Investigate the Repurchase Intentions for Biobased Detergents among Malaysian Consumers through the Lens of SOR Theory

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ABSTRACT

Manuscript type: Research paper
Research aims: This paper examines the intention of repurchase towards biobased detergent among Malaysian consumers using the Stimulus-Organism-Response (SOR) theory.
Design/Methodology/Approach: This study used a purposive sampling technique to gather 349 responses for data analysis.
Research findings: The findings in this paper shows performance expectancy, environmental concern, product, promotion, and place have a significant relationship to intention to repurchase for biobased detergent. Meanwhile the effort expectancy, social influence, and price have an insignificant relationship to repurchase intention of biobased detergent.
Theoretical contribution/Originality: This research provides valuable insights to stakeholders to understand the factors that influence repurchase intention to help their businesses develop and market sustainable products effectively.
Practitioner/Policy implications: Examining consumer inclination to repurchase biobased detergents can aid the Malaysian government in assessing the efficacy of related initiatives and making regulatory adjustments as necessary.

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Research limitation/Implications: The research only focuses on biobased detergent users.

Keywords: Biobased Detergent, Marketing Mix, Repurchase Intention, Satisfaction, SOR, Trust
JEL Classification: M31, O32

1. Introduction

Malaysian society relies heavily on fossil-based chemicals in manufacturing detergents. The environmental issues, possibility of skin irritation, and carcinogenicity of fossil-based detergents have started to become a concern for consumers and thus they have promoted the innovation of plant-based detergents or bio-green detergents. According to the United States Department of Agriculture (USDA) (2002), a biobased product is one that is made entirely or in part from biological products or renewable domestic agricultural materials, such as plants, animals, marines, or forestry materials.

Biobased detergent, which is derived from biobased origins such as biological products or renewable domestic agricultural materials, means the products have a lower carbon footprint during production, faster decomposition, and benefits in resource depletion and climate change (Zimmermann, 2020). Biobased products allow non-renewable fossil-based products to be replaced with renewable biobased materials, reducing carbon emissions, and thereby mitigating climate change (Yaday & Agarwal, 2021; Pokharel et al., 2022). Biobased products can be a key factor in achieving the targets of the Sustainable Development Goals of clean water and sanitation, climate action, and life below water. Due to the disadvantages of fossil-based detergents, the public would be more willing to accept green and eco-friendly detergents to replace the common petroleum-derived detergents (Kumar, Adamopoulos & Jones, 2021; Isikagor & Becer, 2015).

Malaysia is the second country in Asia after China and the first country in ASEAN to establish the national bio-economy initiative, which aims to promote the production of using renewable biological resources in foods, chemicals, and plastics (BioSpectrum, 2021). According to the research on Malaysia's consumer acceptance towards biobased detergent, Malaysians are willing to pay more for environmentally friendly detergent, but were not aware that the detergent could be manufactured using bio-green ingredients (Siwayanan, 2014). As a nation with a burgeoning awareness of environmental issues, investigating the factors that drive repurchase

intentions for biobased detergents in Malaysia holds promise for not only the local market but also for broader implications in the global shift towards sustainable and eco-friendly consumer choices.

Furthermore, the government of Malaysia has made an ambitious commitment to reduce 40% carbon emissions by 2020 and a further 45% reduction compared to 2005 levels in 2030 (Prime Minister's Office of Malaysia, 2023). The carbon dioxide emissions in 2005 were 166.4 million tons and increased to 262.2 million tons in 2020 (Climate Watch, 2020). This shows Malaysia has failed to achieve the goal and instead of reducing the carbon emissions. Malaysia has increased its carbon emissions in year 2020 compared with year 2005. To achieve this goal, the biobased industry can be a solution to contribute to protecting our environment and reduce carbon emissions. Biobased detergents can be a great opportunity for the public and stakeholders to replace the common fossil-based detergent with a greener and more biodegradable product. Detergents are essential everyday items, offering their eco-friendly alternatives can significantly reduce household environmental footprints. Unlike many biobased products that may have niche applications, detergents are widely used across various settings, from homes to commercial spaces, which amplifies their potential benefits. The biobased detergents are derived from renewable resources, which reduces reliance on fossil fuels and minimises ecological damage associated with traditional chemical production. Additionally, these detergents are typically biodegradable, breaking down more easily in the environment and reducing pollution. Many biobased formulations contain natural ingredients, making them safer for human health and less likely to cause skin irritations or allergic reactions. While the demand for biobased detergents is on the rise due to growing environmental consciousness, there exists a gap in understanding the factors that influence consumers' intention to repurchase these sustainable alternatives. Recognising the significance of repeat purchases for the success of biobased detergent products in the market, it is imperative to identify and address the key determinants affecting consumers' decisions to continue using and repurchasing biobased detergents.

In summary, although biobased products have piqued the interest of many researchers, there is still a scarcity of studies focusing on biobased detergents. Malaysians are still not using biobased products, in general. Therefore, it is necessary to study Malaysians' intentions to repurchase biobased detergent because retaining customers helps detergent businesses gain a competitive edge (Ali & Bhasin, 2019). The findings could contribute to the development of targeted

strategies to promote sustainable consumption patterns and foster a more environmentally conscious society.

There are four research objectives in this study including (1) to investigate the effect of performance expectancy, effort expectancy, social influence, environmental concern on trust of biobased detergent, (2) to evaluate the effect of 4Ps Marketing Mix on the consumer's satisfaction toward biobased detergent, (3) to examine the trust of performance expectancy, effort expectancy, social influence, environmental concern toward the consumer's repurchase intention, and (4) to examine the impact of satisfaction on the 4Ps Marketing Mix on the consumer's repurchase intention. The subsequent section provides a comprehensive discussion of the definition and past literature pertaining to biobased detergents, along with the exploration of the Stimulus–Organism–Response Theory and the research framework for this study. Section 3 describes the research methodology used for data collection and analysis, while Section 4 presents the results and discussion of the findings. The final section discusses a conclusion to the research.

2. Literature Review

2.1 Biobased Detergent

A detergent is defined as any compound that is used as cleaning agent (Kogawa, 2017). According to Seddon (2004), detergents are amphipathic molecules that contain anionic, non-ionic, and amphipathic surface-active agents and exhibit unique properties in aqueous solution, in addition to lowering the surface tension of their solution. The main function of detergent is to remove stains, oil, dirt, and other pollutants, without damage or redepositing dirt on the substance (Bhat, 2011). Unlike traditional soaps, detergents are synthetic compounds designed to be effective in both hard and soft water. They typically consist of a combination of surfactants, builders, and other additives that work together to break down and emulsify oils and grime, facilitating their removal during the cleaning process (Keshwani et al., 2015). Detergents find wide applications in various household and industrial cleaning products, including laundry detergents, dishwashing liquids, and general-purpose cleaners, contributing to the maintenance of cleanliness and hygiene in daily life (King & Schowanek, 2015).

