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Determinants influencing attitude, intention and engagement toward circular economy: Empirical evidence in food industry

Dinh Chien Truong[1], Khoa Huu Dang Nguyen[2*], Dinh Toan Nguyen[3], Linh Truong[4]
[1,2,3]National Economics University, 207 Giai Phong St., Hai Ba Trung Dist., Hanoi, Vietnam; tdchien@neu.edu.vn (D.C.T.) khoanhd@neu.edu.vn (K.H.D.N.) nguyendinhtoan@neu.edu.vn (D.T.N.).
[4]Loughborough University, Epinal Way, Loughborough LE11 3TU, United Kingdom; l.truong@lboro.ac.uk (L.T.)

Abstract: The study was conducted to investigate determinants influencing attitude, intention, and engagement toward circular economy adoption in the context of the food industry in Vietnam. Structural equation modelling (SEM) was employed to test the hypotheses with the survey data of 513 respondents in the two biggest cities of Hanoi, and Ho Chi Minh City. The results reveal that environmental awareness, motivation, and benefits of adopting circular economy, regulations, laws, and individual reputation in the community, trust and belief have significant positive impacts on attitude and intention. In addition, attitude has a significant positive effect on engagement intention toward circular economy. Intention also has a significant positive effect on engagement behavior toward circular economy. The study's empirical analysis carries implications for managers when implementing the circular economy model. Policy makers and managers can use the research outcomes in their decision making toward social programs, in which more guidance is provided to the public audience and the details of each process are introduced with tools and equipment that are accessible to individuals.

Keywords: *Attitude, Circular economy, Customer behavior, Engagement, Intention.*

1. Introduction

Circular Economy (CE) is business models for the sustainable future since the natural sources is overly exploited in the last centuries and will be exhausted next few decades (Naidoo *et al.*, 2021; Foundation, 2013; Foundation, 2012; Hvass & Pedersen, 2019; Ki *et al.*, 2021). The research on such topic significantly emerged after 17 Sustainable Development Goals launched by United Nation in 2015 and becomes more urgent with all the signs of climate changes and "permacrisis" situations with many uncertainties such as pandemic, war, and the economy depression. The topics related to circular economy and sustainable development have been on the political agenda in developed countries, in particular Europe (EC, 2014) with the aim of economic promotion with new jobs, cost savings for materials, security of supply systems and reduction on negative environmental impacts (Kalmykova *et al.*, 2018). Conventional linear processes as the "take-make-disposal" model then will be replaced by more sustainable models with "reuse-reduce-recycle" approach (Halog and Anieke, 2021). However, circular economy facilitators such as waste management and recycle solutions as well as the intention and proactive participation in closed loop value chains are still struggling, especially in developing countries (Preston & Lehne, 2017).

Circular economy requires the involvement and collaboration from multiple institutional actors, in which, customers are one of the most crucial stakeholders in such transitions (Foundation, 2013; Aschemann-Witzel & Stangherlin, 2021; Mostaghel & Chirumalla, 2021). However, most of research on CE has employed the top-down approach which started from design, life cycle assessment (LCA), or standardization (Lankoski & Thiem, 2020), while customers and their behavioral changes are rarely mentioned (Van Loo *et al.*, 2015; Mostaghel & Chirumalla, 2021). Although corporate social responsibility (CSR) with the centric role of customers is not new in global business management, the examination of those actors' behavior in reversed logistics or closed loop value chains is quite limited

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* Correspondence: khoanhd@neu.edu.vn

(Wastling *et al*., 2018).

The food systems account for over one third of global greenhouse gas emission (FAO, 2021). This sector is also highly impacted by environmental issues. The challenges from limited availability of natural resources, agricultural land while the population is rapidly increased cause risks in food security, especially under the climate change, dietary changes, food waste and food loss as well as inefficient governance (Dury *et al*., 2019). However, the world population has been estimated to reach 9 billion by 2050 and this would necessitate a 70 percent increase in food production (Dury *et al*., 2019). Producing enough food, effectively distributing it and reducing its loss are some of the issues that the food sector is experiencing due to the expanding population (Despoudi, 2019). According to the Food and Agriculture Organization of the United Nations (Gustavsson *et al*., 2011), food insecurity was described as '*a scenario that arises when people do not have regular and everyday physical, social and economic access to sufficient, safe and nutritious food depending on their dietary preferences and needs*'. As a result, a sustainable food system is crucial in social and economic development as well as environmental protection.

