Kasetsart Journal of Social Sciences 38 (2017) 24–30

Contents lists available at ScienceDirect

Kasetsart Journal of Social Sciences

journal homepage: http://www.elsevier.com/locate/kjss

# Perceived quality, perceived risk and customer trust affecting customer loyalty of environmentally friendly electronics products

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ARTICLE INFO

*Article history:*
Received 31 March 2016
Received in revised form 3 August 2016
Accepted 15 August 2016
Available online 9 January 2017

*Keywords:*
customer loyalty
customer trust
environmentally friendly electronics products
perceived quality
perceived risk

ABSTRACT

At present, industrial business competition causes producers to be aware of quality, price, and variety in developing new products to meet the consumers' needs. This research reviewed the literature on green marketing and proposes a new conceptual framework of customer loyalty. It uses four constructs—perceived quality, perceived risk, customer trust, and customer loyalty—in the context of environmentally friendly electronics products in Thailand. This research employed an empirical study using the questionnaire survey method to verify the hypotheses. Data were obtained from 420 consumers who bought and used environmentally friendly electronic products, particularly mobile phones, computers, and laptops using a purposive sampling method. The data were analyzed using confirmatory factor analysis (CFA) and structural equation modeling (SEM). The results showed that perceived risk and customer trust had a direct effect on customer loyalty while perceived quality had an indirect effect on customer loyalty via customer trust. Furthermore, perceived quality had direct effects on perceived risk and customer trust. The results from the final SEM model were used to confirm the proposed relationships among the variables.



## Introduction

The idea of natural reserves has become an important matter, and globalization has pressured various industries to be motivated to improve their environmental operations (Lee, 2008). Furthermore, the increase in regulations applied to many industrial factories, including social regulations concerning environmental sustainability, reinforces the importance of environmental strategies as a source of competitive advantage.

In addition, there must be a customer loyalty base for a product or service that is ready to support products, services, and marketing activities with the intention to purchase and to repeatedly purchase, as well as word of mouth to maintain the customer base and to continuously expand. Businesses should have an interest in the environmentally friendly market or so-called "green marketing" to add value to products where a customer's perceived value and reduced perceived risk have an influence on the consumer's decision. Studying consumers' behavior is very important to meet green market principles. Nevertheless, a significant factor to driving a sustainable business is customer loyalty, which is related to the success and profit of the company. Loyalty keeps the old consumers and builds new interactions which are a challenge that the business must face. A company needs to adjust its loyalty trend to set up a consumer-tied strategy that can help the marketing efforts of the company.

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Peer review under responsibility of Kasetsart University.

http://dx.doi.org/10.1016/j.kjss.2016.08.012

Perceived quality, perceived risk, and customer trust are very important factors concerning green marketing management and influence the consciousness of being responsible and encouraging participation in environmental activities for beneficial social effects. A review of prior studies indicated that researchers have studied the relationship between perceived quality, perceived risk, and customer trust on customer loyalty (Aydin & Özer, 2005; Chang & Chen, 2008; Chen & Chang, 2013; Hu, 2012; Lai-Ming Tam, 2012; Li, 2011; Sarwar, Abbasi, & Pervaiz, 2012; Snoj, Korda, & Mumel, 2004; Tuu, Olsen, & Linh, 2011). Although the literature on the relationships among perceived quality, perceived risk, customer trust, and customer loyalty is rich, no work has been done on the relationship of the mentioned variables on the customer loyalty of environmentally friendly electronics products in Thailand. The forces of going green are now extending to the Asian region, where environmental threats are alarming local governments and citizens. Consequently, consumers pay more attention to rising environmental protection activities, and green consumption has gained more momentum for environmental protection. It is necessary to investigate the relationship of these variables in the Thai context.

Thus, the researcher was interested in studying the influence of the above variables of perceived quality, perceived risk, customer trust, and customer loyalty with regard to environmentally friendly electronics products.

## Literature Review

This study presents a review of the empirical literature and the theoretical framework. Specifically, perceived quality, perceived risk, customer trust, and customer loyalty were selected after an extensive review of the marketing literature.

### *Perceived Quality*

Perceived quality is defined as the consumers' judgment about an entity's services containing overall excellence or superiority (Snoj et al., 2004). Chen and Chang (2013) proposed a novel construct, “green perceived quality”, although environmental consciousness is more popular. This research suggested a six-dimensional construct of perceived quality using performance, durability, attention, worthiness, reliability, and product safety.

