

## Article

# Research on the Impact of High-End Ev Sales Business Model on Brand Competitiveness

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**Abstract:** Electric vehicles have many advantages compared with traditional fuel vehicles, whereas the immaturity of technologies and high manufacturing cost make it difficult for EV brands to be promoted in traditional business models. Thus, auto-mobile companies started to establish high-end sales business model to promote the brand. This paper studies the influential mechanism of high-end EV sales business model on brand competitiveness and the mediation effect between high-end EV sales business model and brand competitiveness. A total of 624 consumers' survey data were collected and the structural equation model (SEM) was analyzed to test the hypotheses by using a scale made up of indicators referring to high-end EV sales business model, brand competitiveness and customer perceived value. This paper contributes to the sustainable innovation literature by exploring the psychological perception of customer perceived value in strengthening brand competitiveness. The results show that both the value proposition and value creation of high-end EV sales business model have significant positive impacts on brand competitiveness. Moreover, customer perceived value fully mediates the relationships between the value proposition of high-end EV sales business model and brand competitiveness and between the value creation and brand competitiveness. Customer perceived value cannot mediate the relationship between the value capture of high-end EV sales business model and brand competitiveness. Our insights contribute to the business model research area from a customer-centric perspective.

**Keywords:** electric vehicles; high-end EV sales business model; brand competitiveness; customer perceived value; structural equation model; sustainable development



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## 1. Introduction

The International Energy Agency (IEA) issued a report that fuel transportation, including cars, light trucks and heavy-duty trucks, are the largest source of greenhouse gases emission [1]. Global warming and energy shortages have become one of major environmental problems which arouse considerable attention of international community and academic world. To address the carbon dioxide emission problem, electric vehicles have been widely recognized as an essential part for sustainable development and a clean energy future [2]. Although subsidies for electric vehicles apparently boost the development of the industry, on the other hand, subsidies also breed corruption and fraudulent behaviors in some places; thus, recently, lots of governments have halted subsidies for the electric vehicle industry [3]. The dwindling subsidies are taking the shine off the electric vehicles industry and force the industry to accelerate the process of marketization [4]. Compared with traditional worldwide well-known automobile brands and joint venture brands, the competitiveness of China's domestic automotive brands is still very limited [5]. However, electric vehicles present a great opportunity for China to compete with foreign automotive brands on the same development level; therefore, the successful commercialization of electric vehicles is of strategic significance for China's automotive brands to overtake foreign competitors [6].

In recent years, since the competition of electric vehicle brands is just beginning, the entire industry is gearing up for the challenge. The industry transition puts all the automotive brands on same starting line and who will take the lead in the race is still up in the air [7]. Startups such as Tesla, Geely and Weilai do not have a big dealership network, entrenched unions or a legacy business to manage, which are major advantages over traditional automotive brands [8]. Traditional automakers cannot stop selling internal combustion engine cars and it is a very costly exercise for them to get into the electric vehicle space in a big way. The risk and cost transfer that comes with the purchase of a traditional car under the current dominating business models are not well suited for electric vehicles [9]. Extant literature on electric vehicles business model mainly focused on the relationship between car adoption and different business models [10–13]. Extant studies mainly divided the business models of new energy vehicle into three categories: buying model, leasing model and sharing model [14–16]. Subsequently, scholars have conducted empirical studies on the relationship between customer adoption and three different business models. Liao examined consumers' reaction towards the battery and vehicle leasing model by conducting a stated choice experiment; the results show that the leasing model could apparently increase car adoption only for certain consumers in terms of their individual characteristics [17]. Huang compared key features of buying model, leasing model and sharing model of electric vehicle industry [18]. In addition, customers' adoptive preferences for three different business models were empirically analyzed [19]. Studies have shown that innovative business model for electric vehicles may reduce the adoption costs and create greater customer value [20]. Furthermore, some scholars are engaging in how to innovate the electric vehicle business model, that is, how to design a business model which will suit the EV industry well. D.F. Botelho fully analyzed the value proposition, value creation and value capture of an innovative business model [21]. Victor Nian proposed a new business model which is able to benefit all stakeholders in the ecosystem of electric vehicles [15].

Extant research mostly conducted empirical analysis of consumer preferences for electric vehicles buying model, leasing model and sharing model [22–24], the high-end EV sales business model has been largely overlooked. With the rapid development of cloud computing, 5G and mobile broadband technology, the success of an electric vehicle brand not only relies on higher products quality and lower price, but also needs to reshape a totally new and competitive business model which is suitable to meet consumers' growing needs [25]. In this regard, most well-known automotive enterprises, such as Mercedes-Benz, Audi, BMW, Tesla and Weilai, choose to lay out the future of the automobile industry by starting a high-end EV sales business model [26]. Unlike the traditional business model of automotive brands, the newly emerged high-end EV sales business model put more effort into product marketing and after-sale services, rather than mainly focusing on product manufacturing and distribution [27]. In addition, previous studies tended to only focus on the instrumental factors (e.g., product, service and policy attributes) and do not examine the effects of psychological factors on customer perceived value towards an innovative business model [28–30]. This gives us an opportunity to study the mediating effect of the customer perceived value between the high-end EV sales business model and brand competitiveness in a customer-centric perspective. Furthermore, prior studies initially and mainly explore the link between different electric vehicle business models and consumer adoption. For instance, Katja Laurischkat's research found that EV business models which is able to address service problems have the best chances to win in the electric vehicle market competition [31]. Gerardo Zarazua de Rubens studied the future need of innovative EV business model for massive adoption [27]. The impact of the EV business model on brand competitiveness has not been investigated. Unlike the traditional fuel vehicle industry, electric vehicle enterprises are facing a decentralized, decarbonized and digitalized road towards the sustainable transition [32]. Auto makers have been actively innovating established business models to create new values for customers and to adapt to fast changes in the marketplace. Extant research mostly conducted empirical analysis of

consumer preferences for electric vehicle buying model, leasing model and sharing model, the high-end EV sales business model has been largely overlooked. This paper aims to fill this gap by investigating whether and how high-end EV sales business model affects brand competitiveness.