Food loss and food waste have consistently remained at a high rate over the last few decades. About 25% to 50% was lost or wasted in production and distribution (Gustavsson *et al*., 2011; Despoudi, 2019). Compared to developed countries, the cost of food waste in a developing country like Vietnam is doubled which is approximately $3.9 million per year. This is equivalent to nearly 2 per cent of Vietnam's GDP. One third of food loss and food waste in Vietnam is discarded by customers (Thi *et al*., 2022). In spite of many campaigns organized from early 2000s, food waste problem has been increased alongside with the population and economic growth (Pham *et al*., 2021). It is evident that there is a lack of awareness about food waste management and sustainable solutions both from producers and consumers in Vietnam (Thi *et al*., 2022).

Circular economy is still a quite new notion in developing countries, including Vietnam (Preston & Lehne, 2017; Halog & Anieke, 2021). In January 2022, Vietnam has launched the revised law on environmental protection with highlights to integrate CE with the new law No.72/2020/QH14 (Halog & Anieke, 2021). It has proven the vision toward the sustainable development masterplan in Vietnam to the year of 2050. However, the vision can never be achieved without high level of participation from individual customers (Aschemann-Witzel and Stangherlin, 2021; Kirchherr *et al*., 2017). The deep understanding on how circular economy models work and how single person can act as a constructive input in a whole coordinated system is very essential in the transformation from linear processes to circularity (Govindan, 2018). Thus, it calls for more empirical studies for support decision making in business management (Mostaghel and Chirumalla, 2021; Dzhengiz *et al*., 2023), especially in emerging markets (Preston and Lehne, 2017). This research then focuses on examining the customer behavior toward CE adoption in the context of the food sector to accelerate the sustainable transition for an emerging economy.

2. Theoretical Basis

2.1. Circular Economy (CE)

The concept of circular economy (CE) derives from the research on energy conservation, pollution reduction, air and water issues in 1980s (Zimmer *et al*., 1994). In 1990s, many scholars focused on evaluating contributions of environmental management to business practices, including assessing the incorporation of total quality environmental operation and management, new product development, life cycle analysis, performance measurement of environmental concerns, customer satisfaction and greening issues (Zimmer *et al*., 1994; Stuart *et al*., 1999). In 2000s, the CE topics were remanufacturing, closed-loop supply chains, sustainable product recovery, inventory policies, sustainable product design and product returns (Minner, 2001). In the last 10 years, research within this era has focused in waste management (Fujii and Kondo, 2018), carbon friendly, emission control, greenhouse gas (Cachon, 2014), production processes (Cao *et al*., 2011). At the same time, the implementation concepts such as reuse, reduce and recycle have taken a foothold (Jakhar *et al*., 2018; Khan *et al*., 2022). CE is defined as "Technological or other artificial solutions aimed at accounting for and reducing resource use and consumption, improve resource use efficiency and recycling, and minimize waste and emissions. Foster

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industrial symbiosis of productive processes, where an industry by-product is another industry input" (D'Amato *et al.*, 2017). In supply chain management, CE is defined in different aspects. With Closed Loop Supply Chain, Guide Jr & Van Wassenhove (2009) defined as "the design, control, and operation of a system to maximize value creation over the entire life cycle of a product with dynamic recovery of value from different types and volumes of returns over time". Circular Supply Chain is the integration of circular thinking into the management of the supply chain and its surrounding industrial and natural ecosystems. It systematically restores technical materials and management, involving all stakeholders in a product/service lifecycle including parts/product manufacturers, service providers, consumers, and users (Farooque *et al.*, 2019b). Environmental Supply Chain is defined as a set of supply chain management policies held, actions taken, and relationships formed in response to concerns related to the natural environment with regard to the design, acquisition, production, distribution, use, reuse, and disposal of the firm's goods and services (Zsidisin & Siferd, 2001).

