the relations between environmental concern, attitude toward frugality, perceived ease of behavior, and stated intentions to engage in PEB, which indicated different extent of influence on specific PEB.

Normally, self-identity, known as sense of self, is believed to have strong connection with consumer behaviors. Birgitta Gatersleben (2014) and his colleagues examined the role of personal values and identity in explaining individual pro-environmental behaviors, and found that identity was a significant predictor of intention to perform PEBs while green value had direct influence on identity. Similar conclusion was proposed to reinforce existing evidence for the importance of self-identity and past behavior in predicting predicting environmentally-significant behavior in the study of L. Whitmarsh and S. O' Neil (2010), while they also proved that influence of self identity on BI differs from certain pro-environmental behaviors.

A more recent study (J. Dermody et al., 2017) even discussed about how self-identity and consumer behavior function in the era of innovation. They discussed the relation between pro-environmental self-identity(PESI) and sustainable consumption buying and curtailment behavior in emerging markets with eco-innovation ideas in China and Poland, verifying the dynamic expression of PESI on pro-environmental behavior.

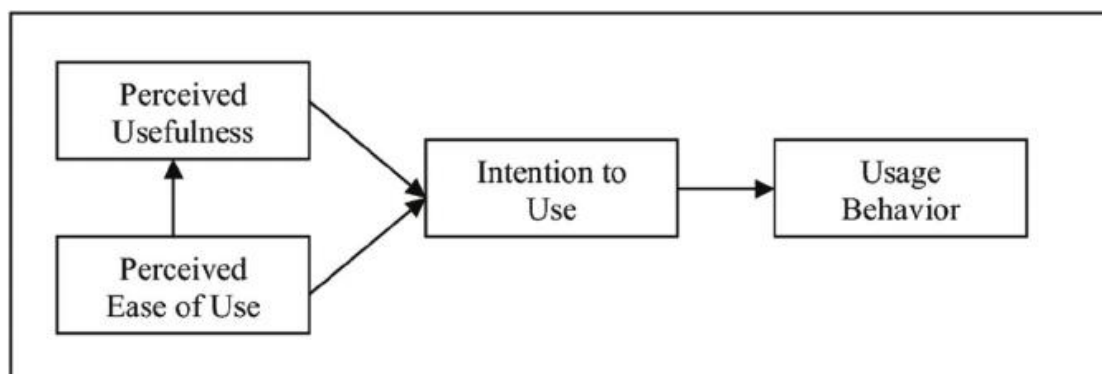
#### **2.4. Technology Acceptance Model**

According to a literature review of TAM by Marangunić, N., & Granić, A. (2015), originated from the theory of reasoned action (TRA) and the theory of planned behavior (TPB), Technology Acceptance Model (TAM) was first developed by Fred D. Davis (1989) in the end of 1980s in order to predict user acceptance of computer usage and new IT products, comprising two specific variables, perceived usefulness (PU) and perceived ease of use (PEOU). Davis defined PU as “the degree to which a person believes that using a particular system would enhance his or her job performance”, while in contrast, PEOU as “the degree to which a person believes that using a particular system would be free of effort”. (as Fig.2 shown) TAM has been always applied and studied as a fundamental theory for the past to discuss consumer acceptance towards innovation. In 2000, TAM2, a theoretical extension of TAM, was studied and proposed by Viswanath Venkatesh and Fred D. Davis (2000), advancing social influence processes and cognitive influence processes significantly affected user acceptance behavior. Later, in order to improve managerial decision making on IT implementation, Venkatesh and Bala (2008) developed TAM 3 from TAM2, expanding more comprehensive determinants at individual level.

With many studies of the acceptance of IT-enabled services, which can be regarded as antecedents of sharing service participation, Hawlitschek, F., Teubner, T., and Gimpel, H. (2016) established an upgraded model combining TAM and Unified Theory of Acceptance And Use Of Technology (UTAUT) to study user activity in sharing service market. As well, Marius C. Claudy(2015) and his colleagues developed behavioral reasoning theory by applying TAM to examine the attitude, intentions and usage behavior towards EVs.

Although TAM has already been broadly used to explain consumer behavior of new information systems, there are still few studies of TAM on car-sharing or innovative business models. Saleh Alharbi&Steve Drew (2014) applied TAM to measure the BI to use a newly-emerging tool Learning Management Systems(LMS) in Saudi Arabia. They verified a positive effect of PEOU on attitude and BI to using LMS. A.B. Ozturk(2016) and his colleagues also identified PEOU as a key component of technology adoption and usage behavior. From their research, PEOU is positively influential to not only BI, but also the likelihood to build loyalty and recommend to others.

**Fig.3. Technology Acceptance Model**



Source: F. D. Davis. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*

## 2.5. Sense of Community

Sense of Community was first conceptualized and presented in a working paper by McMillan in 1976. Ten years later, he and D.M. Chavis attempted to describe the dynamics of sense-of-community force and proposed a more precise and comprehensive definition as: “Sense of Community is a feeling that members have of belonging, a feeling that members matter to another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (D. W. McMillan&D.M. Chavis, 1986). Speer, P. W. and Hughey, J. (1995) even applied network concepts in their study to community theory, emphasizing the positive significance of social network dynamics to strengthen sense of community. Emily Talen (1999) as well, proved the relation between sense of community and



neighbourhood-environment factor, supporting that a sense of community will follow the physical form of neighbourhoods.

Previous studies have shown that community identification, which was actually derived from social identification, can express the sense of community on individuals (C.L. Hsu&J.C. Lin, 2008; C.Y. Chen et al., 2016). In our study, community identification was used to discuss itself the relation to consumer`s BI. Masayuki Yoshida (2015) and his colleagues found that community identification has a positive leading effect to community engagement, customized product use, and positive word-to-mouth when they studied fan community identification in Japan. Identification with a community positively influences the motivation to interact and cooperate with other people into the same shared activity (L.V. Casalo et al., 2010), where people`s identification promotes cohesion and commitment of the community to develop the sense of community belonging.

Since the behavior of using time-shared rental in China is spontaneous and at the beginning period, we focus on the possible community identification that will form among people and study the intention to use time-shared rental from conformity behavior to motivated social identification.

