

EXAMINING CUSTOMERS' INTENTION TO PURCHASE CIRCULAR ECONOMY PRODUCTS USING THEORY OF PLANNED BEHAVIOR AND MODERATING EFFECTS

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ABSTRACT

The circular economy is the contemporary approach for environmental solution from the United Nations. It is relatively new in most emerging countries, including Thailand. Therefore, this research aims to explore Thai consumers' behavior for their purchase intention toward circular economy products to see whether market is ready for circular economy or not. The study has adopted the theory of planned behavior as it is well accepted and widely used in literature. This research was conducted in Thailand by using quantitative approach, collecting data from 559 respondents. The results showed that among the three main determinants in the theory, attitude toward behavior was found to have highest impact on purchase intention of circular economy products while the other two factors, perceived behavioral control and subjective norms, were also positively related to the purchase intention as well. In this research, the authors have also investigated three moderating variables: price sensitivity, perceived convenience, and product involvement. It is interesting to find that all three variables have moderating effects on the attitude towards purchase intention whereas none of these moderators have significant impacts on subjective norms.

Keywords: Circular Economy Product, Theory of Planned Behavior, Price Sensitivity, Perceived Convenience, Product Involvement.

INTRODUCTION

The world has been facing severe environmental problems; the emission of greenhouse gas reflected climate change and global warming, the increase in temperature affected for more than 1,400 species (Root et al., 2003) which could lead to the extinction of some species (Anbumozhi & Kim, 2016). One of the main causes of these problems is from the use of plastic (Astrup et al., 2009). Geyer et al. (2017) indicated that in the year 2015, there were 6,300 million metric tons of plastic used. Only nine percent of those plastic were being recycled whereas twelve percent were incinerated, and the rest of them, or 79% were problems left on the earth. Lebreton & Andrady (2019) estimated that, mismanaged plastic waste would be around 155-256 million metric tons per year in the year 2060.

While Thailand also faces the same problems, Wattayakorn (2006) found that up to 200,000 tons of waste was discharged to the Gulf of Thailand. Moreover, Marks (2011) pointed that Thailand faces climate change, and the government would need to respond to these severe problems.

From the above problems, the UN has launched strategies to achieve its Sustainable Development Goals by the year 2030 to solve environmental problems (Costanza et al., 2016). One of the approaches that the UN drives toward is the circular economy (Schroeder et al., 2019). Thailand also launched national strategies, which included a circular economy as an implication to solve environmental problems (Desatova, 2018; Ngammuangtueng et al., 2020).

However, one study revealed that among ASEAN countries, Thai consumers have the lowest purchase intention toward the remanufactured products which is considered a type of circular economy product (Wang & Kuah, 2017). Therefore, this research aims to explore purchase intention towards circular economy products in Thailand as well as determinants of the intention to purchase.

The key research questions in this study are (1) what are the factors that affect a consumer's purchase intention for the circular economy product in Thailand? (2) what and how price sensitivity, perceived convenience, and product involvement can moderator intention to purchase of circular economy products?

LITERATURE REVIEW

Circular Economy

The circular economy is a cradle-to-cradle concept, changing from the take-make-dispose way of linear economy to the make-use-return as in circular economy loop (McDonough & Braungart, 2010; Stahel, 1982). Mestre & Cooper (2017) explained that the circular economy loop can be divided into two sub-loops: biological and technical loop. The biological loop is a natural base. Wastes from biological materials return to nature and regenerate (Mestre & Cooper 2017) while the technical loop refers to the inorganic materials that can still be used after recovering and restoring products' materials and/or components (Moreno et al., 2016)

Lombardi & Laybourn (2012) pointed out that industrial symbiosis is good for the circular economy as it provides and exchanges the physical material and energy among firms and helps create eco-innovation and knowledge-based sharing. Wastes from one industry could be an input for another industry. Baldassarre et al. (2019) also added that new business model or product innovation could emerge from the industrial symbiosis. Moreover, Camacho-Otero et al. (2018) and Peronard & Ballantyne (2019) emphasized that manufacturers would have to facilitate customers to return wastes back into their system to complete a circular economy cycle.

