*Article*

# Determinants of Consumers' Purchasing Intentions for the Hydrogen-Electric Motorcycle

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**Abstract:** In recent years, increasing concerns regarding the energy costs and environmental effects of urban motorcycle use have spurred the development of hydrogen-electric motorcycles in Taiwan. Although gasoline-powered motorcycles produce substantial amounts of exhaust and noise pollution, hydrogen-electric motorcycles are highly energy-efficient, relatively quiet, and produce zero emissions, features that suggest their great potential to reduce the problems currently associated with the use of motorcycles in city environments. This study identified the significant external variables that affect consumers' purchase intentions toward using hydrogen-electric motorcycles. A questionnaire method was employed with a total of 300 questionnaires distributed and 233 usable questionnaires returned, yielding a 78% overall response rate. Structural equation modeling (SEM) was applied to test the research hypothesis. The research concluded that (1) product knowledge positively influenced purchase intentions but negatively affected the perceived risk; (2) perceived quality via hydrogen-electric motorcycles positively influenced the perceived value but negatively affected the perceived risk; (3) perceived risk negatively affected the perceived value; and (4) the perceived value positively affected purchase intentions. This study can be used as a reference for motorcycle manufacturers when planning their marketing strategies.

## 1. Introduction

Data published by Taiwan's Bureau of Energy (MOEA) (2015) [1] and the International Energy Agency (IEA) (2015) [2] identify the transportation sector as the main consumer of energy and the biggest producer of greenhouse gas emissions both in Taiwan and around the world. As such, the specific shortcomings in energy efficiency in this sector must be analyzed and addressed to save energy and, in turn, decrease greenhouse gas emissions. In Taiwan, motorcycles are an important means of transportation due to their high maneuverability, agility, and ease of parking, especially in metropolitan areas where traffic is dense. Such large numbers of motorcycles not only cause traffic jams, but also create air pollution and other negative impacts to the environment.

With accelerated climate change, environmental ethics has become an important issue among organizations as well as consumers. The increasing attention toward protection of the natural environment and environmental ethics has also altered consumer buying preference. "Green

consumption" is considered as one of the broad categories of ethical consumption [3]. Compared with gasoline and lead–acid batteries, hydrogen batteries possess numerous advantages, such as zero pollution, high efficiency, low noise levels, and minimal vibration. They also provide rapid start-up and have a long life span. Therefore, regarding the trends in both environmental protection and energy efficiency, hydrogen-electric motorcycles have a developmental advantage in the future. However, the application of hydrogen batteries in electric motorcycles is still in the initial stage and customer acceptance of this new product type and other external variables still require further clarification.

Since not all consumers are familiar with hydrogen-electric motorcycles, product knowledge may seem to be more important. Wang and Hazen (2016) [4] thought that if consumers have different levels of familiarity for a product, then their levels of product knowledge and cognition will also vary, thereby affecting their purchase intentions. Research by Zhang and Hou (2017) [5] pointed out that for products with an external presence that are higher in price, the factor of perceived risk is relatively important, possibly affecting consumers' perception of value and their purchase intentions. In addition, product knowledge might also influence perceived risk, thereby becoming one of the important factors influencing consumers' purchase intentions [6].

Given the research outlined above, this study focuses on hydrogen-electric motorcycles, which has been getting a lot of attention in recent years. We wanted to investigate whether the hydrogen-electric motorcycle affects consumers' purchase intentions or whether it generates any perceived value to consumers, thereby affecting their purchase intentions. We hope the findings will shed light on the influence of hydrogen-electric motorcycles on purchase intentions and its mechanism. Furthermore, if the causality between hydrogen-electric motorcycles and purchasing behavior can be identified, then the information could be useful to motorcycle manufacturers when they design their products and plan their marketing strategies.

