

RESEARCH ARTICLE

# Consumer Intention to Adopt Dockless Bike Sharing Scheme in Southern China Based on Value-Attitude-Behavior Model

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**Abstract:** This study aims to reveal the influences of personal value priorities on consumers' environmental attitude and their intention to adopt fourth-generation shared bikes (DBSS) in Southern China based on the value-attitude-behavior model. Also, how environmental attitude mediates the relationship between predictors and consumer intention to adopt DBSS is tested. Three hundred sixty-three self-administrated questionnaires were collected in Nanning City in China. Quota sampling, judgmental sampling, and convenient sampling techniques were applied for data collection. In terms of data analysis, the partial least square structural equation model (PLS-SEM) approach based on Smart PLS 3 was employed to evaluate the structural equation model and mediation effect. The results reveal that openness-to-change plays the most important role in affecting consumer environmental attitude, which significantly influences consumers' intention to adopt a dockless bike-sharing scheme. Also, the mediation effect of environmental attitude is confirmed. Thus, it is recommended that certain programs be organized to boost the usage of DBSS and create a good public reputation for the users and companies, and creating an inclusive environment at the firm level is necessary to facilitate the user community.

**Keywords:** Personal Values, Environmental Attitude, Bike Sharing Scheme, Intention to adopt, PLS-SEM

## 摘要

在基于价值-态度-行为模型上，本文研究个人价值对消费者环境态度以及使用第四代共享单车意图的影响，还检验了环境态度在预测因素与消费者使用第四代共享单车的意愿之间的中介效应。本研究采用配额采样、判断采样和便捷采样三种研究方法在中国南宁市收集了363份问卷，并且使用偏最小二乘结构方程模型（PLS-SEM）方法去评估结构方程模型和中介效果。研究结果表明，开放性变化在影响消费者的环境态度中起着最重要的作用，同时很大程度上地影响了消费者采用无桩共享单车的意图。此外，环境态度的中介效应也被证实。因此，本文建议在公司层面上创建一个包容性环境以促进用户社区的发展，组织特定项目以提高无桩共享单车的使用率，从而在用户和公司中建立良好的公众声誉。

## 关键词：

个人价值观；环境态度；自行车共享计划；使用意愿；偏最小二乘结构方程模型（PLS-SEM）

Economic development and the improvement of living standards have increased the demand for travel, leading to a rapid increase in vehicle ownership in China (Qiu & He, 2018). As of June 2020, “the number of motor vehicles in China has reached 360 million, of which 270 million are cars, and 3.3 million motorcycles were registered” (“The number of motor vehicles in the first half of the year reached 360 million,” 2020, par. #). Under such circumstances, concerns for environmental and health issues have accelerated research on sustainable transportation (Shaheen et al., 2010). Consequently, in recent years, China has vigorously developed sustainable transportation, which provides an efficient and effective channel to incorporate production, service, and innovation in the contemporary transportation system (Yin et al., 2018; Zhang et al., 2015). As a result, the use of sustainable transportation has greatly increased. For instance, “the number of new energy vehicles in the first half of 2020 was 4.17 million, an increase of 9.45% over the end of 2019” (“The number of motor vehicles in the first half of the year reached 360 million,” 2020, par. #). More importantly, as a sustainable transportation alternative (Yin et al., 2018), a bike-sharing scheme is vital for building a healthy and environmentally-friendly environment (Scott & Ciuro, 2019), improves urban traffic congestion (Martin & Shaheen, 2014), and reduces carbon emissions and fuel consumption (Shaheen et al., 2013). In 2019 there were more than

30 million shared bicycle users (“Mobike and Ofo: Reinventing the bike-sharing business model in China,” 2020). Specifically, the dockless bike-sharing scheme (DBSS), which “emerged as a disruptive transportation innovation in China in late 2015” (Yin et al., 2019, p. 169), has attracted the attention of mainstream firms, scholars, policymakers, and social marketers (Lovelace et al., 2011; Yin et al., 2018). Dockless bike-sharing system (DBSS) injects internet-based payment mechanism and global positioning system (GPS; Shi et al., 2018) into the operating system. DBSS does not require fixed stations (Zhang, 2019); rather, it allows users to park the bike within a defined district (Alta, 2016), and the bike can be locked and unlocked by using apps from a smartphone (Yin et al., 2019). Accordingly, consumers can use mobile payment system to get affordable transportation, which eventually reduces car usage and consumption of fossil-fuel energy in the city (see Qiu & He, 2018; Wang & Zhou, 2017; Yin et al., 2019). Mobike (2017), a leading DBSS player in China, reported that the usage of private cars fell by 3.1% due to the implementation of DBSS. At present, Mobike, ofo, Hellobike, and Yongon are the top players in the Chinese market (Zhuang et al., 2019).

Wang et al. (2018) expounded that even if the benefit of DBSS has aroused interests among scholars, the gaps inevitably remain (see also Fishman et al., 2013). Firstly, among the existing works of literature,

various scholars (e.g., Bieliński et al., 2019; Erdogan et al., 2015; O'Brien et al., 2014; Zhang et al., 2015) have come up with models to advance and augment the design and operating system of bike-sharing scheme (Gao et al., 2019; Wang et al., 2018), but consumer behavioral studies are still insufficient. The fact is that an understanding of the consumer is also important to establish an efficient, sustainable transportation system (Fishman et al., 2012; Wang et al., 2018). However, the majority of quantitative studies concerning consumer usage do not have a strong theoretical foundation, especially from a behavioral perspective (Bernatchez et al., 2015; Fishman et al., 2015). Second, Kim et al. (2017) explicated that investigating the influence of psychological factors is effective in promoting a sustainable public bike system. For this reason, I chose to study consumers' personal value as it acts as the foundation in understanding consumers' sustainable consumption behavior (Barbarossa et al., 2017; Steg & Vlek, 2009). Some researchers, such as Yin et al. (2018, 2019), Wang et al. (2018), and Ma et al. (2018), have contributed empirical findings to existing literature. Still, value study is limited in bike-sharing practices regardless of its importance. In addition, studies on the adoption of the bike-sharing scheme have become apparent in recent years; still, their adoption behaviors in terms of intention to adopt and continuity to adopt deserve further research and discussion. For these reasons, the research attempts to bridge the above gap by providing timely empirical findings to existing studies. It is expected that this study will provide insightful results for future research on consumers' adoption of other types of sustainable transportation. For this purpose, the value-attitude-behavior model is introduced to this study serving as behavioral theoretical foundation, and Schwartz' human value theory, environmental attitude, and consumer intention to adopt will be assessed accordingly. Specifically, as exploratory research, this study aims to

1. Understand the impact of personal values on environmental attitude.
2. Investigate the influence of environmental attitude on consumer intention to adopt DBSS.
3. Reveal the mediating role of environmental attitude.

The remaining article will be structured as follows. The second section is the theoretical foundation, in

which the value-attitude-behavior model and relevant variables will be discussed. The third section is material and methods that explain research methodology. The fourth section presents the results, in which user profiles and the evaluation of measurement model and structural model are discussed. The fifth section provides a discussion and conclusion. The sixth section highlights the implication from theoretical, practical, and social perspectives. The final part expounds on the limitation and relevant recommendations.

## Theoretical Background

Value-attitude-behavior (VAB) model by Homer and Kahle (1988) elucidated that a value system is viewed as "an enduring organization of beliefs concerning preferred modes of conduct or end-states along an importance continuum" (p. 638; see also Roach, 1973). This system functions in a hierarchical sequence (Fu et al., 2014; Vinson et al., 1977). According to Homer and Kahle (1988), value affects a specific behavior through attitudes, and in this context, the mediating effect of attitude is vital to understand the effect of values on a given behavior (Manan, 2016; Vincent & Selvarani, 2013). Accordingly, Homer and Kahle (1988) exemplified this relationship in a causal sequence: Value → Attitude → Behavior (see also Milfont et al., 2010, p. 3). More importantly, at both individual and national level, the value system is stable and difficult to change (Schwartz, 1992); thus, this stability serves as a strong base for various market-related activities (Manan, 2016; Nepomuceno & Porto, 2010). In this context, the relative stability of the value system provides consumers with a foundation that forms specific consumer behaviors. Therefore, from a general perspective, studying the value system will allow us to understand better attitudinal and corresponding behavioral consequences (Chrysoschoidis & Krystallis, 2005).