Theory of Planned Behavior

The theory of planned behavior is the theory used to predict people's behavior (Ajzen, 1991). This framework aims to predict the willingness or intention to respond and act in a particular behavior under consideration (Ajzen, 1991). Montano et al. (2008) stated that the theory of planned behavior is well-known, well-accepted, and widely used to foretell behavior. Several researchers applied this theory for green and environmental-related studies. For example, Verma & Chandra (2018) employed this framework to predict the green hotel visit among young Indians. Hsu et al. (2017) explored the purchase intention of green skincare products. The purchase intention of remanufactured products was studied by Khor & Hazen (2017) in Malaysia, and the exploration of the purchase intention towards remanufactured products in closed-loop supply chains was also investigated in China (Wang et al., 2013). In addition,

Maichum et al. (2016) used this concept to predict purchase intention of green products in Thailand.

The theory of planned behavior consists of three main determinants: Attitude toward behavior, Subjective norms, and Perceived behavioral control. Attitude toward behavior is a degree of preference of a particular person toward one specific behavior. The degree of preference can be positive or negative (Ajzen, 1991). Montano et al. (2008) found that a stronger positive attitude toward behavior could lead to a higher chance of performing a specific action. For environmental-related studies, attitude toward behavior was found to lead to purchase intention of remanufactured products (Khor & Hazen, 2017), and green goods (Paul et al., 2016). Moreover, Wang et al. (2013) found that attitude toward a behavior was the most influential factor toward purchase intention.

Subjective norm is the social pressure that impacts individual's decision-making process, whether to act or avoid the particular action (Ajzen, 1991). The papers of Khor & Hazen (2017) and Conner & Armitage (1998) described that it is the social expectation from one person's assessment that what social will think when an individual conducts a specific behavior. Khor & Hazen (2017) found that subjective norm has the relationship toward purchase intention of remanufactured products. Furthermore, Albayrak et al. (2013) and Ko & Jin (2017) found that subjective norm was the most influential for green behavior. However, there were evidences that subjective norms may be varied in different cultures. For instance, the finding in one cross-cultural study found that the Chinese norm had more substantial effect toward purchase intention than Americans' intention (Chan & Lau, 2002).

Perceived behavioral control is the psychological interest of one specific person to act. This variable relates to the ease or difficulty of conducting one particular behavior; in other word, the more comfortable one can perform, the more likely the respondent will behave in a particular way (Ajzen, 1991). Chang (1998) revealed that perceived behavioral control played the most significant role affecting behavioral intention. Moreover, Conner & Armitage (1998) indicated that one was unlikely to carry out a particular behavior that he or she has no control. While Godin & Kok (1996) found that perceived behavioral control was as important as the attitude toward behavior for explaining intention, Montano et al. (2008) stated, perceived behavioral control could predict humans' intentions, given that everything else (i.e., attitude and subjective norm) remained constant. There was also a cultural difference found with this variable, for example, Chan & Lau (2002) found that Chinese's perceived behavioral control had higher influence on their behavior than American customers had.

According to the theory, the first three hypotheses are proposed as follows:

- H₁ Attitude toward behavior has a positive relationship with intention to purchase circular economy products.*
- H₂ Subjective norm has a positive relationship with intention to purchase circular economy products.*
- H₃ Perceived behavioral control has a positive relationship with intention to purchase circular economy products.*

Price Sensitivity

Ghali-Zinoubi & Toukabri (2019) defined that price sensitivity is customers' sensitivity toward the given price. It affects the customer's decision to purchase the product. For the high

sensitivity, the higher the price, the less likely customers to purchase products. On the other hand, for the low level of sensitivity, even price increases, customers still have needs to purchase products. Moreover, in their paper, the researchers found that price sensitivity would be lower if the products could provide superiority and/or more benefits.

Hsu et al. (2017) found that price sensitivity toward green skincare products moderated all three variables in the theory of planned behavior. Furthermore, Yue et al. (2020) also found that if customers were pro-environmental, customers with lower price sensitivity were willing to buy green products. Furthermore, Chaudhary & Bisai (2018) found that India's younger generation tended to purchase green products even though the price is higher than non-green ones.