To address the aforementioned problems, it would be interesting and significant to study high-end EV sales business model and its impact on brand competitiveness, so that EV enterprises could better adjust current business model to make it become more appropriate for the brand promotion strategy. Therefore, the objectives of this paper are threefold: (1) To study the impact mechanism between high-end EV sales business model and brand competitiveness and then derive the hypotheses, establish a new conceptual structural equation model according to the universally recognized consumer-based brand equity model [33] and the recent argument of customer perceived value in this hierarchy [34,35]. (2) To conduct an empirical analysis encompassing 624 EV consumers by dividing high-end EV sales business model into three dimensions: value proposition, value creation and value capture [36,37]. (3) To discuss the empirical results and present implications for EV automakers to adjust their business model for sustainable development.

## 2. Theoretical Review and Hypothesis Presentation

### 2.1. Value Theory

Value theory is the fundamental basis of management and marketing; it addresses a common concern of how to create value, improve customer perception and deliver superior consumer value [38]. Business model is founded on value theory; Michael Porter believes that every firm is made up of a series of value activities, value flows through each section as product design, production, marketing and delivery [39]. Ghaziani and Ventresca have studied the concept of business model and they found that despite scholars have studied business model from different lenses, while the core of business model is value creation and they drew a conclusion that business model is to solve the problems of how to create value in the face of changing business environment [40]. At present, in terms of the word “value” in the value theory, most of the previous studies define the value as customer value, e.g., to provide value for customers [41–43]. However, some scholars believe that the value in the definition of business model includes not only “customer value”, but also “company value” [44–46]. Scholars believe that the core of business model is to provide value for customers; Woodruff’s study has shown that customer value is the preference used by customers to evaluate the attributes of goods and customer value comes from the use of customer products and it is a subjective judgment on whether the product attributes can meet customer needs [38].

The other important concepts in value theory are value proposition, value creation and value capture; these concepts are constituent dimensions of business model structure. Value proposition usually refers to the benefits which an enterprise promised to offer to its customers [47]. Kaplan and Norton believe that customer value proposition describes a group of unique interests, which includes not only the combination of product (service) attributes, but also customer relations and brand image; moreover, enterprises establish customer relationships with target customers through differentiation strategy and, during the process, value proposition is the key link to connect internal and external customers [48]. Van Rossum’s study discovers that when the enterprise puts forward the correct value proposition, it means that the enterprise focuses on specific customer groups to meet their needs [49]. Value creation refers to how an enterprise can make a wise choice and carefully allocate their scarce resources and develop new products to satisfy customer needs. Traditionally, the value creation in value theory emphasizes the value creation of producers (suppliers), while with the development of the times and business, the value creation of business model tends to be more customer-centric [50]. Another important concept in value theory is value capture, which means how an enterprise can make profits from the attractive value created through correct mechanism; it deals with the problem of how to make profits [51].

Customer value was first proposed by Peter Drucker; it emphasizes the leading role of products in the value relationship [52]. With the intensification of market competition, A. Eggert fully studied the theory of customer perceived value, which has gained great influence in the field of management. Customer perceived value, as the source of enterprise competitive advantage, has become the focus in the field of management research [53]. Woodruff defines customer perceived value as customers' perception and evaluation of the utility of purchased products or services [38]. From the perspective of perception and trade-off, Philip Kotler believes customer perceived value is the sum of a series of benefits that customers feel they can obtain from the products and services and it is the emotional connection between consumers and brands in the process of product consumption [54]. Customer perceived value extends the concept of value to both sides in the process of commodity transaction and widens the research scope of value theory.

## *2.2. Impacts of EV High-End Sales Business Model*

Business model is made up of a series of value activities, through which companies could design competitive products and services and then deliver them to customers [55]. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, enticing customers to pay for value [56]. The three components of business model which are universally acknowledged by scholars are: value proposition, value creation and value capture [57–59]. The study of this paper is based on the judgment that business model has significant impact on brand competitiveness [60,61]. Unlike traditional fuel vehicle industry, EV makers facing high manufacturing cost due to the high cost of batteries, which makes it impossible for EV makers to compete with traditional auto players under the same business model [62]. How to make EV brands quickly stand out of traditional big brands has become a hot topic. Recent years, EV startups such as Telsa, Weilai and Xiaopeng started to adopt a high-end sales business model to compete with traditional big brands in the market. These enterprises aim to attract brand attention and increase brand awareness through selling high quality luxury vehicles at first and then gradually move to affordable and economic EV car market as the manufacturing costs drop. The success of Tesla proves that the value proposition, value creation and value capture activities of high-end sales business model reinvent the way a car company brands itself [8].

Value proposition refers to the functional and emotional benefits a brand willing to provide to its potential customers [63]. Effective value proposition could show unique, powerful and recognizable brand marks to customers, which can significantly improve brand competitiveness [64]. Justin Beneke and Stephen Carter have studied the development of a consumer value proposition of private label brands and found that customer proposition plays an important role in enhancing brand competitiveness [65]. Starr and Brodie have explored the relationship between customer value proposition and brand competitiveness; their research discovered that brand competitiveness could be strengthened when customers' perceptions of a brand align with marketers' proposed brand promises and brand attribute [66]. The value proposition of EV high-end sales business model is that EV makers offer electric high technology cars to wealthy customers who are willing to travel eco-friendly, sustainably and to maximize user experience and enjoyment and then switch to offer affordable cars to the early majority. The value proposition of sustainable transport is able to quickly differentiate EV brands from traditional fuel vehicle brands such as BMW or Audi. In addition, the high-quality products and good customer service which EV makers promise to provide to potential consumers can trigger positive emotions towards the brand [67]. Therefore, we argue that the value proposition of EV high-end sales business model has a direct and significant impact on brand competitiveness.