## 2. Methods

### 2.1. Conceptual Model

In light of the research discussed above, this study aimed to investigate the influence of perceived risk, product knowledge, and perceived quality on consumers' purchase intentions. A conceptual model of the research is shown in Figure 1.
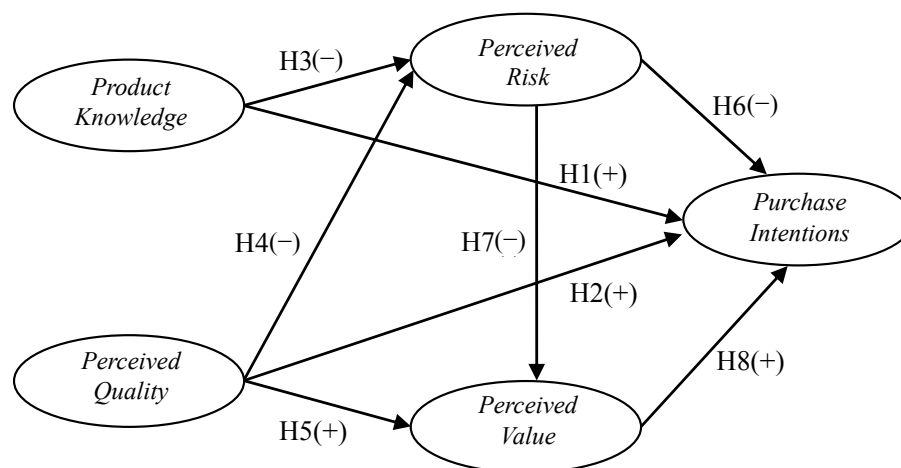


**Figure 1.** Conceptual model. H: hypothesis.

### 2.2. Research Hypothesis

#### 2.2.1. Relationship between Product Knowledge and Purchase Intentions

According to Brucks (1985) [7] and Wood and Lynch (2002) [8], the quantity of domain-specific knowledge about a product class that is stored in one's memory is defined as product knowledge. Such knowledge, according to Lin and Zhen (2005) [9], is directly dependent upon the awareness or understanding of the given product among consumers, or upon their confidence in it. Coulter et al. (2005) [10] pointed out that the amount of product knowledge affects consumers' choice of product and brand.

When engaged in the process of purchasing a given product, the knowledge that consumers have about the product will affect their search behaviors, their processing of relevant information, their decision making, and, finally, their purchase intentions [7,11]. For example, an empirical study conducted by Han and Stoel (2016) [12] found that in terms of searching for relevant information, the product knowledge of consumers has a significant and positive effect on their efforts.

The literature discussed here offers the following hypothesis for this study:

**Hypothesis 1 (H1).** *Product knowledge via hydrogen-electric motorcycles positively affects consumers' purchase intentions.*

#### 2.2.2. Relationship between Perceived Quality and Purchase Intentions

Perceived quality is defined as consumers' judgment about a product's excellence or superiority [13]. Given that consumers typically lack information or have only asymmetric information upon which to base their judgments, it is thought that consumer trust may directly rely upon the perceived quality of a product or a brand, with such quality being viewed as a key indicator among consumers [14].

Given that it essentially consists of a collection of attributes relating to consumer perceptions of the quality of a product or brand, perceived quality can amplify a positive word-of-mouth effect, lower customer management costs, boost price premiums, and raise purchase quantities [15,16]. Tamimi and Sebastianelli (2016) [17] pointed out that when consumers perceive product quality as high, their perceived value of the product will be high too, thereby increasing their purchase intentions. In this light, we propose the following hypothesis:

**Hypothesis 2 (H2).** *Perceived quality of a product via hydrogen-electric motorcycles positively affects consumers' purchase intentions.*

#### 2.2.3. Relationship between the Product Knowledge and the Perceived Risk

A purchase decision often involves risk, especially when the post-purchase consequences are uncertain [18]. Prior research has asserted that the perceived risk is a combination of negative consequence and uncertainty and that the assessment of perceived risk would affect customer purchase decisions [19–21]. Cox (1967) [22] proposed three perspectives to assess the consumer risk: financial, social and psychological. Jacoby and Kaplan (1972) [23] refined this two-dimensional concept into a multidimensional one that has since been verified and become commonly used to evaluate social, financial, psychological, physical and performance risks. The way these risks are perceived is fairly critical for understanding how people react to the possible hazards associated with their choices [24].