### *Perceived Risk*

Prior literature argues that a reduction in perceived risk leads to an increase in purchase probability, so a decrease in perceived risk is useful for increasing customer trust (Chang & Chen, 2008). Perceived risk has been measured by functional risk (Chen & Chang, 2012, 2013; Hu, 2012), performance risk (Chen & Chang, 2012, 2013; McCorkle, 1990), psychological risk (McCorkle, 1990), social risk (Chen & Chang, 2013; Hu, 2012), financial risk (Chang & Chen, 2008; Hu, 2012; McCorkle, 1990), and physical risk (Chen & Chang, 2013). This research suggested a six-dimensional construct of perceived risk using functional risk, performance risk, physical risk, psychological risk, social risk, and financial risk.

### *Customer Trust*

Trust development is more suitable for trade when considering the business-to-consumer market. Customers trust more highly reputable organizations, and marketing organizations need more emphasis on corresponding organizational distinctiveness than on the product features (Keh & Xie, 2009). Customer trust has been measured by reputation (Chang & Chen, 2008; Chen & Chang, 2012; Chen, 2010), performance (Chang & Chen, 2008; Chen & Chang, 2012; Chen, 2010), claims (Chen & Chang, 2012; Chen, 2010), expectation (Chen & Chang, 2012; Chen, 2010), and commitment (Chang & Chen, 2008; Chen & Chang, 2012; Chen, 2010). This research suggested a five-dimensional construct of customer trust using reputation, performance, claim, expectation, and commitment.

### *Customer Loyalty*

Customer loyalty is defined as a deeply held commitment to rebuy or repatronize a preferred product or service consistently in the future, despite situational influences and marketing efforts that have the potential to cause switching behavior. Tuu et al. (2011) defined customer loyalty as a cumulative construct including both the act of consuming (action loyalty) and expected consumption (future repurchasing). Most studies measure loyalty outcomes using behavioral loyalty dimensions such as word-of-mouth communication, purchase intention, price insensitivity, and complaint behavior (Bloemer & Odekerken-Schröder, 2002; Ibrahim & Najjar, 2008). Another way customer loyalty can be measured is by repurchase intention (Li & Green, 2011; Li, 2011; Marakanon & Panjakajornsak, 2013). This research suggested a four-dimensional construct of customer loyalty using repurchase intention, complaint behavior, price insensitivity, and word-of-mouth.

Previous research indicated that there is a relationship between perceived quality and customer loyalty (Aydin & Özer, 2005). The subsequent hypothesis explains the relationship between perceived quality and customer loyalty:

**H1**. There is a significant association between perceived quality and customer loyalty.

Previous research indicated that there is a relationship between perceived quality and perceived risk (Chang & Chen, 2008; Snoj et al., 2004) because consumer behavior involves risk in the sense that any action of a consumer will produce consequences that the consumer cannot anticipate with any approximating certainty, and some of those consequences are likely to be unpleasant. The subsequent hypothesis explains the relationship between perceived quality and perceived risk:

**H2**. There is a significant association between perceived quality and perceived risk.

There was evidence to support a relationship between perceived quality and customer trust (Aydin & Özer, 2005;

Chang & Chen, 2008; Chen & Chang, 2013). Hence, the preceding discussion leads to the following hypotheses:

**H3**. There is a significant association between perceived quality and customer trust.

There was evidence to support a relationship between perceived risk and customer loyalty (Hu, 2012; Lai-Ming Tam, 2012; Marakanon & Panjakajornsak, 2014; Tuu et al., 2011). Hence, this study proposes the following hypothesis:

**H4**. There is a significant association between perceived risk and customer loyalty.

Customer trust may lead to buying a product or service, and customer trust has a direct relationship with customer loyalty. There was evidence to support a relationship between customer trust and customer loyalty (Aydin & Özer, 2005; Li, 2011; Sarwar et al., 2012). Hence, the preceding discussion leads to the following hypotheses:

**H5**. There is a significant association between customer trust and customer loyalty.

The variables used in Figure 1 and the corresponding hypotheses are further elaborated on in the following sections.

*Research Framework*

Based on the hypotheses, the causal relationship between the potential variables was analyzed using structural equation modeling (SEM). The research framework is as follows.

## Methodology

*Measurement Design*

The questionnaire structure consisted of five sections. (1) Background: these questions covered research variables including gender, age, and buying experience. (2) Perceived quality: there were 23 items covering six dimensions. (3) Perceived risk: there were 20 items covering six dimensions. (4) Customer trust: there were 15 items covering five dimensions. (5) Customer loyalty: there were 19 items covering four dimensions. Reference was made to Chen (2010), Chen and Chang (2012, 2013), Li (2011), Li and Green (2011), and Snoj et al. (2004).