Precisely, the VAB model is more effective in coping with pro-environmental issues, and its validity has been proven by various researchers such as do Paço et al. (2019), Jacobs et al. (2018), and Su et al. (2019). Particularly, researchers (such as Milfont et al., 2010 and Joung, 2014) have given environmental attitudes more attention. However, the VAB model is rarely applied by the existing studies concerning sustainable transportation mode. For this reason,

this paper aims to integrate Schwartz's (2012) value theory, environmental attitude derived from Chen et al. (2018), and intention to adopt from (Yin et al., 2018) into a value-attitude-behavior model. I expect that the updating empirical findings will be a contribution to existing literature. Consequently, Schwartz's human values theory, environmental attitude, and behavioral intention are briefly explained as follows:

### ***Schwartz's Basic Human Values***

Schwartz's basic human value theory has been gradually esteemed by mainstream scholars. Schwartz (1994, p. 21) refers human values to "desirable trans-situational goals, varying in importance that serve as guiding principles in people's lives" that is made up of 10 basic human values, which are "(a) universalism, (b) benevolence, (c) tradition, (d) conformity, (e) security, (f) power, (g) achievement, (h) hedonism, (i) stimulation, and (j) self-direction" (see also Koivula, 2008, p. 17). These basic values are also categorized into four pillars, which are "self-transcendence, self-enhancement, conservation, and openness-to-change" (Giménez & Tamajón, 2019, p.1; see also Basáñez & Inglehart, 2016; Bell, 2013). Simply, self-transcendence (benevolence and universalism) addresses the interests of humans, society, and community relative to personal interests (Schwartz, 2012); self-enhancement (achievement and power) focuses on the satisfaction of individual needs such as improving social status, creating or maintain a good public image, achieving promotion in the career, among others (Caracciolo et al., 2016); openness-to-change (hedonism, self-direction, and stimulation) stands for the attempt and experience of novelty, the pursuit of freedom and independence, and the spirit of courage to face a challenge (Pomarici et al., 2018; Zhou et al., 2013); and conservation (tradition, security, and conformity) insists on the preservation of tradition and social order, reinforcement of the relationship among members in a certain group or society, and maintenance of humbleness and modesty (Basáñez & Inglehart, 2016; Schwartz, 1994; Zhou et al., 2013). The importance of values at the individual level has been verified by a series of studies, including Schwartz (1992), Inglehart (1997), Hsu et al. (2013), and Caracciolo et al. (2016).

Specifically, Schultz and Zelezny (1999) addressed that the value-based technique has been applied to study sustainable consumption, in which personal

values are treated as predictors for pro-environmental behavior (see also Alzubaidi, 2019; Barbarossa et al., 2017; Leonidou et al., 2010; Thøgersen & Ölander, 2006). Also, Schwartz's value theory is extensively applied by others (such as Barbarossa et al., 2017; Zhu et al., 2018; Mansori et al., 2015; and Martin & Upham, 2016) to unfold consumer acceptance or adoption of innovation. For instance, Mansori et al. (2015) found that conservation negatively influences consumer acceptance of novelty, whereas openness to change optimistically facilitates consumer acceptance decision. Martin and Upham (2016) underlined a positive role of self-transcendence in fostering innovation, thereby enacting sustainable development. In addition, Schwartz (2006) argued that the more emphasis an individual put on particular values, the more those values will influence their behavior. In this context, inspired by Ma et al. (2018) who revealed the role of value in predicting attitude and subjective well-being in the study of bike sharing in Beijing, I formed the following hypotheses:

- H1a: Self-transcendence has a positive effect on consumer's environmental attitude.
- H1b: Openness-to-change has a positive effect on consumer's environmental attitude.
- H1c: Conservation has a positive effect on consumer's environmental attitude.
- H1d: Self-enhancement has a positive effect on consumer's environmental attitude.

### ***Environmental Attitude***

Kingston (2016) defined attitude as "the tendency to think, feel, or act positively or negatively towards objects in our environment" (p. 576; see also Eagly & Chaiken, 1993). The linear relationship between attitude and behavior confirms that changes in personal attitude will directly lead to changes in the corresponding individual behavior (Razzaq et al., 2018). In the context of the pro-environmental study, environmental attitude is identified as an individual's beliefs, affection, and behavior about environmental issues and practice (Chen et al., 2018; De Medeiros & Ribeiro, 2018). Environmental attitude manifests a psychological state (Rodríguez-Barreiro et al., 2013) that is essential to determine a person's behavior that could affect the environmental quality (Gifford & Sussman, 2012). For instance, those consumers who express a positive attitude towards recycling or



reuse practice will most likely result in actual action (Joung, 2014; Razzaq et al., 2018). Davison et al. (2014) stressed that an individual attitude towards environmental issues would either increase or decrease the extent to which he or she engages in responsible behavior. Accordingly, this study aims to shed light on the role of environmental attitude in sustainable transportation mode.

### ***Consumer Intention to Adopt***

According to Ajzen (1991, p. 181), intentions refer to “indicators of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior.” A higher level of intention will likely result in a greater extent to which individuals engage in a behavior (Ajzen, 1991). It can also be said that “the greater the motivation, the greater the intention to act” (Hoque & Alam, 2018, p. 6). With respect to consumer intention to adopt DBSS, it, therefore, refers to the motivational factor (Ajzen, 2012) that affects individual consumers to engage in using DBSS. However, consumer motivation to engage in a specific behavior varies under different milieus. For example, Samarasinghe (2012) expounded that the relationship between value orientation and pro-environmental behavior remains inconsistent under different market and socio-cultural conditions (see also Kaiser et al., 1999); thus, consumer attitudes toward specific behaviors will also differ. For instance, middle- and high-income consumers may demand for a better quality of life (such as a clean environment, healthy food, etc.); therefore, they tend to actively seek more possibilities to satisfy their needs (United Nations Environment Programme, 2015). Their concerns are often reflected in pro-environmental practices (e.g., reusing products, using bike-sharing, eating organic food, buying green products; Joung, 2014; Kaiser et al., 1999). It is worth mentioning that benefiting the environment has become a powerful driving force for consumers to engage in a pro-environmental practice, and their intentions depend on their attitudes to a large extent (Hoque & Alam, 2018). Even if an attitude-intention relationship has been widely studied from a general aspect, the specific evidence regarding environmental attitude–environmental behavior relationship are still rare in the context of sustainable transportation. For this reason, in this

paper, I propose that consumer’s attitudes toward environmental issues will affect their intention to adopt DBSS for short-distance travel. Accordingly, based on the above-mentioned studies, the following hypotheses are developed:

H2: Consumer’s environmental attitude has a positive effect on consumer intention to adopt DBSS.

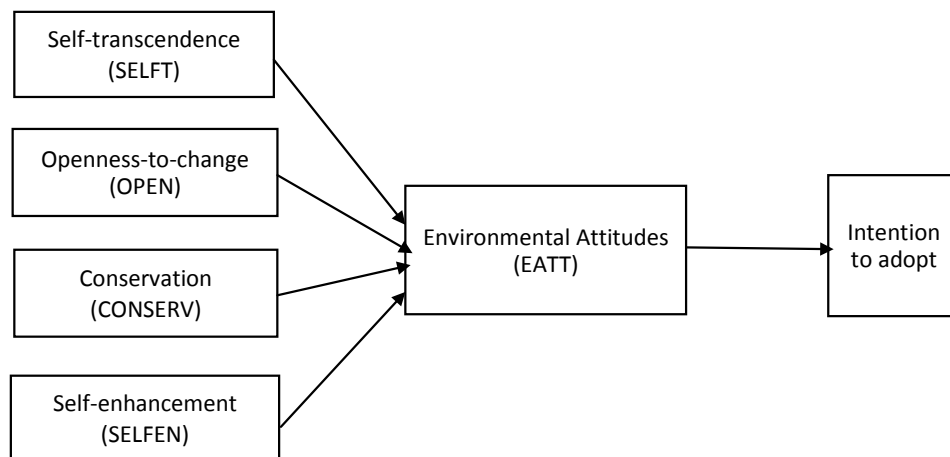
More importantly, prior studies confirm the mediation effect of environmental attitude. In other words, as a mediator, one’s attitude toward the environment and related issues can affect the relationship between predictors and pro-environmental behavior (e.g., Fransson & Gärling, 1999; Gärling et al., 2003; Milfont et al., 2010; Neumayer, 2004). Hence, as environmental attitude serves as a mediator when predicting the relationship between personal values and intention to adopt, I propose that

H3: Consumer’s environmental attitude mediates the relationship between personal values and intention to adopt.