2.2. The Shift Towards a Circular Economy (CE)

The trend of the future research will continue with well-performed business organizations with innovative technology as well as cost optimization and sustainable consumption. According to Kirchherr *et al.* (2017), only 17 per cent of 114 CE definitions include some key concepts such as "rethinking consumption". Thus, it is evident that there is still a gap in CE research (Dzhengiz *et al.*, 2023). The role of multiple stakeholders, including business organizations, governments, and local authorities has been highlighted in recent research. These actors are relevant in shaping CE habits (Dzhengiz *et al.*, 2023; Halog & Anieke, 2021). In term of research settings, agriculture and food are among most urgent sectors since waste generated from production such as plastic packaging can be very harmful (Halog & Anieke, 2021).

Circular economy has been practiced in developing countries for a long time. Practice is important in difficult situations when resources are limited. However, the scale has been very small within households most of the time rather than in a larger scale within a region or the whole country. The role of government in circular transition was underlined in nurturing the use of CE models. However, the focus on education should be facilitated along with the infrastructure development (Patwa *et al.*, 2021). More importantly, attitude and behavior changes to engaging circular activities need to be considered as an enabler for CE adoption.

3. Hypotheses and Research Model

According to Ghisellini *et al.* (2016), a circular business model is an essential component of the circular economy (CE) concept in the way it promotes customer responsibilities. The role of customers in CE may be very different from the conventional system of linear take-make-dispose (Ghisellini *et al.*, 2016). In fact, the involvement from the design stage to energy or the functional optimization during usage or consumption, to correctly return used items to be new sources of manufacturing inputs. The process requires a high level of knowledge about circular systems and environmental impacts. Based on the most recent research (e.g., Mostaghel & Chirumalla, 2021; Camacho-Otero *et al.*, 2018; Guyader *et al.*, 2022) on how customer can impact on circular business transition, the research constructs are proposed, including to awareness, motivation, image and incentives that impact to attitude then intention to actual contributions. Environmental issues have raised high awareness both in regional and global scale as a very first step to achieve sustainable development (Iizuka, 2016). Last several decades, there are much research on how to improve the knowledge of environmental protection that can determine customers' attitude and intention in purchasing and consuming habits (Chen & Lee, 2015). Thus, two propositions are proposed as:

H_1 - Customer's environmental awareness has a positive effect on attitude toward CE business models and implications

H_5 - Customers' environmental awareness has a positive and direct effect on intention toward CE adoption

The survey constructs was built by adapt the previous work of Diddi & Niehm (2016), and Malik

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(2015). Motivation and belief are the internal determinants that can drive reasonable action of customers in decision making process of purchasing and consuming (Suki, 2016). Those attributes lie deep in customers' cognition in the relation with value and evaluation of advantages and disadvantages in purchase intention (Scarpi *et al.*, 2021). This group of determinants were surveyed with the constructive items adapted from the work of Abbey *et al.* (2015) in the two propositions:

H_2 – Customers' motivation and belief have positive effect on attitude toward CE business models and implications

H_6 – Customers' motivation and belief have positive and direct effect on intention toward CE adoption

Image and reputation were designed in the survey following the work of Suki (2016), and Diddi & Niehm (2016). The customers potentially have more convincing reasons for decision on circular products when it is associated with the reputation of the manufacturer or retailers. They also concern about their own image as a "wise" and "right" consumers in the new century of many challenging issues (Ali *et al.*, 2019). Therefore, the propositions are presented as:

H_3 – Image and reputation have positive impact on customers' attitude toward CE business products and applications

H_7 – Image and reputation have positive and direct impact on customers' intention toward CE practices