Questionnaires using a 7-point Likert scale with the anchors of (1) 'strongly disagree' to (7) 'strongly agree' can reduce variability in the results. Items with an IOC index higher than 0.5 were acceptable due to the congruence between the objective and content (Brown, 1996). The acceptable value of Cronbach's alpha should be greater than 0.7 (Hair, Black, Babin, & Anderson, 2010). Hence, the questionnaire achieved an IOC value of 0.971 and the Cronbach's alpha values were calculated with the results of each construct being more than 0.8 and thus indicating that the questionnaire had high reliability.

*Data Collection*

This research used the purposive sampling method due to the almost infinite population of people who bought and used environmentally friendly products. The sample size was a proportional allocation separated by regions according to which sampling data were representative of relevant data in the data collection. The use of SEM could be impacted by the requirement of a sufficient sample size (for example, 5–20 respondents per parameter estimate) (Schumacker & Lomax, 1996). Hence, considering the 21 variables used in CFA and SEM, this study required a minimum sample size of 420 respondents.

*Data Analysis*

The data were analyzed using descriptive statistical analysis, confirmatory factor analysis (CFA) and structural equation modeling (SEM).

## Results

*Results of Confirmatory Factor Analysis*

CFA was conducted to indicate whether the observed variables were elements in the model and as the factor loading of observed variables. From Figure 2, the results of the CFA show that the variables of perceived quality can be