## **2.6. Hedonic consumption perspectives**

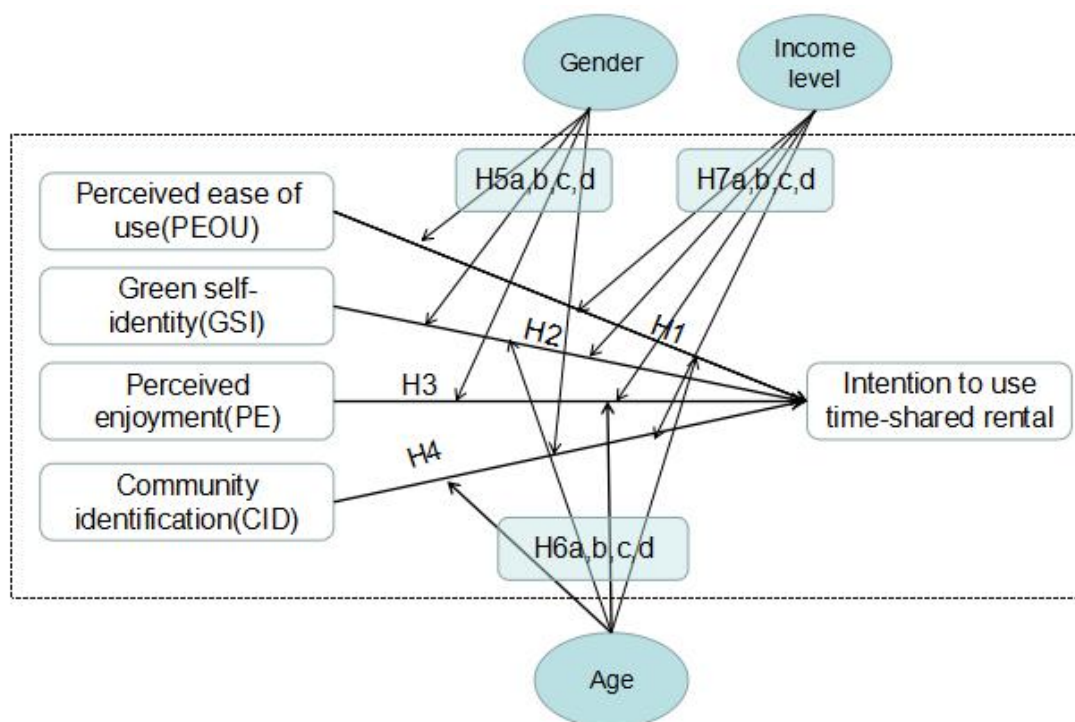
Hedonic consumption was developed by Hirschman and Holbrook (1982) to study “the facets of consumer behavior that relate to consumers' multisensory images, fantasies and emotional arousal in using products”. They focused on the function of product image influencing the behavior of consumers and believed that what a product represents is as much important as what it really is. In the subsequent studies(Wang, C. L., Chen, Z. X., Chan, A. K., & Zheng, Z. C., 2010; Jiming Wu&Clyde Holsapple, 2014), researchers identified two main types of hedonic consumption experiences including imaginal and emotional experiences. Empirically, imaginal experience is an unspoken, internal activities of imagining things/events that is accordant to sensory information, while emotional experience is people`s affection towards specific activities, which can be classified as positive or negative.

For many years, hedonic value has been examined to be an important motivation to influence consumers' BI. As one of the determinants of hedonic value, perceived enjoyment is especially considered as a predictor of consumer intention. T. Ramayah and Joshua Ignatius(2005) proved that PEOU and PE were positively related to online shopping behavior, whereas perceived usefulness didn't show relevant influence to the intention. Teo, T. and Noyes, J.(2011) in their research also examined the influence of perceived enjoyment on pre-service teachers' intention to use technology, figuring out the potential relationship among PE, PEOU and perceived usefulness. Therefore, PE is usually studied with elements of TAM as a motivation valuable to further explain the acceptance theory.

Since the sharing economy has emerged these years, researchers studied the influence that PE can bring for the consumer intention to participate into sharing activities. They found that enjoyment of the activity is one of the factors to motivate the participation in collaborative consumption, positively affecting the attitude and intention to sharing behaviors (Hamari, J., Sjöklint, M., & Ukkonen, A., 2016). Example that according to consumers' bike-riding time, they receive points and corresponding recognition statuses , which typically increases enjoyment of bike-sharing commuting and positively influences their future behavior (Wunsch, M., et al., 2015).

## **2.7. Conceptual framework and research hypotheses**

In this study, we discussed the determinants of intention to use time-shared rental in terms of cognitive value and affective perspective of an individual. Since the immaturity and inadequacy were found in the previous researches on time-shared rental, we did an abundance of literature review related to BI and consumer acceptance. By generally considering the realistic research values and authorized theories, a conceptual framework presenting the relationship between antecedent variables and intention to use time-shared rental is shown below in Fig. 4.

**Figure 4. Conceptual framework**

Source: Self-constructed table

### 2.7.1. Perceive ease of use

Based on the TAM of Fred D. Davis (1989), PEOU is a direct determinant of PU, indicating the less efforts to use a system, the more efficiency to increase the job performance. Therefore, examine the effect of PEOU on intention to use time-shared rental can explain consumers' acceptance towards it.

Extensive previous studies identified the significant impact of PEOU on BI of consumers towards emerging technology (Chien-Chuan K. et al, 2011; A. M. Elkaseh, K. W. Wong & C. C. Fung, 2016; DR V. Gautam, 2011) including e-reading system, e-Learning, Internet of Things, mobile banking etc. However, there is still an opposite opinion from Anja Peters and Elisabeth Dütschke (2014) that according to their study, PEOU played a negative-low influence. It means people would be more likely to purchase and use an EV if they perceived the use of EVs is complex.

In current study, we built our questionnaire items based on two previous relative

papers from Saleh Alharbi&Steve Drew (2014) and A.B. Ozturk(2016), and did some modifications in order to fit our research purposes. The hypothesis is stated as below:

**Hypothesis1: There is a positive relationship between intention to use time-shared rental and PEOU.**

### **2.7.2. Green self-identity**

For a long time, consumer researchers have recognized that people's consumption ways keep a consistency with their sense of self (M.J. Sirgy, 1982). Self-identity refers to how an individual sees him/herself, as well, a contemporary sense of self connecting to our interaction with the rest of the world, with deep spiritual significance to a person (F. H. Besthorn, 2002). A self-identity reflected from the aspect of eco-friendly intention formation, concerning environmental consequences of consumption, is called green self-identity(GSI).

EV time-shared rental existing as an approach to reduce pollution and advocate the use of sustainable energy, arouses people's attention to re-select their transportation for pro-environmental value. Since the value of GSI was proven to have strong influence on environmental preferences and intention of product choice (J. Escalas, 2013; E. V. der Werff, L. Steg&K. Keizer, 2013), V. Carfora (2017) and his colleagues found that GSI is an important determinant of pro-environmental behavior and intentions to perform such behaviors in their study about intention-behavior relationship. A cross-cultural comparative study about electric car adoption was conducted in the European context including Denmark, Belgium and Italy, proving that green self-identity drives an individual to engage in the adoption of eco-friendly electric cars and other specific green behaviors(C. Barbarossa et al., 2015). According to their research scale, we studied the relationship between this self-identity and intention to use time-shared rental.

**Hypothesis2: There is a positive relationship between intention to use time-shared rental and GSI.**

### 2.7.3. Perceived enjoyment

Perceived enjoyment(PE) is “the degree to which the activity of using technology is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated”(Teo, T., & Noyes, J., 2011). PE, as one of the intrinsic motivations, has been found to have significant influence on people`s BI, contributed by the effect on individual attitude towards the behaviors (Chin-Lung H.&Judy Chuan-Chuan Li., 2008).

In this study, we decided to adopt indicator items of perceived enjoyment from Lingling G. and Xuesong B.`s (2014) research on the factors influencing consumer acceptance of internet of things technology. They found that PE positively influences the acceptance of new technology, and helps motivate consumers` interaction into the activity.

**Hypothesis3: There is a positive relationship between intention to use time-shared rental and PE.**

### 2.7.4. Community identification

Sense of community identification(CID) was proven to affect consumer-to-consumer helping behavior within a consumption communication in the study of Johnson Z., Massiah C.&Allan J.(2013). They stated that consumers who sharing the same or similar community or subgroup are more motivated to help other members because of CID. It implies in our study that CID may have accumulative influence to BI to use time-shared rental if there are many users nearby. Although the development of time-shared rental in China still posits in the very beginning stage, trust and reputation will be built as the emergence more and more groups, especially when communicating information and engaging buying behavior(Shiau, W. L., & Luo, M. M., 2012).

According to C.L. Hsu&J.C. Lin(2008), CID as a social influence factor, has significant influence on consumer`s intention to use blog. In other words, establishing strong sense of CID can improve the willingness of people to participate into some specific activities. We used items from their study in our questionnaire, with proper

changes in objectives.