## **Methods**

### ***Data***

The conceptual framework (Figure 1) was inspired by prior works of Schwartz (2012), Yin et al. (2018), and Chen et al. (2018). In the survey questionnaire, the usage of DBSS is included in the common part. For varying parts, 5-point Likert Scale was used to evaluate measurement items. Short Schwartz’s Value Survey (SSVS; Schwartz & Rubel-Lifschitz, 2009) was utilized to assess the prevalence of personal values (e.g. Keh et al., 2014; Lindeman & Verkasalo, 2005). This short version of Schwartz’s value survey has been used in European Social Survey (ESS; Schwartz et al., 2015). Moreover, three items of environmental attitudes were derived from Chen et al. (2018), and four items of intention to adopt were adapted from Yin et al. (2018). The measurement items are provided in the Appendix.



Source: developed by the author based on Schwartz (2012), Schwartz and Rubel-Lifschitz (2009), Yin et al. (2018), and Chen et al. (2018)

**Figure 1.** Proposed Conceptual Framework

### **Sampling Procedures**

Originally self-administered questionnaires were distributed to 440 respondents in Nanning City, but only 363 questionnaires with comprehensive information were collected, which accounted for an 82.5% response rate. The study was carried out through two steps. Firstly, 30 respondents were included in a trial test conducted on the street with a short interview. The purpose was to check if the respondents understand the questionnaire and obtain users' opinions about DBSS. In the end, some issues (e.g., time, duration, frequency, distance, brand) were included to finalize the questionnaire design. Secondly, judgmental sampling, quota sampling, and convenient sampling were applied to collect the data from target respondents. With judgmental sampling, I selected two central business districts (CBDs)—Chaoyang CBD and Wuxiang CBD—which are the most prosperous and busiest areas in the city. This allows me to obtain a wide range of information. The respondents who ride the dockless share bike were approached and invited to participate in the survey. Consequently, 220 questionnaires were distributed to each CBD. Convenient sampling was used to assure respondents' availability and willingness to complete the questionnaires.

### **Statistical Analysis**

Partial least-square structural equation modeling (PLS-SEM) was run to test the proposed path model using SmartPLS3 program (Ringle et al., 2015). Hair

et al. (2018) addressed that PLS-SEM is a causal-predictive technique that can be applied to estimate “statistical models, whose structures are designed to provide causal explanations” (p. 3). PLS-SEM allows researchers to identify the key drivers of the construct (Ramayah et al., 2018). More importantly, the stronger statistical power to assess statistical significance in a predictive model (Reinartz et al., 2009) and the less serious issue of normality (Hair et al., 2014) has made PLS-SEM gradually accepted and applied in exploratory research in various disciplines (Hair et al., 2018). PLS-SEM has been applied in various studies concerning management information systems (Hair et al., 2017; Shiao & Chau, 2016), social media usage (Cao et al., 2016; Wu & Li, 2018), consumer behavior in social commerce (Lin et al., 2018), and the impact of customer reviews on purchase behavior (Lee & Yang, 2015). For these reasons, PLS-SEM is deemed to be a suitable analytical approach for this study due to its exploratory characteristics. The evaluation of the measurement model and structural model follows the recommendations of Hair et al. (2018).

## **Results**

### **Demographic Profile**

Respondents of this study are mainly male consumers (53.4%) who are 18 to 30 years old (39.9%), and their monthly income ranges between 2,500 CNY and 4,000 CNY (34.7%). Majority of the respondents

possess a bachelor's degree (61.2%) and work in a private company (30.6%).

### ***Profile of Usages of DBSS***

At present, Mobike is still the most popular shared bike brand among the respondents (34.2%), followed by a local brand (24%), and Ofo (21.6%). When asked about the reason for using a shared bike, 29.5% of the respondents claimed that they utilized it as a form of exercise, followed by 23.1% of them saying it is for environmental concern, and 20.7% of them used it because of convenience.

In terms of frequency of using DBSS, 35% of the respondents reported that they used it once a week, 28.7% of them used DBSS twice a month, and 28.1% of them used it at least twice a week. As for the duration of using DBSS each time, 35.5% of the respondents used it between 15 to 30 minutes, followed by 30% of them used it for 30 to 45 minutes, and 16.8% of respondents used it for 45 to 60 minutes. As for the

traveling distance, 29.2% of respondents normally used DBSS traveling between 5 to 7 kilometers, followed by 3 to 5 kilometers (26.7%), and farther than 7 kilometers (24.8%). Accordingly, the respondents also raise some major problems that DBSS has faced. The top three problems are bikes being vandalized (21.5%), bikes being piled up on the street (20.4%), and poor parking (19.3%).

### ***Evaluation of Measurement Model***

Table 1 presents the results of the convergent validity test and internal consistency test. The convergent validity consists of indicator loading and average variance extracted (AVE). According to Hair et al. (2018), the value of indicator loading should be greater than 0.708, and AVE should be greater than 0.5. In this study, indicator loadings are varied between 0.827 and 0.937, and AVE values are ranged between 0.710 and 0.841; thus, the results surpass the recommended values. Internal consistency test

**Table 1**

*Construct Validity and Reliability*

Construct	Items	Loading	Cronbach's Alpha	<i>pA</i>	<i>pc</i>	AVE
Intention to adopt	ADP1	0.827	0.864	0.866	0.907	0.710
	ADP2	0.835				
	ADP3	0.847				
	ADP4	0.861				
Environmental Attitude	EATT1	0.890	0.870	0.876	0.920	0.793
	EATT2	0.877				
	EATT3	0.905				
Openness-to-change	HED	0.906	0.903	0.907	0.939	0.838
	SD	0.914				
	STI	0.926				
Self-transcendence	BENEV	0.885	0.774	0.791	0.898	0.815
	UNIV	0.920				
Conservation	COMF	0.857	0.857	0.869	0.912	0.776
	SECU	0.890				
	TRAD	0.895				
Self-enhancement	POW	0.896	0.813	0.847	0.914	0.841
	ACHIE	0.937				

contains Cronbach's alpha, composite reliability ( $pc$ ), and Dijkstra-Henseler's  $roh\_A$  ( $pA$ ) (Hair et al., 2018). Cronbach's alpha values varied from .774 to .903, which are above a threshold value of 0.7 (Choo et al., 2014; Keh et al., 2014; Nunnally & Bernstein, 1994), reliability of the construct in the measurement model is confirmed. As for composite reliability ( $pc$ ), all indicators possess values that exceeded 0.7, as identified by Bagozzi and Yi (2012). In addition, Dijkstra and Henseler (2015) recommended the  $roh\_A$  coefficient ( $pA$ ) for assessing the reliability of the PLS construct, and the  $pA$  values of all construct should be beyond 0.7 (see also Sarstedt et al., 2017; Shmueli et al., 2019). Because the values of the  $roh\_A$  coefficient surpassed 0.7, it confirms the reliability of the PLS-SEM model in this study.

Discriminant validity is assessed based on heterotrait-monotrait ratio of correlation indicated in Table 2, which is an emerging technique to evaluate discriminant validity when using PLS-SEM (Hair et al., 2018; Ramayah et al., 2018). As all the values are smaller than a threshold value of 0.85 (Kline, 2015),

the acceptance of discriminant validity is assured.