Nowadays, detergents are made from a variety of petroleum derived chemicals, natural origins, chemicals, and alkalis. The commercial detergent which is manufactured from crude oil from

fossil fuels will cause climate change and irreversible damage to our environment. In the past century, fossil-derived raw materials were the primary feedstock for the chemical industry (Brue, 2003). Fossil-based detergents are typically nonbiodegradable or have a long shelf life in the environment, and they could be toxic and hazardous to the users and environment (Silva et al., 2019). Nationwide Children's Hospital (2016), Bates (2017), and Oghobase et al. (2020) investigated the toxicity and biochemical effects of detergents. Nielson et al. (2000) revealed that industrial detergents are harmful to human skin. On different occasions, Bates (2017) and Oghobase et al. (2020) studied the toxicity of detergents on animals. According to Bates (2017), biochemical ingredients can harm the eyes, skin, and oral and respiratory mucosa. In addition, Oghobase et al. (2020) also suggested that detergents can have hazardous health effects.

Laroche (2001) highlighted that detergents also have a harmful effect on the environment. Mousavi and Khodadoost (2019) revealed that detergent is one of the important pollutants that affect the natural ecosystems because the detergents can leach into the wastewater treatment plants and have an adverse effect on their performance. The side effects of the detergent can affect biodiversity and wildlife ecosystems. Mousavi and Khodadoost (2019) highlighted that the environmental-friendly detergent is crucial as it is a part of daily life consumed, especially for hygienic purposes. As a result, there is a call to investigate new technology or innovate environmentally friendly detergent products.

Biobased products mean that said products wholly or partially contain a significant number of biological materials or renewable domestic agricultural materials for chemicals, lubricants, ink, bioplastic, fertiliser, and packing materials (USDA, 2002). According to ISO/DIS 21680, the biobased products are wholly or partly derived from biomass. The European Commission of Standardisation has created categories for biobased products, that >95% will be categorised as completely biobased, 50–94% is categorised as majority biobased, 5–49% is categorised as minority biobased, and below 5% is non-biobased. Besides this, biobased products such as biodiesel, biosurfactants and oleochemicals could be derived from vegetable oil such as sunflower oil, soybean oil, palm oil, coconut oil and animal fats (Rashid, 2010).

Biobased products can drive our economy to take a more green, sustainable approach by reducing the dependence on fossil-based material. According to a study conducted by the European Commission, biobased products and biofuels generate around €57

billion in yearly sales and employ 300,000 people. According to projections, the biobased percentage of total chemical sales would increase to 12.3% by 2015 and to 22% by 2020, with a compounded annual growth rate of about 20% (European Commission, 2016). Besides this, according to European Structural and Investment Funds Growth Programme which analysed the market potential for chemicals that produced from renewable resource using biotechnology. The study claims that the production of chemicals from renewable resources could reach 113 million tons by 2050, standing for 38% of all organic chemical production (Patel, 2012).

In the household cleaning product sector, biobased detergents present a promising opportunity to minimise environmental impact while ensuring effectiveness. With its rich biodiversity, strong agricultural industry, and dedication to sustainability, Malaysia is well-positioned to become a leading contributor to the development and production of biobased detergents. Chala, Guangul, & Sharma (2019) highlight that these resources provide Malaysia with a significant advantage in advancing the biobased detergent industry. The country's tropical climate and rich ecosystems foster a variety of plant species that can be utilised as raw materials for biobased detergents.

In conclusion, biobased detergents emerge as a vital solution in the quest for sustainable cleaning products. Their reliance on renewable resources not only minimises environmental impact but also addresses the growing consumer demand for eco-friendly alternatives. As more individuals and businesses recognise the importance of sustainability, the biobased detergent industry is poised for significant growth. By harnessing local resources and promoting innovative practices, countries like Malaysia can lead the way in this emerging market, contributing to a healthier planet and fostering a culture of environmental responsibility. Ultimately, biobased detergents represent a promising step toward a more sustainable future in household cleaning.

2.2 Stimulus–Organism–Response Theory

The S-O-R theory initially proposed by Mehrabian and Russellin in 1974, the stimulus–organism–response (SOR) theory has attracted attention of researchers over the past several decades in various fields of study due to its intuitive and powerful exploratory nature in investigating human behaviours (Kim, 2021). The S-O-R theory is construct by three main parts, the independent variable part (stimulus), the mediating variable (organism), and the dependent

variable (response) (Turley & Milliman, 2000). Based on the theory, Mehrabian and Russell suggesting that environmental stimuli (S) that affect consumer emotional reaction (O) that result in evoking behavioural responses (R) (Kim & Lennon, 2013).

The stimulus in the S-O-R framework refers to the external environment surrounding individuals (Jacoby, 2002; Kim & Park, 2019), including brands, logos, ads, store environments, word-of-mouth communications, etc. (Jacoby, 2002). The organism discuss the inner states of an individual, such as perception, feeling, emotions, thinking exercise, and cognitive behavior (Kim & Park, 2019; Luqman et al., 2017), and it also acts as an intermediate to link between stimulus and response (Lee & Chen, 2021). Response is a psychological attitude or behavioral reaction that results from the external stimuli and an individual internal evaluation of the stimulus (Kim & Park, 2019; Lee & Chen, 2021).

The S-O-R framework explains consumer behaviour from the perspective of the environmental effect (Jani & Han, 2015). The theory is popular in the studies of consumer behaviour and has been applied across various retail settings to explain the consumer decision-making process (Kim & Lennon, 2013; Wu & Li, 2018). So, the S-O-R theory is chosen to be applied in study to examine the consumer behavior toward the biobased detergent and thus this research can fill up the gap in this industry.