Empirical research by Klerck and Sweeney (2007) [6] proposed that both subjective and objective knowledge of a product would directly influence consumers' perceived risk. Given these propositions, we propose the following hypothesis:

**Hypothesis 3 (H3).** *The higher the product knowledge via hydrogen-electric motorcycles, the lower the consumers' perceived risk.*

### 2.2.4. Relationship between Perceived Quality and Perceived Risk

Consumer decision making relies heavily upon the perceived quality such that, with respect to the alternatives within a given category, consumers will conduct comparisons of the quality of those alternatives in relation to their respective prices [25]. Accordingly, individual purchase decisions and brand loyalty are directly impacted by perceived quality, particularly under circumstances in which consumers must contend with a lack of information concerning the products they are seeking to buy [20,26].

Dowling and Staelin (1994) [27] proposed that factors affecting consumers' perceived risk might include their character, product quality, purchasing situation, social culture, and other influences. Though the focus of this study is the influence of hydrogen-electric motorcycles on consumers' behavior, product quality and purchasing situation are also important factors that affect the perceived risk. Given this notion, we arrive at the following hypothesis:

**Hypothesis 4 (H4).** *The higher the perceived quality of a product via hydrogen-electric motorcycles, the lower the consumers' perceived risk.*

### 2.2.5. Relationship between Perceived Quality and Value

As the fundamental outcome of marketing efforts, the perceived value constitutes a first-order component of relationship marketing [28,29]. The perceived value can be broken down, in turn, into two distinct components of its own, namely, the social, economic and relationship benefits gained by the consumer and the risk, effort, price, time and convenience-related sacrifices made by the consumer [29,30]. Such benefits and sacrifices can be further specified for a particular type of product; for example, a measuring scale for determining the perceived value of restaurants was developed in which the perceived value was broken down into the five dimensions of monetary price, behavioral price, reputation, quality and emotional response [31].

Fundamentally, perceived quality is determined by the evaluation of a given result and the comparison of that result to the consumer's prior expectations; as such, it is essentially a cognitive construct. The perceived value is also determined through an evaluation conducted by the consumer; however, in this case, the consumer compares the benefits and sacrifices associated with the purchase [32,33]. According to Asshidin et al. (2016) [34], performance and perceived quality combine to account for a portion of the positive component of functional value. Meanwhile, according to various value models, quality and price are viewed as having distinct and separate impacts on the perceived value, with the former seen as having a positive impact and the latter seen as having a negative impact [30,35].

Ness et al. (2009) [36] and Ranjbarian and Pool (2015) [37] stated that perceived quality would positively influence the perceived value. Research by Cronin et al. (2000) [38] also suggested that the quality consumers perceive in a product has a significant influence on its perceived value. Based on these findings, we propose the following hypothesis:

**Hypothesis 5 (H5).** *Perceived quality of a product via hydrogen-electric motorcycles positively influences consumers' perceived value.*

### 2.2.6. Relationship between Perceived Risk and Purchase Intentions

The perceived risk significantly affects consumer behaviors because it essentially consists of a subjective expectation regarding a potential loss [21,39]. According to perceived risk theory, purchasers are typically more inclined toward minimizing their perceived risks than they are toward maximizing their expected payoffs [39]. Given that the purchase probability and purchase intentions of a consumer are raised by a reduction in the perceived risk, it can be clearly seen that a negative association exists between the perceived risk and purchase intentions [39,40]. The previous literature indicates that the perceived risk negatively affects customer purchase intentions [40,41].

Chen and Chang (2012) [42] showed that the perceived risk and purchase intentions have a negative causality with trust, meaning that if enterprises wish to increase consumers' purchase intentions, they should lower products' perceived risk and increase confidence in the products. Given these results, we suggest the following hypothesis:

**Hypothesis 6 (H6).** *The higher the perceived risk of a product via hydrogen-electric motorcycles, the lower the consumers' purchase intentions.*

### 2.2.7. Relationship between Perceived Risk and Value

Past studies have often considered perceived risk to be an antecedent of perceived value [16,43]. Research by Agarwal and Teas (2001) [44] showed that the perceived risk plays an important role in forming consumers' perceptions of value. Studies by Hong (2015) [45] and Zhang and Hou (2017) [5] also suggested that for products with high external visibility and price, the perceived risk would become an important factor and might influence consumers' perceived value. Therefore, we arrive at the following hypothesis:

**Hypothesis 7 (H7).** *The higher the perceived risk of a product via hydrogen-electric motorcycles, the lower the consumers' perceived value.*

### 2.2.8. Relationship between Perceived Value and Purchase Intentions

Since the decisions of consumers are frequently based on incomplete or asymmetric information, the perceived values of products effectively serve as signals to customers that are likely to guide their purchase intentions in a positive manner [14]. Given that it fundamentally consists of a collection of features relating to consumer perceptions of product value, the perceived value can be boosted via the effects of positive word-of-mouth and can, in turn, enhance consumers' purchase intentions [16,46]. Indeed, Gounaris et al. (2007) [47] reported that consumer purchase intentions and perceived value are positively related; as such, a loss of purchase intentions may occur due to a low level of perceived value [35]. On the other hand, a consumer will be more likely to purchase a given product if the consumer perceives the value of the product to be high [40]. To summarize and reiterate, the fact that customers' purchase intentions are positively influenced by customers' perceived value has been amply demonstrated by the past literature [48,49]. Given the above, we propose the following hypothesis:

**Hypothesis 8 (H8).** *Perceived value of a product via hydrogen-electric motorcycles positively affects consumers' purchase intentions.*

### 2.3. Questionnaire Design and Data Analysis Methods

After the design of the questionnaire was completed, three expert researchers were invited to examine the questions and their content appropriateness to confirm the content validity of the study. They recommended that the wording of five questions be amended, and a pre-test was then conducted using 10% (30) of the questionnaires to examine the reliability of the questionnaire's scale.

All questions for the variables were measured using a five-point Likert scale. The higher the score, the greater the value of the variable. This study investigated adult supermarket shoppers using purposive sampling to obtain the questionnaires. The survey was conducted in February and March of 2016. A total of 300 questionnaires were distributed, with 67 returned with irregularities. Thus, omissions of answers, incomplete answers, or those in which answers to all the questions were the same scale point were all deemed as invalid and removed. The 233 valid questionnaires represented a recovery rate of 78%.

Sample Data Analysis

In terms of the respondents' demographics, there were slightly more males than females (51.7% vs. 48.3%). The majority were from 31 to 40 years old (58.5%), a substantial minority being 41 to 50 years old (24.2%). Most of the respondents had a university degree (59.1%) followed by senior high school qualifications (21%). Occupation-wise, almost half were from the service industry (49.2%) followed by staff from the military and government sectors (12.6%). The respondents' average monthly income was mostly between NT$30,001 and 40,000 (50.1%) followed by those under NT$30,000 (38.8%). In terms of geographic distribution, respondents resided mainly in Taipei (28.9%), Taichung (20.1%) and Kaohsiung (20.3%).

## 3. Results

### 3.1. Measurement Model

The analysis started with a confirmatory factor analysis (CFA) using AMOS 16.0. The measurement model contains five latent constructs (Figure 1). After an initial CFA analysis, the revised model shows an appropriate level of model fit as seen in Table 1 ($\chi^2/\text{df}$ = 2.599, RMSEA = 0.071, CFI = 0.957, NFI = 0.923, AGFI = 0.819). All values for composite reliability, which ranged from 0.730 to 0.872, clearly exceeded the minimum threshold of 0.60. This result supported internal consistency among the items for each construct. In addition, all AVE values in the present study were greater than 0.50, thus supporting convergent validity. Finally, the degree of discriminant validity was acceptable and the AVE value for each study variable clearly exceeded the squared value for its correlations with other study variables [50].

**Table 1.** Result of the fit indicators of the evaluation model.

| Fit Index | Ideal Value | Result | Conclusion |
|:---:|:---:|:---:|:---:|
| $\chi^2/\text{df}$ | <3 | 2.599 | Acceptable |
| GFI | >0.9 (good fit)<br>0.8–0.89 (acceptable fit) | 0.852 | Acceptable |
| AGFI | >0.9 (good fit)<br>0.8–0.89 (acceptable fit) | 0.819 | Acceptable |
| NFI | >0.9 | 0.923 | Acceptable |
| CFI | >0.9 | 0.957 | Acceptable |
| PNFI | >0.5 | 0.823 | Acceptable |
| RMR | <0.05 | 0.036 | Acceptable |
| RMSEA | $\leq$0.05 (close fit)<br>0.05–0.08 (fair fit)<br>0.08–0.10 (mediocre fit)<br>>0.10 (poor fit) | 0.071 | Fair fit |

Note: GFI: goodness-of-fit index; AGFI: adjusted goodness-of-fit index; NFI: normalized fit index; PNFI: parsimonious normed fit index; CFI: comparative fit index; RMR: root mean square residual; RMSEA: root mean square error of approximation.