### ***Evaluation of Structural Model***

Bootstrapping technique was applied to evaluate structural mode. The evaluation consists of the test of collinearity and path coefficients, in-sample prediction, and out-of-sample prediction.

#### ***Collinearity, Significance, and Relevance of Path Coefficients***

Table 3 shows the results of the collinearity test and structural model test. Firstly, the VIF values are lower than 5, which means that the multicollinearity issue is not discovered in this study (Hair et al., 2018). Secondly, both T-values and path coefficients confirm that environmental attitude presents the strongest relationship with adoption. Also, openness-to-change is the factor that affects environmental attitude most, whereas conservation shows an insignificant relationship with environmental attitude. Moreover, the results of confidence intervals exhibit that zero does not exist in Hypothesis 1a, 1b, 1d, and Hypothesis 2; thus,

**Table 2**

*Heterotrait-Monotrait Ratio of Correlation (HTMT)*

	Adoption	CONSERV	EATT	OPEN	SELFEN	SELFT
Adoption						
CONSERV	0.331					
EATT	0.688	0.394				
OPEN	0.613	0.504	0.589			
SELFEN	0.696	0.472	0.512	0.492		
SELFT	0.671	0.565	0.613	0.587	0.747	

**Table 3**

*Collinearity and Significance Testing Results of the Structural Model Path Coefficients*

	Path	VIF	Path Coefficient	T Value	P Values	95% Confidence Intervals	Results
H1a	SELFT->EATT	1.833	0.255	3.437	***	[0.116, 0.400]	Support
H1b	OPEN->EATT	1.467	0.333	5.277	***	[0.204, 0.447]	Support
H1c	CONSERV->EATT	1.401	0.027	0.390	0.673	[-0.105, 0.175]	rejected
H1d	SELFEN->EATT	1.649	0.133	2.514	***	[0.022, 0.234]	Support
H2	EATT->ADP	1.000	0.600	10.342	***	[0.466, 0.701]	Support

\*\*\*  $p \leq 0.01$



the significance of these hypotheses are confirmed, and Hypothesis 1c is rejected. Figure 2 visualized the results of model testing by presenting both T-value and path coefficients.

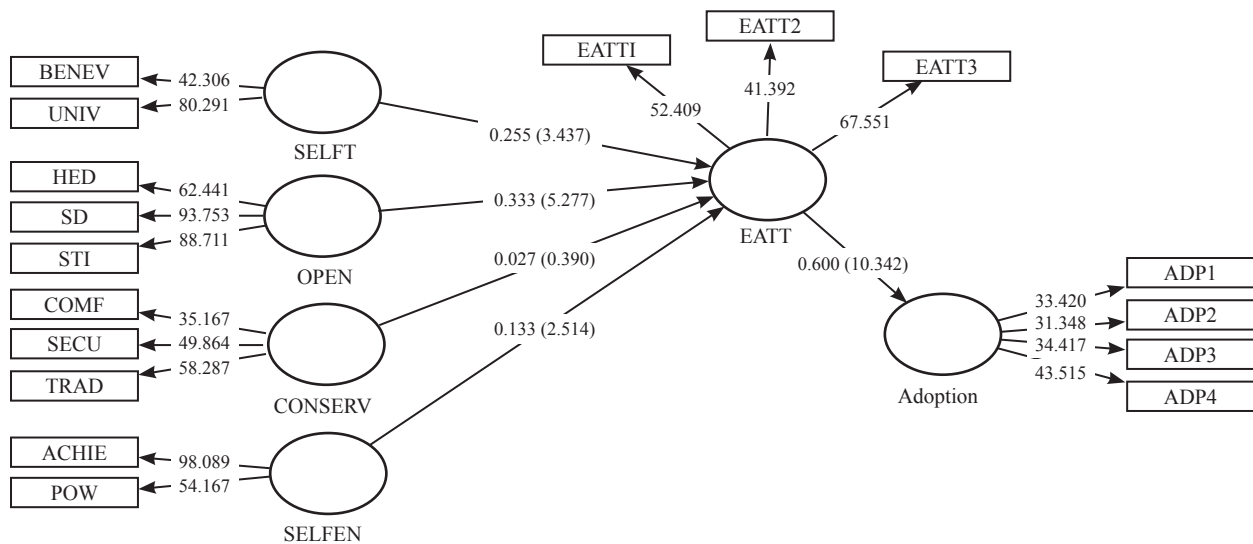
### *In-Sample Model Fit*

In-sample model fit focuses on the evaluation of  $R^2$ . According to Hair et al. (2018), as long as the collinearity issue does not exist, the coefficient of determination ( $R^2$ ) should be tested to indicate the explanatory power of the model (see also Shmueli & Koppius, 2011; Shmueli et al., 2019). Thus,  $R^2$  is defined as “in-sample predictive power” (Rigdon, 2012). Accordingly, Hair et al. (2018, p. 11) stated that “ $R^2$  values of 0.75, 0.50 and 0.25 can be considered

substantial, moderate and weak” explanatory power (see also Hair et al., 2011; Henseler et al., 2009). As the  $R^2$  value of environmental attitude is 0.374 and of adoption is 0.360, it shows a low to medium level of explanatory power. Even if the  $R^2$  value is rather small compared to the study of Amaro and Duarte (2015), it is acceptable to explain endogenous construct.

### *Out-of-Sample Prediction*

Table 4 shows the result of PLSpredict with 10 folds, which is recommended by Shmueli et al. (2019) for out-of-sample prediction. Firstly, all the indicators generate  $Q^2_{\text{predict}}$  values greater than zero. Then, I compared the root mean squared error (RMSE) value with the naïve linear regression (LM) benchmark.



**Figure 2.** Structural Model Testing Presenting by Path Coefficients and T-values

**Table 4**

*PLSpredict Assessment of Manifest Variables*

	PLS		LM	
	RMSE	$Q^2_{\text{predict}}$	RMSE	PLS-LM
ADP1	0,863	0,226	0,753	0,110
ADP2	0,880	0,219	0,788	0,092
ADP3	0,792	0,254	0,740	0,052
ADP4	0,882	0,260	0,805	0,077
EATT1	0,874	0,294	0,881	-0,007
EATT2	0,953	0,193	0,960	-0,007
EATT3	0,840	0,325	0,846	-0,006

According to the guideline of Shmueli et al. (2019, p. 2330), a medium predictive power is assured if “the majority (or the same number) of indicators in the PLSE-SEM analysis” generates lower RMSE values than that in the naïve LM benchmark (see also Nor-Aishah et al., 2020). Accordingly, the predictive power of the model in this study is almost close to the medium level as three (EATT1, EATT2, and EATT3) out of seven indicators generated lower RMSE value than that in the LM benchmark.

### Indirect Mediation Test

Table 5 shows the result of the indirect mediation test. The mediation effect of environmental Attitudes was assessed through bootstrapping analysis. Indirect effect of H1c was rejected, and other three indirect effects of H1a, H1b, and H1d were supported ( $\beta = 0.153$ ,  $\beta = 0.200$ ,  $\beta = 0.08$ ) with  $t = 2.975$ ,  $t = 4.389$ , and  $t = 2.975$ . Correspondingly, 95% Boot CI Bias Corrected are [LL = 0.058, UL = 0.258], [LL = 0.107, UL = 0.284], and [LL = 0.013, UL = 0.150]. Thus, it is concluded that the mediation effects of H1a, H1b, and H1d are statistically significant.

## Discussion

This study discovers the roles of personal values and environmental attitudes in consumers' intention to adopt the fourth-generation bike-sharing system in Nanning, China, under the scope of the value-

attitude-behavior model. Also, the mediation effect of environmental attitude is expected. Consequently, the findings confirmed most of the assumptions.