**Hypothesis 1.** *The value proposition of high-end EV sales business model has a direct and significant positive impact on brand competitiveness.*

Value creation is a series of economic activities of companies to produce and supply products and services for potential customers to satisfy their needs; it is the central cog of the business model [68]. The primary objective of a successful business model is to create a valued, trustworthy and unique product or service [69]. A successful value creation process makes brands differentiate themselves against fierce competition [70]. Many scholars have studied the relationship between value creation and brand competitiveness in different areas. Jamie Carlson has studied on how customer participation affects value creation activities and how these changes will influence brand competitiveness in social media brand communities in the retailing sector, they found that customer participation can improve value creation and thus enhance brand competitiveness [71]. Óscar González-Mansilla has studied the impact of value creation on hotel brand equity and found that customer participation could positively affects the value creation and value creation positively affect brand equity [72]. The high-end EV sales business model first aims to shape the brand, occupy the top of the electric vehicle market and has a high degree of market recognition by creating and producing electric cars full of technology, sustainable energy and luxury [73]. Automakers first concentrate on creating valuable electric cars with high-quality, well-thought-through set of hardware which could be improved with over-the-air software updates almost endlessly for free. This gives the brand opportunity to overtake traditional auto brands. After acquiring high-end brand image, it aims to create value from offering affordable vehicles and services to gain market share. Therefore, we argue that the value creation process of high-end EV sales business model has a direct and significant impact on brand competitiveness.

**Hypothesis 2.** *The value creation of high-end EV sales business model has a direct and significant positive impact on brand competitiveness.*

Value capture is the process of retaining the value and profits created in value creation process [74]. The ultimate goal of business model is to make profits [75]. Compared with traditional automotive business models, the high-end EV sales business model largely changed the way an auto brand makes profits [76]. In the era of traditional industrial economy, according to the strategic isolation mechanism of resource-based theory, the value capture of traditional auto brands mainly depends on the differential advantages of enterprises' products and technologies [77]. Meanwhile, with the development of big data and mobile communication technology, for the automotive industry, the isolation mechanism based on consumers' purchase intention and preference is replacing the isolation mechanism based on ability and resources [14]. In addition, influenced by the Internet and new technologies, the functional boundaries of electric vehicles have become more diversified, further driving the gradual increase of automobile consumption scenes [78]. Typically, traditional fuel automakers only capture value from selling a car, while companies which adopt the high-end EV sales business model first get product endorsement through selling high-end product to super rich consumers and then get revenue and profit not only from selling a car, but also from selling vehicle software, a charging network, car insurance, after-sale services and batteries, etc. [79]. These value capturing activities apparently and directly increase brand exposure and push the company to gain competitive advantage over other brands. Therefore, we argue that the value capture of high-end EV sales business model has a direct and significant impact on brand competitiveness.

**Hypothesis 3.** *The value capture of high-end EV sales business model has a direct and significant positive impact on brand competitiveness.*

### 2.3. Customer Perceived Value

The concept of customer perceived value was first proposed by Zeithaml; it means the success of a product or service depends on how much value consumers believe they can get [80]. Brand value assessment is based on the customers personal value perception [81]. Parasuraman and Grewal found that customer perceived value is a psychological feeling



towards the value of the products or services provided by a brand; this kind of psychological feeling can influence customers buying decisions before they purchase a product or service; they also found that customer perceived value can even influence customer satisfaction and behavior during the post purchase stage [82].

When customers feel they could receive more value than their costs after buying a product or service, they are more likely to support the brand than if they feel the costs exceed the benefits [83]. Patrick Spieth has studied the relationship between business model and customer perceived value of industrial enterprises; Patrick Spieth divides business model into value proposition, value creation and value acquisition advantages and then studies the impact of these three dimensions on brand trust through the mediation variables of customer perceived value [26]. Syed Muhammad has studied the impact of customer perceived value on customer-brand relationship in an online retail environment and found that consumer hope plays an important role between customer perceived value and customer-brand relationship [84]. Ana Paula Graciola explores the mediation effect of customer perceived value in supermarkets; her research found that customer perceived value has a mediation effect between purchase intention and brand image [85].

According to customer perceived value theory, when customers feel they could get more benefits from a series of value activities innovated by EV high-end sales business model, the EV high-end business model could have a positive impact on customer perceived value. Therefore, this study proposes that:

**Hypothesis 4a.** *The value proposition of EV high-end sales business model has significant positive impacts on customer perceived value.*

**Hypothesis 4b.** *The value creation of EV high-end sales business model has significant positive impacts on customer perceived value.*

**Hypothesis 4c.** *The value capture of EV high-end sales business model has significant positive impacts on customer perceived value.*

The improvement of customer perceived value can increase the perceived utility, satisfaction and recognition of the products, information and services provided by the company [86]. Customers' perception and recognition of the value created by the enterprise will produce the word-of-mouth effect. When consumers feel satisfied with the value created by the enterprise, they will consciously promote the brand [87]. Relevant research shows that the word-of-mouth effect caused by the increase of customer perceived value can improve the brand popularity, brand loyalty, brand reputation and brand market competitiveness, which will establish a kind of comparative advantage about the brand in term of consumers' psychological perception, so as to guide customers to buy their products and services and improve brand competitiveness [88]. According to the studies above, this paper proposes that:

**Hypothesis 5.** *Customer perceived value has a significant positive impact on brand competitiveness.*

According to consumer choice theory, customers will face uncertainty when new products or services entering into market, which will result in the resistance of their purchase habits by purchasing new products and services [89]. This kind of uncertainty comes from whether the brand's new products and services performance can meet consumers' psychological expectations [90]; it could be relieved by a customer's previous positive purchasing experience, resulting in positive customer perceived value with the brand [91]. The EV high-end sales business model aims at gain market reputation and producing a sense of emotional reliability and functional compatibility for the brand in consumers' mentality through developing and promoting high-end EV cars at first [92]. High-end sales business model could increase customer perceived value, reduce consumer uncertainty leading to a higher purchasing intension and brand competitiveness [93]. Therefore, we

argue that customer perceived value mediates the relationships of all three EV high-end business model dimensions with brand competitiveness.