This present study, therefore, hypothesizes that:

- H_{4A} Price sensitivity can moderate relationship between attitude and intention to purchase circular economy products.*
- H_{4B} Price sensitivity can moderate relationship between subjective norm and intention to purchase circular economy products.*
- H_{4C} Price sensitivity can moderate relationship between perceived behavioral control and intention to purchase circular economy products.*

Perceived Convenience

Nowadays, convenience becomes the ultimate currency for people. Therefore, exploring how convenience could impact the purchase intention toward circular economy products would be beneficial for further implications.

Chang et al. (2012) described that perceived convenience was the perception of convenience toward time, place, and action. They also found that perceived convenience affected attitude toward behavior. In addition, Matos & Krielow (2018) showed that perceived convenience played a vital role in purchase intention; in other words, the more convenient, the more likely one has intention to purchase. In the research of Sun et al. (2017), convenience was found to be the most critical variable among several factors (including all three key determinants in the theory of planned behavior) impacting on Chinese consumers' intention to use plastic bags.

Thus, it is hypothesized that:

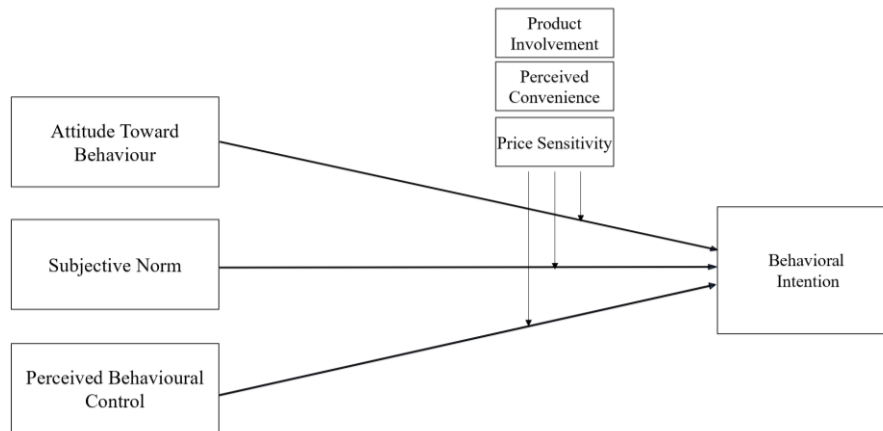
- H_{5A} Perceived convenience can moderate relationship between attitude and intention to purchase circular economy products.*
- H_{5B} Perceived convenience can moderate relationship between subjective norm and intention to purchase circular economy products.*
- H_{5C} Perceived convenience can moderate relationship between perceived behavioral control and intention to purchase circular economy products.*

Product Involvement

Te'eni-Harari et al. (2009) described product involvement as the degree to which individual pays involvement toward features of a specific object which result in a different degree of each people feels toward the same object depending on individual factor (i.e., belief, values, thoughts, experience, etc). Rahman (2018) pointed out that involvement influenced the attitude and behavior of individuals. Moreover, Ghali-Zinoubi & Toukabri (2019) found that involvement was affected by purchase intention (Figure 1). The purchase intention may vary across environmental products, and it would be evaluated differently in different product category.

Therefore, this research hypothesizes as follows:

- H_{6A} Product involvement moderate relationship between attitude and intention to purchase circular economy products.*
- H_{6B} Product involvement can moderate relationship between subjective norm and intention to purchase circular economy products.*
- H_{6C} Product involvement can moderate relationship between perceived behavioural control and intention to purchase circular economy products.*



**FIGURE 1
PROPOSED RESEARCH MODEL**

METHODOLOGY

Sample and Data Collection

This study used a convenience random sampling methodology to collect data from 400 target respondents. The questionnaire survey was distributed through several social media and online channels in order to obtain a wide range and diverse data from Thai consumers in terms of gender, age, occupation, and regions. Probably, because the data were collected during Covid-19 pandemic in Thailand and most people work from their home. It seemed that people had more free time and were willing to participate in the survey. Eventually, 580 responses were received, and 559 sets of data were usable, approximately 96%.

Questionnaire Design

To design the questionnaire instrument, the authors adapted the four main variables according to the theory of planned behavior from Paul et al. (2016), which included attitude toward behavior (3 items), perceived behavioral control (7 items), subjective norm (4 items), and purchase intention (5 items). For the moderating variables, perceived convenience was adapted from Chang et al. (2012) with 4 question items, price sensitivity from Hsu et al. (2017) with 3 questions, and product involvement from Drossos & Fouskas (2010) with 8 questions.

