

Pham Tien Dat; Nga Phan Thi Hang; Hang Le Thi Thuy

Article

Factors affecting the circular economy in Vietnam

Contemporary Economics

Provided in Cooperation with:

VIZJA University, Warsaw

Suggested Citation: Pham Tien Dat; Nga Phan Thi Hang; Hang Le Thi Thuy (2025) : Factors affecting the circular economy in Vietnam, Contemporary Economics, ISSN 2300-8814, VIZJA University, Warsaw, Vol. 19, Iss. 2, pp. 132-147,
<https://doi.org/10.5709/ce.1897-9254.558>

This Version is available at:

<https://hdl.handle.net/10419/323487>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Primary submission: 10.03.2024 | Final acceptance: 09.05.2024

Factors Affecting the Circular Economy in Vietnam

Pham Tien Dat¹, Nga Phan Thi Hang², and Le Thi Thuy Hang³

ABSTRACT

Environmental pollution and resource depletion are increasingly adversely affecting human life, requiring many countries to actively build and develop a circular economy, including Vietnam. Besides, Vietnam participates in many new-generation free trade agreements and commitments to safety standards and the ecological environment. Applying the circular economy is an inevitable trend toward sustainable development. Building a circular economy model has a close relationship with factors such as: Reduce, Reuse, Recycle, Rethink, and Refuse. They have played an essential and groundbreaking role in shaping closed-loop systems. Therefore, the article aimed to discover critical factors affecting the circular economy and proposed policy recommendations. The authors applied qualitative and quantitative methods to process data through SPSS 20.0. The authors surveyed 450 leaders and other people working for 30 provinces in Vietnam. Based on structural equation modeling, the authors tested the overall fit of the data. The main findings explored the Reduce (Red) factor as the most substantial impact of the five factors affecting the circular economy, with a significance of 1.0 percent. Based on the research, the authors proposed the policy recommendations such as a clear legal corridor for the formation and development of the circular economy, mechanisms and policies for developing advanced technology, reuse, and recycling of waste. The article's novelty has analyzed the policies that Vietnam is trying to develop economically sustainably, minimizing adverse impacts on the environment, and the circular economy is a model of interest and development orientation.

KEY WORDS: circular, economy, sustainable, development, policy.

JEL Classification: F63, O10, Q01.

University of Finance - Marketing (UFM), Ho Chi Minh City, Vietnam

1. Introduction

Over the years, the circular economy has been implemented in many fields, bringing socioeconomic and environmental benefits and associated with sustainable development worldwide (Lahti et al., 2018; Ormazabal et al., 2018). The critical purpose of a circular economy is to optimize resource use by circulating products, components, and materials that are used at their highest utility in both the engineering and biological cycles, through those products or

materials in the eco-economy will be continuously maintained, reused, and recycled to no longer exploit resources or create waste. This has become one of the critical components of carbon reduction plans in many countries. The circular economy also aims to decouple economic growth from resource use through the reduction and circularization of natural resources, achieving both goals, responding to resource depletion and reducing resource use inputs and environmental pollution in development at the output (Accorsi et al., 2015; Smol et al., 2017).

Correspondence concerning this article should be addressed to:

Le Thi Thuy Hang, University of Finance - Marketing (UFM), Ho Chi Minh City, Vietnam

E-mail: ltt.hang@ufm.edu.vn

The benefits of the circular economy in the socioeconomic and environment are all towards sustainable development. The circular economy offers a high potential for economic growth and more jobs. Through the economical use of resources, businesses can produce at a low cost by providing products and services with multiple benefits (Dong et al., 2016; Kirchherr et al., 2017; Meyer et al., 2017). The circular economy model can save more raw materials than the linear method extraction of standard raw materials. While the demand for raw materials will increase due to the increase in world population and consumer demand, the activities in the circular economy use fewer raw materials by focusing on prolonging the life cycle of the materials.