**Hypothesis4: There is a positive relationship between intention to use time-shared rental and CID.**

### **2.7.5. Socio-demographics**

Socio-demographic covers sociological and demographic characteristics of respondents such as age, gender, educational level, religion, income level, marital status and so on. Previous researches( Wang Y.S. et al., 2009; Tarhini, A. et al., 2014) have explored the influence of gender and age differences to attitude and behavior towards new technology. The former found that gender and age as two moderating roles, strongly affect people`s behavior of using technology in their decision-making process, while the latter proved that t age moderates the effect of PEOU and BI to e-learning systems. P. Rani (2014) as well, confirmed in his study that personal factors like age, gender, economic circumstances and even lifestyle may explain our changing preferences, which obviously influence our BI in consumption. So in this study, we will discuss whether age, gender, and income level have moderating effects on BI when aggregating with other factors.

**Hypothesis5(a,b,c,d): Gender may have a moderating role to the relationship between intention to use time-shared rental and PEOU<sup>a</sup>, GSI<sup>b</sup>, PE<sup>c</sup> and CID<sup>d</sup>.**

**Hypothesis6(a,b,c,d): Age may have a moderating role to the relationship between intention to use time-shared rental and PEOU<sup>a</sup>, GSI<sup>b</sup>, PE<sup>c</sup> and CID<sup>d</sup>.**

**Hypothesis7(a,b,c,d): Income level may have a moderating role to the relationship between intention to use time-shared rental and PEOU<sup>a</sup>, GSI<sup>b</sup>, PE<sup>c</sup> and CID<sup>d</sup>.**

## **2.8. Summary**

In this chapter, we reviewed several literature related to BI and influential factors. Based on the review, a conceptual framework was developed to analyze the relationship between intention to use time-shared rental and factors including PEOU, GSI, PE and CID. As well, age, gender and income level of respondents in this study will be examined to understand whether these relationships may be moderated by age, gender and income level.

Based on literature review, we identified seven main hypotheses in order to test usage intention among PEOU, GSI, PE, CID and moderating roles. The research bases on the context of people in China or with habitual residence in China. Therefore, we need to take chinese economic, politics and social factors into consideration.

### 3. Methodology

In terms of the literature reviews and the status quo of timeshare rental in China, we decided to design a highly relevant questionnaire from some previous study scales, and deliver to respondents via the Internet. Base on this, the data analysis comprised two parts. We examined the quality of questionnaire (validity and reliability) followed by the tests of hypotheses.

After gleaning necessary data from our respondents, in order to clarify our study model, we established the regression simplest formula (1) concerning factors that may influence the intention to use time-shared rental, as shown below:

$$Intention = a + bPEOU + cGSI + dPE + eCID + \varepsilon \quad (1)$$

To note that formula (1) is underlying, which doesn't take moderators into consideration yet. However, as our study goes further, moderating effect of age, gender and income level will be respectively tested by hierarchical regression.

#### 3.1. Questionnaire

To test the hypotheses of our research, a 5-point Likert scales with ordered categories is considered to be one of the most effective tools to collect primary data, which can intuitively provides us descriptive and explanatory information for our study purposes (Bryman, 2015). We set jump topic in the first question in order to distinguish different results from three situations towards time-shared rental program including respondents that have never heart about, that have heart about but never used, and that have already used.

Because all the scales in our questionnaire were translated from English to Chinese with some of the contents changed, a pretesting was conducted to discover any possible problems in understanding or sequencing problems. We have done a pre-test to a group of 15 participants from the same sample, who were physically present to accomplish the questionnaire. Their feedback was collected to improve the overall quality of our research, after which, the refined questionnaire was sent to the final



respondents.

The questionnaire comprehends demographic research (individual characteristics), attitude and feeling towards ease of use, pro-environmental consumption, enjoyment and community. For the section of demographic data, the respondents are required to fill in the personal information including age, gender, and income level. For the other section, we developed 14 items according to previous research scales we mentioned in literature review, respectively related to respondents' PEOU, GSI, CID and PE. A dependent variable was also designed to examine the result of BI to use time-shared rental in China.

Before going further, in this part, we will present the tests we conducted to demonstrate the quality of each measure, which is constituted by reliability and validity.

The test of scale reliability reflects whether all question items have consistency with the purpose of the study. According to Kuder-Richardson Reliability, we statistically calculated Cronbach's  $\alpha$  (at the spectrum of 0 to 1), which is required to be above 0.7 to express high reliability of the scale. As Table 1 shown below, we accepted the research with good reliability as the Cronbach's  $\alpha$  is 0.831 for 14 items, which demonstrates a strong consistency within all items to the purpose.

**Table 1. Reliability Statistics**

Cronbach's Alpha	N of Items
.831	14

We also ran explanatory factor analysis using principle component with Varimax rotation to test the scale's validity, providing us information such as Keiser-Meyer-Olkin (KMO) measure of sampling adequacy that should be above 0.600 (Hair et al., 2006) and, Bartlett test for further analysis if the p value is below 0.05. In the rotated component matrix(Eigenvalues>1), all items with Communalities below 0.60 will be removed from the analysis.

We can see the table 2 below, the value of KMO is 0.805 (approach to 1), which represents an obvious correlation among variables to go through an explanatory factor analysis, while Barlett's Test shows good construct validity (Chi-Square:964.811, df:91,Sig.:.000). The Cumulative Squared loadings in our study is 65.905% (approximately 0.66), indicating a "very good" percentage (Tabachnick&Fidell, 2007) of extracted principle components remains in our factor analysis shown as table 3. After rotation, there are four principle components extracted out from 14 items with Communalities above the required value 0.60 as table 4 shown below.

According to the explanatory factor analysis and the result of principle components shown in Table 4, four components were extracted from 14 items. In order to conduct regression analysis conveniently in process, we reduced dimensions with varimax rotation based on the four components through computing average values of items in each segment, named PEOU, GSI, PE and CID in our research.

Taking into consideration the factors we study are traditionally associated with each other since they are directly relevant to individual's values and attitude, especially when we are connecting them with BI. We have treated these separately and believe that the respondents also treated them in a different way during answering the questions. In order to further analyze the factors, we include correlation analysis of all explanatory variables, collinearity analysis and an indicator Dublin-Watson to prevent variance inflation (multicollinearity) and self-correlation. We assume the stepping method criteria of accepted hypothesis when the probability (p-value) is lower than 0.05.

**Table 2. KMO and Bartlett's Test**

Keiser-Meyer-Olkin Measure of Sampling Adequacy.	.805
Approx. Chi-Square	964.811
Bartlett's Test of Sphericity df	91
Sig.	.000

**Table 3. Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.553	32.523	32.523	4.553	32.523	32.523
2	2.197	15.694	48.218	2.197	15.694	48.218
3	1.407	10.053	58.271	1.407	10.053	58.271
4	1.069	7.634	65.905	1.069	7.634	65.905
5	.833	5.951	71.857			
6	.728	5.198	77.055			
7	.588	4.199	81.254			
8	.506	3.614	84.868			
9	.488	3.486	88.354			
10	.433	3.094	91.448			
11	.372	2.655	94.103			
12	.316	2.260	96.363			
13	.301	2.152	98.515			
14	.208	1.485	100.000			

Extraction Method: Principal Component Analysis.