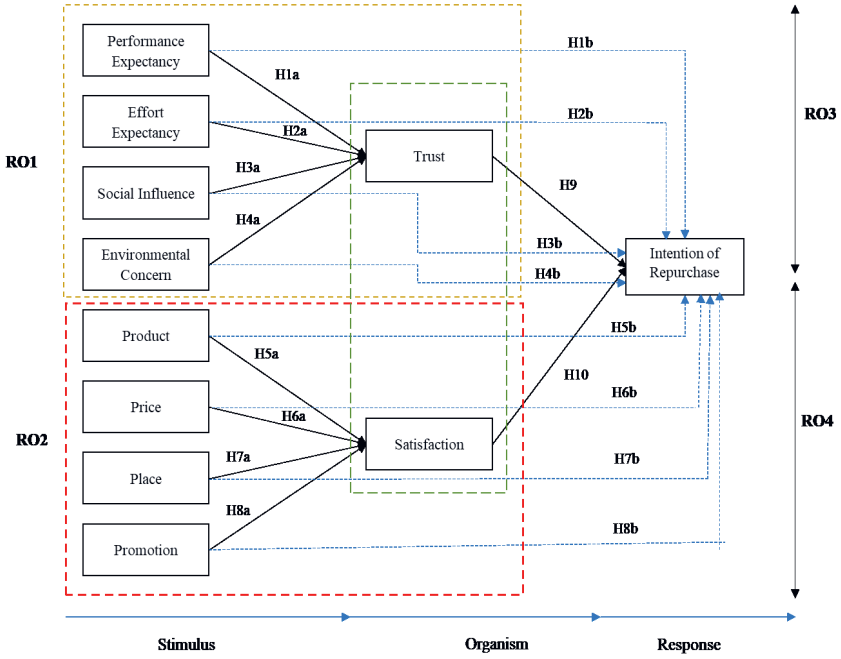
2.3 Research Framework

This research investigates the factors that affect consumer's intention of repurchase to biobased detergent by applying a S-O-R theory. Since biobased technology is an innovative technology, therefore, performance expectancy, effort expectancy, and social influence are chosen to examine the degree to which consumers' beliefs about the biobased technology will help the detergent reach gains in its pollution of the environment. Furthermore, environmental concern is selected as the stimulus because consumers are increasingly considering the environmental impact of their purchasing decisions. Biobased detergents, with their sustainability features and eco-friendly attributes, are believed to have a significant impact on customers' trust. Influencing their purchase decisions.

The 4Ps in Marketing Mix were also selected as the independent variables because it is a fundamental framework in marketing that helps businesses create a comprehensive and effective marketing strategy. An integrated approach that considers technology acceptance and marketing strategy can help the business to well-

position the products to meet the preferences of consumers, leading to higher repurchase intention. Figure 1 is the conceptual framework of this study.

Figure 1: Conceptual Framework



The performance expectancy, effort expectancy, and social influence are constructs from the Unified Theory of Acceptance and Use of Technology (UTAUT) to forecasting the adoption and subsequent utilization of a system or Information Technology by users (Venkatesh, Morris, Davis, & Davis, 2003). Gruzd et al. (2012) and Chiu et al. (2010) discovered that factors such as performance expectancy, effort expectancy, facilitating conditions, and social influence play a significant role in influencing consumer's use intention. Venkatesh et al. (2003) outlined UTAUT, which identified four key factors impacting the intention and utilisation of information technology. The biobased detergent is a new technology that able to substitute the traditional fossil-based detergent, so the performance expectancy, effort expectancy, and social influence from UTAUT is selected as factors that affecting the Malaysian consumer intention of repurchase.

Performance expectancy is the measure of an individual's belief in how using a new technology can help them in achieving a particular objective (Venkatesh et al., 2003). The performance of biobased detergents significantly affects consumer acceptance, builds trust, and influences repurchase intentions. If the product's performance does not meet expectations, consumer satisfaction declines, thereby undermining trust in the product. Conversely, when performance exceeds expectations, consumers are likely to be highly pleased (Then & Johan, 2020).

Effort expectancy refers to the perceived ease of use that consumers experience when interacting with technology. Effort expectancy encompasses the degree of effort required to utilise new technology, irrespective of its simplicity or complexity (Catherine, 2017). According to Sun et al. (2006), users are more inclined to adopt technology that provides a user-friendly interface, facilitates easy navigation, and offers clear learning instructions.

Social influence refers to the degree to which an individual conforms to the expectations of significant others regarding their use of a specific product or service (Indrawati, 2017). According to a study by Chong (2013), consumers are more likely to use shopping applications when influenced by environmental factors, such as recommendations from friends, relatives, or family members.

Environmental concern, as described by Ebreo et al. (2002), revolves around prioritising the protection of the environment without considering any personal benefits. Singh and Verma (2017) found that while environmental concern is a significant factor influencing consumer attitudes, it takes a secondary role compared to health and product quality in explaining attitudes and intentions. Nevertheless, a multitude of studies consistently support the idea that environmental concerns contribute positively to shaping attitudes toward green products (Wojciechowska-Solis and Barska, 2021; Zou and Chan, 2019; Kim and Chung, 2011).

The marketing mix is defined as the "set of controllable variables that the company can apply to influence the customer's response" (Kotler, 2000). Besides this marketing mix can provide solutions for companies to meet the customers' needs and achieve the goals setting (Pruskus, 2015). The main elements of marketing mix can be referred to the 4 Ps which are Product, Price, Place, and Promotion. (Singh, 2012)

According to Kotler and Armstrong, a product can define the goods and services provided by the company to the consumer. The quality of a product or service is crucial when a consumer decides

what to buy. (Mirabi, 2015). According to Lew and Sulaiman (2014), compared to a lesser quality product or service, a higher quality product or service promotes a higher purchase intention. Similarly, Tariq et al. (2013) have indicated the impact of product quality on purchase intent.

Price is the amount of money that consumers pay to obtain a service or a product from seller (Kotler & Armstrong, 2020). The pricing of a product can influence the consumer's purchasing intention. According to Kotler and Armstrong (2020), product or service pricing significantly impacts customers' perceptions. Customers typically consider the price when evaluating the value of services, they have experienced (Virvilaite, 2009). According to Rajadurai, Alias, Jaaffar, Hanafi (2018), Malaysians are willing to pay more to purchase products that are more green and environmentally friendly, but price is still a factor that affects their purchasing intention.

Place is a location whereby a consumer can obtain a product or a service, and it is also referred to as distribution (Sitanggang et al., 2021). It can be both physical and virtual stores. The location is also called a store and includes delivery type, market coverage, product inventory, product transfer type, and distribution location (Nasirun et al., 2019). According to Goi (2011) and Muala and Qurneh (2012), to attract customer intention, the location strategy requires effective distribution of the firm's products through marketing channels such as wholesalers or shops. Kotler and Amstrong (2020) defined place as a collection of interconnected organisations that cater to the process of making a product or service available to consumers.

Promotion is a company's activity to market a product and persuade the consumer to buy the product (Nugroho & Irena, 2017). Promotion is a market exchange process in which a company develops a collection of marketing communication instruments to communicate its product message and brand to potential stakeholders and the public (Duncan, 2005). Although the product or service produced by the company is the right quality product, if people have never seen and heard of this product or service, they will not be confident of the product (Djatmiko & Pradana, 2016). The promotion of products not only to communicate with consumers but also to influence to utilise the service or product based on the consumer's needs and desires (Wongleedee, 2015). Siwayanan et al. (2014) depicted that Malaysians are not aware that the natural surfactants can be applied in commercial laundry detergents due to insufficient information on the detergent product label and lack

of promotion to the public. Recently, the United States Department of Agriculture (USDA) has created the Bioprefered program to encourage manufacturers to undergo biobased testing to find their product's biobased content percentage and obtain a certificate for the logo on their label. While in Malaysia, there are several strategies taken by the government to promote the biobased products, such as the Malaysian Bioeconomy Development Corporation's plans for post-pandemic economic recovery in the National Recovery Plan in 2021 (BioSpectrum, 2021).

