Cawangan Kedah
Kampus Sungai Petani
UNIVERSITI TEKNOLOGI MARA

Voice of Academia

Academic Series of Universiti Teknologi MARA Kedah

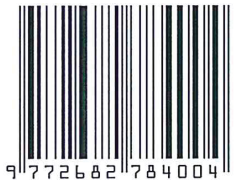
BUSINESS MANAGEMENT AND ENTREPRENEURSHIP

SPECIAL ISSUE

VoA
Volume 15 Issue 2
August 2019

COMMITTEE PAGE

e-ISSN: 2682-7840



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Voice of Academia
e-ISSN: 2682-7840

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Voice of Academia
Academic Series of Universiti Teknologi MARA Kedah
Available online at http://voa.uitm.edu.my

Demistyfing Consumer Purchase Intention For Remanufactured Auto Parts

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ARTICLE INFO

Article history:
Received June 2019
Received in revised form
Accepted June 2019
Published August 2019

Keywords:
Consumer Behavior, Remanufactured Auto Part, Green Purchase

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ABSTRACT

This study investigates customer purchase intention on remanufactured auto parts (RAPs) in the northern region of Malaysia. This study used an online survey of 158 respondents to identify factors of their knowledge of RAPs, how they perceive benefits, risk and price awareness, and the effects of their behavioral intentions. From this study, purchase intention was found to be significantly affected by all the mentioned factors in the market setting. Future research could further analyze green purchase intention by adding other perception variables such as perceived trust, self green identity and RAPs country of origin.

1. Introduction

In 1985, the introduction of Proton marks the development of the automotive industry in Malaysia. This was succeeded in 1993 by Perodua following the National Car Project, which had subsequently increased the manufacturing of automotive components and parts in the country. The total vehicle production in 2017 was 576,635 vehicles compared to 580,085 vehicles in 2016 (Malaysia Automotive Association, 2018). As one of the core industries related to remanufacturing on a global scale (Seitz, 2007), it is imperative for Malaysia's automotive industry to delve further into green technology. In conjunction with this, the Malaysia Automotive Institute (MAI) as the agency in charge of coordinating the program stated that the remanufacturing direction will emphasize the utilization of green and clean technology from its onset (The Academy of Sciences Malaysia, pg 112, 2016).

A study by Fernando, Walters, Ismail, Seo and Kaimasu (2018) on the automotive industry revealed that the inability of an automotive firm to accommodate technical and market requirements on the environmental aspect has hindered Malaysia's advancement of green technology. Nonetheless, there is a positive slow progress in automotive firms to incorporate, collaborate and perfect green technology in their business (Fernando et al., 2018). Even though remanufacturing has been practiced widely in regions such as North America and Europe, it is still beyond Malaysia's capability to be

utilized. The objective of this study is to understand the factors that affect consumers' purchase intention for remanufactured auto parts, specifically in the northern region of Malaysia.

2. Literature Review

The need for environmental safety has been recognized in every corner of the world, where the green marketing concept has become a foundation for many business organizations to adhere to, showing their concerns to satisfy customer needs in an environmentally-friendly approach. As environmental regulations have been set across the globe, a variety of business entities has shown more initiative with regards to the movement of merely adopting this concept, given the inevitable lethal issues due to the environmental factor and the rising pressure from the community on protecting the environment. Solutions and innovations such as introducing environmentally-friendly substitutes to their traditional products and re-engineering their business processes to suit the environment has become a common enterprise practice, especially in reputable companies (Randiwela & Mihirani, 2015).

The auto parts industry holds a crucial position to increase remanufacturing innovation while simultaneously ensuring that pollution to the environment and social impacts from manufacturing is addressed. According to the Sustainability Accounting Standards Board (2014), the auto parts manufacturing industry covers approximately $1.1 trillion worldwide in its value. Given that this industry has grown in a large size, governmental agencies and consumers have taken part to enhance the environmental management of the associated companies in terms of their remanufacturing operations. Hence, the management of the remanufacturing companies has to be well taken care of, as it does not affect the environment solely but may also pose an adverse impact to the sustainability and image of the company from consumers' negative perceptions. It is essential that consumers are given a convincing argument to opt for remanufactured components over a new, original equipment manufacture (OEM) component as this sustainability in supply will ensure that companies safeguard against environmental risks and wastage by simultaneously enhancing their operational efficiencies (Singh, Singh & Bhardwaj, 2011; Lin, Hu, Tseng, Chiu & Lin, 2015).

2.1 Prior studies on Remanufactured Auto Parts

Remanufacturing is a reproduction strategy of reusing, refurbishing, replacing components and restoring used products to a like-new condition (Debo, Toktay & Van Wassenhouse, 2002), which has the potential to deliver economic, social and environmental benefits. Due to its shorter production lead times, companies will need to manufacture fewer raw materials, leading to lower energy and emissions and higher production savings (Wang, Wiegerinck, Krikke & Zhang, 2013). In fact, this cost-benefit of purchasing remanufactured parts will offer knowledgeable consumers with lower prices (Hamzaoui-Essoussi & Linton, 2014). As the world is heading to implement pro sustainable procurement strategies and waste management (Michaud & Llerena, 2011), this remarkable strategy could enhance the socially-positive image of a brand (Gutowski, Sahni, Boustani & Graves, 2011).