**Table 4. Principle components of our study**

Sources	Items	Extraction Component			
		1	2	3	4
C. Barbarossa et al., 2015	You are very interested in green traveling	.843			
	Green consuming behavior can make you feel good	.781			
	You will consider environmental protection as a priority before choosing vehicle	.776			
	You are very concern about environment	.760			
	You are willing to pay more time and money for green transportation	.633			
Saleh Alharbi&Steve Drew, 2014; A.B. Ozturk, 2016	It is easy for you to get in touch with e-car sharing information in your daily life		.839		
	You can get the information from various resources and channels		.836		
	The concept and information is easily understood		.766		
	You can understand the advantage and figures of e-car sharing from the information		.749		

C.L. Hsu&J.C. Lin, 2008	You will not participate into theme activities unless your friends encourage and join as well			.736	
	The consumption decision can be easily affected by other people or the big trend			.733	
	The possibility of using e-car sharing will increase if there are many people nearby using it			.693	
Gao, L., & Bai, X., 2014	Additional entertainment functions are very attractive to rent a car.				.765
	It's important to me that I have fun when travelling				.634

Source: Self-constructed table

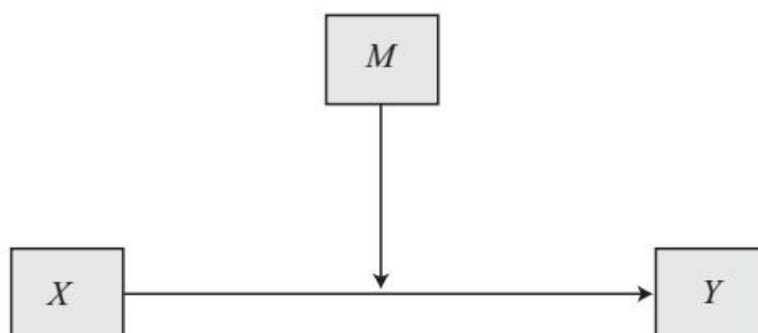
### 3.2. Analysis procedure of moderating effects

Based on the introduction to moderation process analysis written by A. F. Hayes (2013), variables of age, gender and income level are about to examined as moderating roles in our conceptual structure (Fig. 4). To set up the initial interaction terms (product terms), differences of age, gender and income level in the importance of PEOU, GSI, PE and CID as determinants of intention to use time-shared rental were examined by computing two-way interactions respectively (e.g., PEOUxAGE; GSIxGENDER; PExINCOME). In this process, standardized variables were introduced and the standardized scores (Z scores) of independent variables were calculated to create product terms. Then, we conducted hierarchical regression to test the moderating roles effecting on the relationships of PEOU-BI, GSI-BI, PE-BI and CID-BI. Collinearity analysis was conducted as well.

There are totally three hierarchical regression analysis we conducted based respectively on the moderators gender, age, and income level. For example, to test gender as a moderator, we entered all predicted variables PEOU, GSI, PE and CID in the initial block. In the second block, gender was added to examine the potential moderating effect on the relationships in this context. In the third block, 2-way interaction terms including gender and predicted variables that we already computed were added. For other two moderating variables age and income level, we followed the same procedure.

In order to figure out how moderators influencing the relationships between independent variables and intention to use time-shared rental, two-way standardized interaction effects were identified by interpreting plot with simple slope test produced by Dawson, J. F. (2014). This is valuable to explain single model (A. F. Hayes, 2013) of moderation shown as Fig. 5(e.g., PE-income-PE\*income-Intention). With the results drawn out from our tests, further study will be conducted to segment in the sample groups and understand the influence of each moderators on the relationships, implementing selection variables with specific rules in linear regression analysis process.

**Fig. 5. Single model of moderating effect**



Source: A. F. Hayes. (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.

### 3.3. Sample

Our questionnaire survey were delivered through online platform and social media covering an extensive range of different places. Most of the respondents are from Guangdong Province, Shanghai, Shenzhen and Beijing. A total of 237 answers were received and 233 are valid. Among these valid samples, 183 respondents have used or heart about time-share rental, while 50 of whom have no knowledge about it. In order to ensure the quality and credibility of our study result, the 183 responses were taken into consideration in our further research. The questionnaire survey was conducted

from August 15<sup>st</sup> to October 15<sup>th</sup>, 2017.

### 3.4. Analysis Tool

In our study, the SPSS 21.0 and Excel 2016 were used to analyze the data collected from the questionnaire survey. We conducted descriptive (means and standard deviations), correlations, and linear regression analysis tools in SPSS. As well, interaction effect was tested by Univariate to examine the possible moderating roles existing in the relationships between intention and our variables.

## 4. Results and discussions

### 4.1. Sample result

In this section, we would like to firstly present the sample characteristics with the components of gender, age and income. Then the correlations of different variables would be tested and stated before our accomplishment of the hypotheses test results.

**Table 5. Sample Description**

Individual characteristics	Sample classification	Frequenc y	Percent %
Gender	Male	89	48.6
	Female	94	51.4
Age	18 and below	4	2.2
	19-30	135	73.8
	31-40	17	9.3
	41-50	20	10.9
	51 and above	7	3.8
Annual income	Less than RMB30,000	22	12.0
	RMB30,000--80,000	33	18.0
	RMB80,000—120,000	38	20.8
	RMB120,000-200,000	51	27.9
	RMB200,000-300,000	18	9.8
	RMB300,000-500,000	11	6.0
	RMB500,000-1,000,000	6	3.3
	More than RMB1,000,000	4	2.2

Source: Self-constructed table

The number of total respondents is 183. There are 89 (48.6%) male and 94 (51.4%) female respondents, which shows an average distribution of target gender for discussion.

Respondents at the age of 18 and below comprise 4 (2.2%); respondents aged between 19 and 40 comprise 152 (83.1%); respondents who are above 40 years old comprise 27 (14.7%). Thus, the major group of this study ages between 19 and 40, at which people are the principle workforce of the society.

There are 93 (50.0%) respondents whose family average annual income is lower than RMB 120,000 while 86 (47.0%) earn between RMB 120,000 and RMB 1,000,000; only 4 (2.2%) respondents surpass the income of RMB 1,000,000. According to the publicized data from National Bureau of Statistics of China (NBSC) 2017, family whose annual income is lower than RMB 120,000 belongs to low-income groups; that between RMB 120,000 and 1,000,000 is middle-class groups; that above RMB 1,000,000 is high-income groups. Therefore, our main study target is low- and middle- class groups.

**Table 6. Means, standard deviations and correlations among variables in BI to use time-shared rental (N=183)**

Variables	Means	S.D.	1	2	3	4	5	6	7
1.Age	2.40	.858	-	-	-	-	-	-	-
2.Gender	1.51	.501	-.064	-	-	-	-	-	-
3.Income level	3.48	1.654	.038	-.051	-	-	-	-	-
4.Intention	3.628	.714	-.058	.183*	.155*	-	-	-	-
5.PEOU	3.099	.786	-.028	.141	.001	.421**	-	-	-
6.GSI	3.507	.807	.064	.271**	.106	.489**	.281**	-	-
7.PE	3.336	.913	-.076	.077	.014	.336**	.194**	.355**	-
8.CID	3.475	.822	-.074	.031	.070	.496**	.177**	.416**	.394**

Note:S.D.=standard deviation \*p<0.05, \*\*p< 0.01

Source: Self-constructed table

Among the variables under the same 5-point Likert scale, GSI presents the highest average (3.507) followed by CID (3.475) and PE (3.336), while PEOU shows the lowest average, which is at the mid point of the scale (3.099). Therefore, we consider that participants' attitude and self-evaluation towards environmental consciousness and community recognition are stronger than towards other factors. Meanwhile,

intention is above the average value, which shows the preference of participants to accept and use time-shared rental. However, the average performance of PEOU indicates another fact that there are still a large amount of people knowing little about time-shared rental, considering it a not-clear-enough subject to use. The cause to this will be discussed in the following section in terms of advertising and information accessibility.

Also, we can see that all explanatory variables PEOU, GSI, PE and CID have positive correlations ( $r>0$ ,  $p<0.01$ ) with the variable Intention. According to the theory from A. Buda & A.Jarynowski (2010), the Pearson correlation indicators between intention and four explanatory variables show positive medium linear correlation ( $0.3<r<0.5$ ). However, the sample linear correlation coefficients among PEOU, GSI, PE and CID are statistically significant, which means they are not independent to each other. Although correlation shows multicollinearity, their indicators are much lower than that with dependent variable, and therefore, we will keep studying with these results.