Rewards and incentives are external determinants that can motivate customers in choosing, consuming, and participating in a circular business model (Mostaghel & Chirumalla, 2021). Such factors are not just well supports from governments and policy systems but also help the company can increase their reputation and brand image in the market (Diddi & Niehm, 2016). The constructs of those factors in the research then were derived from studies of Etzioni (2019) and Mugge *et al.* (2017) in how to build the trust and connection between sellers and buyers for circular products with an efficient incentive system. The hypotheses are then formulated as:

H_4 – The rewards and incentives for customers create a positive impact on attitude toward CE business models and implications

H8 – good rewards and incentives will positively create the intention of customers to participate in circular activities

Attitude and Intention constructs in survey were adapted from work of Malik *et al.* (2017). The two groups of other moderators, namely, hesitation and barriers, are added to the model based on the recent literature (e.g., Farooque *et al.*, 2019a; Zeng *et al.*, 2021; Beiler *et al.*, 2020). Hence, we propose hypotheses as below:

H_9 – Customers' intention has positive impact on action and engagement in CE business model

H_{10} – Hesitation or lack of facilities has a strong impact on action and engagement of customers in CE business adoption

H_{11} – Barriers such as high costs, hazards, unsecured, dangers or less efficiency from reused materials have strong impact on action and engagement of customers toward CE adoption

The research model is displayed in Figure 1 as follows.

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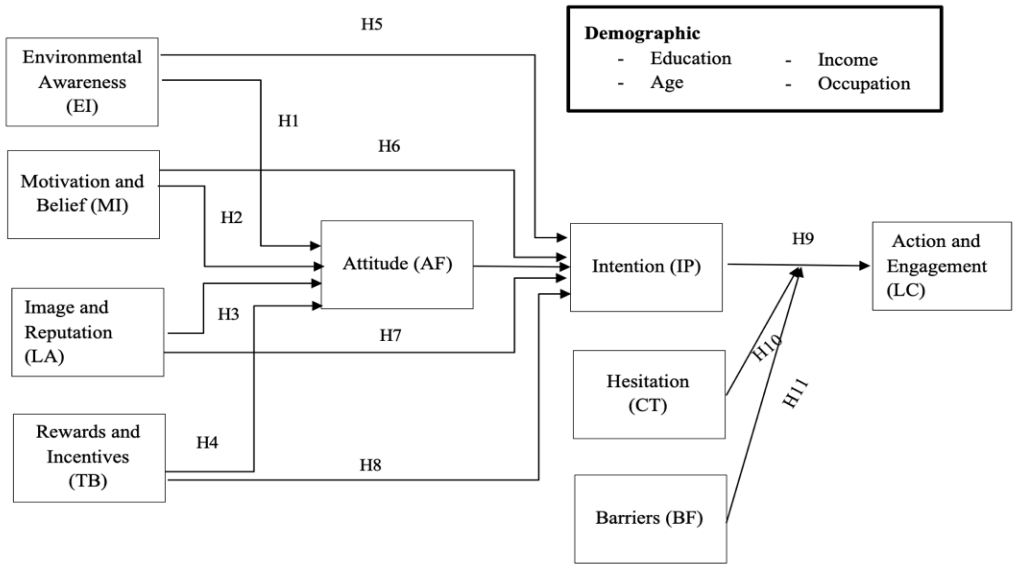

Figure 1.
Proposed research model.

4. Research Methods

The study was conducted in two phases. The first phase focused on developing measurement scales based on the definitions of each factor, primarily adjusting the scales that had been established in previous studies. Content validity was assessed to ensure the consistency of the scales. The second phase involved testing research hypotheses using data collected from consumers who were familiar with the circular economy model.

4.1. Measurement

The observed variables for each determinant in the research were adjusted from previous studies. We made minor adjustments to the wording of the observed variables to fit the research context. As this study was conducted in the Vietnamese market, the observed variables were translated from English to Vietnamese and then back to English to check for accuracy. If necessary, the Vietnamese translation can be further adjusted. A 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree" was used to measure the observed variables in the study. The level of commitment toward circular economy behaviors is measured by five scales of customer intention.