Product Knowledge

Product knowedge refers to concrete knowledge, indirect knowledge, and consumer feelings (Dacin & Mitchell, 1986). A consumer who has experience with the actual product and advertisement will gain knowledge that may influence his/her decision making (Rao & Monroe, 1988). Hence,

consumers have product knowledge at different levels in relation to their perception of a product (Laroche, Bergeron & Goutaland., 2003). In the context of remanufactured parts, knowledgeable consumers are able to compare and evaluate the quality of remanufactured products against new products (Hauser & Lund, 2003). According to previous research, the way a consumer evaluates a product may be directly influenced by their product knowledge (Barrutia & Gilsanz, 2013). Wang, Wiegerinck, Krikke and Zhang (2013) found that purchase intention is influenced by purchase attitude, perceived behavioral control, perceived risk, perceived benefit, and product knowledge.

Hypothesis 1: Product knowledge positively influences the purchase intention of RAPs.

Perceived Benefit

Gutowski, Sahni, Boustani and Graves (2011) posited that an increase in energy requirement cancels the benefits of lower energy requirement during the remanufacturing stage. In fact, numerous researchers support the notion that consuming remanufactured products is beneficial in both social and personal aspects such as preventing waste, promoting awareness on the environment in manufacturing, conserving energy and raw material, reducing landfills and decreasing air pollution (Michaud & Llerena, 2011). Significant resource, energy savings and solid waste reductions are achieved through the use of recovery components (Michaud & LIerena, 2010). When compared against new products, remanufactured products provide a 60 percent savings in energy consumption and more than 70 percent in material use (McConocha & Speh, 1991). The social benefit that consumers perceive can be associated with environmental awareness, as long as there is an adequate number of consumers who have this awareness. Studies have shown that such awareness can influence the attitudes and purchase behavior of the consumer.

Hypothesis 2: Perceived benefits positively influence the purchase intention of RAPs.

Perceived Risk

According to Peter and Ryan (1976), perceived risk is uncertainty mixed with the impact of the related outcome. It also involves "the expectation of losses associated with purchase and acts as an inhibitor to purchase behavior" (Peter & Ryan, 1976, p. 185). According to Matsumoto et al., (2016), Japanese consumers believe RAPs are linked to marked physical and performance risk. In fact, according to a survey by the Xinhua News Agency in 2012, 78.1% of the studied population would refrain from purchasing RAPs due to quality concerns; 12.4% refrain from purchasing RAPs as they believe new products have better performance; and 9.5% would not purchase RAPs as they are unfamiliar with the products (Liu, Liang, Zhang & Li, 2009). Similarly, one of the reasons consumers are unwilling to buy RAPs is the concern over the quality of the product (Harms & Linton, 2015). Hazen, Overstreet, Jones-Farmer and Field's (2012) research on ambiguity tolerance, perceived quality and willingness to pay for remanufactured products discovered that remanufacturing entails ambiguity because consumers cannot assess the extent to which a product component is being created. Thus, the availability of specific information for consumers may influence their decision making.

Hypothesis 3: Perceived risk positively influences the purchase intention of RAPs.

Price Consciousness

According to Hazen et al., (2012), consumers perceived remanufactured products as having lower quality than new products and only purchase them at a price that is lower than the corresponding new product. One point of interest is that U.S consumers are less likely to associate price with quality (Creighton, 1988), as the Grey Advertising Survey of consumer's attitude revealed that price is not necessarily linked to quality (Rice, 1992). Contradictorily, low-priced products goods are associated with a low quality product, and consumers prefer high-end, pricey and high-quality products (Salsberg, 2010; Sakamaki, 1994). For price-conscious consumers, they are more aware of the range of market prices, which leads to an increased tendency to find the best deals and maximize savings.

Hypothesis 4: Price consciousness positively influences the purchase intention of RAPs.

3. Methodology

The data were collected in the northern region of Malaysia. Respondents were interviewed at the main local official car service centre. They were asked for permission to send the questionnaire link to their personal mobile phone. A total of 158 questionnaires were returned online. This study was adopted from Matsumoto, Chinen and Endo (2017) and Chen (2017). There were 30 questions which consisted of six sections: demographics, product knowledge, perceived benefit, perceived risk, price consciousness and purchase intention. All variables in the questionnaire, with the exception of questions related to general demographic information, were measured on a 7-point Likert scale.

4. Results and Discussion

The personal information of the respondents who participated in the current study is an essential and useful aspect to understand the data segment. The respondents' profiles include gender, age group, race, religion, education level, income per month and number of vehicles (car) that a household owns. Based on the assessment, there were 84 (53.2%) male respondents and 74 (46.8%) female respondents. With regards to the age group, 67.7% of the respondents were between 18 to 30 years old, 20.3% were between 31 to 40 years old, 7.6% were between 41 to 50 years old, and only 4.4% were 51 years old and above. For the number of vehicles (car) that a household owns, the highest percentage was 62% with at least one vehicle and the lowest percentage was 5.7% with four vehicles. The details of the results are presented in Table 1.0.