The Ministry of Natural Resources and Environment recently said that shifting from a linear economy to a circular economy is becoming a global trend. In the current context, transitioning from a straight to a circular economy is essential for all countries worldwide, notwithstanding Vietnam. The four main reasons that this transition is required include (a) The increase in demand for raw materials, while this resource is increasingly depleted, especially for mineral resources, which are non-renewable resources; (b) Dependence on other countries, especially countries dependent on other countries for raw materials. This dependence leads to global political tension; (c) Impacts on climate change (emissions of greenhouse gases, especially CO₂) increase the process of extreme climate change, causing severe consequences. The transition to a circular economy with the goal of sustainable energy use will reduce climate change; (d) Create economic opportunities, especially for business and science in innovation, design, recycling, and creativity. Solving problems related to the scarcity of raw materials, using sustainable energy, minimizing waste in each stage of the product life cycle, reusing available materials, etc., significant investment in qualified scientific human resources, increasing the economy's competitiveness.

The role of the circular economy is to encourage companies to introduce disruptive technologies and new circular economy models. The development of Industry 4.0 has promoted as well as some limitations to the implementation of the circular

economy model. Technology contributes significantly to the circular economy model's success because waste reuse and recycling require advanced and modern technology. In addition, regulations and policies for sustainable development and sustainability goals, requirements, and requirements will significantly affect the ability to deploy the Circular Economy. The transformation to a green, circular business model will help businesses meet the market's and consumers' requirements in the current period.

In addition, the circular economy is an inevitable trend in the world, including Vietnam. The world faces many challenges and difficulties when the global living environment is threatened. Each country must be responsible for devising solutions to solve the problem of saving fuel, ensuring production and business activities, creating high economic value, and protecting the environment. Vietnam has initially implemented the circular economy model well and achieved specific results. However, Vietnam has not yet completed regulations on this new circular economy model, and there has been no official survey on factors affecting the circular economy. Therefore, perfecting the law and exploring the factors are essential for the circular economy to develop systematically, become more robust, and become safer. This is a new point compared to other domestic and international studies and is also the basis for policy researchers to refer to in formulating policies.

Thus, the article aims to explore critical factors affecting the circular economy and give policy recommendations for improving the circular economy. The paper is structured as follows: part 1 reviews the literature and presents the theoretical framework of this research; part 2 describes the database used and the methodology applied; part 3 offers and discusses the analysis results; and the article ends with some final conclusions.

2. Literature Empirical Review

2.1. The Circular Economy

The circular economy and the business models belong to different sectors (manufacturing, services, or high knowledge-intensive sectors). For example,

the biotechnology industry is an innovative and highly knowledge-intensive industry that shows that the business innovation process results from striving for market competitiveness, not achieving sustainable development. Thus, financial issues are as important as environmental issues in the circular economy. There are similarities and differences between circular economy models in different industries. Traditional business models can also be transformed into circular economy models by incorporating circular strategies into various sectors. At the product level, assessing product value, circularity, and economic potential if the circular economy model is applied and evaluating the product and service system for the supply chain's circularity shows the relationship between the circular economic model and the product. Therefore, different product types with their own characteristics and extended product life cycles will affect the selection and application of the appropriate circular economy model for businesses.

The circular economy is becoming a trend in countries, significantly when the world's resources are increasingly depleted, helping to solve the problem between economic benefits and environmental protection. A circular economy is an industrial system that restores or regenerates by intent and design. It transitions to renewable energy, eliminating hazardous chemicals and waste that degrades reusability through the superior design of materials, products, systems, and scope. These are business models. Or, to put it simply, a Circular economy is turning the waste output of one industry into an input resource of another sector or circulating within an enterprise itself. The circular economy partly contributes to adding value to businesses, reducing resource exploitation, waste treatment costs, and minimizing environmental pollution. In the context of modern society's development, high consumption causes many factors that negatively impact human health and ecosystems, bringing many dangers to the environment and sustainable development. There have been many interpretations of the circular economy (Geissdoerfer et al., 2017; Schroeder et al., 2019; Tseng et al., 2018; Zink & Geyer, 2017).

Zink and Geyer (2017) showed that the circular

economy is an industrial system restored or recreated according to intent and design. It transitions to renewable energy, eliminates hazardous chemicals that cause reuse, and returns to the biosphere through the superior design of materials, products, systems, and tissues business model. Ünal et al. (2019) defined the circular economy as transcending the current extractive industrial model, focusing on positive societal benefits. It entails economic activity gradually separating from the consumption of finite resources and limiting waste generation, and at the same time converting to renewable energy sources (Korhonen et al., 2018; Govindan and Hasanagic, 2018; Ghisellini et al., 2016). 5R Model: Developed based on the 3R model with the addition of 2Rs Rethink and Recover.