**Hypothesis 6.** *Customer perceived value mediates the relationships of all 3 EV high-end business model dimensions with brand competitiveness.*

According to the theoretical justifications and literature analysis above, we frame our conceptual hypotheses model, as shown in Figure 1.

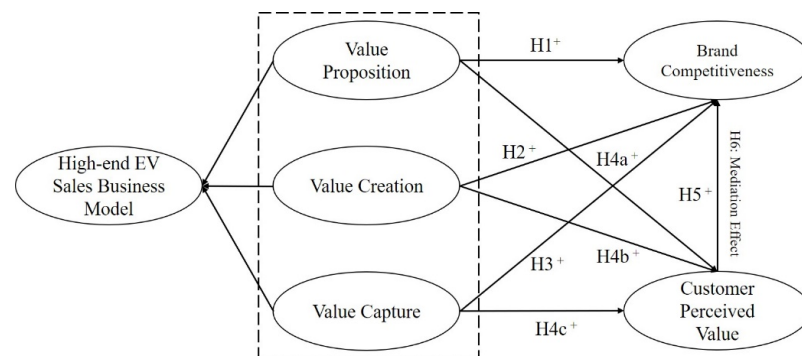


Figure 1. Conceptual model.

### 3. Materials and Methods

#### 3.1. Data Collection and Sample Characteristics

The targeted respondents in this study are the consumers of EV auto makers which implement EV high-end sales business model. According to several criteria including age distribution, the average gender ratio, income and education [94], we spent three weeks to carry out a survey in Beijing, Shanghai and Shenzhen; 1000 questionnaires were handed out to EV consumers. A total of 624 valid questionnaires were received at last and the valid survey response rate is 62.4%. Subsequently, we analyzed the characteristics of the descriptive statistical. The consumers who participated in the valid survey are between the ages of 22 and 67, 58% of the participants are men and 42% are women, with an average age of 45. Most of the participants (82%) have a net income below EUR 20,000. Among all participants, 69% of the consumers have a bachelor's degree or lower, 23% of the consumers hold a master's degree and 8% of the consumers hold a doctor's degree or higher (see Table 1).

Table 1. Demographics of respondents (n = 624).

Variables	Items	Frequency	Percentage
Gender	Male	362	58%
	Female	262	42%
Age	18–25	19	3%
	26–30	50	8%
	31–35	119	19%
	36–40	168	27%
	41–50	218	35%
	Over 50	50	8%
Net Income	501€–1000€	25	4%
	1001€–1500€	418	67%
	1500€–2000€	131	21%
	2000€–3000€	38	6%
	Over 3000€	12	2%
Degree	Bachelor	368	59%
	Master	212	34%
	Doctoral	44	7%

### 3.2. Measurements

We adopted the measurement from existing literature to measure EV high-end sales business model, customer perceived value and brand competitiveness.

For brand competitiveness, we followed Sally Baalbaki's research to measure brand competitiveness, Sally Baalbaki divided brand competitiveness into 3 dimensions: brand loyalty, brand awareness and brand reputation [95]. For brand loyalty, we utilized the three-item scale developed by Giuseppe Pedeliento [96]. We measured brand reputation through using the three-item scale developed by Patrick Spieth [26]. The brand awareness was evaluated through the three-item scale suggested by Catarina Marques [97].

For customer perceived value, Sweeney and Soutar developed a measure to evaluate customer perceived value [98]. We followed their suggestion through dividing customer perceived value into three dimensions including customer perceived functional value, emotional value and social value; each dimension has 4 items.

For EV high-end sales business model, we adapted the measurement scale from Patrick Spieth et al. [26]. Value proposition is a three-item measure. An example item is "The high-end positioning of brand (X) makes it well-known in the market". Value creation is a three-item measure, an example is "Brand (X) provides high qualified products". Value capture is a three-item measure, an example is "You prefer to buy products of brand (X)".

In addition to the aforementioned variables, we used age, gender, income and education level as control variables in our study. All the items were measured with seven-point Likert scales (ranging from 1 = strongly disagree to 7 = strongly agree).

### 3.3. Data Analysis

Confirmatory factor analysis (CFA) is a method to check whether the data of the scale items fit to the established variables [99]. Exploratory factor analysis (EFA) is a method to identify the relationship between the manifest variables in building a construct [100]. In order to test whether the data and the variables fit to the proposed model, we randomly split 624 collected survey responses into two groups of 312 each, one group was used for EFA and the other group was used for CFA. During the process of evaluating the fit of proposed structural equation model, Kline suggests that the NNFI, the CFI, the IFI, the  $\chi^2/df$ , the RMSEAR, the GFI and the AGFI should be reported [101]. Therefore, we utilized non-normalized fit index (NNFI), incremental fit index (IFI) and comparative fit index (CFI) to assess the relative indices of fit, if the value of NNFI, IFI and CFI greater than 0.9, it means the proposed conceptual model is acceptable. The ratio of  $\chi^2$  and its degrees of freedom ( $\chi^2/df$ ), the root mean square error of approximation (RMSEA), the goodness of fit index (GFI) and the adjusted goodness of fit index were tested as absolute indices of fit.

In order to check the quality and usefulness of the scales proposed above, reliability and validity are two indicators widely used by scholars [102]. We checked the reliability of all scales through using Cronbach's Alpha, the composite reliability (CR) and the average variance extracted (AVE) suggested by Hair et al. [103]. The significance of the factor loadings of indicators in their respective dimensions were calculated in the paper to check the convergent validity of all scales. Discriminant validity is an indicator to evaluate whether the constructs in the scale are highly correlated among them or not [104]. We used AVE value to check the independence among constructs in each scale. According to the research by Henseler, the discriminant validity will pass the test if the square root of the AVE value of a given construct is larger than the correlation coefficients between the construct and any other constructs in a scale [104]. Therefore, we utilized AVE value to test discriminant validity among constructs. Furthermore, correlation coefficient is an indicator used to test how strong a relationship among constructs [105], we calculated the correlation coefficients among constructs for the comparison of AVE value.