Next, the reliability analysis procedure provides information about the relationship among individual items in the scale and their internal consistency and examines the properties of a measurement scale and the questions (Nunnally, 1978). Based on Table 2, the construct of product knowledge scores the highest with $\alpha > 0.91$, with intention at 0.90, perceived risk at 0.88, price consciousness at 0.88 and product knowledge at 0.70. From the table, the internal consistency of the data is within the range of 0.70 to 0.9; therefore, most of the scales exceeded the minimum standards for reliability.

Also, the correlation on the four factors which were product knowledge, perceived benefit, perceived risk and price consciousness were significant. This was evident from the findings, which were: product knowledge ($r=0.161$, $p<0.01$), perceived benefits ($r=0.365$, $p<0.01$), perceived risk ($r=-0.419$, $p>0.01$), and price consciousness ($r=0.449$, $p<0.01$). This finding shows most of the

variables are in a significantly positive direction. It shows that price consciousness is highly correlated toward purchase intention toward remanufactured auto parts in Malaysia, followed by perceived benefit, product knowledge and perceived risk. Thus, all the hypotheses were supported.

Table 1.0 Personal Information of the Respondent

PROFILE		**FREQUENCY**	**(%)**
Gender			
	Male	84	53.2
	Female	74	46.8
Age Group			
	18 – 30	107	67.7
	31 – 40	32	20.3
	41 – 50	12	7.6
	51 & above	7	4.4
Race			
	Malay	28	17.7
	Chinese	102	64.6
	Indian	28	17.7
Religion			
	Islam	28	17.7
	Buddha	93	58.9
	Hindu	24	15.2
	Others	13	8.2
Education Level			
	SPM	13	8.2
	STPM/Diploma	47	29.7
	Bachelor of Degree	92	58.2
	Degree's Master	6	3.8
Income per month (RM)			
	Below 3000	83	52.5
	3001 – 5000	49	31.0
	5001 – 7000	15	9.5
	7001 & above	11	7.0
Number of vehicles (car) household own			
	1 vehicles	98	62.0
	2 vehicles	30	19.0
	3 vehicles	21	13.0
	4 vehicles & above	9	6.0

Table 2: Reliability Coefficient

Variable Name	No. of Items	Cronbach's Alpha
Purchase Intention	5	0.903
Product Knowledge	5	0.916
Perceived Benefit	3	0.701
Perceived Risk	5	0.887
Price Consciousness	4	0.883

Regression analysis is a powerful and flexible procedure for analysing associative relationships between a metric-dependent variable and one or more metric-independent variables (Malhotra, 2009). Based on the results, it shows that the four listed factors explained 36% and this indicates that 64% can be explained by other factors. Consumers who have awareness on RAPs would search for more information through referrals or online searches. Consumers who have

knowledge about the remanufactured products were able realize that the quality and performance of remanufactured products are the same as those of new products (Hauser & Lund, 2003). Knowing this, customers will have more confidence when the product shows reassuring content.

Furthermore, perceived benefit is another variable that influences consumer purchase intention. The social benefit in this context refers to the positive impact on the environment. By having environmental awareness, consumers are more likely to have the purchase intention on RAPs and this is consistent with the result gathered. This is supported by Michaud and Lierena (2011), in which remanufactured products reduce solid waste through the recovery of used components and which could be considered as "green products". At the same time, the consumer as an individual will also be concerned with the quality of the RAPs before making a purchase. This shows that when consumers make a purchase, they would like to receive a good quality remanufactured product like the new product.

On the other hand, perceived risk has the capability to affect purchase intention. Consumers believe that purchasing remanufactured products has a higher uncertainty on the product's performance and is of lower quality compared to new products. Therefore, customers may consider putting themselves on a higher risk level when they are making their RAPs purchase. According to Ovchinnikov (2011) and Hazen, Overstreet, Jones-Farmer and Field (2012), consumers perceive new products as having higher quality than remanufactured products. Lastly, price consciousness also influences the purchase behavior of a consumer (Sternuist, Byun, & Jin, 2004). When consumers are making a purchase, they would like to consider the weightage between the price and the quality of the product. Regardless of purchasing either the original equipment or RAPs, consumers will take time to survey the price differences and compare the reasonability.

5. Conclusion

There were four main determinants which affected purchase intention towards RAPs in Malaysia's market and this was measured based on product knowledge, perceived benefit, perceived risk and price consciousness. In general, the results show that all the independent variables positively influenced the purchase intention of RAPs. Price consciousness was the highest in correlation towards purchase intention of remanufactured auto parts in Malaysia, followed by perceived benefit, product knowledge and perceived risk. Further research should be undertaken by adding other variables such as perceived trust. Other research have suggested that perceived trust is a factor that affects a consumer's purchasing behavior as one who has minimal understanding on RAPs consider these products as unusable and does not propose a standard quality when compared to the original equipment (Wang, Wiegerinck, Krikke, & Zhang, 2013). Other potential variables such as self-green identity, RAPs brand trust and brand RAPs country of origin can also be explored.

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e-ISSN: 2682-7840

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