All variables used in the questionnaire were five-point Likert scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Only the product involvement variable was used five-point semantic differential scale rating anchored by not important versus very important. All questions were translated from English into Thai and back translated to ensure the correct meaning and prevent mislead interpretation.

Since the circular economy concept is relatively new in Thailand, and there are a wide range of product and service, this paper thus showed a few examples for respondents' better understanding; for instance, shirts that made from PVC bottle and bags from cement bag as the upcycle product reference, and refill stores (a place where customers can use the package to refill products) and portable cups made from rubber as a reference for zero waste products.

Before proceeding to the data collection, the reliability of all constructs was tested as the result presented in Table 1. Cronbach's alphas of all variables were above 0.7. As Ursachi et al. (2015) suggested that the Cronbach's alpha above 0.7 is considered acceptable and the value over 0.8 is considered good reliability. Therefore, the further analysis could be proceeded.

Variables	No of Items	Cronbach's Alpha
Attitude toward behavior	3	0.858
Perceived Behavior Control	7	0.825
Subjective Norm	4	0.882
Perceived Convenience	4	0.861
Product Involvement	8	0.798
Price Sensitivity	3	0.889

RESULTS

There were respondents from diverse background. In total of 559 respondents; 358 (60%) were male and 201 (40%) were female. While the geographical area; 181 (32.4%) were from Bangkok and vicinities whereas 378 (67.6%) were from other provinces. For the age groups; 236 (42.2%) from Generation Z (birthyear from 1997 onward), Generation Y (birthyear 1981-1996) was 133 (23.8%), Generation X (birthyear 1965-1980) was 81 (14.5%), and Baby Boomer (birthyear 1946-1964) was 109 (19.5%). The birthyear for each generation cohort was taken from Eastman & Liu (2012). The minimum of age is 18 and the maximum is 69. The age mean is 35.77 years old.

To test the hypotheses, the multiple regression analysis was employed using SPSS software. In Table 2, the result for the three main independent variables from the theory of planned behavior were all statistically significant (p -value < 0.05), and the attitude toward behavior was found to have the highest impact as its beta or standardized coefficient is highest as 41.7%. All main hypotheses (H1 – H3) were supported.

Paths	Hypothesis	Beta	p-value	Result
Attitude toward behavior toward purchase intention	H1	0.417	0.000	Supported
Perceived behavioral control toward purchase intention	H2	0.201	0.000	Supported
Subjective norms toward purchase intention	H3	0.143	0.001	Supported

Once the main relationships between the attitude toward behavior, perceived behavioral control, subjective norm and the purchase intention, as a dependent variable, were significant. The authors proceeded with the moderating effect tests for price sensitivity, perceived convenience, and product involvement while key demographic factors (i.e., age, gender, education) were controlled. As shown in Table 3, it is found that 5 out of 9 moderator hypotheses were supported for Thai consumers' purchase intention toward circular economy products. In sum, the attitude toward behavior could be moderated by all moderators while subjective norms were not moderated by any moderating variables in this study.

Paths	Hypothesis	p-value	Result
Price Sensitivity moderate attitude toward behavior	H4A	0.001	Supported
Price Sensitivity moderate perceived behavioral control	H4B	0.161	Not supported
Price Sensitivity moderate subjective norms	H4C	0.140	Not supported
Perceived convenience moderate attitude toward behavior	H5A	0.001	Supported
Perceived convenience moderate attitude toward behavior	H5B	0.005	Supported
Perceived Convenience moderates subjective norms	H5C	0.876	Not supported
Product involvement moderate attitude toward behavior	H6A	0.007	Supported
Product involvement moderates perceived behavioral control	H6B	0.017	Supported
Product Involvement moderates subjective norms	H6C	0.241	Not supported

DISCUSSION AND CONCLUSION

Research Implication

First, the company needs to focus on creating a positive attitude toward the circular economy products. Since attitude is the most impactful variable toward purchase intention, as indicated in Han et al. (2011) and Han et al. (2009) that marketers' job is to create a favorable mindset for customers toward the product. Consistent with the study of Khor & Hazen (2017), it is recommended that in the emerging market, such as ASEAN countries including Thailand, changing attitudes toward behavior first is very essential. Therefore, business and marketers should develop marketing communication to cultivate positive attitude of consumers toward circular economy products.