4.2. Data Collection and Analysis

To test the hypotheses, an online survey was conducted with customers who have purchased food products in Vietnam and are familiar with the circular economy. The main research questionnaire used convenient sampling method with customers who were aware of the circular economy in Vietnam, from February to April 2024. With 513 survey responses collected, after screening and removing invalid responses, the author utilized 496 valid responses for formal analysis. Among the respondents, 130 (26.2%) were male, and 366 (73.8%) were female. Furthermore, most respondents had at least an undergraduate degree or higher (94.4%) (see Table 1). SPSS 24.0 and AMOS 24.0 were employed for statistical analysis. The data was analyzed by the two-step modelling approach recommended by Anderson and (Anderson & Gerbing, 1988). First, Confirmatory Factor Analysis (CFA) was conducted to assess the adequacy of each measurement scale and the structure of each factor. Second, Structural Equation Modelling (SEM) was employed to test research hypotheses.

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Table 1.
Demographics of respondents.

Characteristics		Frequency	Percentage
Gender	Female	366	73.8%
	Male	130	26.2%
Year of birth	< 18 years of age	7	1.4%
	18-20	215	43.3%
	21-29	200	40.3%
	30-39	44	8.9%
	40-49	24	4.8%
	> 50 years of age	6	1.2%
Marital status	Married	82	16.5%
	Divorced	6	1.2%
	Unmarried	408	82.3%
Occupations	Currently employed	126	25.4%
	Retired	3	0.6%
	Freelancers	14	2.8%
	Students	353	71.2%
Educational level	Not having a high school degree	4	0.8%
	High school degree	16	3.2%
	2-year college degree	8	1.6%
	University degree	373	75.2%
	Post-graduate degree	95	19.2%
Residency	Hanoi	359	72.4%
	Ho Chi Minh City	137	27.6%

5. Results and Discussion

5.1. Measurement Model

Confirmatory Factor Analysis (CFA) was employed to determine the uni-dimensionality, reliability, and validity of the measurement scales following the initial descriptive analysis phase. All measurement scale tests were deemed acceptable. Based on the CFA output, the fitted model was determined with Chi-square = 2382.770, p = .000; Chi-square/df (CMIN/DF) = 2.009, GFI = 0.833, RMSEA = 0.045, IFI = 0.910, TLI = 0.902, CFI = 0.909. All standardized factors of the measurement scales were greater than 0.6 ($p < 0.001$). Furthermore, the Composite Reliability (CR) of all seven factors exceeded 0.7, and all Average Variance Extracted (AVE) values were greater than 0.5, indicating uni-dimensionality and convergence validity. The measurement scales achieved uni-dimensionality and discriminant validity as the correlation coefficients between the concepts within the overall range were significantly different from 1, with statistical significance at $p < 0.05$, and the square root of the AVE for each concept was larger than the correlation coefficients between these concepts and other concepts (see Table 3). In addition, Cronbach's alpha coefficients were computed for each scale, ranging from 0.795 to 0.941. Detailed results can be found in Table 2.

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Table 2.
Summary of the measurement model and convergent validity.

No	Determinants	Cronbach's alpha	CR	AVE	Codes
1	Environmental awareness	0.838	0.842	0.516	EI
2	Motivation and benefits of adopting circular economy	0.838	0.838	0.509	MI
3	Regulations, laws, and individual reputation in the community	0.795	0.801	0.502	LA
4	Restraints	0.882	0.877	0.544	BF
5	Attitude	0.857	0.858	0.502	AF
6	Considerations and influence	0.839	0.839	0.510	CI
7	Trust and belief	0.836	0.837	0.508	TB
8	Intent to join and spread circular economy models	0.835	0.836	0.505	IP
9	Level of commitment to circular economy behaviors	0.941	0.941	0.613	LC

Table 3.
Discriminant validity.