Repurchase intention is consumer's willingness to buy a product again after having previously purchased it. This decision-making process occurs post-purchase and is significantly influenced by the consumer's trust in the product or manufacturer. Wang and Hazen (2016) noted that trust is a critical factor affecting individuals repurchase intentions, Meanwhile, satisfaction is a psychological state that arises from responding to a positive experience (Sai Vijay et al., 2019). However, it can be positive, neutral, or negative, depending on the consumer's feelings when assessing their experience with a product or service (Bressolles, 2007).

In conclusion, this study able to offers important theoretical implications for researchers and stakeholders, especially when examined through the SOR theory framework. Additionally, it addresses the research gap identified in the problem statement. Applying SOR theory to investigate the repurchase intention of biobased detergents among Malaysian consumers contributes to several key theoretical areas. First, it expands the framework's relevance in understanding consumer behaviour, particularly regarding trust and satisfaction in the context of sustainability and the adoption of eco-friendly products. Second, it offers cross-cultural insights into consumer behaviour, highlighting how Malaysian environmental awareness and economic factors influence responses within the SOR framework. These insights are valuable for policymakers, marketers, and businesses aiming to effectively promote biobased detergents and encourage sustainable consumer choices.

3. Research Methodology

This study collected data using both online and physical questionnaires to increase the response rate. Purposive sampling technique was used, and the target respondents of this study are Malaysians aged 18 and above. Etikan (2016) stated that the purposive sampling method could help researchers focus on the

participant's particular characteristics. To ensure the participant is from the target group, a screening question, "Have you ever used biobased detergent?" was added to the questionnaire to eliminate the respondents who have not used biobased detergent before. A five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) was used in the questionnaire. The questionnaire consisted of 52 questions, encompassing all the relevant factors related to Malaysian consumers' intention of repurchase toward biobased detergent.

3.1 Sample size

The selection of an appropriate sample size is crucial to minimise statistical errors and enhance the reliability of the analysis, as emphasised by Saunders, Lewis & Thornhill (2015). Hair et al. (2006) suggests a minimum of 150 respondents for optimal sample size to ensure accuracy in research findings. Roscoe (1975) proposed a range of 30 to 500 individuals as ideal for most behavioural studies, while a sample exceeding 500 respondents might lead to a Type II error, according to Sekaran and Bougie (2016). Mooi et al. (2018) argue that thoughtful selection of targeted respondents with a sample size which exceeds 150 holds more significance than indiscriminately opting for a larger sample size surpassing 300. Furthermore, Memon et al. (2020) recommends a sample size ranging from 160 to 200 for the application of multivariate statistical analysis techniques. Tabachinick and Fidell (2013) also indicate that a sample size of 300 respondents is required for robust factor analysis. Therefore, considering the inevitability of outliers during data collection, the present study opted for a sample size of 349 respondents, conducting data collection within the context of Malaysia.

3.2 Data Screening

Data screening is an indispensable stage to assess data errors before conducting multivariate data analysis (Abubakar, 2017). According to Yong & Pearce (2013), data screening can determine the data's accuracy and find out if there is any missing data to ensure the validity of the data collected. The questionnaires are distributed through email, social media platforms and a physical data collection in the shopping malls, green product exhibition, etc. 452 people took part in the survey and after the data screening, 103 data eliminated because of the incomplete data. Thus, 349 data were used for further analysis. Reliability test, validity test and mediation analysis are

conducted using Statistical Software Package for Social Science (SPSS) version 26 and SmartPLS version 3. The findings are summarised and discussed in the following section.

4. Results and Discussion

4.1 Demographic Data Analysis

The respondents' demographic profile is reported in this section. This study has 252 female respondents and 97 male respondents in total. Due to the fact that in Malaysian households, it is usually the women who shop for groceries, this study received more female respondents than male respondents overall.

Table 1: Demographic profile of respondents

Profile Category	Number of Respondents	Percentage
Gender		
Male	97	27.79%
Female	252	72.21%
Age		
Below 21	6	1.72%
21 – 30	72	20.63%
31 – 40	111	31.81%
41 - 50	72	20.63%
51 - 60	47	13.47%
Above 60	41	11.75%
Education Level		
High school or lower	60	17.19%
Diploma/ Certificate	51	14.61%
Bachelor's degree	122	34.96%
Master's degree	92	26.36%
Doctorate/PhD	24	6.88%
Monthly Income		
No income	6	1.72%
Less than RM2,500	87	24.93%
RM2,501 – 5,000	141	40.40%
RM5,001 – 7,500	71	20.34%
RM7,501 – 10,000	22	6.30%
Above RM10,000	22	6.30%

Table 1 shows the respondents by age group. The majority of the respondents are aged 31-40, following by aged 21-30 (20.63%), 41-50 (20.63%), 51-60 (13.47%), above 60 (11.75%), and 1.72% are below 21 years old. For the education level, 60 respondents are from high school or lower qualification, 51 respondents are holding diploma or having a professional certificate, 122 respondents hold bachelor degrees, 92 respondents hold master degrees and 24 respondents have doctorate degrees. For the monthly income range of the respondents, 6 respondents claimed that they have no income, 87 respondents are earning less than RM2,500 per month, 141 respondents are earning RM2,501 to RM5,000, 71 respondents are earning RM5,001 to RM7,500, 22 respondents are earning RM7,501 to RM10,000, and 22 respondents are earning more than RM10,000 per month.

4.2 Descriptive Analysis

According to Kaur, Stoltzfus, and Yellapu (2018), descriptive analysis is used to summarise data in an organised way by describing the relationship among variables from sample or population. Table 2 shows the descriptive statistics for each variable.

Table 2: Descriptive Statistics

Items	Mean	Standard Deviation
Performance Expectancy	4.55	0.52
Effort Expectancy	4.56	0.50
Social Influence	4.50	0.66
Environmental Concern	4.55	0.52
Product	4.53	0.51
Price	4.28	0.73
Promotion	4.45	0.70
Place	4.20	0.79
Trust	4.56	0.45
Satisfaction	4.51	0.59
Intention to Repurchase	4.52	0.56

The mean is the sum of values in a dataset divided by the total number of observations, or the arithmetic mean. The mean values for the variables in this study are 4.55 for performance expectancy, 4.46 for effort expectancy, 4.50 for social influence, 4.55 for environmental concern, 4.53 for product, 4.28 for price, 4.45 for promotion, 4.20

for place, 4.56 for trust, 4.51 for satisfaction, and 4.52 for intention to repurchase. The range of the mean values for all variables are from 4.20 to 4.56, which all are higher the midpoint of scale 2.5. As a conclusion, we can assume that the respondents have a positive attitude to repurchase biobased detergent.