In this present study, as the price sensitivity and product involvement can moderate the attitude toward behavior toward purchase intention, the products may need to be sold at a lower price at the beginning stage to allow customers get familiar with products first. This is also consistent with Ko & Jin (2017) which recommended the similar pricing strategy in their work. Public sectors can help the private sector by providing subsidies or tax exemptions to reduce the cost of products. For product involvement, the product-market fit is the key implication. High involvement products can be designed to let customers keep and use it longer time as an effective

involvement for emotional durability (Chapman, 2015) or special features as cognitive involvement (Ghali-Zinoubi & Toukabri, 2019).

Second, perceived control behavior which means customers' easiness to perform their purchases circular economy products. Since perceived behavioral control has a positive relationship toward purchase intention and perceived convenience can also moderate perceived behavioral control toward purchase intention, so the availability of the products and services will be the critical factor that marketers should consider approaching customers and being convenient for purchases. Hence, a variety of distribution channels, both online and offline channels will be a key to increase purchase. Furthermore, mode of acquisition and variety of products could also help enhance the customers' perceived behavioral control. To effectively implement, both public and private sectors need to put high efforts and may collaborate with each other to drive circular economy products to the market (Chan & Lau, 2002; Paul et al., 2016; Wang et al., 2013).

Third, subjective norm is the other influential factor on intention to purchase circular economy products. As indicated in Chan & Lau (2002), subjective norm, or social pressure, is very influential toward purchase intention of Chinese customers while Nuttavuthisit & Thøgersen (2017) found that in eastern culture society, such as Thailand, social norms played a significant role. Public and private sectors can thus provide more knowledge of circular economy and may use key opinion leaders (i.e., influencers) to promote and create familiarity of circular economy with customers. Ko & Jin (2017) supported the idea of public movement and valuable campaign to earn more customer acceptance. In addition, rewards and compliments may also be used in the implementation process. Furthermore, Chaudhary & Bisai (2018) suggested that conducting the corporate social responsibility campaign would help to encourage customer acceptance for the circular economy and products.

Limitation of This Study

There are a few limitations for this present study as well. First, the circular economy concept is quite new in Thailand. The respondents may not thoroughly understand the core concept of the circular economy. Although the explanation of the concept was clearly written in the questionnaire, and few examples were given, it is likely that participants may not fully understand this complicated concept.

Second, there are both products and services included in the circular economy concept. However, in the questionnaire, the authors included only a few products to represent the concept of the circular economy. This may lead to the limitation of research implication as the respondents are varied in their thoughts and preferences. Some may not have used the given products in the example, but they may be ones who prefer other circular economy products and/or services.

Future Research

In addition to the intention to purchase circular economy products, there are also other interesting dependent variables, including intention to return and intention to use circular economy products. Since the circular economy is about make-use-return, we also need to know whether once customers purchased the products, will they use and will they return the used products or not? Otherwise, if customers only purchase, it may be useless to encourage consumers to use circular economy products since it may not help reduce waste. Jena & Sarmah

(2015) found the support on this thought that perceived benefits and social awareness can lead to return intention.