2.2. Reduce (Red)

Reduce unnecessary things you are still using, such as resources, energy consumption, and waste (Geissdoerfer et al., 2017; 2018). Previous literature maintains that the consumption habits of people, communities, and society need to be changed to reduce excessive consumption leading to the consumption and depletion of natural resources. To promote this goal, many communities and countries have applied the sharing economy model with high efficiency (the model of sharing appliances, household appliances, sharing means of transport, etc.), sharing logistics infrastructure in transportation and storage of goods...). Thus, the authors proposed H1 below:

H1: Reduce is significantly affecting the circular economy in Vietnam.

2.3. Reuse (Reu)

Reuse is to reuse anything used repeatedly to prolong the life of the items for the same purpose or for another purpose before replacing them (Gardas et al., 2019; Geissdoerfer et al., 2017). Reuse is an activity; consumer habits need to be changed to continue using products and goods many times and can be used for many different purposes instead of just using one and then throwing it away. However, for effective reuse, the products and goods must have quality and features to be reused (Geissdoerfer et al., 2018). In addition, to enhance reuse activities,

enterprises and manufacturers must ensure the formation and provision of warranty, maintenance, component replacement, repair services, etc., to prolong the service life. Thus, the authors proposed H2 below:

H2: Reuse is significantly affecting the circular economy in Vietnam.

2.4. *Recycle (Rec)*

Recycle: Recycle discarded items and unnecessary items into useful ones, and convert waste into resources and energy by applying new technology & techniques (Geissdoerfer et al., 2017).

Recycling is a resource recovery activity that includes collecting, classifying, and treating discarded products after use and waste to recover all resources and process them into recycled materials. These recycled materials will be returned to the next production cycle at an appropriate rate to meet product quality requirements or produce new products according to society's customer needs (Beitzen-Heineke et al., 2017).

According to the general trend of the world, in manufacturing goods, businesses need to be responsible for recovering, reusing, recycling, and disposing of their products after use. Thus, right from the design stage, the selection of production materials, packaging materials, etc., the manufacturer had to calculate and choose the most optimal solution to solve all the problems in terms of production costs, costs of recovery, reuse, recycling, and disposal for the entire product life cycle. Thus, the authors proposed H3 below:

H3: Recycling is significantly affecting the circular economy in Vietnam.

2.5. *Rethink (Ret)*

Rethink: Change your mind/rethink about maintaining the ecosystem. Weigh your options, consider their environmental impact, and review all other Rs holistically and holistically (Beitzen-Heineke et al., 2017; Esposito et al., 2017; Geissdoerfer et al., 2017).

Rethink and Redesign: Requires all manufacturers to change their thinking and approach when deciding and producing any new commodity products in terms of responsibility for

recovery, reuse, and recycling process and process this product after use, thereby determining the design and selection of production materials, packaging... in the most optimal way (Geissdoerfer et al., 2017). At the same time, for manufactured goods, it is also required to improve and change the design to meet the above "responsibility" and bring higher efficiency. Thus, the authors proposed H4 below:

H4: Rethink is significantly affecting the circular economy in Vietnam.