According to Wan & Wang (2014), standard deviation is how far the data spreads from the mean. Hence, a low standard deviation reveals that the data are close to the mean.

4.3 Convergent Validity

Convergent validity is a measure of the quality of a measurement instrument where the instrument itself is typically a set of question statements. According to Hair (2016), convergent validity able to measure the correlates positively or negatively with other measures of same construct. To evaluate the convergent validity, the indicator's outer loading and average variance extracted need to be measured.

Table 3: Convergent Validity Results

Indicator	Outer Loading	Average Variance Extracted (AVE)	Indicator	Outer Loading	Average Variance Extracted (AVE)
PE1	0.832		PMT1	0.903	
PE2	0.895	0.732	PMT2	0.931	0.823
PE3	0.838		PMT3	0.890	
EE1	0.851		PMT4	0.904	
EE3	0.853	0.763	PLA1	0.873	
EE4	0.861		PLA2	0.900	
SI1	0.836		PLA3	0.757	0.698
SI2	0.846		PLA4	0.804	
SI3	0.892	0.727	PLA5	0.860	
SI4	0.826		PLA6	0.809	
SI5	0.862		TRT1	0.851	
EC1	0.903		TRT2	0.788	
EC2	0.905		TRT3	0.812	0.661
EC3	0.842	0.757	TRT4	0.882	
EC4	0.902		TRT5	0.742	
EC5	0.794		TRT6	0.796	

Indicator	Outer Loading	Average Variance Extracted (AVE)	Indicator	Outer Loading	Average Variance Extracted (AVE)
PRO1	0.817		SAT1	0.908	
PRO2	0.803		SAT2	0.868	
PRO3	0.853	0.685	SAT3	0.848	0.787
PRO4	0.879		SAT4	0.898	
PRO5	0.783		SAT5	0.912	
PRI1	0.831		INT1	0.867	
PRI2	0.878		INT2	0.908	
PRI3	0.902	0.698	INT3	0.887	0.763
PRI4	0.910		INT4	0.859	
PRI5	0.831		INT5	0.845	

Generally, the indictor's outer loading shall between 0.6 - 0.7 as the rule of thumb of acceptance in social science research, and the indicator with outer loading between 0.4 – 0.7 should be removed from the study to increase the composite reliability (Hair, 2016). In this research, all the outer loadings are exceeded 0.7, so no removal of indicator is needed.

AVE is the metric for evaluating a construct's convergent validity, and a value above 0.5 is considered adequate as this indicates that the construct shows at least 50% of the variance amid its items (Hair et al., 2021). As illustrated in Table 4.3, the AVE values for this study are ranged between 0.661 to 0.823 and all these results are above 0.5. As a conclusion, no indicator needs to be removed and the convergent validity of this study is meet.

4.4 Internal Consistency Reliability

Internal consistency reliability is a measure of consistency of results across factors within research (Hajjar, 2018). According to Cortina (1993) state that the Cronbach's Alpha is the most for interpret the internal consistency. The value of Cronbach's Alpha should above or equal to 0.7 as the acceptable level for internal consistency.

The findings in Table 4 shows the Cronbach's Alpha values for all variables are ranged between 0.818 to 0.932, and all exceed the minimum values of 0.7. The result of Cronbach's Alpha guarantees the convergent validity of the constructs. Composite reliability calculates the extent to which each index reflects the latent variable. The value for composite reliability is varies from 0 to 1, and reliability will be stronger when the value is closer to 1 (Hair Jr et al., 2016). The value below 0.6 would be consider weak and lack of composite

reliability. The results in table 4.4 shows all the values of composite reliability for each construct are higher than 0.6, which further affirms the internal consistency reliability.

Table 4: Internal Consistency Reliability

Latent Variables	Cronbach's Alpha	Composite Reliability
Performance Expectancy	0.818	0.891
Effort Expectancy	0.896	0.928
Social Influence	0.906	0.930
Environmental Concern	0.919	0.940
Product	0.885	0.916
Price	0.920	0.940
Promotion	0.928	0.949
Place	0.913	0.932
Trust	0.897	0.921
Satisfaction	0.932	0.949
Intention to Repurchase	0.922	0.942

4.5 Discriminant Validity

Discriminant validity is referring to the extent in which the construct is differing from one another empirically (Ab Hamid et al., 2017). It also measures the degree of differences between the overlapping constructs (Hair J et al., 2014). The discriminant validity can be evaluated by using cross-loading of indicator and Fornell & Larcker criterion.

Table 5: Fornell - Larcker Criterion

	Effort Expectancy	Environmental Concern	Intention to Repurchase	Performance Expectancy	Place	Price	Product	Promotion	Satisfaction	Social Influence	Trust
Effort Expectancy	0.87										
Environmental Concern	0.65	0.87									
Intention to Repurchase	0.76	0.74	0.88								
Performance Expectancy	0.79	0.74	0.72	0.86							
Place	0.74	0.64	0.76	0.64	0.84						
Price	0.71	0.73	0.77	0.72	0.73	0.87					
Product	0.83	0.80	0.82	0.79	0.80	0.83	0.87				
Promotion	0.74	0.78	0.81	0.71	0.74	0.85	0.85	0.91			
Satisfaction	0.79	0.80	0.87	0.80	0.81	0.81	0.87	0.89	0.89		
Social Influence	0.70	0.75	0.82	0.69	0.72	0.77	0.78	0.82	0.83	0.85	
Trust	0.70	0.80	0.79	0.77	0.72	0.74	0.85	0.77	0.87	0.74	0.87

The Fornell-Larcker Criterion is the square root of Average Variance Extracted (AVE) for latent variable should be more than the correlation values among the latent variables. Based on the findings in Table 5, all the values of latent variables are greater than other value in their respectively row and column. For example, the value of environmental concern is 0.870 which is highest value in its own row and column. This can assume that the reflective measurement model has fulfil the discriminant validity as per Fornell-Lacker Criterion.