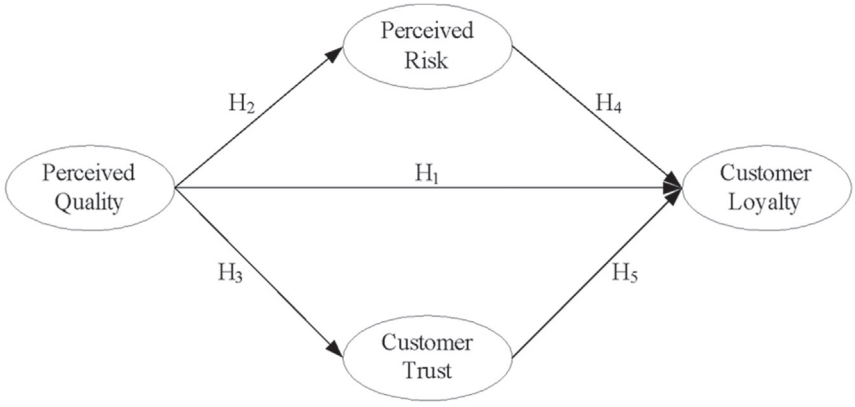


**Figure 1** Conceptual framework

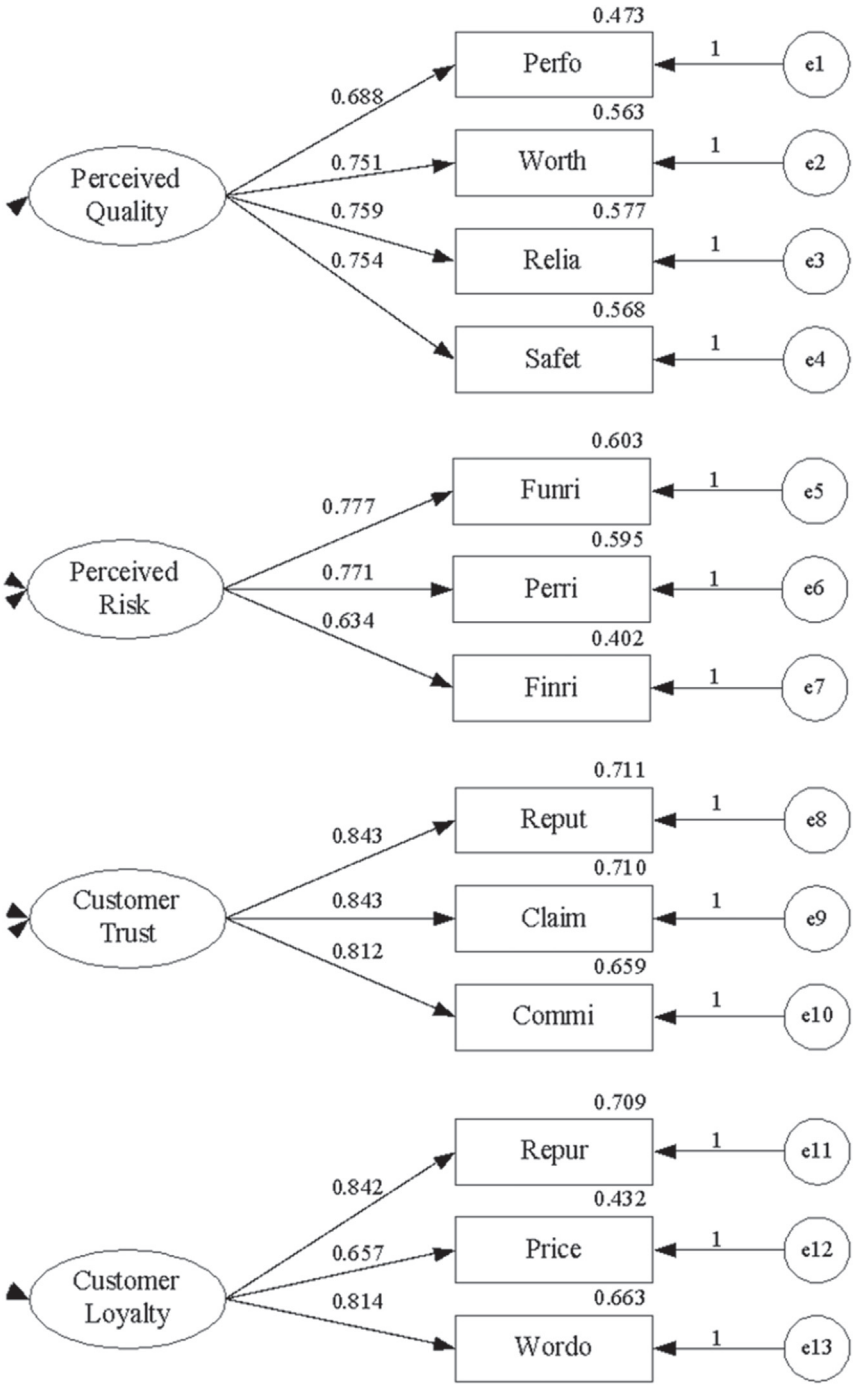


**Figure 2** Confirmatory factor analysis of perceived quality, perceived risk, customer trust, and customer loyalty ($p$ value < .001)

measured from four observed variables—performance, worthiness, reliability, and product safety—with standardized loadings: $\lambda = 0.688, 0.751, 0.759$ and 0.754, respectively. Perceived risk can be measured from three observed variables—function risk, performance risk, and financial risk—with standardized loadings: $\lambda = 0.777$, 0.771 and 0.634, respectively. Customer trust can be measured from three observed variables—reputation, claim, and commitment—with standardized loadings: $\lambda = 0.843$, 0.843 and 0.812, respectively. Customer loyalty can be measured from three observed variables—repurchase intention, price insensitivity, and word-of-mouth—with standardized loadings: $\lambda = 0.842$, 0.657 and 0.814, respectively. All observed variables were significant when considering a $p$ value < .001.

*Results of Structural Equation Modeling*

For SEM, this research identified the latent variables that were exogenous and those that were endogenous. In this study, perceived quality was an exogenous variable. Perceived risk, customer trust, and customer loyalty were endogenous variables.

The results from the final measurement model were used to evaluate the structural model that tested the significance of the theorized relationships. The final model with path coefficients is shown in Figure 3. Of the five path coefficients, four were significant. The path coefficients were measured to support the hypotheses, as shown in Table 1.

According to the results shown in Table 1:

**Hypothesis 1**. the results showed that perceived quality had no significant direct effect on customer loyalty which did not follow the set hypothesis.

**Hypothesis 2**. the results showed that perceived quality had a highly significant direct positive effect on perceived risk ($p < .001$) with a rather high effect.

**Hypothesis 3**. the research results indicated that perceived quality had a highly significant direct positive effect on the customer trust ($p < .001$) with a rather high effect.

**Hypothesis 4**. the research results indicated that perceived risk had a significant direct positive effect on the customer loyalty ($p < .05$) with a low effect.

**Hypothesis 5**. the research results showed that customer trust had a highly significant direct positive effect on the customer loyalty ($p < .001$) with a medium effect.