	CR	AVE	MSV	MaxR(H)	EI	LA	MI	TB	BF	IP	AF	CI	LC
EI	0.842	0.516	0.257	0.843	0.718								
LA	0.801	0.502	0.250	0.806	0.430***	0.709							
MI	0.838	0.509	0.223	0.840	0.362***	0.432***	0.714						
TB	0.837	0.508	0.354	0.842	0.507***	0.500***	0.472***	0.712					
BF	0.877	0.544	0.122	0.885	0.017	0.133*	0.349***	0.028	0.737				
IP	0.836	0.505	0.415	0.840	0.486***	0.393***	0.433***	0.595***	0.034	0.711			
AF	0.858	0.502	0.415	0.860	0.500***	0.489***	0.472***	0.590***	0.017	0.644***	0.709		
CI	0.839	0.510	0.412	0.839	0.382***	0.408***	0.416***	0.448***	0.161**	0.642***	0.447***	0.714	

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LC	0.941	0.613	0.245	0.943	0.266***	0.317***	0.403***	0.461***	0.124*	0.460***	0.495***	0.333***	0.783

Note: C.R. = Composite Reliability; AVE = Average Variance Extracted; MSV: Maximum Shared Variance; ** $p < 0.01$; *** $p < 0.001$

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5.2. Structural Model

To test the proposed hypotheses, the Structural Equation Modeling (SEM) technique was utilized. The acceptable fitted model has Chi-square = 1649.767; Chi-square/df = 2.282; p = 0.000; GFI = 0.845; TLI = 0.903; CFI = 0.910; RMSEA = 0.051. Also from SEM analysis, all hypothetical relationships were tested. Environmental awareness in consumption and value chain has a positive influence on attitude towards circular economy (ß = 0.255, t = 5.048, p <0.001) and intention to join and spread transmission of circular economy models in the food industry (ß = 0.145, t = 2,947, p <0.01). Therefore, hypotheses H1 and H5 were accepted. Motivation and benefits of circular economy application have a positive effect on attitudes towards circular economy (ß = 0.232, t = 4.646, p <0.001) and intention to participate and spread the models towards circular economy in the food industry (ß = 0.126, t = 2.598, p <0.01). Therefore, hypotheses H2 and H6 were accepted. Hypothesis H3 is also accepted, when regulations, laws and individual reputation in the community have a positive effect on attitudes towards circular economy (ß = 0.208, t = 4.105, p < 0.001). However, regulations, laws and individual reputation in the community did not find an effect on the intention to participate in and spread circular economy models in the food industry (ß = 0.003, t = 0.071, p = 0.944); therefore, hypothesis H7 is not accepted. Trust and belief have a positive effect on attitude towards circular economy (ß = 0.382, t = 7.014, p < 0.001) and intention to participate and spread circular economy models in the food industry (ß = 0.305, t = 5.346, p < 0.001). Therefore, hypotheses H4 and H8 were accepted.

Finally, hypothesis H9 was accepted, when attitude towards circular economy has a positive effect on intention to join and diffuse the adoption of circular economy models in the food industry (ß = 0.399, t = 6.016, p < 0.001). Meanwhile, the SEM results show that there is evidence of a relationship between intention to participate and spread circular economy models in the food industry and Level of commitment to circular behavior (ß = 0.470, t = 8,019, p < 0.001), so hypothesis H10 was accepted. The estimated results are detailed in Table 4.