Firstly, with respect to the linkage between personal values and consumers' environmental attitude, the results supported that self-transcendence (H1a), openness-to-change (H1b), and self-enhancement (H1d) significantly affect environmental attitudes except for conservation (H1c). Openness-to-change plays the most important role in intensifying environmental attitudes. This implies that the more active and open-minded the respondents become, the more they pay attention to environmental issues. Thus, with the prevalence of openness-to-change values, the respondents tend to be willing to explore, learn, accept, and use DBSS or even advanced models because of their sensitivity to the environment. When self-transcendence values become salient, it manifests that the establishment of a sustainable society is inseparable from the efforts of every individual in the society. Thus, people tend to engage in environmental practices. The active practice of DBSS represents a demand for a green lifestyle, which is not only beneficial to consumers themselves but also beneficial to society as a whole. This finding is in keeping with the study of Arieli and Tenne-Gazit (2017). Moreover, the significance of self-enhancement implied that, recently, Chinese consumers are inclined to using DBSS to distinguish themselves from others. This not only symbolizes support for sustainable transportation but also allows them to be recognized and appreciated by others. As

**Table 5**

*Hypothesis Testing on Indirect Effects*

Hypotheses	Std. Beta	Standard Deviation	T Statistics	LL	UL	Decision
H1a: SELFT → EATT → ADOPTION	0.153	0.051	2.975**	0.058	0.258	supported
H1b: OPEN → EATT → ADOPTION	0.200	0.045	4.389***	0.107	0.284	Supported
H1c: CONSER → EATT → ADOPTION	0.016	0.041	0.398	-0.066	0.099	Rejected
H1d: SELFEN → EATT → ADOPTION	0.080	0.034	2.975**	0.013	0.150	supported

\*\*\*  $p \leq 0.01$  \*\*  $p \leq 0.05$

for the insignificance of conservation, it can be said that the extent to which consumers express their voices regarding environmental issues is inseparable from an open and active social milieu, especially when China is entering a period of transition. As a result, an open society and an evolving economy have accelerated the demand for sustainability, and the people's thirst for a green environment has become more vigorous. Under these conditions, conservative thinking loses the soil in which it lives.

Secondly, corresponding with the finding of Milfont et al. (2010) and Joung (2014), a higher level of environmental attitude results in pro-environmental intention to adopt DBSS. This study presents an optimistic scenario showing that the extent to which respondents care about environmental issues highly influences their intention to use DBSS. This therefore implies the positive interest and higher tendencies of the respondents towards using sustainable transportation in a broader context.

Furthermore, the mediation effect of environmental attitude was evaluated and confirmed. This means that the influence of self-transcendence, openness-to-change, and self-enhancement on consumer intention to adopt DBSS is mediated by environmental attitude. This echoes the findings of Milfont et al. (2010) that the relationship between values and pro-environmental behavior is mediated significantly through environmental attitude. From a long-term perspective, increasing consumer awareness of protecting the environment and improving their attitudes towards the environment will encourage more and more people to choose sustainable lifestyles, such as sustainable transportation, and ultimately achieve the goal of sustainable development.

## Implications

The purposes of this study were to reveal how personal values and environmental attitudes affect consumers' adoption of a dockless bike-sharing scheme in Southern China. The findings have provided implications at the theoretical level and practical level.

With regard to its theoretical implications, the integration of the value-attitude-behavior model with corresponding concepts (Schwartz's personal values, environmental attitude, and consumer adoption behavior) is highlighted. The results reflect that

of the previous studies, which address the roles of personal values (e.g., Mansori et al., 2015; Steenkamp et al., 1999) and environmental attitude (Joung, 2014; Kaiser et al., 1999; Milfont et al., 2010) in predicting consumers' environmental behavior. This study also complements the gap in the context of the Chinese market, which lacks an updated study of the application of the value-attitude-behavior model in the sustainability context and how Schwartz's values study matter to Chinese consumers' adoption of sustainable products or services. Further, the results testify that environmental attitude remains critical for a predictive purpose in the Chinese market. Lastly, this study updates Chinese consumers' patterns and characteristics in the scope of sharing economy by highlighting the critical roles of values and environmental attitudes.

As for managerial implications, the findings have shed light on the strategy to foster an environmental attitude and consumer intention to adopt DBSS. From a macro perspective, creating a culture of openness in society is critical. In general, people tend to perform efficiently and effectively when they are encouraged to talk and think. In this context, if the mainstream actors (e.g., government bureau, bike-sharing players, social media, etc.) provide relevant channels to the public, the participation of the public may be mobilized. Their participation might be a great contribution to improve the mechanism of the bike-sharing scheme. Also, education is an imperative means to strengthen the usage of shared bikes, thereby promoting a pro-environmental lifestyle.

At the firm level, the players (e.g., Ofo, Mobike, Hellobike, etc.) might come up with certain programs such as Biking Challenge to boost the usage of DBSS. This will likely create a good public reputation for the riders and the company itself. Also, creating an inclusive environment is another furtherance of establishing a user's community that fosters their involvement of shared bikes.

## Limitations

Some limitations are inevitable in the study. First, the small sample size could not be representative of Chinese consumers as a whole; rather, the study is limited to produce findings from respondents in Nanning City only. Second, the study limits itself to quantitative study only, which might not be convincing

enough in revealing consumer insight. Thus, an in-depth interview is recommended for further study to obtain more information regarding the barriers and problems that consumers may have encountered during the process of using DBSS. Lastly, there is still a question about whether consumers' pro-environmental behavior is routinized (using DBSS for daily travel), regular (installing DBSS App on the smartphone), or occasional. Thus, consumers' continuity to adopt is recommended so that researchers will be able to provide a profound understanding of consumer adoption behavior.

### Declaration of ownership:

This report is my original work.

### Conflict of interest:

None.

### Ethical clearance:

This study was approved by my institution.

### References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Process*, 50(2), 179–211.
- Ajzen, I. (2012). Martin Fishbein's legacy: The reasoned action approach. *The ANNALS of the American Academy of Political and Social Science*, 640(1), 11–27. <https://doi.org/10.1177/0002716211423363>
- Alta. (2016). *What is dockless bike share?* <https://altaplanning.com/dockless-bike-share/>
- Alzubaidi, H. (2019). A qualitative exploration of consumers' pro-environmental behaviours: Identifying emerging themes. In Rana N. et al. (Eds.), *Digital and social media marketing: Advances in theory and practice of emerging markets* (pp. xx–xx). Springer. [https://doi.org/10.1007/978-3-030-24374-6\\_6](https://doi.org/10.1007/978-3-030-24374-6_6)
- Amaro, S., & Duarte, P. (2015). An integrative model of consumers' intentions to purchase travel online. *Tourism Management*, 46, 64–79.
- Arieli, S., & Tenne-Gazit, O. (2017). Values and behavior in a work environment: Taking a multi-level perspective. In S. Roccas & L. Sagiv (Eds.), *Values and behavior* (pp. 115–141). Springer.
- Bagozzi, P. R., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of the Academy of Marketing Science*, 40, 8–34. <https://doi.org/10.1007/s11747-011-0278-x>
- Barbarossa, C., De Pelsmacker, P., & Moon, I. (2017). Personal values, green self-identity and electric car adoption. *Ecological Economics*, 140, 190–200. <https://doi.org/10.1016/j.ecolecon.2017.05.015>
- Basáñez, E. M., & Inglehart, F. R. (2016). *A world of three cultures: Honor, achievement and joy*. Oxford University Press.
- Bell, L. M. (2013). *Self-enhancement and self-transcendence organizational values' effects on customer satisfaction and corporate reputation* [Unpublished doctoral dissertation]. Drexel University. <http://hdl.handle.net/1860/idea:7013>
- Bernatchez, A. C., Gauvin, L., Fuller, D., Dubé, A. S., & Drouin, L. (2015). Knowing about a public bicycle share program in Montreal, Canada: Are diffusion of innovation and proximity enough for equitable awareness? *Journal of Transport and Health*, 2(3), 360–368. <https://doi.org/10.1016/j.jth.2015.04.005>
- Bielinski, T., Kwapisz, A., & Wazna, A. (2019). Bike-sharing systems in Poland. *Sustainability*, 11(2458). <https://doi.org/doi:10.3390/su11092458>
- Cao, X., Guo, X., Vogel, D., & Zhang, X. (2016). Exploring the influence of social media on employee work performance. *Internet Research*, 26(2), 529–545. <https://doi.org/10.1108/IntR-11-2014-0299>
- Caracciolo, F., Cicia, G., Del Giudice, T., Cembalo, L., Krystallis, A., Grunert, G. K., & Lombardi, P. (2016). Human values and preferences for cleaner livestock production. *Journal of Cleaner Production*, 112, 121–130. <https://doi.org/10.1016/j.jclepro.2015.06.045>
- Chen, C. C., Chen, W. C., & Tung, Y. C. (2018). Exploring the consumer behavior of intention to purchase green products in belt and road countries: An empirical analysis. *Sustainability*, 10(3), 1–18. <https://doi.org/doi:10.3390/su10030854>
- Choo, J. H., Sim, Y. S., Lee, K. H., & Kim, B. H. (2014). The effect of consumers' involvement and innovativeness on the utilization of fashion wardrobe. *International Journal of Consumer Studies*, 38(2), 175–182. <https://doi.org/https://doi.org/10.1111/ijcs.12078>
- Chrysosoidis, G. M., & Krystallis, A. (2005). Organic consumers' personal values research: Testing and validating the list of values (LOV) scale and implementing a value-based segmentation task. *Food Quality and Preference*, 16(7), 585–599. <https://doi.org/10.1016/j.foodqual.2005.01.003>
- Davison, L., Littleford, C., & Ryley, T. (2014). Air travel attitudes and behaviours: The development of environment-based segments. *Journal of Air Transport Management*, 36, 13–22. <https://doi.org/10.1016/j.jairtraman.2013.12.007>