As well, individual characteristics like gender ( $r=0.183$ ,  $p<0.05$ ) and income level ( $r=0.155$ ,  $p<0.05$ ) correlate with the intention to use time-shared rental, while age ( $r=-0.058$ ,  $p>0.05$ ) doesn't show significant correlation with intention. However, except gender ( $r=0.271$ ,  $p<0.01$ ) slightly correlating to GSI, there are no correlations between individual characteristics and our predictors.

#### **4.2. Main factors influencing consumer intention to use e-car sharing in China**

In this section, we start to explore our research model with the hypotheses we came out with before, by using linear regression method. Since we already tested correlations from the beginning, variables including PEOU, GSI, PE and CID are entered into regression analysis.

A linear regression analysis with PEOU, GSI, PE and CID as predictors and intention to use time-shared rental as a dependent variable showed a model explaining a good variance ( $R^2$  adjusted=0.409). Durbin-Watson (1.774) test shows no self-correlation among these variables since it approaches to the value "1". In the ANOVA table, the possibility that all predictors have no influence to dependent variable is rejected ( $df=4$ ,  $F=32.477$ ,  $Sig.=.000$ ). It interprets that at least one out of these four predictors has



relation with intention.

**Table 7. Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.650 <sup>a</sup>	.422	.409	.54879	1.774

a. Predictors: (Constant), CID, PEOU, PE, GSI

b. Dependent Variable: 14.Intention to use time share rental

**Table 8. ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.124	4	9.781	32.477	.000 <sup>b</sup>
	Residual	53.608	178	.301		
	Total	92.732	182			

a. Dependent Variable: 14.Intention to use time share rental

b. Predictors: (Constant), CID, PEOU, PE, GSI

We examined Coefficients test to figure out which predictors have significant impact on dependent variable. From Table 10 below, we can see that predictors PEOU(Beta=0.281, p=0.000), GSI(Beta=0.256, P=0.000) and CID(Beta=0.314, P=0.000) have significant influence to BI since their p-value were tested to be lower than 0.001. However, PE(Beta=0.067, P=0.296) shows no significance to BI, which rejects the hypothesis that PE has positive influence to intention to use time-shared rental.

For the collinearity diagnostics, value of VIF is lower than 5 in each predictors, which means there are no collinearity among variables.

**Table 9. Coefficients<sup>a</sup> of predictors**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.921	.243		3.786	.000		
	PEOU	.255	.054	.281	4.697	.000	.909	1.100
	GSI	.227	.058	.256	3.896	.000	.750	1.334

PE	.052	.050	.067	1.047	.296	.794	1.259
CID	.272	.057	.314	4.787	.000	.757	1.322

a. Dependent Variable: 14.Intention to use time share rental

Therefore, to demonstrate the linear correlation between dependent variable intention and predictors without considering moderating roles, the function of PE will be removed and the formula will be:

$$Intention = 0.921 + 0.255PEOU + 0.227GSI + 0.272CID \quad (2)$$

Here, we assume that the standardized error in our regression function is so small that is estimated to be zero, i.e.,  $E(\varepsilon)=0$ . Therefore, we accept formula (2).

### 4.3. The moderating effects of socio-demographic factors

The result of regression analysis intends to examine the differences of socio-demographic elements age, gender and income level in the importance of the relationships between predictors and intention to use time-shared rental. After conducting hierarchical regression for potential moderators age, gender and income level, the results rejected Hypothesis5(a,b,c,d) and Hypothesis6(a,b,c,d), which indicates that there are no moderating effects of age and gender on our research targets. Note that consumers' income level shows moderating role on PE, which is not significant to BI as we verified before. According to Table 10, as confirmed by Step 1, PEOU, GSI and CID do have influence on BI to use time-shared rental ( $p<0.001$ ). Based on Step 2 and 3, it shows that income level moderates the effects of PE on intention, with participants paying more attention to sense of community ( $p<0.001$ ) than to ease of use and environmental awareness ( $p<0.05$ ) in having intention to behavior.

So, we can confirm that Hypothesis7(a,b,c,d) "income level may have a moderating role to the relationship between intention to use time-shared rental and PEOU<sup>a</sup>, GSI<sup>b</sup>, PE<sup>c</sup> and CID<sup>d</sup>" is partially accepted. Income level of participants may moderate the relationship between PE and BI while PE doesn't associate with BI by itself. Assume that the linear function under moderating effect with an estimated error to zero, a formula (3) is proposed as below:

$$Intention = 0.563 + 0.338PEOU + 0.26GSI + 0.494CID + 0.083IL * PE \quad (3)$$

(Note: IL:Income level)

**Table 10. Hierarchical regression Statistics on income level**

Step		R <sup>2</sup>	ΔR <sup>2</sup>	B
1	PEOU			.255***
	GSI			.227***
	PE	.422	.409	.052
	CID			.272***
2	PEOU			.258***
	GSI			.217***
	PE	.433	.417	.055
	CID			.268***
	Income level			.046
3	PEOU			.338*
	GSI			.260*
	PE			-.218
	CID			.494***
	Income level	.458	.429	.103
	ILxPEOU			-.022
	ILxGSI			-.011
	ILxPE			.083*
	ILxCID			-.068

Note: IL: Income level.

\*p<.05, \*\*p<.01, \*\*\*p<0.001.

Since we identified the moderating effect of income level on the relationship between PE and BI, 2-way standardized variables plot developed by Dawson, J. F. (2014) was introduced to demonstrate how income level moderates participants' intention to use time-shared rental as the spectrum of enjoyment varies from low level to high level. As Table11 shown, positive influence (Beta=0.109, p<0.05) to BI is resulted as the

income level goes upwards, which, in other words, no matter the PE of participants changes, the intention will increase as income level increases.

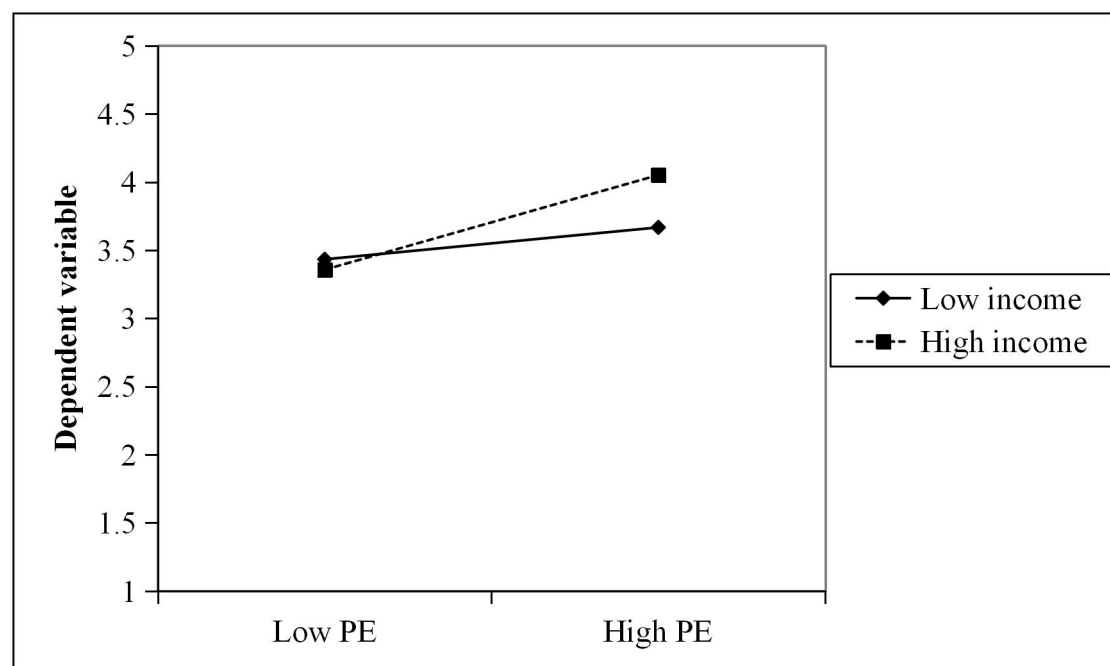
**Table 11. Coefficients<sup>a</sup> of interaction in single model**

Model	Unstandardized Coefficients B	t	Sig.
(Constant)	3.627	74.268	.000
Zscore(PE)	.233	4.755	.000
Zscore(Income level)	.078	1.538	.126
Zscore(PE)*Zscore(Income level)	.109	2.165	.032

a. Dependent Variable: Intention to use time-shared rental

Therefore, we extracted information including values of independent variable(0.233), moderator(0.078), interaction(0.109) and intercept/constant(3.627), to demonstrate the plot with simple slopes in Excel (shown as Table 12) based on Dawson, J. F.'s theory (2014).