Second, as service and sharing economy are parts of the circular economy concept, future research may study the service business models of sharing economy. Since this current study conducted during the Covid-19 pandemic, it may then affect the intention to buy services and sharing economy. Therefore, we need to explore the business models when the situation all recovers.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Albayrak, T., Aksoy, Ş., & Caber, M. (2013). The effect of environmental concern and scepticism on green purchase behaviour. *Marketing Intelligence & Planning*, 1(1), 27- 39.
- Anbumozhi, V., & Kim, J. (2016). Towards a circular economy: Corporate management and policy pathways.
- Astrup, T., Fruergaard, T., & Christensen, T.H. (2009). Recycling of plastic: *accounting of greenhouse gases and global warming contributions*. *Waste Management & Research*, 27(8), 763-772.
- Baldassarre, B., Schepers, M., Bocken, N., Cuppen, E., Korevaar, G., & Calabretta, G. (2019). Industrial Symbiosis: towards a design process for eco-industrial clusters by integrating Circular Economy and Industrial Ecology perspectives. *Journal of Cleaner Production*, 216, 446-460.
- Camacho-Otero, J., Boks, C., & Pettersen, I.N. (2018). Consumption in the circular economy: A literature review. *Sustainability*, 10(8), 2758.
- Chan, R.Y., & Lau, L.B. (2002). Explaining green purchasing behavior: A cross-cultural study on American and Chinese consumers. *Journal of International Consumer Marketing*, 14(2-3), 9-40.
- Chang, C.C., Yan, C.F., & Tseng, J. S. (2012). Perceived convenience in an extended technology acceptance model: Mobile technology and English learning for college students. *Australasian Journal of Educational Technology*, 28(5).
- Chang, M.K. (1998). Predicting unethical behavior: A comparison of the theory of reasoned action and the theory of planned behavior. *Journal of Business Ethics*, 17(16), 1825-1834.
- Chapman, J. (2015). *Emotionally durable design: objects, experiences and empathy*. Routledge.
- Chaudhary, R., & Bisai, S. (2018). Factors influencing green purchase behavior of millennials in India. *Management of Environmental Quality: An International Journal*, 29(5), 798-812.
- Conner, M., & Armitage, C.J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology*, 28(15), 1429-1464.
- Costanza, R., Daly, L., Fioramonti, L., Giovannini, E., Kubiszewski, I., Mortensen, L.F., Pickett, K.E., Ragnarsdottir, K.V., De Vogli, R., & Wilkinson, R. (2016). Modelling and measuring sustainable wellbeing in connection with the UN Sustainable Development Goals. *Ecological Economics*, 130, 350-355.
- de Matos, C.A., & Krielow, A. (2019). The effects of environmental factors on B2B e-services purchase: perceived risk and convenience as mediators. *Journal of Business & Industrial Marketing*, 34(4), 767-778.
- Desatova, P. (2018). Thailand 4.0 and the internal focus of nation branding. *Asian Studies Review*, 42(4), 682-700.
- Drossos, D.A., & Fouskas, K.G. (2010). Mobile Advertising: Product involvement and its effect on intention to purchase. In *2010 Ninth International Conference on Mobile Business and 2010 Ninth Global Mobility Roundtable (ICMB-GMR)* (pp. 183-189).
- Eastman, J.K., & Liu, J. (2012). The impact of generational cohorts on status consumption: an exploratory look at generational cohort and demographics on status consumption. *Journal of Consumer Marketing*, 29(2), 93-102.
- Geyer, R., Jambeck, J.R., & Law, K.L. (2017). Production, use, and fate of all plastics ever made. *Science advances*, 3(7), e1700782.
- Ghali-Zinoubi, Z., & Toukabri, M. (2019). The antecedents of the consumer purchase intention: Sensitivity to price and involvement in organic product: Moderating role of product regional identity. *Trends in Food Science & Technology*, 90, 175-179.
- Glanz, K., Rimer, B. K., & Viswanath, K. (2015). *Health behavior: Theory, research, and practice*. John Wiley & Sons.