- Mobike and Ofo: Reinventing the bike-sharing business model in China*. (2020, July 7). Retrieved from <https://daxueconsulting.com/mobike-and-ofo-bike-sharing/>
- De Medeiros, J. F., & Ribeiro, J. L. D. (2018). Environmentally sustainable innovation: Expected attributes in the purchase of green products. *Journal of Cleaner Production*, 142, 240–248. <https://doi.org/10.1016/j.jclepro.2016.07.191>
- Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS Quarterly*, 39(2), 297–316.
- do Paço, A., Shiel, C., & Alves, H. (2019). A new model for testing green consumer behaviour. *Journal of Cleaner Production*, 207, 998–1006. <https://doi.org/10.1016/j.jclepro.2018.10.105>
- Eagly, A. H., & Chaiken, S. (1993). *Psychology of attitudes*. Harcourt Brace Jovanovich, Fort Worth, TX.
- Erdogan, G., Battarra, M., & Calvo, R. W. (2015). An exact algorithm for the static rebalancing problem arising in bicycle sharing systems. *European Journal of Operational Research*, 245(3), 667–679. <https://doi.org/10.1016/j.ejor.2015.03.043>
- Fishman, E., Washington, S., & Haworth, N. (2012). Barriers and facilitators to public bicycle scheme use: A qualitative approach. *Transportation Research Part F: Traffic Psychology and Behaviour*, 15(6), 686–698. <https://doi.org/10.1016/j.trf.2012.08.002>
- Fishman, E., Washington, S., & Haworth, N. (2013). Bike share: A synthesis of the literature. *Transport Reviews*, 33(2), 148–165. <https://doi.org/10.1080/01441647.2013.775612>
- Fishman, E., Washington, S., Haworth, N., & Watson, A. (2015). Factors influencing bike share membership: An analysis of Melbourne and Brisbane. *Transportation Research Part A: Policy and Practice*, 71, 17–30. <https://doi.org/10.1016/j.tra.2014.10.021>
- Fransson, N., & Gärling, T. (1999). Environmental concern: Conceptual definitions, measurement methods, and research findings. *Journal of Environmental Psychology*, 19(4), 369–382. <https://doi.org/10.1006/jevp.1999.0141>
- Fu, W., Koo, W., & Kim, Y.-Y. (2014). Chinese-inspired products: Value-attitude-behavior. *International Journal of Marketing Studies*, 6(3), 76–86. <https://doi.org/10.5539/ijms.v6n3p76>
- Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology*, 23(1), 1–9. [https://doi.org/10.1016/S0272-4944\(02\)00081-6](https://doi.org/10.1016/S0272-4944(02)00081-6)
- Gao, S., Li, Y., & Guo, H. (2019). Understanding the adoption of bike sharing systems: By combining technology diffusion theories and perceived risk. *Journal of Hospitality and Tourism Technology*, 10(3), 464–478. <https://doi.org/10.1108/JHTT-08-2018-0089>
- Gifford, R., & Sussman, R. (2012). Environmental attitudes. In D. S. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology*. Oxford University Press.
- Giménez, C. A., & Tamajón, G. L. (2019). Analysis of the third-order structuring of Shalom Schwartz's theory of basic human values. *Heliyon*, 5(e01791), 1–7. <https://doi.org/10.1016/j.heliyon.2019.e01797>
- Hair, J. F., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems*, 117(3), 442–458. <https://doi.org/10.1108/IMDS-04-2016-0130>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2018). When to use and how to report the results of PLS-SEM. *European Business Review*, 30(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, G. V. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), 106–121. <https://doi.org/10.1108/EBR-10-2013-0128>
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In R. R. Sinkovic & P. N. Ghauri (Eds.), *New challenges to international marketing* (pp. 277–320). Emerald Group Publishing Limited. [https://doi.org/10.1108/S1474-7979\(2009\)0000020014](https://doi.org/10.1108/S1474-7979(2009)0000020014)
- Homer, P. M., & Kahle, L. R. (1988). A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology*, 54(4), 638–646. <https://doi.org/10.1037/0022-3514.54.4.638>
- Hoque, Z. M., & Alam, N. M. (2018). What determines the purchase intention of liquid milk during a food security crisis? The role of perceived trust, knowledge, and risk. *Sustainability*, 10(10), 1–22. <https://doi.org/10.3390/su10103722>
- Hsu, S. Y., Woodside, G. A., & Marshall, R. (2013). Critical tests of multiple theories of cultures' consequences: Comparing the usefulness of models by Hofstede, Inglehart and Baker, Schwartz, Steenkamp, as well as GDP and distance for explaining overseas tourism behavior. *Journal of Travel Research*, 52(6), 679–704. <https://doi.org/10.1177/0047287512475218>
- Inglehart, R. (1997). *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Princeton University Press.
- Jacobs, K., Petersen, L., Hörisch, J., & Battenfeld, D. (2018). Green thinking but thoughtless buying? An empirical extension of the value-attitude-behaviour