In addition, a goodness of fit test was carried out. Table 2 shows the results of the structural model in this study. The

**Table 1**
Support hypotheses: path coefficients

| Hypothesis | Support | Proposed effect | Path coefficient |
|---|---|---|---|
| H1 There is a significant association between perceived quality and customer loyalty. | No | | 0.289 |
| H2 There is a significant association between perceived quality and perceived risk. | Yes | + | 0.747*** |
| H3 There is a significant association between perceived quality and customer trust. | Yes | + | 0.810*** |
| H4 There is a significant association between perceived risk and customer loyalty. | Yes | + | 0.483* |
| H5 There is a significant association between customer trust and customer loyalty. | Yes | + | 0.673*** |

* $p < .05$, *** $p < .001$

**Table 2**
Measurement of goodness of fit

| | Heuristic | Final structural model |
|---|---|---|
| Chi-Square ($\chi^2$) | $p > .05$[a,b] | 38.83 ($p = .189$) |
| $\chi^2/df$ | <3.0[a,b] | 1.214 |
| Goodness of fit index (GFI) | >0.9[a,b] | 0.989 |
| Adjusted goodness of fit index (AGFI) | >0.9[a,b] | 0.968 |
| Comparative fit index (CFI) | >0.9[a,b] | 0.998 |
| Normed fit of index (NFI) | >0.9[a,b] | 0.991 |
| Incremental fit index (IFI) | >0.9[a] | 0.998 |
| Tucker-Leis fit index (TLI) | >0.95[c] | 0.996 |
| Root Mean Square Error of Approximation (RMSEA) | ≤0.08[b] | 0.020 |

[a] Bagozzi and Yi (1988)
[b] Hair et al. (2010)
[c] Hu and Bentler (1995)

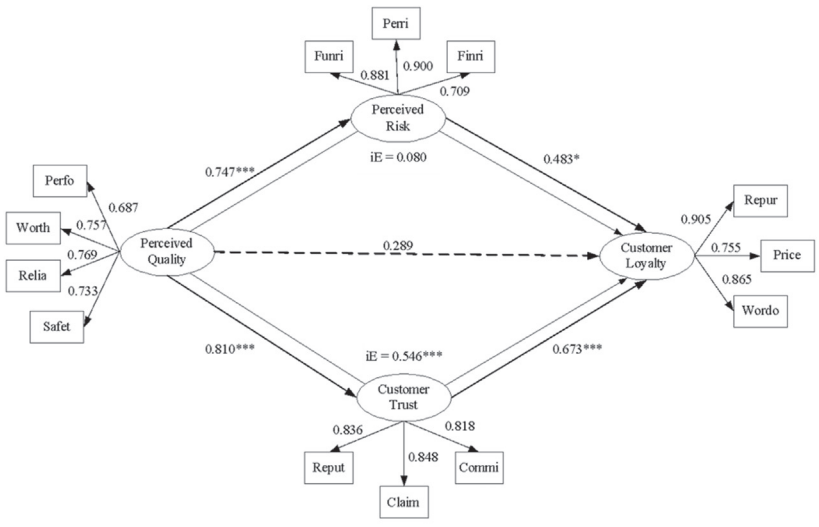


**Figure 3** Results of structural equation modeling of perceived quality, perceived risk, customer trust, and customer loyalty

overall fit measured for the full model in the SEM indicates that the fit of the model is acceptable. The values of the goodness of fit (illustrated in Table 2) were as follows: $\chi^2/df = 1.214$ ($\chi^2 = 38.83$, df = 32), GFI = 0.989, AGFI = 0.968, CFI = 0.988, NFI = 0.991, IFI = 0.998 and TLI = 0.996 and RMSEA = 0.020.

In this study, the value of $\chi^2/df$ was 1.214 and is therefore acceptable. The value of goodness of fit index (GFI) was 0.989, which represents the overall degrees of freedom in the specified model. One value that should be considered in baseline comparisons is the comparative fit index (CFI), which is recognized as an index reflecting all sample sizes and measures the comparative reduction in noncentrality. The value of CFI was 0.998 in this model and is highly acceptable. Next, the values of the normed fit index (NFI) and the incremental fit index (IFI) were 0.991 and 0.998, respectively, which fall into the acceptable range. The value of the Tucker-Leis fit index (TLI) was 0.996 in this study, which is larger than 0.95 that is considered a good indicator of good fit (Hu & Bentler, 1995). Moreover, the value of the root mean square error of approximation (RMSEA) was 0.020, which is acceptable.