**Table 12. 2-way standardized variables plot with simple slopes**



Source: Dawson, J. F. (2014). <http://www.jeremydawson.co.uk/slopes.htm>

In the table of 2-way standardized variables plot, dependent variable is intention to use time-shared rental, and figures from 1 to 5 are used to depict the extent of consumers' BI from strong negative attitude to strong positive. So, in this case, a

spectrum between “3” to “4.1” shows the intention to use time-shared rental from consumers is above neutral and pro-positive. Most importantly, we can see the slope of low income increases very gently from low PE to high PE, while the other slope of high income performs a steep trend. It interprets that participants who are with high income level may have stronger intention to use time-shared rental as their perception of enjoyment is satisfactory. In reverse, although intention grows higher as the level of PE grows stronger, consumers with low income level may not share such a big change on behavioral intention to use time-shared rental. Therefore, income level of a consumer does have moderating effect on the relationship between PE and BI.

Further study was also conducted in the segment of income level group to find out the specific influence and the division of income level on consumer intention based on the PE. By setting rules on this moderator, and following the chinese standardized definition of low-, mid- and high- income level separations, as the result Table 13 shown below, we can understand that people with middle and high income level have an obvious motivation to use time-shared rental rather than one with low income level. Moreover, when we looked into the effect on another predictor GSI, the result showed that people with middle and high income level have less attention to environmental awareness and green self-identity than people with lower income.

Although there are some limitations of our research sample and the quality of the respond answers, this result indicates a preliminary trend of how the participants with different economic conditions react to the factors before they make consuming decision to use time-shared rental.

**Table 13. Segment of income level group with p-value**

Factors	p-value	
	low-income level	mid-,and high income level
PE	0.998	0.047
PEOU	0.001	0.001
GSI	0.001	0.07
CID	0.001	0.002

Source: Self-constructed table

### 4.3. Summary of results

According to the results of our study above, we can make a summary of the hypotheses as Table 13 and two descriptive formulas shown below before we start to discuss and conclude our research.

**Table 14. Summary of hypotheses results**

	Hypotheses	Rejected/Accepted
1	There is a positive relationship between intention to use time-shared rental and PEOU.	Accepted
2	There is a positive relationship between intention to use time-shared rental and GSI.	Accepted
3	There is a positive relationship between intention to use time-shared rental and PE.	Rejected
4	There is a positive relationship between intention to use time-shared rental and CID.	Accepted
5a,b,c	Gender may have a moderating role to the relationship between intention to use time-shared rental and PEOU, GSI, PE, CID.	Rejected
6a,b,c	Age may have a moderating role to the relationship between intention to use time-shared rental and PEOU, GSI, PE, CID.	Rejected
7a,b,c	Income level may have a moderating role to the relationship between intention to use time-shared rental and PEOU, GSI, PE, CID.	Partially accepted

Source: Self-constructed table

- Without concerning moderating effect:

$$Intention = 0.921 + 0.255PEOU + 0.227GSI + 0.272CID$$

- Concerning moderator income level (IL):

$$Intention = 0.563 + 0.338PEOU + 0.26GSI + 0.494CID + 0.083IL * PE$$

I.e.,  $E(\epsilon) = 0$

### 4.5. Discussion

There are many researches exploring the influential factors of consumers' intention to behave. In our study, several factors are discussed and examined in order to find out what are relative to people's BI to use time-shared rental, which is an emerging market in China. Individual characteristics including age, gender and income level are also taken into consideration in our research, because they are crucial for managers to figure out the target market and consumers in their business. As well, diverse operational strategies can be developed and applied to different market positioning and targeting so that companies can grab more consumers' attention. In this section, managerial implication is provided as suggestions for the ongoing business program in eco-car sharing industry.

#### **4.5.1. Level of people's intention to use time-shared rental**

According to our questionnaire research, participants replied "normal" and "positive" intention to use time-shared rental at the percent of 42.6% and 43.7% respectively. Only less than 11% of them express strong positive intention. It turns out to be a level of neutral for the main consumer intention (Table 12). There are several reasons that can explain this phenomenon. First, time-shared rental program is mostly implemented in big and developed cities such as Beijing, Shanghai, Shenzhen and Guangzhou, where are sophisticated in public transportation. People in these cities can fulfill their daily travel with the full-covered transport system and even bike sharing, which is pervasive as a commuting tool with benefits of keeping fit and healthy (Zhang, L., Zhang, J., Duan, Z. Y., & Bryde, D., 2015). They don't need to go fetch the electric stations or e-car rental points either, and cost more on renting a car. Therefore, the demand and necessity of using time-shared rental is not high among these people. Since the new tech and innovation of eco-car sparks a fashion in China, people who haven't tried time-shared rental will still grow interest to use it once there is convenient with time and place conditions.

As we mentioned, time-shared rental is mainly spread in developed cities. However, in there, the ownership and capacity of private car is huge, which makes it another reason for neutral level of intention. Car-possessed people are usually dependent on their private cars rather than other transportation, which is an approach more

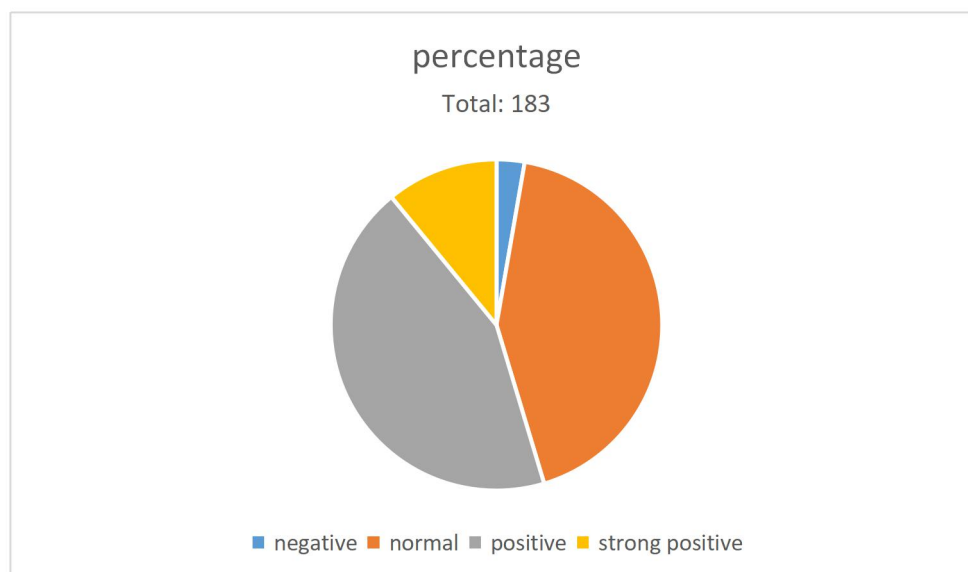
convenient than using time-shared rental. According to the development of automation and vehicle-sharing service, the ownership of private car will reduce in the next coming years (Menon, N., Barbour, N., Zhang, Y., Pinjari, A. R., & Mannering, F., 2018), which may motivate more people to use car sharing, concerning more on environmental protection(Hiroyuki Ohta et al., 2013). Especially in China, the survey researched (Mckinsey Report, 2017) among young generations shows an obvious drop on household vehicle ownership. In this case, although it is on a slow path, private car possession will be less an obstacle for the development of time-shared rental.