Common method bias was checked by using Harmon's single factor test and the fit of the single factor model were compared with that of the measurement model to recheck if there is common method bias phenomenon. After checking the reliability, the validity and the common method bias of the scales and the model fit indices. We took



three steps to test the theoretical hypotheses through using structural equation models. First, we built a structural equation model to test the direct effect between each dimension of EV high-end sales business model and brand competitiveness. Second, we integrated customer perceived value to build another model to test the mediation effect of customer perceived value on the relationship between EV high-end sales business model and brand competitiveness. Third, we checked whether the mediation effect of customer perceived value is complete mediation effect or partial mediation effect. All of the data analysis procedures above allowed us to test the proposed theoretical hypotheses.

## 4. Results

### 4.1. Measurement Validation

In order to test the psychometric properties of the used scales, we used SPSS and AMOS to conduct EFA and CFA. Before conducting EFA, the value of Kaiser–Meyer–Olkin (KMO) and Bartlett’s test of sphericity need to be tested to determine whether the sample data is suitable for EFA. The results of the test show that the KMO value of customer perceived value, brand competitiveness and EV high-end sales business model are 0.905, 0.881 and 0.912, respectively, greater than 0.8, which indicates the sample data is suitable for EFA. In addition, the level of significance of Bartlett’s test of all scales are 0.000, all lower than our chosen significance level, which shows the sample data are suitable for EFA as well. The results of EFA (see Table 2) show that the standardized factor loadings for all items are higher than 0.78, exceeding the recommended threshold of 0.7. Therefore, all the indicators are considered as adequate indicators for the respective factors. Therefore, the results above show that our measurements have high reliability.

**Table 2.** KMO and Bartley spherical test results.

Variables	KMO	Bartlett’s Test	
		$\chi^2$	Sig.
customer perceived value	0.905	4735.334	0.000
brand competitiveness	0.881	2894.048	0.000
High-end EV sales business model	0.912	2120.580	0.000

Further, we evaluated the composite reliability (CR), Cronbach’s alpha ( $\alpha$ ) and average variance extracted (AVE). The results show that the  $\alpha$  values (see Table 3) and CR values (see Table 4) for all constructs are all higher than the recommended threshold 0.7, with values ranging from 0.847 to 0.906 and from 0.881 to 0.912. The average variance extracted (AVE) of all constructs were evaluated and the results (see Table 4) show that all AVE values are greater than the threshold of 0.5, which means that the convergent validity has been established. Moreover, we used Fornell–Larcker analysis and Heterotrait–Monotrait (HTMT) analysis to examine discriminant validity [106]. First, the AVE value for each construct is greater than its squared correlation with any other constructs (see Table 4). Second, the results of Heterotrait–Monotrait (HTMT) test (Table 5) show that the HTMT ratio of all constructs are less than 0.9. Both tests above demonstrate that the discriminant validity has been established.

**Table 3.** KMO and Bartley spherical test results.

Items		M	SD	TC	CAID	IL
High-end EV sales business model $\alpha = 0.912$						
Value proposition	[Brand X] is a unique brand.	4.17	1.27	0.73	0.87	0.86
	The high value-added products and services of [brand X] satisfy your needs.	4.04	1.23	0.66	0.90	0.85
	The high-end positioning of [brand X] makes it well-known in the market.	3.92	1.26	0.71	0.89	0.83
Value creation	[Brand X] provides high qualified products.	4.25	1.17	0.69	0.90	0.85
	[Brand X] will make every effort to solve any problem with the products.	4.03	1.14	0.69	0.91	0.79
	[Brand X] offers outstanding after-sales services	3.79	1.21	0.74	0.89	0.84

Table 3. Cont.

	Items	M	SD	TC	CAID	IL
Value capture	You prefer to buy the products of [brand X].	4.13	1.33	0.68	0.91	0.86
	You prefer to buy the value-added services of [brand X].	3.94	1.20	0.71	0.88	0.82
	The profit margin of [brand X] is higher than the industry average.	3.77	1.19	0.69	0.90	0.83
Customer perceived value $\alpha = 0.905$						
Perceived emotional value	I enjoy the products and services offered by [brand X].	4.25	1.20	0.63	0.90	0.81
	The products and services of [brand X] make you feel comfortable.	4.16	1.21	0.71	0.88	0.86
	The products and services of [brand X] make you feel good.	4.23	1.10	0.68	0.90	0.83
	The products and services of [brand X] give you pleasure.	4.09	0.95	0.72	0.89	0.80
Perceived functional value	The products of [brand X] are well made.	3.91	0.94	0.70	0.87	0.85
	The products of [brand X] have excellent workmanship.	4.12	0.95	0.66	0.90	0.82
	The customer services experience of [brand X] is great.	3.97	1.03	0.65	0.88	0.84
	The products of [brand X] would perform consistently.	3.93	1.12	0.63	0.90	0.85
Perceived social value	The products of [brand X] would make a good impression on other people.	4.07	1.07	0.61	0.90	0.83
	The products of [brand X] would give you social approval.	3.85	1.01	0.67	0.86	0.86
	The products of [brand X] would improve the way you are perceived.	3.96	.93	0.65	0.89	0.78
	The products of [brand X] would help you to feel acceptable.	3.74	0.89	0.75	0.88	0.81
Brand competitiveness $\alpha = 0.881$						
Brand awareness	When you think of this product, [brand X] will come to your mind.	3.94	1.08	0.71	0.86	0.86
	You are very familiar with [brand X].	4.13	1.16	0.68	0.87	0.83
	You can recognize the logo of [brand X] among competing brands.	4.25	1.31	0.65	0.88	0.83
Brand reputation	[Brand X] has the best products.	3.78	0.91	0.67	0.85	0.80
	[Brand X] is socially responsible.	4.11	1.17	0.63	0.87	0.85
	[Brand X] is a status brand.	4.02	1.35	0.72	0.86	0.84
Brand loyalty	After using the products of [brand X], you grow fond of it.	4.30	1.21	0.75	0.84	0.82
	You will buy the products of [brand X] again.	3.85	0.94	0.69	0.87	0.84
	You will not buy other brands, when [brand X] is available in the market.	3.73	1.15	0.66	0.88	0.85

Note: M (Mean), SD (standardized deviation), TC (The total correlation of corrected item), CAID (Cronbach's alpha if the item is removed), IL (standardized item loadings).