The results of the full model are shown in Figure 3. Four estimated paths were significant. Therefore, H2, H3 H4 and H5 were supported in this study. The perceived quality had no direct effect on the customer loyalty, but the perceived quality had an indirect effect on customer loyalty via customer trust, with standardized loadings of $\beta = 0.546$ ($p < .001$). The perceived quality had highly significant direct and positive effects on the perceived risk and customer trust, with standardized regression coefficients of $\beta = 0.747$ and 0.810, respectively, ($p < .001$). In addition, perceived risk had a significant direct and positive effect on customer loyalty, with a standardized regression coefficient of $\beta = 0.483$ ($p < .05$). Customer trust had a highly significant direct and positive effect on customer loyalty, with a standardized regression coefficient of $\beta = 0.673$ ($p < .001$).

## Discussion

Perceived quality did not directly affect customer loyalty, but did have an indirect effect. From this research, perceived quality had observable effects on the variables of performance, worthiness, reliability, and product safety from collecting data in Thailand an in-depth interview. The research found that the perceived quality was a personal perception and consumers' perceptions were different for products or services without definite standards. Consumer perceptions depended on the decision of personal sense and experience. Furthermore, to build customer loyalty to a product, the results demonstrated that firms should seek to build satisfactory information on any matter of the products, including branding new products with a strong effort to increase continuous product demand.

Perceived quality directly affected perceived risk, with the statistical significance being 0.001, which corresponded to Snoj et al. (2004) and Beneke, Flynn, Greig, and Mukaiwa (2013). Additionally, perceived risk was determined by consumers to be an unexpected and bad result which happened simultaneously in product purchasing.

Perceived quality directly affected trust, with a statistical significance of 0.001, which corresponded with Chen and Chang (2013). The results indicated that green perceived quality had positive effects on green satisfaction and trust. Therefore, investment in green perception increased the perceived quality and showed that reduced green risk would be beneficial to increased green satisfaction and green trust.

Perceived risk directly affected customer loyalty, with a statistical significance of 0.05, which agreed with Hu (2012) who had researched relationships among brand value, perceived risk, customer loyalty, and participation. These results corresponded with Marakanon and Panjakajornsak (2014), who studied the observed variables of functional risk, performance risk, and financial risk. They found that risk, performance risk, and financial risk influenced customer loyalty. These results corresponded with Tuu et al. (2011), whose studied the effect of the mediation variables of perceived risk, knowledge, and uncertainty on satisfaction and loyalty.

Customer trust directly affected customer loyalty, with a statistical significance of 0.001, which agreed with Yap, Ramayah, and Shahidan (2012) who investigated satisfaction and trust compared to customer loyalty. The current research results indicated that analysis of the coefficients of the structural equation model supported the set hypothesis that trust positively affected loyalty, corresponding with Sarwar et al. (2012). The research results found that the variables of customer trust, customer loyalty, and maintaining customers had positive relationships.

## Conclusion and Recommendation

The research model tested found that the statistical value for testing matched the proposed model and the empirical data. The perceived quality factor directly influenced perceived risk and customer trust. Additionally, the factors of perceived risk and customer trust were latent variables that directly influenced customer loyalty. However, the factor of perceived quality indirectly influenced customer loyalty via customer trust. Beyond studying the relationships, this study also suggests applications for businesses, especially for electronics products.

In terms of the managerial implications, practitioners must create different strategies to enhance perceived quality, perceived risk, and customer trust to increase the likelihood of customer loyalty. Realization of these factors will help companies anticipate what activities should be undertaken for the successful launch of these practices. According to the empirical results of this study, companies should emphasize their perceived quality, perceived risk, and customer trust in order to elevate their customer loyalty. As previously mentioned, acquiring new customers is both costly and difficult in terms of marketing for the company when the number of customers has reached its peak level. A useful starting point for practitioners or marketers is to develop marketing strategies to increase customer perception in order to build up longer-term loyalty in the context of environmentally friendly products nowadays. In order to effectively influence loyalty, it is important that practitioners understand which aspects of

marketing contribute most to customer perceptions and customer trust. This research studied the relation between variables concerning the consumers' perception, specifically with regard to green electronics products. In general, the discussion about the effects of various variables in developed countries still has little support in Thailand. Future research should emphasize the profoundness of the consumers' perception and include an awareness or other factors that affect customer loyalty to realize different objectives.

## Conflict of interest

There is no conflict of interest.

## Acknowledgments

The authors would like to express their appreciation to the Administration and Management College, King Mongkut's Institute of Technology Lad Krabang for providing facilities to support this research.

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