Third, at present, consumers, especially the elderly generations, express little trust on electric car due to their limited knowledge about it and prolonged driving habits. According to table 6 with the relatively low contribution of PEOU, it may be caused by the weak delivery of explanation and guidance information. It is also a conventional misunderstanding that fuel-energy vehicle outperforms electric one, which can hardly change people `s preference and acceptance of new mobility. Therefore, thorough advertising and specification of eco-cars are needed to further motivate the potential market.

Last but not least, service dependence. One of the biggest difference between time-shared rental and its competitors like Taxi and DiDi is driver service. According to the Automotive Consumer Study (2016) reported by Deloitte as an example, more than 40% of consumers in China purchase driver service at least once a week, especially the younger generations. Thus, people are more likely to choose transportation without driving themselves, and service enjoyment.

**Fig. 6. Pie Chart for level of intention to use time-shared rental**





Source: Self-constructed table

#### 4.5.2. Influential factors and BI to use time-shared rental

The results show that PEOU, GSI and CID have significant linear function on the intention to use time-shared rental (Table 10) as formula (2) shown. Therefore, the Hypotheses 1, 2 and 4 are accepted, which indicate they are positively associated with the behavioral intention. Another result in the study shows that PE is not statistically significant to the dependent variable behavioral intention. It implies that PE doesn't associate with intention to use time-shared rental and we reject Hypothesis 3. Based on formula (2), CID has the strongest correlation with intention, followed by PEOU and then GSI. When the situation that valuables PEOU and GSI remain unchanged, 1 unit changing on CID will increase or decrease 0.272 on intention. When GSI and CID remain unchanged, PEOU will influence intention by 0.255 per unit. And 0.227 for GSI with the other two unchanged. As confirmed by correlation analysis in Table 6, Pearson Correlation Coefficient ( $r$ ) is considered to tell the degree of linear relationship between two variables. For example, if the indicator  $r$  between explanatory variable  $X$  and dependent variable  $Y$  is positively high, the performance of  $Y$  will grow stronger as  $X$  grows. In terms of the  $r$  values, the strongest correlation with intention turns out to be CID with  $r=0.496$ , followed by GSI with  $r=0.489$  and PEOU with  $r=0.421$ .

Firstly, in the era of extensive social media and information exchange, especially

when we talk about China, common interest among the crowd is easily found out and then, triggers a trend that will be tracked by many people. Although systematic community of time-shared rental has not yet established, we study the positive leading effect of community identification based on the beginning of conformity (Wang, X., Yu, C., & Wei, Y., 2012). People sharing mutual interests and under influential conditions such as theme activity, may easily change their belief or behavior to join together and use time-shared rental. Secondly, the emergence and spread of new energy vehicles are not only considered as a great innovation in auto industry, but also one of the effective approaches to follow low-carbon lifestyle and green travel. As the combination of new energy vehicle and sharing economy, time-shared rental will perfectly meet the increasing environmental awareness of consumers in China. Meanwhile, the cost of fuel consumption is more and more becoming a concern of drivers, which is a decisive element to choose transportation tools and to purchase private cars. Thirdly, intention to use an innovative stuff will not enact if there is no explanation or specification. People with few knowledge about time-shared rental will just reduce their passion. Therefore, connecting with potential consumers with an idea that time-shared rental is easy and efficient to use is important.

#### **4.5.3. Moderating roles in regression analysis**

Individual characteristics age, gender and income level were examined in the hierarchical regression in order to figure out their potential moderating effect. The results show that only income level plays a moderating role in the relation between PE, and intention to use time-shared rental. Therefore, Hypothesis 7c is accepted. In terms of the formula (3), when PEOU, GSI and CID remain constant, intention will increase  $n \cdot 0.0831$  as the interaction term  $IL \cdot PE$  increases  $n$ . According to Table 12, participants with higher income level involve themselves more into using time-shared rental as the PE goes high. Their intention is more sensitive related to PE than people at lower income level. So, among different income groups, how do we know the specific income line that divides different behaviors? We set rules on income level in linear regression, and thus, work out that people with annual income level greater than RMB120,000 have significant association to PE when they use time-shared rental. On the contrary, the groups with less than or equal to RMB120,000 don't show interest on PE as much as the former. Therefore, we identify that people at mid- and high-

income level pay more attention to enjoyment when they intend to use time-shared rental based on the report of NBSC in 2017.

Although age is not a moderator in our study, according to the test of age segment with rule setting in the regression analysis PEOU and intention, we found that when age cohort is below 40, PEOU can positively associate with intention. In reverse, above 40, there is no relation between them. Although this result is affected by the uneven sample size of different age cohort, it may reconfirm that elder people has less knowledge about innovative stuff and are likely to spend more time learning. They are more dependent on ease-of-use and explanation than younger generations.

**Table 15. Linear correlation between different age cohort**

	Age<41			Age>41		
	R <sup>2</sup>	△R <sup>2</sup>	B	R <sup>2</sup>	△R <sup>2</sup>	B
(Constant)	.412	.396	.970***	.812	.437	-.001
PEOU			.252***			.715
GSI			.242***			-.169
PE			.038			-.191
CID			.264***			.727

\*\*\*p<0.001

Source: Self-constructed table

#### 4.5.4. Management implication

The results of our study can make a contribution to the business presence, especially for companies operating or preparing to operate time-shared rental and eco-car market entrance. Here are some implication based on the findings of this research and literature review:

- a. Users of time-shared rental can be categorized into individual groups and enterprise groups. At present, most of the time-shared rental operations focus on B2C business, targeting individual users. For B2C business, consumers with diverse characteristics may have different needs of transportation at locations

such as residential areas, traffic hubs and university intensiveness. For instance, people with mid- and high- income level, who may have extensive price acceptance, may involve into time-shared rental usage according to their perceived enjoyment of this activity. Therefore, the e-car operating companies should take positioning and targeting into consideration by setting specific price, promotion and car design.

However, the market share of B2B business is still small, which may contribute huge profits for the industry. In order to explore the potential market of enterprise users, which include government, companies and factory/Hi-tec parks, one of the implications for time-shared rental from our research is making good use of community identification. For instance, in factory/Hi-tec parks, the potential consumers are mostly IT or labor workers, sharing similar interest of transportation. They usually use cars for their daily commuting with document or goods to delivery from place A to place B. Therefore, daily or monthly travel fare is practical for them and with e-car stations established nearby each cell or warehouse of factory. Detachable trailers can be prepared as they use time-shared rental for loading delivery.

- b. The e-car sharing operating companies can establish systemic communities, combining people with common interest and requirement on traveling through online platform such as Wechat, Microblog, APP and Applet. As more and more people participate into the community, online flow can switch to offline practical consumption by regularly organizing theme activities with awards stimulation. Also, experience communication and information sharing can proceed and attract more attention from the potential market through online community.
- c. To advertise, pro-environmental awareness is an attractive tactic to encourage people get themselves involved into green consumption. Time-shared rental as a product of car-sharing and sustainable energy technology, can fully satisfy people's demand on GSI. Therefore, the companies should focus on ideas of environmental friendly, evoking consumers' consciousness on green travel. Approach can be used for reference as the bike-sharing, which people can record their green pace and energy they collect from their biking.