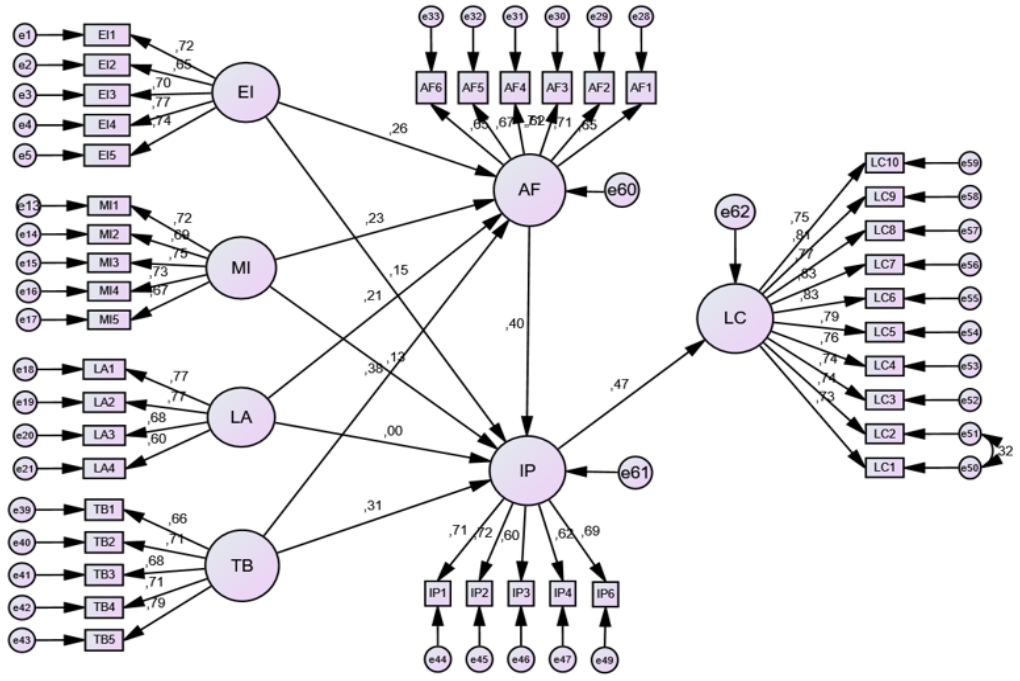

Figure 2.
The results of the model testing (Standardized).

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Table 4.
Hypothesis testing (Standardized).

			Estimate	S.E.	C.R.	P	Hypotheses
AF	<---	EI	0.255	0.043	5.048	***	H1: Accepted
AF	<---	MI	0.232	0.038	4.646	***	H2: Accepted
AF	<---	LA	0.208	0.051	4.105	***	H3: Accepted
AF	<---	TB	0.382	0.052	7.014	***	H4: Accepted
IP	<---	EI	0.145	0.035	2.947	**	H5: Accepted
IP	<---	MI	0.126	0.032	2.598	**	H6: Accepted
IP	<---	LA	0.003	0.041	0.071	ns	H7: Not accepted
IP	<---	TB	0.305	0.047	5.346	***	H8: Accepted
IP	<---	AF	0.399	0.057	6.016	***	H9: Accepted
LC	<---	IP	0.470	0.093	8.019	***	H10: Accepted

Note: N.S: Not Significant; *p<.05; ***p<.001; S.E: Standard Error; CR: Critical Ratios; Path estimates are standardized.

5.3. Testing the Moderating Role of Restraints and Considerations

To test the regulatory role of restraints and considerations, the Bootstrap technique was used (n = 5000 bootstrap resamples: 95% CI). This allows testing of the magnitude and statistical significance of the regulatory effect (Preacher & Hayes, 2008). Regulatory effects of Barriers and Affected Considerations on the relationship between intention to participate and spread circular economy models in the food industry and Level of commitment to weekly behavior complete has been checked. Results for teachers Barriers and Impact considerations do not have a moderating role on the relationship between intention to participate and spread circular economy models in the food industry and Level of Commitment for cyclical behavior. Specifically, P-value (Int_1) = 0.833 > 0.05 of Barriers and p-value (Int_1) = 0.153 > 0.05 of Impact Consideration. Thus, it can be concluded that neither Barriers nor Impact Considerations have a moderating role on the relationship between intention to participate and spread circular economy models in the food industry and food industry. Level of commitment to cyclical behavior. The results of the moderator effect are shown in Table 5.

Table 5.
Moderating roles of BF and CI.