Table 6: Cross Loading

	Effort Expectancy	Environmental Concern	Intention to Repurchase	Performance Expectancy	Place	Price	Product	Promotion	Satisfaction	Social Influence	Trust
EC1	0.617	0.903	0.667	0.626	0.619	0.616	0.762	0.707	0.75	0.606	0.77
EC2	0.499	0.905	0.598	0.634	0.538	0.676	0.701	0.675	0.719	0.63	0.717
EC3	0.639	0.842	0.662	0.766	0.581	0.723	0.708	0.678	0.708	0.66	0.68
EC4	0.625	0.902	0.677	0.669	0.588	0.659	0.705	0.758	0.73	0.736	0.699
EC5	0.45	0.794	0.624	0.493	0.446	0.476	0.57	0.564	0.53	0.621	0.598
EE1	0.851	0.547	0.696	0.661	0.627	0.68	0.735	0.707	0.723	0.685	0.611
EE2	0.927	0.605	0.66	0.733	0.678	0.641	0.756	0.684	0.758	0.639	0.676
EE3	0.853	0.516	0.551	0.625	0.647	0.54	0.677	0.538	0.604	0.552	0.518
EE4	0.861	0.606	0.733	0.73	0.622	0.619	0.719	0.625	0.661	0.56	0.628
INT1	0.609	0.68	0.867	0.697	0.652	0.723	0.789	0.688	0.746	0.742	0.754
INT2	0.672	0.63	0.908	0.599	0.711	0.714	0.802	0.736	0.796	0.721	0.673
INT3	0.693	0.616	0.887	0.571	0.709	0.705	0.813	0.729	0.769	0.733	0.67
INT4	0.646	0.598	0.859	0.637	0.645	0.574	0.693	0.683	0.754	0.682	0.689
INT5	0.697	0.713	0.845	0.65	0.606	0.649	0.667	0.715	0.75	0.709	0.674
PE1	0.669	0.728	0.702	0.832	0.673	0.739	0.772	0.75	0.805	0.731	0.723
PE2	0.661	0.613	0.575	0.895	0.475	0.611	0.65	0.554	0.651	0.556	0.657
PE3	0.7	0.518	0.556	0.838	0.48	0.457	0.585	0.478	0.561	0.446	0.564
PLA1	0.626	0.55	0.609	0.53	0.873	0.636	0.682	0.64	0.671	0.622	0.629
PLA2	0.663	0.606	0.735	0.609	0.9	0.671	0.712	0.686	0.759	0.718	0.647
PLA3	0.571	0.449	0.468	0.555	0.777	0.49	0.59	0.473	0.555	0.446	0.571
PLA4	0.612	0.463	0.536	0.474	0.804	0.506	0.57	0.483	0.549	0.515	0.499
PLA5	0.578	0.565	0.695	0.556	0.86	0.68	0.71	0.69	0.744	0.641	0.643
PLA6	0.641	0.548	0.714	0.497	0.809	0.653	0.7	0.666	0.735	0.612	0.586
PMT1	0.716	0.706	0.69	0.69	0.653	0.771	0.769	0.903	0.784	0.728	0.723
PMT2	0.721	0.721	0.82	0.646	0.697	0.788	0.785	0.931	0.826	0.781	0.66
PMT3	0.644	0.747	0.747	0.628	0.658	0.809	0.812	0.896	0.773	0.75	0.698
PMT4	0.591	0.659	0.693	0.606	0.666	0.701	0.71	0.904	0.828	0.726	0.7
PRI1	0.586	0.61	0.702	0.571	0.678	0.831	0.728	0.721	0.705	0.788	0.623
PRI2	0.684	0.606	0.65	0.687	0.624	0.878	0.761	0.721	0.714	0.608	0.659
PRI3	0.551	0.682	0.677	0.611	0.646	0.902	0.707	0.757	0.699	0.69	0.666
PRI4	0.619	0.65	0.686	0.638	0.697	0.91	0.735	0.762	0.746	0.663	0.692
PRI5	0.665	0.619	0.642	0.621	0.547	0.831	0.679	0.717	0.671	0.588	0.595
PRO1	0.797	0.644	0.714	0.679	0.606	0.626	0.817	0.676	0.762	0.681	0.721
PRO2	0.69	0.655	0.636	0.617	0.617	0.587	0.816	0.639	0.62	0.581	0.637
PRO3	0.656	0.722	0.795	0.615	0.683	0.818	0.853	0.891	0.806	0.754	0.724
PRO4	0.646	0.69	0.74	0.688	0.694	0.758	0.879	0.699	0.723	0.65	0.704
PRO5	0.637	0.574	0.665	0.677	0.696	0.62	0.816	0.566	0.689	0.546	0.716
SAT1	0.688	0.686	0.759	0.705	0.747	0.708	0.79	0.805	0.908	0.761	0.805
SAT2	0.714	0.72	0.671	0.686	0.66	0.695	0.724	0.794	0.869	0.701	0.759
SAT3	0.652	0.619	0.815	0.601	0.771	0.696	0.761	0.719	0.848	0.676	0.67
SAT4	0.691	0.742	0.799	0.795	0.678	0.769	0.789	0.794	0.898	0.753	0.778
SAT5	0.76	0.759	0.821	0.748	0.738	0.731	0.815	0.816	0.912	0.799	0.807
SI1	0.565	0.646	0.616	0.542	0.578	0.598	0.627	0.634	0.682	0.836	0.605
SI2	0.511	0.619	0.659	0.568	0.568	0.613	0.585	0.693	0.698	0.846	0.608
SI3	0.647	0.675	0.745	0.607	0.626	0.665	0.702	0.739	0.729	0.892	0.664
SI4	0.566	0.617	0.689	0.561	0.607	0.633	0.706	0.658	0.66	0.826	0.618
SI5	0.683	0.622	0.784	0.657	0.682	0.756	0.708	0.777	0.778	0.862	0.64
TRT1	0.659	0.652	0.756	0.717	0.735	0.662	0.743	0.722	0.819	0.717	0.851
TRT2	0.511	0.722	0.615	0.588	0.464	0.615	0.622	0.608	0.615	0.571	0.809
TRT3	0.661	0.697	0.628	0.651	0.595	0.614	0.74	0.672	0.703	0.564	0.812
TRT4	0.614	0.694	0.719	0.656	0.698	0.699	0.771	0.72	0.799	0.681	0.882
TRT5	0.484	0.526	0.574	0.526	0.497	0.489	0.642	0.477	0.625	0.518	0.808
TRT6	0.459	0.594	0.541	0.574	0.461	0.519	0.599	0.488	0.645	0.505	0.808

Abbreviation: PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, EC: Environmental Concern, PRO: Product, PRI: Price, PMT: Promotion, PLA: Place, TRT: Trust, SAT: Satisfaction, INT: Intention to Repurchase.

Cross Loadings is another method to evaluate the discriminant validity. The outer loading of an indicator for the corresponding variable should be greater than any if its loading value on another variable (Hair Jr et al., 2016). Table 6 shows the result cross loading that generated by SmartPLS calculation, and all the loading values of each construct are higher than another loading values. As a conclusion, the cross-loading method also show it has fulfilled the discriminant validity.