- hierarchy in sustainable clothing. *Journal of Cleaner Production*, 203, 1155–1169. <https://doi.org/10.1016/j.jclepro.2018.07.320>
- Joung, H.-M. (2014). Fast-fashion consumers' post-purchase behaviours. *International Journal of Retail & Distribution Management*, 42(8), 688–697. <https://doi.org/10.1108/IJRDM-03-2013-0055>
- Kaiser, F. G., Wölfling, S., & Fuhrer, U. (1999). Environmental attitude and ecological behaviour. *Journal of Environmental Psychology*, 19(1), 1–19. <https://doi.org/10.1006/jev.1998.0107>
- Keh, T. H., Ji, B. W., Wang, X., Sy-Changco, A. J., & Singh, R. (2014). Online movie ratings: A cross-cultural, emerging Asian markets perspective. *International Marketing Review*, 32(3/4), 366–388. <https://doi.org/10.1108/IMR-08-2013-0161>
- Kim, J., Choi, K., Kim, S., & Fujii, S. (2017). How to promote sustainable public bike system from a psychological perspective? *International Journal of Sustainable Transportation*, 11(4), 272–281. <https://doi.org/10.1080/15568318.2016.1252450>
- Kingston, T. (2016). Cute, creepy, or crispy—How values, attitudes, and norms shape human behavior toward bats. In C. C. Voigt & T. Kingston (Eds.), *Bats in the Anthropocene: Conservation of bats in a changing world* (pp. 571–595). Springer International Publishing. [https://doi.org/10.1007/978-3-319-25220-9\\_18](https://doi.org/10.1007/978-3-319-25220-9_18)
- Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4<sup>th</sup> ed.). Guilford Publications.
- Koivula, N. (2008). *Basic human values in the workplace* [Doctoral dissertation, University of Helsinki]. <http://urn.fi/URN:ISBN:978-952-10-4691-9>
- Lee, K. Y., & Yang, S.-B. (2015). The role of online product reviews on information adoption of new product development professionals. *Internet Research*, 25(3), 435–452. <https://doi.org/10.1108/IntR-11-2013-0238>
- Leonidou, L. C., Leonidou, C. N., & Kvasova, O. (2010). Antecedents and outcomes of consumer environmentally friendly attitudes and behaviour. *Journal of Marketing Management*, 26(13-14), 1319–1344. <https://doi.org/10.1080/0267257X.2010.523710>
- Lin, J., Li, L., Yan, Y., & Turel, O. (2018). Understanding Chinese consumer engagement in social commerce: the roles of social support and swift guanxi. *Internet Research*, 28(1), 2–22. <https://doi.org/10.1108/IntR-11-2016-0349>
- Lindeman, M., & Verkasalo, M. (2005). Measuring values with the Short Schwartz's Value Survey. *Journal of Personality Assessment*, 85(2), 170–178. [https://doi.org/10.1207/s15327752jpa8502\\_09](https://doi.org/10.1207/s15327752jpa8502_09)
- Lovelace, R., Beck, S. B. M., Watson, M., & Wild, A. (2011). Assessing the energy implications of replacing car trips with bicycle trips in Sheffield, UK. *Energy Policy*, 39(4), 2075–2087. <https://doi.org/10.1016/j.enpol.2011.01.051>
- Ma, L., Zhang, X., Ding, X. Y., & Wang, G. S. (2018). Bike sharing and users' subjective well-being: An empirical study in China. *Transportation Research Part A: Policy and Practice*, 118, 14–24. <https://doi.org/10.1016/j.tra.2018.08.040>
- Manan, A. H. (2016). The hierarchical influence of personal values on attitudes toward food and food choices. *Procedia Economics and Finance*, 37, 439–446. [https://doi.org/10.1016/S2212-5671\(16\)30149-6](https://doi.org/10.1016/S2212-5671(16)30149-6)
- Mansori, S., Sambasivan, M., & Md-Sidin, S. (2015). Acceptance of novel products: The role of religiosity, ethnicity and values. *Marketing Intelligence & Planning*, 33(1), 39–66. <https://doi.org/10.1108/MIP-03-2013-0050>
- Martin, C. J., & Upham, P. (2016). Grassroots social innovation and the mobilisation of values in collaborative consumption: A conceptual model. *Journal of Cleaner Production*, 134(Part A) 204–213. <https://doi.org/10.1016/j.jclepro.2015.04.062>
- Martin, E. W., & Shaheen, S. A. (2014). Evaluating public transit modal shift dynamics in response to bikesharing: A tale of two US cities. *Journal of Transport Geography*, 41, 315–324. <https://doi.org/10.1016/j.jtrangeo.2014.06.026>
- Milfont, L. T., Duckitt, J., & Wagner, C. (2010). A cross-cultural test of the value–attitude–behavior hierarchy. *Journal of Applied Social Psychology*, 40(11, 2791–2813). <https://doi.org/10.1111/j.1559-1816.2010.00681.x>
- Mobile. (2017 April). *Bike-sharing and the City: 2017 White Paper*. [PowerPoint slides]. [https://mobike.com/global/public/Mobike%20-%20White%20Paper%202017\\_EN.pdf](https://mobike.com/global/public/Mobike%20-%20White%20Paper%202017_EN.pdf)
- Nepomuceno, M. V., & Porto, J. B. (2010). Human values and attitudes toward bank services in Brazil. *International Journal of Bank Marketing*, 28(3), 168–192. <https://doi.org/10.1108/02652321011036459>
- Neumayer, E. (2004). The environment, left-wing political orientation and ecological economics. *Ecological Economics*, 51(3-4), 167–175. <https://doi.org/10.1016/j.ecolecon.2004.06.006>
- Nor-Aishah, H., Ahmad, H. N., & Thurasamy, R. (2020). Entrepreneurial leadership and sustainable performance of manufacturing SMEs in Malaysia: The contingent role of Entrepreneurial bricolage. *Sustainability*, 12(8), 3100. <https://doi.org/10.3390/su12083100>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- O'Brien, O., Chesire, J., & Batty, M. (2014). Mining bicycle sharing data for generating insights into sustainable transport systems. *Journal of Transport Geography*, 34, 262–273. <https://doi.org/10.1016/j.jtrangeo.2013.06.007>
- The number of motor vehicles in the first half of the year reached 360 million.* (2020, July 15). Retrieved from

- [http://paper.people.com.cn/rmrb/html/2020-07/15/nw.D110000renmrb\\_20200715\\_5-02.htm](http://paper.people.com.cn/rmrb/html/2020-07/15/nw.D110000renmrb_20200715_5-02.htm)
- Pomarici, E., Asioli, D., Vecchio, R., & Naes, T. (2018). Young consumers' preferences for water-saving wines: An experimental study. *Wine Economics and Policy*, 7(1), 65–76. <https://doi.org/10.1016/j.wep.2018.02.002>
- Qiu, L.-Y., & He, L.-Y. (2018). Bike sharing and the economy, the environment, and health-related externalities. *Sustainability*, 10(4). <https://doi.org/10.3390/su10041145>
- Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, A. M. (2018). *Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0: An updated and practical guide to statistical analysis* (2nd ed.). Pearson Malaysia Sdn Bhd.
- Razzaq, A., Ansari, Y. N., Razzaq, Z., & Awan, M. H. (2018). The Impact of fashion involvement and pro-environmental attitude on sustainable clothing consumption: The moderating role of Islamic religiosity. *SAGE Open*, 8(2). <https://doi.org/10.1177/2158244018774611>
- Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of Research in Marketing*, 26(4), 332–344. <https://doi.org/10.1016/j.ijresmar.2009.08.001>
- Rigdon, E. E. (2012). Rethinking partial least squares path modeling: In praise of simple methods. *Long Range Planning*, 45(5-6), 341–358. <https://doi.org/10.1016/j.lrp.2012.09.010>
- Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3*. In SmartPLS GmbH. <http://www.smartpls.com>
- Rockeatch, M. (1973). *The nature of human values*. Free Press.
- Rodríguez-Barreiro, L. M., Rosario Fernández-Manzanal, L. M., Serra, J. C., María, M., María, M., José, M. C., & Javier, V. (2013). Approach to a causal model between attitudes and environmental behaviour. A graduate case study. *Journal of Cleaner Production*, 48, 116–125. <https://doi.org/10.1016/j.jclepro.2012.09.029>
- Samarasinghe, R. (2012). The influence of cultural values and environmental attitudes on green consumer behaviour. *International Journal of Behavioral Science*, 7(1), 83–98.
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial least squares structural equation modeling. In C. Homburg, M. Klarmann, & A. Vomberg (Eds.), *Handbook of market research* (pp. 1–40). Springer, Cham. [https://doi.org/10.1007/978-3-319-05542-8\\_15-1](https://doi.org/10.1007/978-3-319-05542-8_15-1)
- Schultz, P. W., & Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of Environmental Psychology*, 19(3), 255–265. <https://doi.org/10.1006/jevp.1999.0129>
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1–26). Academic Press.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50(4), 19–45.
- Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Psychology and Culture*, 2(1). <https://doi.org/10.9707/2307-0919.1116>
- Schwartz, S. H., Breyer, B., & Danner, D. (2015). *Human Values Scale (ESS)* <https://doi.org/doi:10.6102/zis234>
- Schwartz, S. H., & Rubel-Lifschitz, T. (2009). Cross-national variation in the size of sex difference in values: Effects of gender equality. *Journal of Personality and Social Psychology*, 97(1), 171–185.
- Scott, M. D., & Ciuro, C. (2019). What factors influence bike share rideship? An investigation of Hamilton, Ontario's bike share hubs. *Travel Behaviour and Society*, 16, 50–58. <https://doi.org/10.1016/j.tbs.2019.04.003>
- Shaheen, S. A., Guzman, S., & Zhang, H. (2010). Bikesharing in Europe, the Americas, and Asia: Past, present, and future. *Transportation Research Record*, 2143, 159–167. <https://doi.org/10.3141/2143-20>
- Shaheen, S. A., Martin, E. W., & Cohen, A. P. (2013). Public bikesharing and modal shift behavior: A comparative study of early bikesharing systems in North America. *International Journal of Transportation*, 1(1), 35–54. <http://dx.doi.org/10.14257/ijt.2013.1.1.03>
- Shi, J.-G., Si, H. Y., Wu, G. D., Su, Y. Y., & Lan, J. (2018). Critical factors to achieve dockless bike-sharing sustainability in China: A stakeholder-oriented network perspective. *Sustainability*, 10(2090). <https://doi.org/doi:10.3390/su10062090>
- Shiau, W. L., & Chau, Y. K. (2016). Understanding behavioral intention to use a cloud computing classroom: A multiple model-comparison approach. *Information and Management*, 53(3), 355–365. <https://doi.org/10.1016/j.im.2015.10.004>
- Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. *MIS Quarterly*, 35(3), 553–572. <http://dx.doi.org/10.2139/ssrn.1606674>
- Shmueli, G., Sarstedt, M., Hair, F. J., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, M. C. (2019). Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322–2347. <https://doi.org/10.1108/EJM-02-2019-0189>
- Steenkamp, J. E. M., Hofstede, F., & Wedel, F. (1999). A cross-national investigation into the individual and national cultural antecedents of consumer innovativeness. *Journal of Marketing*, 63(2), 55–69. <https://doi.org/10.1177/002224299906300204>
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda.