### 3.2. Path Model

The proposed model was evaluated by running Structural Equation Modeling (SEM) with the maximum likelihood estimation method. The goodness-of-fit statistics indicated a satisfactory fit ($\chi^2/\text{df}$ = 2.599, RMSEA = 0.071, CFI = 0.957, NFI = 0.923, AGFI = 0.819). Results from the SEM revealed that the proposed model explained 78.5% of the total variance in purchase intentions and accounted for 67.2% of the variance in the perceived risk and the value. The findings indicated that our proposed model has a satisfactory predictive ability in outcome variables. The results of the structural model are

described in Figure 2 and Table 2, revealing that six of eight hypotheses were supported, the exceptions being H2 (β = −0.105, *p* > 0.05) and H6 (β = −0.226, *p* > 0.05).
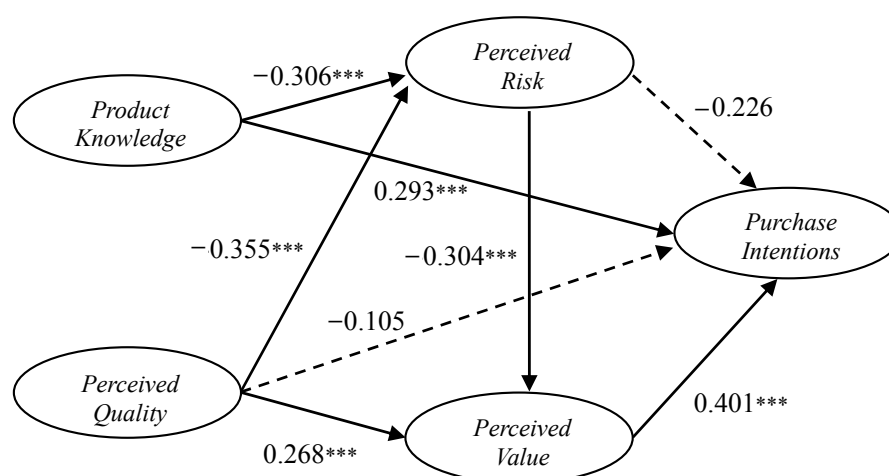


**Figure 2.** Paths within the hypothesis model. Note: Dotted lines denote hypotheses that were not supported, whereas solid lines denote established hypotheses. Note: *** *p* < 0.001.

**Table 2.** Results of tested Hypotheses H1–H8.

| Research Hypothesis | Hypothesized Path | Path Coefficient | *p*-Value | Results |
|---|---|---|---|---|
| H1 | Product knowledge → Purchase intentions | 0.293 | *p* < 0.001 *** | Supported |
| H2 | Perceived quality → Purchase intentions | −0.105 | *p* > 0.05 | Not supported |
| H3 | Product knowledge → Perceived risk | −0.306 | *p* < 0.001 *** | Supported |
| H4 | Perceived quality → Perceived risk | −0.355 | *p* < 0.001 *** | Supported |
| H5 | Perceived quality → Perceived value | 0.268 | *p* < 0.001 *** | Supported |
| H6 | Perceived risk → Purchase intentions | −0.226 | *p* > 0.05 | Not supported |
| H7 | Perceived risk → Perceived value | −0.304 | *p* < 0.001 *** | Supported |
| H8 | Perceived value → Purchase intentions | 0.401 | *p* < 0.001 *** | Supported |

Note: *** *p* < 0.001.