4.6 Structural Model

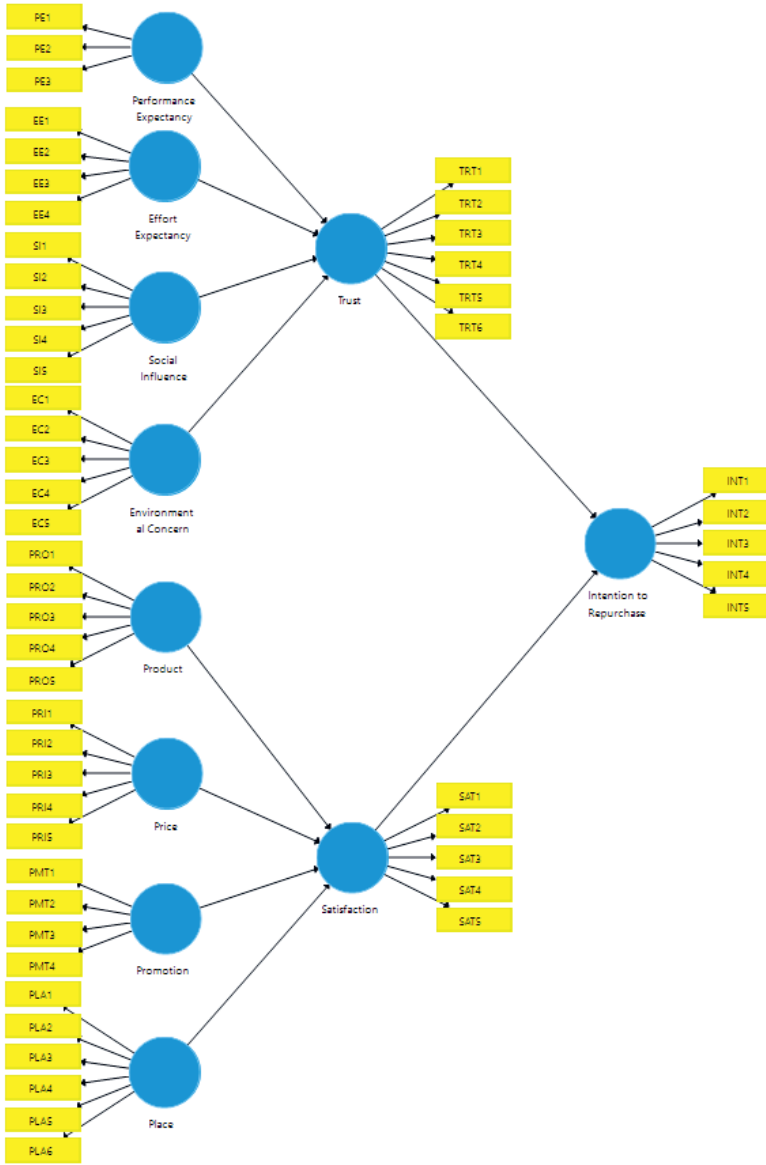
The structural model is a statistical model to evaluate the relationship among multiple variables (Hair, 2010). The bootstrapping calculation in the SmartPLS can used to check the hypothesis and avoid errors (Hair Jr et al., 2014). Bootstrapping is a nonparametric procedure that allows statistical significance of various PLS-SEM results, such as path coefficients, R-square calculations, and Q-square calculations. (Hair Jf. et al., 2014)

Table 7: Inner VIF

Latent Variables	Trust	Satisfaction	Intention to Repurchase
Performance Expectancy	3.441		
Effort Expectancy	3.025		
Social Influence	2.755		
Environmental Concern	2.850		
Product		4.851	
Price		4.253	
Promotion		4.630	
Place		2.906	
Trust			4.059
Satisfaction			4.059

The variance inflation factor (VIF) is the accepted measure for evaluating indicator collinearity (Hair Jf et al., 2021). Higher VIF values correspond to a higher degree of collinearity. If the VIF values of 5 or above indicate moderate multicollinearity issue, meanwhile the value of VIF is lower than 1 indicate no multicollinearity. According to James (2013), the VIF values larger than 10 are an indicator of multicollinearity. Based on the results in Table 7, all the inner VIF values are ranged between 2.755 to 4.851, and all these values are below 5 reflects less serious multicollinearity issue.

Figure 2: Model



Abbreviation: PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, EC: Environmental Concern, PRO: Product, PRI: Price, PMT: Promotion, PLA: Place, TRT: Trust, SAT: Satisfaction, INT: Intention to Repurchase

Table 8: Path Coefficient, T Value, and P-Value

Relationship	Path Coefficient	T Statistics	P-Values	Decision
Performance Expectancy to Trust	0.261	4.852	0	Support
Performance Expectancy to Trust to Intention to Repurchase	0.036	2.069	0.039	Support
Effort Expectancy to Trust	0.104	2.376	0.018	Support
Effort Expectancy to Trust to Intention to Repurchase	0.014	1.54	0.124	Reject
Social Influence to Trust	0.182	3.397	0.001	Support
Social Influence to Trust to Intention to Repurchase	0.025	1.765	0.078	Reject
Environmental Concern to Trust	0.404	6.789	0	Support
Environmental Concern to Trust to Intention to Repurchase	0.056	2.189	0.029	Support
Product to Satisfaction	0.3	6.428	0	Support
Product to Satisfaction to Intention to Repurchase	0.226	5.645	0	Support
Price to Satisfaction	0.015	0.200	0.841	Reject
Price to Satisfaction to Intention to Repurchase	0.011	0.201	0.841	Reject
Promotion to Satisfaction	0.45	7.946	0	Support
Promotion to Satisfaction to Intention to Repurchase	0.339	7.598	0	Support
Place to Satisfaction	0.23	5.887	0	Support
Place to Satisfaction to Intention to Repurchase	0.174	5.121	0	Support
Trust to Intention to Repurchase	0.138	2.274	0.023	Support
Satisfaction to Intention to Repurchase	0.754	12.065	0	Support

Table 8 shows the values of path coefficient, T statistics, P-values for this research. The path coefficient value falls in between -1 and +1. The relationship between latent variables would be a strong positive relationship when the path coefficient values move closer to +1 and will become a strong negative relationship if they move closer to -1. The relationship would become insignificant when the path coefficient values move closer to 0 (Hair JF, 2016).