Table 4. The composite reliability and correlations between latent constructs.

Variables	CR	(1)	(2)	(3)	(4)	(5)
Value proposition	0.847	0.658				
Value creation	0.862	0.061	0.732			
Value capture	0.853	0.057	0.042	0.676		
Customer perceived value	0.860	0.513 **	0.535 **	0.086	0.716	
Brand competitiveness	0.906	0.674 **	0.579 **	0.523 **	0.510 **	0.684

Note: The diagonal entries represent the AVE of each construct, \*\*  $p < 0.01$ .

Table 5. HTMT tests for discriminant validity.

Variables	(1)	(2)	(3)	(4)	(5)
Value proposition	N/A				
Value creation	0.089	N/A			
Value capture	0.095	0.119	N/A		
Customer perceived value	0.427	0.505	0.094	N/A	
Brand competitiveness	0.261	0.324	0.301	0.629	N/A

In addition, the measurement model in this study shows a satisfying level of goodness of fit (see Table 6). The non-normed fit index (NNFI) (0.938, 0.978, 0.976), the comparative fit index (CFI) (0.948, 0.986, 0.986) and the goodness-of-fit index (GFI) (0.909, 0.972, 0.973) are greater than the recommended threshold 0.9. The adjusted goodness-of-fit index (AGFI) (0.891, 0.959, 0.960), the  $\chi^2/df$  ratio (2.517, 2.707, 2.371) and the asymptotic root mean square error (RMSEA) (0.046, 0.044, 0.039) meet the requirements as well ( $>0.85$  for AGFI,  $<3$  for  $\chi^2/df$  and  $<0.07$  for RMSEA) [107].

**Table 6.** Fitting tests.

Variables	NNFI	CFI	GFI	AGFI	$\chi^2/df$	RMSEA
High-end EV sales business model	0.938	0.948	0.909	0.882	2.624	0.046
Customer perceived value	0.978	0.986	0.972	0.959	2.707	0.044
Brand competitiveness	0.976	0.986	0.973	0.960	2.371	0.039
Direct effect model	0.954	0.968	0.938	0.920	2.285	0.041
Mediating effect model A	0.950	0.974	0.932	0.921	2.075	0.035
Mediating effect model B	0.955	0.977	0.940	0.926	1.965	0.033
Mediating effect model C	0.943	0.965	0.922	0.910	2.480	0.041

Furthermore, we used Harman's single-factor test to check if there is common method phenomenon and the results show that all of the extracted factors explain 72.138% of the total variance and the maximum variance explained by one factor is 31.206%, which indicates that common method bias is not a major concern in this study. Further, the fit of the one factor model (NNFI = 0.507, CFI = 0.523, GFI = 0.525, AGFI = 0.501,  $\chi^2/df$  = 6.134, RMSEA = 0.122) did not yield better results than that of the measurement model, which reindicates that there is no common method phenomenon in this study [108].

#### 4.2. Structural Equation Model Results

First, we examined the direct effects between the three EV high-end sales business model dimensions and the brand competitiveness. We established structural equation models to test the hypotheses proposed above using AMOS. We evaluated the model fitness to test whether the data are consistent with the hypothetical model. As shown in Table 6, the results show that all fitness index such as the incremental fit index (IFI), RMSEA, CFI, GFI, AGFI and  $\chi^2/df$  meet the standard, which means the data fit the hypothetical structural equation models [107]. Furthermore, the results (see Table 7) show that there is a significant positive impact between value proposition and brand competitiveness. In addition, value creation shows a significant positive effect on brand competitiveness. Value capture shows a significant effect on brand competitiveness. Therefore, the results support H1, H2 and H3.

**Table 7.** Structural equation model results.

Direct Effect							
Hypothesis	Paths	Standard Estimate	C.R.	<i>p</i>	Conclusion		
H1	VP→BC	0.356	7.697	***	Supported		
H2	VC→BC	0.312	8.764	***	Supported		
H3	VT→BC	0.294	7.323	***	Supported		
H4a	VP→CPV	0.454	10.764	***	Supported		
H4b	VC→CPV	0.375	7.835	**	Supported		
H4c	VT→CPV	0.006	0.752	0.422	Rejected		
H5	CPV→BC	0.292	8.153	**	Supported		
Mediator: Customer Perceived Value; Dependent Variable: Brand Competitiveness							
Hypothesis	Estimate	SE	Lower	Upper	<i>p</i>	Conclusion	
H6	VP→CP→BC	0.096	0.025	0.052	0.154	0.001	Full mediation
	VC→CP→BC	0.195	0.060	0.073	0.304	0.006	Full mediation
	VT→CP→BC	0.023	0.021	−0.044	0.053	0.761	No mediation

Note: VP stands for value proposition, VC stands for value creation, VT stands for value capture, CPV stands for customer perceived value, BC stands for brand competitiveness, \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Furthermore, following suggested procedures and through building three structural equation models [109], we tested the mediating effect of customer perceived value on the relationship between high-end EV sales business model and brand competitiveness. The results (see Table 7) of three models show that the customer perceived value has

a significant positive effect on brand competitiveness. In order to fully understand the mechanism of how customer perceived value mediates the relationship between high-end EV sales business model and brand competitiveness. We found that the model without customer perceived value shows the variance explained ( $R^2$ ) of brand competitiveness is 0.157 and the model with customer perceived value shows the  $R^2$  of brand competitiveness is 0.442. Furthermore, we examined the proposed hypotheses about mediation effect. The results (see Table 7) show the value proposition and the value creation of EV high-end sales business model both have significant indirect impacts but nonsignificant direct impacts. This indicates that the customer perceived value fully mediates the relationship between value proposition of high-end EV sales business model and brand competitiveness and between value creation of high-end EV sales business model and brand competitiveness. The indirect-only mediation suggests that the value proposition and value creation of high-end EV sales business model can only increase brand competitiveness when they provide a direct and positive impact to the customer perceived value. In contrast, customer perceived value does not mediate the value capture of EV high-end sales business model and brand competitiveness, since the direct effect is significant while the indirect effect is nonsignificant. Finally, the controlled variables of age, gender, income and education are not significant. Summing up, H4 and H6 are partial supported, H5 is supported.