After verification, six of the eight hypotheses of the proposed model obtained supporting results and were established. The exceptions were H2 and H6, which failed to obtain significant support. Figure 2 shows the empirical analysis chart. The results of the fit indicators for the hypothesis model are shown in Table 1, indicating that the overall goodness-of-fit for the structural model was acceptable. Based on the SEM results for the path analysis of the hypothesis model, we discovered that the relationship between one variable and another could be divided into direct and indirect effects. According to Chiou (2011) [51], a significant regression coefficient of error in the model means that the causal variable has a direct effect. Besides the direct effect, there was also the possibility of an indirect effect between two variables. If there were one or more mediated variables, then the direct effect between two variables would be significant. If any of the direct effects were not significant, then no indirect effect would be established. The results showed that the perceived value played an important intermediary role in the separate influences of perceived quality and risk on purchase intentions. The relationships among the numerous variables are shown in Table 3.

**Table 3.** Path effects on purchase intentions.

| Path | Direct Effect | Indirect Effect | Total Effect |
|---|---|---|---|
| Product knowledge → Purchase intentions | 0.293 | 0.119 | 0.412 |
| Perceived quality → Purchase intentions | −0.105 | 0.245 | 0.140 |
| Perceived risk → Purchase intentions | −0.266 | −0.122 | −0.388 |
| Perceived value → Purchase intentions | 0.401 | – | 0.401 |

## 4. Discussion

Based on the results of the empirical analysis, the hypotheses are discussed below, beginning with H1 (*Better product knowledge via hydrogen-electric motorcycles will have a significant and positive influence on consumers' purchase intentions*). The empirical results for H1 were consistent with those obtained by Brucks (1985) [7]; specifically, the extent of consumer knowledge about hydrogen-electric motorcycles (such as functions and method of use) influences consumers' purchase intentions of hydrogen-electric motorcycles. Therefore, our results would support a recommendation that players in the motorcycle industry should strengthen their knowledge on hydrogen-electric motorcycles and intake. Creating a stronger impression on consumers might help to increase consumers' purchase intentions for a company's products.

Two of the hypotheses were not supported: H2 (*Higher perceived quality of a product via hydrogen-electric motorcycles will have a significant and positive influence on consumers' purchase intentions*) and H6 (*A higher perceived risk via hydrogen-electric motorcycles will have a significant and negative influence on consumers' purchase intentions*).

The lack of significant support for these hypotheses is not consistent with theories by researchers such as Asshidin et al. (2016) [34]; rather, this research infers that for hydrogen-electric motorcycles, consumer perceived quality needs to go through the formation of consumer perceived value to affect purchase intention. The results for H6 are inconsistent with the research done by Klerck and Sweeney (2007) [6], which stated that the perceived risk will affect consumer purchase behaviors and decisions. This difference in results may be because the researchers conducted their investigations in different industries. Consumers may need time to observe and evaluate, and, when their perceived value has been raised—that is, when consumers feel that hydrogen-electric motorcycles have a reference value and when the obtained value is more than the actual cost—the result will be a higher intention to consume.

The empirical results for H3 (*Better product knowledge via hydrogen-electric motorcycles will have a significant and negative influence on consumers' purchase intentions owing to the perceived risk*) are consistent with those obtained by Klerck and Sweeney (2007) [6]. Both subjective and objective knowledge of a product result in the perceived risk for consumers. Thus, the negative relationship between the product knowledge and the perceived risk is supported.

With regard to H4 (*A higher perceived quality of a product via hydrogen-electric motorcycles will have a significant and negative influence on consumers' purchase intentions owing to the lower perceived risk*), the negative influence of perceived quality on the perceived risk is supported. We further found that product quality as reflected on hydrogen-electric motorcycles provided by motorcycle industry players will cause consumers to have different levels of perceived risk.

Research results for H5 (*A higher perceived quality of a product via hydrogen-electric motorcycles will have a significant and positive influence on consumers' purchase intentions owing to a greater perceived value*) showed that the relationship between consumers' perceived quality and the value is consistent with results obtained by Ranjbarian and Pool (2015) [37] and Cronin et al. (2000) [38]. Perceived quality plays an important role in the formation process of perceived value, meaning that service quality (including the provision of hydrogen-electric motorcycles) would increase consumers' perceived value, thereby positively influencing their purchase intentions.