- d. In this era of Internet, information flow rapidly among individuals through online media. According to our survey, people get in touch with time-shared rental at a low frequency and through sole channel. Explanation and demonstration should be updated online and offline, as well, channel of information spread should be expanded. To grab more market potential from elder generation, the companies need to open on-site exhibition, so that they may grow more knowledge and interest in this new-born industry.
- e. Seeking corporation with eco-car OEMs and retailers is another important attempt for the spread of time-shared rental by developing battery, charging pack, automobile technology such as intelligent drive, navigation etc. Meanwhile, time-shared rental can be used as a model for consumers that plan to purchase electric vehicles to experience.

## **5. Conclusion**

In conclusion, the consumers' intention to use time-shared rental is influenced by internal motivation stated PEOU, GSI and CID. Although there are many evidence that PE positively associate with behavioral intention in previous studies, it has no significance to the intention in our research. Moreover, income level plays a moderating role in the relation between PE and intention to use time-shared rental. Although age and gender have no moderating effect, participants with different age cohort reflect contradictory PEOU about using time-shared rental. The major reason for this could be stated as the elder generation is prone to have less knowledge and acceptance of innovative stuff than the younger ones.

From our research of factors that influencing the intention to use time-shared rental, managerial implications are proposed to improve the market presentation and provide better solutions for future operation. Aspects including B2C and B2B business, online consumer community, advertising, information delivery and technology development are briefly stated according to our results in this research.

## **6. Limitation and further research**

There are still some limitations in this study. First, the study is supposed to reflect a situation in the area of China, which is too general that the sample size we collected from the questionnaire is not large enough and still, has strong regional features, which may explain some non-significant values. Second, the questionnaire were spread through internet without seeing each other face to face, which may affect the quality of answers from the respondents. Third, the age distribution of our samples is not integrated, in which participants age over 40 are not enough. This influences our study on intention to use time-shared rental covering multiple generations.

In the further research, limitation in this study referring to sampling size and distribution will be refined. Besides, the influence of education level on the intention to use time-shared rental can be studied since values and decision making of people with different education background are distinct. A comparative research with qualitative analysis can be conducted between consumers' intention to use eco-car sharing and willingness to purchase eco-cars by interviewing people who are prone to consume themselves private automobiles. More intrinsic and extrinsic factors that motivate specific behaviors will be explored. Also, we will think about the influential factors that are relative to enduring usage of time-shared rental.

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## Annexes

### Questionnaire in Chinese

#### 影响我国新能源汽车分时租赁的因素分析调查问卷

您好：

我们是里斯本工商管理学院的研二学生，目前正在研究影响中国消费者使用新能源汽车分时租赁（简称“分时租赁”）的因素。您的作答将会对我们的研究起到重要作用，为如何让分时租赁更好进行服务和运营提供建议。分时租赁是一种新兴的汽车共享模式，主体为电能源汽车。消费者可以按个人用车需求和用车时间预订租车的小时数，并按照规定的方式进行支付。

1. 新能源汽车，您：没听说过 听说过，但没使用过 听说过，也使用过
2. 您的年龄：18岁及以下 19-30 31-40 41-50 51及以上
3. 您的性别：男 女
4. 您家庭的年平均收入：低于3万 3-8万 8-12万 12-20万  
20-30万 30-50万 50-100万 100万以上
5. 您使用分时租赁的意愿：非常不强 不强 一般 强 非常强

请您对下列四部分因素影响您使用分时租赁意愿的程度进行评价，并在您认为最合适的方格内打“√”。（1-非常不准确；3-一般；5-非常准确）

（1）请您根据实际情况对下列陈述进行评价：

日常易于接触关于分时租赁的信息资讯	1□	2□	3□	4□	5□
分时租赁的信息和概念易于被理解	1□	2□	3□	4□	5□
获取分时租赁相关信息的途径众多，渠道广	1□	2□	3□	4□	5□
能从信息中得知分时租赁的优势与特征	1□	2□	3□	4□	5□

（2）请您根据实际情况对下列关于个人绿色消费的陈述进行评价：

您对环境十分关注	1□	2□	3□	4□	5□
绿色消费让您有满足感	1□	2□	3□	4□	5□

您对绿色出行有强烈的兴趣	1□	2□	3□	4□	5□
选择出行方式前，您会优先考虑环保问题	1□	2□	3□	4□	5□
能为绿色出行付出更多时间或金钱成本	1□	2□	3□	4□	5□

(3) 请您根据您对出行趣味性对下列陈述进行评价：

出行方式的趣味性很重要	1□	2□	3□	4□	5□
多样的附加乘客体验功能很有吸引力	1□	2□	3□	4□	5□

(4) 请您根据下列消费情况进行评价：

消费行为的决定容易受到外界的影响	1□	2□	3□	4□	5□
身边人使用分时租赁会增加您使用可能性	1□	2□	3□	4□	5□
参与消费活动容易受到好友或他人鼓励影响	1□	2□	3□	4□	5□

### Questionnaire in English

#### Questionnaire about consumer behavior on electric car sharing program in China

Hello,

We are second year master students at business administration in ISCTE-IUL, studying the factors that influence consumer behavior on electric car sharing (E-car sharing) program in China. Your sincere answer will be appreciated in that you provide significant value to our research and improve the service and operation level of e-car sharing program. This questionnaire will take your about 3 minutes. Thank you for your time.

1. Talking about e-car sharing program, you:

- Have never heard about it
- Heard about it, but never used
- Heard about it and also used it

2. Your age:
  - 18 and below
  - 19-30
  - 31-40
  - 41-50
  - 51 and above
3. Your gender:
  - Male
  - Female
4. The average annual income of your family:
  - Less than RMB30,000
  - RMB30,000--80,000
  - RMB80,000—120,000
  - RMB120,000-200,000
  - RMB200,000-300,000
  - RMB300,000-500,000
  - RMB500,000-1,000,000
  - More than RMB1,000,000
5. Your intention to use time-shared rental:
  - Strongly negative
  - Negative
  - Neutral
  - Positive
  - Strongly positive

According to your situation, evaluate the following questions in the four sections.(To what extent do you disagree or agree, please make a “√” to 1-Very incorrect, 3-Normal, 5-Very correct)

(1) According to your situation, you think:

It is easy for you to get in touch with e-car sharing information in your daily life

1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
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You can get the information from various resources and channels

1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
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The concept and information is easily understood

1□	2□	3□	4□	5□
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You can understand the advantage and figures of e-car sharing from the information

1□	2□	3□	4□	5□
----	----	----	----	----

(2)What do you think yourself about green consumption:

You are very interested in green traveling

1□	2□	3□	4□	5□
----	----	----	----	----

Green consuming behavior can make you feel good

1□	2□	3□	4□	5□
----	----	----	----	----

You will consider environmental protection as a priority before choosing vehicle

1□	2□	3□	4□	5□
----	----	----	----	----

You are very concern about environment

1□	2□	3□	4□	5□
----	----	----	----	----

You are willing to pay more time and money for green transportation

1□	2□	3□	4□	5□
----	----	----	----	----

(3)According to your experience and interest on traveling, you think:

Additional entertainment functions are very attractive to rent a car.

1□	2□	3□	4□	5□
----	----	----	----	----

It's important to me that I have fun when travelling

1□	2□	3□	4□	5□
----	----	----	----	----

(4) According to your behavior, you think:

You will not participate into theme activities unless your friends encourage and join as well

1□	2□	3□	4□	5□
----	----	----	----	----

The consumption decision can be easily affected by other people or the big trend

1□	2□	3□	4□	5□
----	----	----	----	----

The possibility of using e-car sharing will increase if there are many people nearby using it

1□	2□	3□	4□	5□
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