## 5. Discussion and Conclusions

This study explores the impact of high-end EV sales business model on brand competitiveness and analyzes the mediation effect between high-end EV sales business model and brand competitiveness. Our key findings are as follows: First, we find that the value proposition, value creation and value capture of high-end EV sales business model increase customer perceived values. Second, the growth of customer perceived value can enhance brand competitiveness. In addition, customer perceived value also mediates the relationship between value proposition of high-end EV sales business model and brand competitiveness and between value creation of high-end EV sales business model and brand competitiveness, whereas it does not mediate the relationship between value capture of high-end EV sales business model and brand competitiveness. More specifically, the promotion of brand competitiveness is positively associated with customer perceived value. Third, we find that the value capture of high-end EV sales business model can only affect brand competitiveness directly, which suggests that the brand premium and high revenue acquired from conducting high-end brand positioning strategy can directly promote brand competitiveness without the positive customer perception.

First, we discuss the proposed hypotheses H1, H2 and H3. According to the result, the value proposition of high-end EV sales business model has a direct positive effect on brand competitiveness. This is in line with the notion that the value proposition of high-end sales strategy aims at providing the highest brand value and pricing power by leveraging all tangible and intangible elements of singularity, which in turn gives a brand particularly powerful feeling of uniqueness [110]. This kind of superlative and not comparative positioning is an excellent way to make the brand leave a deep impression on customers and strengthen brand competitiveness [111]. Furthermore, our results support the value creation of high-end EV sales business model has a direct positive effect on brand competitiveness. Brands usually create two types of value—functional value and symbolic value [112]. EV brands which adopt high-end sales business model all follow differentiation strategy, they not only deliver high-quality products and services, but also strive to carve out their own way of creating symbolic value in the segment of customers that they are primarily targeting [113]. As such, it directly creates a sense of exclusivity of the brand and enhance brand competitiveness [114]. In addition, the results show that the value capture of high-end EV sales business model has a direct positive effect on brand competitiveness. High-end EV sales strategy gives brands ability to command a price higher than their competitors, which can increase their revenue [8]. Sustainable profitability

guarantees the brand has sufficient money to improve its products and services [14]. As a result, it enhances their overall brand equity and competitiveness.

Second, we elaborate on the proposed effects of H4 and H5. Our results show that the value proposition and value creation of high-end EV sales business model have significant positive impacts on customer perceived value. This is in line with the notion that high-end sales strategy aims at appealing to high-end customers, but whether the proposition of the brand is truly valuable depends on how customers evaluate it [115]. Moreover, the success of a product or service created by a brand is closely related to the customers' evaluation of the merits of them [116]. There is a strong link between the value created by a brand and how customers perceive it [117]. Unexpectedly, the value capture of high-end EV sales business model does not have a significant impact on customer perceived value. This may be due to the reason that value capture mainly refers to the internal profitability mechanism of how a company retain revenue from its value proposed and created in its business model [118], thus the profitable mechanism or procedure designed inside a company has little to do with how customers perceived it. Furthermore, the empirical analysis above demonstrates that customer perceived value has a significant positive impact on brand competitiveness. This finding is consistent with extant research. Customers are the foundation of brand survival and development. Customer perceived value is the direct experience in the process of consumption, which has a profound impact on brand competitiveness.

Finally, we discuss the proposed mediation effect of customer perceived value on brand competitiveness, which is our hypotheses H6. As our analysis goes deeper, we found that the value proposition and value creation of high-end EV sales business model can only strengthen brand competitiveness indirectly through the rise of customer perceived value, while at the same time, they cannot make positive impacts on brand competitiveness directly when the customer perceived value is introduced. Yaqun Yi states that the successful value proposition of a brand is the key to gain customers and beat other competitors, it helps the brand to identify what kind of products and services it needs to offer to its potential customers, but the competitiveness rises and increases in market share must be based on the fact that customers perceive these propositions to be superior to alternatives [119]. The value creation of high-end EV sales business model focuses on offering expected unique and differentiated products and services to customers [8], whether customers prefer the value a brand offering is one of the most important parts for winning over other competitors [17]. In addition, the value capture of high-end EV sales business model can only affect brand competitiveness directly without the mediation effect of customer perceived value. This conclusion indicates that value capture concentrates on the process of how to generate sufficient revenue and profits to sustain brand competitive advantage. Different from some authors, this insight believes value capture is an internal profit-making mechanism within organizations; the revenue from value capture is usually used to fund brand promotion and this process does not need customer intervention.

### *5.1. Theoretical Enlightenment*

Through exploring how high-end EV sales business model affects brand competitiveness, we contribute and extend the research boundary on business model theory and brand competitiveness. In particular, from a customer-centric perspective, we introduce customer perceived value into the study on high-end EV sales business model with respect to three separate dimensions. Previous scholars mainly and merely focused on the study of either high-end EV sales business model or brand competitiveness, whereas they often separated the relationship between parts and the whole, ignoring the mediation impact mechanism of high-end EV sales business model on brand competitiveness. We filled this academic gap in our study.

First, recent studies mainly focused on the relationship between sales volume and high-end EV sales business model [120,121]. Lots of EV companies are startups and it is especially important for startups to build a strong brand when launching into a new market [79].