Moderating role of BF						
R	**R-square**	**MSE**	**F**	**df1**	**df2**	**P**
0.431	0.186	0.819	37.518	3.000	492.000	0.000
Model						
	Coeff	se	t	p	95% C.I.	
					LLCI	ULCI
Constant	0.000	0.041	0.004	0.997	-0.080	0.080
IP	0.416	0.041	10.126	0.000	0.335	0.496
BF	0.106	0.042	2.515	0.012	0.023	0.189
Int_1	-0.009	0.040	-0.210	0.833	-0.088	0.071
Note: Int_1: IP x BF						
Moderating roles of CI						
R	R-square	MSE	F	df1	df2	P
0.432	0.187	0.818	37.647	3.000	492.000	0.000
Model						
	Coeff	se	t	p	95% C.I.	
					LLCI	ULCI

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Constant	-0.022	0.043	-0.508	0.612	-0.107	0.063
IP	0.381	0.050	7.593	0.000	0.283	0.480
CI	0.112	0.048	2.304	0.022	0.016	0.207
Int_1	0.041	0.029	1.430	0.153	-0.015	0.097

Note: Int_1: IP x CI

Note: C.I.: Confidence Interval; LL: Lower limit; UL: Upper limit.

6. Discussion of the Results

While many previous studies concluded the role of demographic determinants such as age, incomes, education and occupation (e.g., Hwang, 2016; Chekima *et al.*, 2016; Michaelidou & Christodoulides, 2011), the evidence from this study has different results that rejected such determinants as a moderators in circular adoption within customers' intention and engagement. From our point of view to re-shape customer behavior and food consumption habits toward sustainability, demographic information does not play as a segment metric. Instead, the other moderators like barriers or hesitation due to the lack of information or facilities which was not well prepared to support their decision making to be a part of food circular value chains.

The research also rejected the hypothesis regarding the personal image and reputation of brand can directly impact to intention of customers in food circular behavior but their attitude. It can be seen that customers seem to be more carefully with green washing in marketing and corporate social responsibility (Wu *et al.*, 2020). Therefore, instead of investing on circular campaigns, practitioners can focus on educating programs to connect customers with organizations or invest on infrastructures which directly support the food circular processes rather media or communication methods. Practitioners also can promote CE business model in their organizations with more rewarding program and incentive systems to encourage customers' engagement, especially non-monetary offers like donation or helping other programs (Van Loo *et al.*, 2015). It can be used as the main effective and efficient drivers for customer behavior changes toward circular economy (Mugge *et al.*, 2017).

Policy makers can use the research outcomes in their decision making toward social programs, in which more guidance is provided to the public audience and the details of each process are introduced with tools and equipment that are accessible for individuals. Since information and one source of truth is very important, in particular, in sustainability, the transparency across departments and different elements of the economy regarding circularity should be well integrated. Especially, in the form of data and visualization that will support decision making for both enterprises and end-consumers in sorting or selecting right solutions for CE adoption in their own perspectives. A good policy system will help developing countries to catch up with advanced countries in reducing risk of food insecurity and other social problems (Patwa *et al.*, 2021).

7. Conclusion

The study has examined the influencing factors to customer behavior toward CE. The survey was especially designed to investigate the behavioral intention of customers to actively participate in closed loop food value chains. It is not just about recycling and upcycling but also about the deep understanding and thorough awareness of CE business models and applications then be more selective in consumption toward sustainability. The results show the demographic information does not impact on circular behavior. Instead, facilitators, such as guidance information, infrastructure, available equipment, and solutions, are more important toward actions in CE adoption and accelerate the transition from linear to circular. Education for increasing awareness and knowledge, again, is the best pathway toward sustainable food consumption and circular economy.

However, several important limitations need to be considered. First, this study only focuses on the food industry, therefore, future studies should be conducted in other industries such as electronics, fashion, etc. Second, the study This paper only investigated consumer behavior in Vietnam, a transition economy with many differences compared to other economies in the world, therefore, future research may be

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focused in other countries with different economic contexts. Finally, this research did not compare differences between industries and demographic determinants (for example, gender, generation, etc.), so future studies can focus on research and differences between industries and gender.

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