- Journal of Environmental Psychology*, 29(3), 309–317. <https://doi.org/10.1016/j.jenvp.2008.10.004>
- Su, J., Watchravesringkan, K., & Zhou, J. H. (2019). Sustainable clothing: Perspectives from US and Chinese young Millennials. *International Journal of Retail & Distribution Management*, 47(11), 1141–1162. <https://doi.org/10.1108/IJRDM-09-2017-0184>
- Thøgersen, J., & Ölander, F. (2006). The dynamic interaction of personal norms and environment-friendly buying behavior: A panel study. *Journal of Applied Social Psychology*, 36(7), 1758–1780. <https://doi.org/10.1111/j.0021-9029.2006.00080.x>
- United Nations Environment Programme. (2015). *Sustainable consumption and production: A handbook for policymakers (Global edition)*. United Nations. <https://sustainabledevelopment.un.org/content/documents/1951Sustainable%20Consumption.pdf>
- Vincent, T. N., & Selvarani, D. C. (2013). Personal values approach for a better understanding of consumer behavior. *International Journal of Innovative Research and Development*, 2(3), 509–517.
- Vinson, D. E., Scott, J. E., & Lamont, L. M. (1977). The role of personal values in marketing and consumer behavior. *Journal of Marketing*, 42, 44–50. <https://doi.org/10.1177/002224297704100215>
- Wang, M., & Zhou, X. (2017). Bike-sharing systems and congestion: Evidence from US cities. *Journal of Transport Geography*, 65, 147–154. <https://doi.org/10.1016/j.jtrangeo.2017.10.022>
- Wang, Y., Douglas, M. A., Hazen, T. B., & Dresner, M. (2018). Be green and clearly be seen: How consumer values and attitudes affect adoption of bicycle sharing. *Transportation Research Part F: Traffic Psychology and Behaviour*, 58, 730–742. <https://doi.org/10.1016/j.trf.2018.06.043>
- Wu, Y. L., & Li, E. Y. (2018). Marketing mix, customer value, and customer loyalty in social commerce: A stimulus-organism-response perspective. *Internet Research*, 28(1), 74–104. <https://doi.org/10.1108/IntR-08-2016-0250>
- Yin, J., Qian, L., & Singhapakdi, A. (2018). Sharing sustainability: How values and ethics matter in consumers' adoption of public bicycle-sharing scheme. *Journal of Business Ethics*, 149(2), 313–332. <https://doi.org/10.1007/s10551-016-3120-z>
- Yin, J. L., Qian, L. X., & Shen, J. J. (2019). From value co-creation to value co-destruction? The case of dockless bike sharing in China. *Transportation Research Part D: Transport and Environment*, 71, 169–185. <https://doi.org/10.1016/j.trd.2018.12.004>
- Zhang, J. (2019). *Optimal design of shared public transport services* [Doctoral dissertation, Nanyang Technological University]. <http://hdl.handle.net/10220/48358>
- Zhang, L., Zhang, J., Duan, Z.-Y., & Bryde, D. (2015). Sustainable bike-sharing systems: Characteristics and commonalities across cases in urban China. *Journal of Cleaner Production*, 97, 124–133. <https://doi.org/10.1016/j.jclepro.2014.04.006>
- Zhou, Y. F., Thøgersen, J., Ruan, Y., & Huang, G. (2013). The moderating role of human values in planned behavior: The case of Chinese consumers' intention to buy organic food. *Journal of Consumer Marketing*, 30(4), 335–344. <https://doi.org/10.1108/JCM-02-2013-0482>
- Zhu, B., Habisch, A., & Thøgersen, J. (2018). The Importance of Cultural Values and Trust for Innovation—A European Study. *International Journal of Innovation Management*, 22(2), 1–28. <https://doi.org/10.1142/S1363919618500172>
- Zhuang, D. Y., Jin, J. G., Shen, Y. F., & Jiang, W. (2019). Understanding the bike sharing travel demand and cycle lane network: The case of Shanghai. *International Journal of Sustainable Transportation*, 15(2), 111–123. <https://doi.org/10.1080/15568318.2019.1699209>

## Appendix

### Measurement Items

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Schwartz Human Value (21 items ) from Schwartz and Rubel-Lifschitz (2009, p. 185)

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- (1). "Thinking up new ideas and being creative is important to him. He likes to do things in his own original way".
  - (2). "It is important to him to be rich. He wants to have a lot of money and expensive things".
  - (3). "He thinks it is important that every person in the world should be treated equally. He believes everyone should have equal opportunities in life".
  - (4). "It's important to him to show his abilities. He wants people to admire what he does".
  - (5). "It is important to him to live in secure surroundings. He avoids anything that might endanger his safety".
  - (6). "He likes surprises and is always looking for new things to do. He thinks it is important to do lots of different things in life".
  - (7). "He believes that people should do what they're told. He thinks people should follow the rules at all times, even when no one is watching".
  - (8). "It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them".
  - (9). "It is important to him to be humble and modest. He tries not to draw attention to himself".
  - (10). "Having a good time is important to him. He likes to "spoil" himself".
  - (11). "It is important to him to make his own decisions about what he does. He likes to be free and not depend on others".
  - (12). "It's very important to him to help the people around him. He wants to care for their well-being".
  - (13). "Being very successful is important to him. He hopes people will recognize his achievements".
  - (14). "It is important to him that the government ensures his safety against all threats. He wants the state to be strong so it can defend its citizens".
  - (15). "He looks for adventures and likes to take risks. He wants to have an exciting life".
  - (16). "It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong".
  - (17). "It is important to him to get respect from others. He wants people to do what he says".
  - (18). "It is important to him to be loyal to his friends. He wants to devote himself to people close to him".
  - (19). "He strongly believes that people should care for nature. Looking after the environment is important to him".
  - (20). "Tradition is important to him. He tries to follow the customs handed down by his religion or his family".
  - (21). "He seeks every chance he can to have fun. It is important to him to do things that give him pleasure".
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Environmental Attitude (3 items ) from Chen et al. (2018, p. 15)

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- "Advocating an environmentally lifestyle is necessary"
- "I think it is important to control environmental pollution"
- "It is very important to promote consumers' attention to environmental issues"
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Intention to adopt (4 items )from Yin et al. (2018, p. 17-18)

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- "In the next 3 months, I will consider using DBSS because it is less polluting"
- "In the next 3 months, I will consider using DBSS more for ecological reasons"
- "In the next 3 months, I will consider using an environmentally friendly transportation mode such as DBSS"
- "In the next 3 months, I will consider using DBSS more for health reasons"
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