This paper complements this insight by investigating the impact of decomposed three dimensions of high-end EV sales business model on brand competitiveness. On the other hand, scholars have investigated business model from company-centric perspective [122]. The psychological relationship between high-end EV sales business model and brand competitiveness has been largely overlooked. Therefore, our study extends extant research of business model from a customer-centric perspective. Furthermore, by decomposing high-end EV sales business model into value proposition, value creation and value capture [26], we specifically study the impact of decomposed dimensions on customer perceived value. Our customer-centric perspective study indicates that the value proposition and value creation of high-end EV sales business model have positive impact on customer perceived value, whereas the value capture dimension does not have impact on it. The empirical analysis of our study supports that value proposition and value creation play pivotal role for developing positive customer perception. The conclusion helps a brand to allocate capital and resources effectively through putting more effort on optimization of value proposition and value creation process to increase customer perceived value.

Second, some scholars have studied the significance of customers integration in designing a business model which can outperform other competitors [123,124]. In this paper, we argue that scholars have to understand the effect of customer perceived value in order to fully understand customers integration into high-end EV sales business model, because the way a business model perceived by consumers determines its success [36]. In order to investigate the impact mechanism between high-end EV sales business model and brand competitiveness, we discover a new direction which customer perceived value is taken as a mediation effect. Therefore, we complement extant literature that have studied customer intervention on business model. Our results show that the relationships between the value proposition of high-end EV sales business model and brand competitiveness and between the value creation of high-end EV sales business model and brand competitiveness are fully mediated by customer perceived value. This conclusion indicates that the value proposed and created by an EV brand cannot be directly converted into brand competitiveness. Subjectively, based on personal feelings, EV brands do wish their efforts on improving value proposition and value creation can lead to promotion of brand competitiveness, while as a matter of fact, customers' feelings towards the value proposed and created by a brand is of decisive significance in promoting brand competitiveness. The brand competitiveness will only improve when customers feel that the proposed value of a brand can really meet their needs and the products and services created by a brand exceed their expectation. Our finding enriches and deepens the existing research about how high-end EV sale business model affect brand competitiveness. Furthermore, the empirical result also indicates that customer perceived value does not play as a mediator between the value capture process of high-end EV sales business model and brand competitiveness, it can enhance brand competitiveness directly. Therefore, this conclusion reconfirms the understanding that a highly profitable brand can make use of the profit to improve the brand by expanding the markets and becoming more visible in the public [125]. To sum up, our study contributes to the customer-centric perceptive of high-end EV sales business model and the notion that the most important strategy for increasing brand competitiveness is raising customer perceived value.

### *5.2. Management Enlightenment*

Our study also provides us some suggestions for managing a brand. As an emerging industry, the most urgent task for brand managers is to create market positioning regarding a brand. Due to the high manufacturing cost of electric vehicles, most brands choose to implement a high-end sales business model. Our findings suggest that customer perceived value is a key factor for improving brand competitiveness, because it has a strong positive relationship with both high-end sales business model and brand competitiveness. This paper recommends to brand managers that through adopting differentiation strategy and selling high-end products, EV companies should associate their brands' proposition with a

unique aura of mystique and exclusivity. This could help customers to know what their brands represent and help EV companies to improve customer perception and enhance brand competitiveness. Moreover, brand managers should also focus on improving the quality of electric vehicles and services. This could make consumers think that your brand is better than your competitors. In addition, brand managers should take notice of that value capture improvement can only increase brand competitiveness directly. Therefore, managers need to sustain brand profitability to guarantee it has sufficient capital to grow business and competitiveness.

Furthermore, with the development of society and economy, the consumptional needs of consumers have deeply changed. The traditional needs of consumers pay more attention to the functional and practical value of products, while since the culture has become more and more diversified, the consumptional needs of consumers have become more personalized and unique and the spiritual needs of products and services exceed their material needs. Due to technical constraints, traditional automobile manufacturers can not monitor the personalized needs of potential consumers effectively, while auto makers now could grasp the personalized needs of consumers and proposed precised value proposition with the help of new technologies, e.g., 5G and big data mining. EV brands should also build a diversified value creation system in the future, products and services such as catering, entertainment, e-commerce and big data resources can also become the carrier of value creation. In terms of value capture for EV brands, abandoning the mode of pursuing short-term profits gradually is very important, EV brands should pay attention to abandoning the traditional concept of “product + customer”, innovate management methods, shift the management focus to the concept of “customer + product” and put customers at first place. Brand managers of EV companies can build an inhabited ecosystem for customers through the combination of offline experience center and online apps to attract customers and increase customer base at first and then provide customers with personalized products and services to achieve value capture.

### *5.3. Research Limitations and Future Research Directions*

Despite our study offers some insights on the relationship between high-end EV sales business model and brand competitiveness. There are still some limitations for future studies. First, from customer-centric perspective, this research focused on the relationship between high-end sales business model and brand competitiveness; future research can investigate on how various value capture models, such as direct sales, will affect brand competitiveness. Second, due to the weaknesses of the analytical method chosen, it is inappropriate to compare whether certain brands had been more successful than others in creating the perceptions which are likely to lead to success, future research can use other methods to further study and discuss this issue. Moreover, the electric vehicle industry was taken as research subject to investigate the impact of high-end sales business model on customer perceived value and brand competitiveness. Whether our conclusions can be applied in other industries still needs to be studied in the future. In addition, there are other elements, such as switching costs and substitutive effect, affecting the relationship between business model and brand competitiveness [126]. It is also fruitful for scholars to examine the moderating effect of switching costs on the relationship between business model and brand competitiveness. Furthermore, despite our researchers trying to collect data from different places to reduce the effect of common method bias while it is still inevitable, to avoid the existence of common method bias, future studies could expand data sources to further reduce common method bias. Last but not least, this study collected data in mainland China, high-end EV sales business model also exists in many other countries; scholars can use our method to broaden our insights through investigating the impact of psychological factors on brand competitiveness in other industries and countries, which will strengthen the externality validity of the conceptual linkages examined in this paper.

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