- Godin, G., & Kok, G. (1996). The theory of planned behavior: a review of its applications to health-related behaviors. *American journal of health promotion*, 11(2), 87-98.
- Han, H., Hsu, L.T.J., & Lee, J.S. (2009). Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers' eco-friendly decision-making process. *International Journal of Hospitality Management*, 28(4), 519-528.
- Han, H., Hsu, L.T.J., & Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism Management*, 31(3), 325-334.
- Hsu, C.L., Chang, C.Y., & Yansritakul, C. (2017). Exploring purchase intention of green skincare products using the theory of planned behavior: Testing the moderating effects of country of origin and price sensitivity. *Journal of Retailing and Consumer Services*, 34, 145-152.
- Jena, S.K., & Sarmah, S.P. (2015). Measurement of consumers' return intention index towards returning the used products. *Journal of Cleaner Production*, 108, 818-829.
- Khor, K.S., & Hazen, B.T. (2017). Remanufactured products purchase intentions and behaviour: Evidence from Malaysia. *International Journal of Production Research*, 55(8), 2149-2162.
- Ko, S.B., & Jin, B. (2017). Predictors of purchase intention toward green apparel products: A cross-cultural investigation in the USA and China. *Journal of Fashion Marketing and Management: An International Journal*, 21(1), 70- 87.
- Lebreton, L., & Andradý, A. (2019). Future scenarios of global plastic waste generation and disposal. *Palgrave Communications*, 5(1), 1-11.
- Lombardi, D.R., & Laybourn, P. (2012). Redefining industrial symbiosis: Crossing academic–practitioner boundaries. *Journal of Industrial Ecology*, 16(1), 28-37.
- Maichum, K., Parichatnon, S., & Peng, K.C. (2016). Application of the extended theory of planned behavior model to investigate purchase intention of green products among Thai consumers. *Sustainability*, 8(10), 1077.
- Marks, D. (2011). Climate change and Thailand: Impact and response. *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, 33(2), 229-258.
- McDonough, W., & Braungart, M. (2010). *Cradle to cradle: Remaking the way we make things*. North point press.
- Mestre, A., & Cooper, T. (2017). Circular product design. A multiple loops life cycle design approach for the circular economy. *The Design Journal*, 20(sup1), S1620-S1635.
- Moreno, M., De los Rios, C., Rowe, Z., & Charnley, F. (2016). A conceptual framework for circular design. *Sustainability*, 8(9), 937.
- Ngammuangtueng, P., Jakrawatana, N., & Gheewala, S.H. (2020). Nexus Resources efficiency assessment and management towards transition to sustainable bioeconomy in Thailand. *Resources, Conservation and Recycling*, 160, 104945.
- Nuttavuthisit, K., & Thøgersen, J. (2017). The importance of consumer trust for the emergence of a market for green products: The case of organic food. *Journal of Business Ethics*, 140(2), 323-337.
- Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, 29, 123-134.
- Peronard, J.P., & Ballantyne, A.G. (2019). Broadening the understanding of the role of consumer services in the circular economy: Toward a conceptualization of value creation processes. *Journal of Cleaner Production*, 239, 118010.
- Rahman, I. (2018). The interplay of product involvement and sustainable consumption: An empirical analysis of behavioral intentions related to green hotels, organic wines and green cars. *Sustainable Development*, 26(4), 399-414.
- Root, T.L., Price, J.T., Hall, K.R., Schneider, S.H., Rosenzweig, C., & Pounds, J.A. (2003). Fingerprints of global warming on wild animals and plants. *Nature*, 421(6918), 57-60.
- Schroeder, P., Anggraeni, K., & Weber, U. (2019). The relevance of circular economy practices to the sustainable development goals. *Journal of Industrial Ecology*, 23(1), 77-95.
- Stahel, W.R. (1982). The product life factor. *An Inquiry into the Nature of Sustainable Societies: The Role of the Private Sector (Series: 1982 Mitchell Prize Papers)*, NARC.
- Sun, Y., Wang, S., Li, J., Zhao, D., & Fan, J. (2017). Understanding consumers' intention to use plastic bags: using an extended theory of planned behaviour model. *Natural Hazards*, 89(3), 1327-1342.
- Te'eni-Harari, T., Lehman-Wilzig, S.N., & Lampert, S.I. (2009). The importance of product involvement for predicting advertising effectiveness among young people. *International Journal of Advertising*, 28(2), 203-229.
- Ursachi, G., Horodnic, I.A., & Zait, A. (2015). How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance*, 20, 679-686.

- Verma, V.K., & Chandra, B. (2018). An application of theory of planned behavior to predict young Indian consumers' green hotel visit intention. *Journal of cleaner production*, 172, 1152-1162.
- Wang, P., & Kuah, A.T. (2018). Green marketing cradle-to-cradle: Remanufactured products in Asian markets. *Thunderbird International Business Review*, 60(5), 783-795.
- Wang, Y., Wiegerinck, V., Krikke, H., & Zhang, H. (2013). Understanding the purchase intention towards remanufactured product in closed-loop supply chains. *International Journal of Physical Distribution & Logistics Management*, 43(10), 866-888.
- Wattayakorn, G. (2006). Environmental issues in the Gulf of Thailand. In *The environment in Asia Pacific harbours* (pp. 249-259). Springer, Dordrecht.
- Yue, B., Sheng, G., She, S., & Xu, J. (2020). Impact of consumer environmental responsibility on green consumption behavior in china: The role of environmental concern and price sensitivity. *Sustainability*, 12(5), 2074.