We noticed that when consumers felt that the quality of hydrogen-electric motorcycles (in terms of functions and ingredients quality) did not meet their expectations or might result in a higher switching cost, they displayed uncertainty or discomfort, resulting in the reduction of the perceived value of the product. Thus, H7 is supported: *A high perceived risk via hydrogen-electric motorcycles will have a significant and negative influence on consumers' purchase intentions owing to a lower perceived value*. This result is consistent with those from empirical research by Agarwal and Teas (2001) [44], which stated that the perceived risk plays a very important role in the formation process of consumers' perceived value. It is also consistent with inferences from the research done by Hong (2015) [45] and Zhang and Hou

(2017) [5], which stated that the perceived risk of a product with high external visibility and price was an important factor that might influence consumers' perceived value.

Finally, the results of this research found that when consumers have a high perceived value of hydrogen-electric motorcycles, that is, when they see the reference value of hydrogen-electric motorcycles, they are more willing to pay the price to purchase hydrogen-electric motorcycles. Hence, H8 was supported: *A higher perceived value for the product via hydrogen-electric motorcycles will have a significant and positive influence on consumers' purchase intentions*. This finding is consistent with those of Petrick (2002) [31] and Asshidin et al. (2016) [34], which stated that a higher perceived value would increase consumers' purchase intentions.

## 5. Conclusions

Two main conclusions may be drawn from the empirical results of this study:

1. Correct product knowledge lowers consumers' uncertainty regarding hydrogen-electric motorcycles and increases their purchase intentions

The research results showed that when consumers are choosing a product, the ease of understanding the hydrogen-electric motorcycles lowers their uncertainty, thereby positively influencing their purchase intentions. When consumers have a high level of knowledge and cognition about hydrogen-electric motorcycles, the perceived risk is reduced, thereby increasing their purchase intentions. In addition, this study also discovered that perceived quality (such as product and service qualities) lowers consumers' perceived risk, revealing that nowadays, consumers focus not only on the quality of tangible products but also on that of intangibles, such as service quality. Therefore, in addition to informing consumers with enough information about how hydrogen-electric motorcycles work, motorcycle industry players should also provide a guarantee of the product's quality. Doing so will likely improve consumers' trust of products with hydrogen-electric motorcycles and also help the industry to promote relevant information via hydrogen-electric motorcycles, thus increasing consumers' purchase intentions.

2. Consumers' perceived quality and risk influence purchase intentions through the perceived value

The results indicate that if consumers perceive that a product has good quality, the perceived value of hydrogen-electric motorcycles will also increase, causing them to be willing to pay more to purchase it. Perceived quality also reduces the uncertainty consumers feel regarding hydrogen-electric motorcycles. Over time, decreased uncertainty can increase consumers' perceived value of a product, thus increasing their purchase intentions.

In the extremely competitive motorcycle marketplace, one of the biggest challenges for motorcycle industry academics and practitioners is to uncover an effective way for hydrogen-electric motorcycles to have a positive influence on consumers' purchase intentions. The findings of this study may help motorcycle industry researchers and practitioners acquire the empirical evidence to show that it has the significant role in determining hydrogen-electric motorcycle purchase intentions. Our empirical results were in line with the existing notion that product knowledge, perceived risk, quality, and value affect consumers' purchase intentions [7,31,34]. Moreover, the findings of this study also included the full identification of the complex relationships among the various elements of perceived value and perceived risk as well as the impacts of these relationships on consumer purchase intentions. Taken together, the study's findings indicate that to encourage consumers to perceive a greater value in hydrogen-electric motorcycles and, in turn, to have favorable purchase intentions toward them, academic professionals and industry practitioners in the motorcycle industry should carefully scrutinize the perceptions of consumers in comparison to product outcomes so as to determine precisely how the perceived value and purchase intentions could be increased.

design; the collection, analysis, and interpretation of data; the writing of the report; or the decision to submit the article for publication.

**Author Contributions:** Three co-authors had together contributed to the completion of this article. Han-Shen Chen analyzed the data and drafted the manuscript; Bi-Kun Tsai contributed to the review, updating and revision; and Chi-Ming Hsieh acted as corresponding author on their behalf throughout the revision and submission process.

**Conflicts of Interest:** The authors declare no conflict of interest.

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