To answer the research objective in this study, the factors that affect the trust of Malaysian consumer on biobased detergent that are performance expectancy, effort expectancy, social influence, and environmental concern. All these factors have a positive relationship towards the trust of Malaysian consumer on biobased detergent, and thus also have direct relationship to the intention to repurchase except effort expectancy and social influence. The insignificant relationships of effort expectancy toward intention of repurchase were in line with Aghdaie et al. (2011), where the intention of repurchase tends to be more driven by other variables other than effort expectancy. Meanwhile the relationship between social influence and intention of repurchase biobased detergent is insignificant, since biobased detergents are relatively new in the market, there may be a limited presence of influencers or peer pressure influencing repurchase intentions. Furthermore, the factors from 4Ps Marketing Mix – product, price, promotion, and place are showing a positive relationship to the satisfaction on biobased detergent except the price. The price range for biobased detergent is higher than fossil-based detergent and thus the respondent might not be satisfied with the price of the biobased detergent. In addition, the price has insignificant relationship to intention to repurchase of biobased detergent because the respondent is a repeater consumer on biobased detergent, so although the consumer is no satisfied with price of biobased detergent, but it would not affect them to repurchase.

Table 9: R-Square

Latent Variables	R-Squared
Intention of Repurchase	0.768
Satisfaction	0.861
Trust	0.729

R-Squared is a statistical method to determine the proportion of variance in the dependent variable by the independent variable.

According to Chin (1998) the R-square's general rule of thumb is 0.67, 0.33, or 0.19, which corresponds to good, moderate, and weak prediction accuracy. As per Table 9 all the variables are above 0.67, so the 76.8% of the variance in intention of repurchase, 86.1% of the variance in satisfaction, and 72.9% of the variance in trust are regarded as strong predicting endogenous construct.

5. Conclusion

In conclusion, the study utilising the Stimulus-Organism-Response (SOR) theory to explore the intention of repurchase towards biobased detergent among Malaysian consumers reveals valuable insights. The findings in the study show performance expectancy, environmental concern, product, promotion, and place have a significant relationship to intention to repurchase for biobased detergent. Performance expectancy refers to consumers' perception of the benefits gained from using a product or service. The greater these perceived benefits, the stronger their influence on the consumer's intention to repurchase. This aligns with the findings of Yeo et al. (2021), which indicate that various benefits increase consumers' likelihood of repurchasing (Nurjanah., 2022; Andrian & Berlianto, 2022; Chandon, 2000). Furthermore, environmental concern positively influences the intention to repurchase biobased detergents. This study's findings are supported by Echchad (2022), Corbin (2020), and Kim (2011) that suggest a positive relationship between environmental concerns and repurchase intention in green products. The positive impact of the product on repurchase intention of biobased detergent is aligned with research that suggests that consumers prefer to repurchase environmentally-friendly products (Mochklas, 2020; Jones & Smith, 2019, Firmansyah & Mochklas, 2018). The findings of this study indicate that the place in which the product is marketed positively influences the repurchase intention of biobased detergents. These results align with the research by Wiranata (2019), Setyandi (2018), and Moriuchi (2016), which found that the place significantly affects repurchase intentions towards biobased detergent. In addition, the product's promotion also shows a positive impact on repurchase intentions of biobased detergent and this finding is supported with research of Tampubolon (2021), Setyandi (2018), and Liu (2009). Meanwhile, the effort expectancy, social influence, and price have an insignificant relationship to the repurchase intentions of biobased detergent. Effort expectancy is often linked to positive user experiences and satisfaction, and it also affects consumers' perceptions of a product's reliability and functionality. However, the

effort expectancy is found to insignificant to impact the repurchase intention of biobased detergent. These findings are consistent with earlier research by Lim (2018), Aghdaie (2011), and Chen (2011) that the effort expectancy is insignificant influence the repurchase intention. Social influence is referring to the extent to which an individual responds to the expectations of important others regarding their use of a particular product or service (Indrawati, 2017). The finding of this study shows that social influence has an insignificant impact on repurchase intentions of biobased detergent and this finding is different with finding from Tarhini (2016) and Chong (2013) that social influence should have a significant relationship with repurchase intentions. This insignificance could be attributed to the novelty of biobased detergents in the market, indicating a potential lack of influencer or peer pressure affecting consumer behavior. As biobased detergents represent a new technological advancement, it is evident that the Malaysian consumer base may not yet be subject to significant external influences in their repurchase decisions. Meanwhile the hypothesis that price positively impacts consumer satisfaction with biobased detergents has been rejected based on the data collected in this study. This finding is supported by findings from Thompson (2019), (Jones, 2018), and Smith (2017),

Studying the repurchase intention for biobased detergents is vital because it reflects a commitment to environmental preservation, improves health and safety, influences market trends toward sustainability, and fosters long-term consumer behaviors that prioritise eco-friendly choices. As we strive for a sustainable future, cultivating a culture where consumers consistently opt for biobased detergents is essential. This shift not only benefits individuals and communities but also plays a critical role in conserving our planet and its resources. Malaysia has significant potential to develop its biobased industry, and the insights from this study can serve as valuable references for policymakers and manufacturers when crafting their marketing strategies. Therefore, recognising and promoting the significance of repurchase intention is key to encouraging the widespread adoption of biobased detergents as a sustainable consumer preference.

5.1 Limitations and Recommendation for Future Research

This study investigates the repurchase intention of biobased detergents among Malaysian consumers using the Stimulus-Organism-Response (SOR) theory, provides valuable insights into sustainable consumer behaviour. However, it is important to

acknowledge several limitations that may impact the study's findings. One significant limitation is related to the sample size and diversity of participants, which may impact the generalisability of the findings across various demographic groups within Malaysia. Additionally, the focus on biobased detergents specifically may limit the applicability of the results to other eco-friendly products, potentially overlooking broader consumer behavior trends. Another important factor is the temporal dynamics of consumer attitudes; the study may not fully account for shifts in perceptions driven by evolving environmental awareness or changes in the market landscape.

Furthermore, the constructs of trust, satisfaction, and repurchase intention could be influenced by external factors not included in the research, raising questions about the validity of the results. To address these limitations, future research should consider several directions. Longitudinal studies would be beneficial in tracking changes in consumer repurchase intentions over time, offering insights into how perceptions evolve in response to marketing strategies or environmental developments. Expanding the research to encompass a variety of eco-friendly products could enhance understanding of consumer behaviour across different segments and contexts. Moreover, conducting cross-cultural comparisons could provide valuable insights into how consumer responses vary in different countries, thereby enhancing the applicability of SOR theory in diverse cultural contexts. In-depth qualitative research, such as interviews or focus groups, could further illuminate the motivations and emotions driving consumer behaviour towards biobased detergents. Finally, examining the effectiveness of specific marketing strategies on trust and satisfaction could help businesses tailor their approaches to better meet consumer needs and enhance repurchase intentions. Together, these future research directions can contribute to a more comprehensive understanding of consumer behaviour in the context of sustainability and eco-friendly products.

Conflicts of Interest

There are no conflicts of interest in this study.

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