2.6. *Recover/Refuse (Ref)*

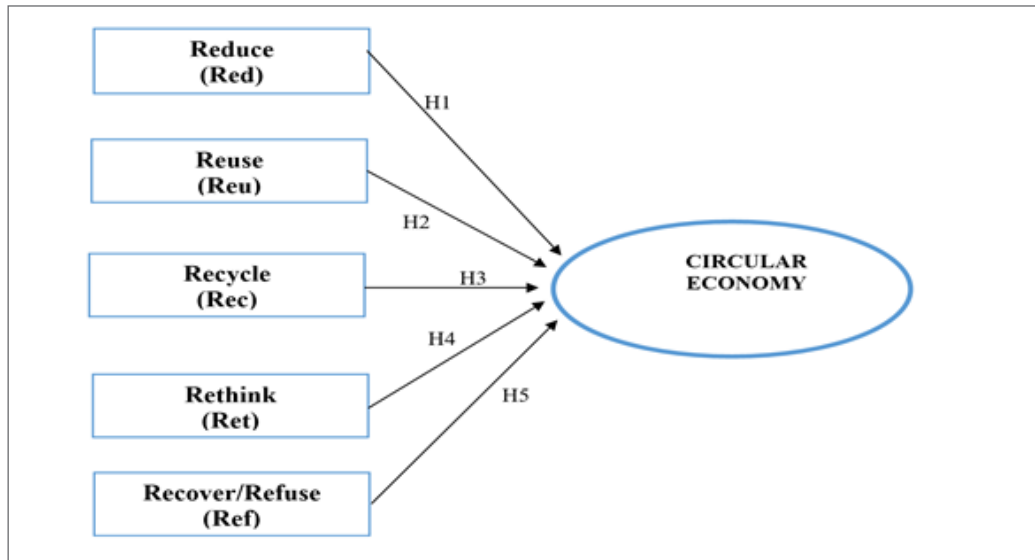
Recover: Recovering practices to put waste to use, repairing destroyed ecosystems to restore values (Geissdoerfer et al., 2017; Wang et al., 2014). Besides, recovery is the action of consumers, communities, and society to show supportive attitudes towards green, environmentally friendly, reusable products derived from activities. The production practices, and at the same time, refuse to use products that are not environmentally friendly, consume a lot of resources and energy in the process of use, are single-use, are not recyclable, and are not recyclable Original. Thus, the authors proposed H5 below:

H5: Recover is significantly affecting the circular economy in Vietnam.

Thus, the operation of the circular economy will have no waste on the environment, thus solving the problem of dealing with the relationship between economics and the environment. The circular economy can accomplish two things: (a) Minimizing the exploitation of raw materials from the natural environment and maintaining the ecosystem; (b) No longer releasing waste into the environment causing environmental pollution and degradation, and maintaining environmental quality (Adams et al., 2017; Adler et al., 2017; Allwood et al., 2011;).

It is not only about recycling materials but also about reducing the use of difficult-to-recycle materials. Accordingly, not only decreasing dependence on resources and limiting emissions, circular economic models still bring significant benefits and promote economic growth.

Figure 1 showed that there were five factors

Figure 1*Analytical Framework and Research Hypotheses*

affecting the circular economy in Vietnam, five factors including Reduce (Red); Reuse (Reu); Recycle (Rec); Rethink (Ret); Recover/ and Refuse (Ref).

3. Methodology and Data

3.1. Qualitative Research

In this article, the qualitative method in this research is first described, and second, the quantitative approach is presented.

The authors applied the in-depth interview to collect qualitative information through direct exchange, conversation, and discussion with a research subject. There, the research subjects can freely share their personal opinions and views, helping the research implementers to exploit in detail and go into many different areas and aspects of the problem of the circular economy. The qualitative method is carried out according to the following process: the authors conducted a review of the overview documents related to the research paper, which is the circular economy, to find the gaps in previous studies, research hypotheses, and proposed theoret-

ical research models; At the same time, the authors discuss with 30 economic experts who are knowledgeable in the field of economics and sustainable development, the circular economy with many years of experience to complete the preliminary research scale.

Qualitative research showed that 30 circular economy experts agree that the 5R model, developed based on the 3R model with the addition of 2Rs Rethink and Recover, is a critical determinant of the circular economy. Accordingly, qualitative research was conducted through discussions with 10 managers and 10 leaders of provinces, and 10 people teaching about the development economy at many public universities in Vietnam.

3.2. Quantitative Research

Quantitative research was conducted to assess the reliability of circular economy components from the study conducted between January and June 2021. The authors applied a questionnaire survey to collect quantitative information on a large scale, using questionnaires to survey and survey, synthesizing all prepared questions to collect data from research subjects. The questions are usually 'closed' with a given answer option and/or

more open options for respondents to share and further explain their answers. The study was conducted with 450 questionnaires sent directly to 30 provinces. The official quantitative research sample includes 450 leaders. The official quantitative research sample consists of 450 leaders and other people working for 30 provinces in Vietnam. Each province surveyed 15 leaders and other people. This study used descriptive statistical tools, measuring mean value and standard deviation. In the simplest terms, when designing a questionnaire where the responses are coded as follows, it is a Likert scale. (a) Strongly disagree, (b) Disagree, (c) Neutral, (d) Agree, (e) Strongly agree. After collecting data from the survey, the authors proceed to use the data processing method through detailed steps as follows:

Firstly, the authors applied the evaluation of Cronbach's alpha reliability coefficient: According to Hair et al. (2021), to calculate Cronbach's alpha for a scale, the scale must have at least three measurement variables. Cronbach's alpha coefficient is variable [0.0-1.0]. Theoretically, the higher the Cronbach's alpha, the more reliable the scale is. However, if Cronbach's alpha coefficient is too large ($\alpha > 0.95$), it shows that many variables in the scale do not differ. They measure the exact content of the research concept, which is the phenomenon of overlap in measurement.

Secondly, the authors applied the exploratory Factor Analysis (EFA): According to Hair et al. (2021) showed that the exploratory factor analysis EFA aims to reduce a set of observed variables of highly significant factors, but for exploratory factor analysis, the following procedures should be performed: KMO test (Kaiser-Meyer-Olkin measure) is more critical than 0.5, Bartlett's test means $\text{Sig} < 0.05$. The case of KMO less than 0.5 indicates that this analysis is not satisfactory on actual data from the market. Factors with Eigenvalue < 1 will be eliminated, only accepting elements with Eigenvalue is 1.0 and total variance extracted 50%. According to Hair et al. (2021), the how Eigenvalue and variance extracted must be based on the extraction method and factor rotation said that if its factors have a higher load factor than that factor and the load factor is smaller than the unmeasurable factor, then this observed variable meets the requirements and each observed variable is different. Load weight difference reaches 0.30 or more. According to Hair et al. (2021), the load factor of the scales reaching 0.3 is acceptable. If greater than 0.4 is good, if greater than 0.5

is very good for research, but for this study, the factor loading factor used by the authors is from 0.5 or more.

Thirdly, the authors applied the confirmatory factor analysis (CFA): CFA analysis was performed to test the suitability of the scale, unidirectionality, combined reliability and total variance extracted, convergent value, and discriminant value. When the CFA is evaluated with good results, it will serve as a basis for testing the proposed hypotheses in the SEM theoretical model. Unidirectionality: Measuring the fit of the model with the collected information, the study considers Chi-square (CMIN), Chi-square adjusted for degrees of freedom (CMIN/df), the fitness index Comparative Fit Index (CFI), Tucker and Lewis Index (TLI), and Root Mean Square Error Approximation (RMSEA). If the model is considered appropriate when the TLI value is obtained, the CFI is 0.9; $\text{CMIN/df} \leq 2$, or some other case $\text{CMIN/df} \leq 3$ (Hair et al., 2021); $\text{RMSEA} \leq 0.08$, then market data are considered appropriate (Hair et al., 2008). However, recently, many research views have suggested that GFI (Goodness of fit index) is still acceptable when it is less than 0.9 (Hair et al., 2010). Evaluate the overall fit of the data based on the model fit indexes such as chi-square/df, comparative fit index (CFI), Tucker-Lewis's index (TLI), the goodness of fit index (GFI), root mean square errors of approximation (RMSEA).

Fourthly, the authors applied the structural equation model (SEM): Structural equation modeling (SEM) is an extension of the general linear model that allows the researcher to test a set of regression equations simultaneously. The SEM model combines all techniques, such as multivariable regression, factor analysis, and correlation analysis (between elements in the network diagram), to allow us to check the relationship complexity in the model. On the other hand, the linear structural model (SEM) provides a precise estimate of the variance parameters, and the data analyzed using the regression method is based on the observed measurements. A linear structural model can combine both observable and unobserved variables. In this case, the linear structural model effectively examines the degree of direct and indirect influence to test for multicollinearity. A criterion is used to evaluate the relationship between concepts in the theoretical model, that is, the value of the academic relationship of the hypotheses posed in the model; this criterion is statistically significant if $p\text{-value} < 5\%$, then these hypotheses are accepted (Hair et al., 2010). The

maximum Likelihood (ML) estimation method and Bootstrap test are used to test the theoretical model. The theoretical model must also achieve appropriate indicators, such as CFA.

Finally, the authors applied the Bootstrap method to view the original sample as the population from which it is drawn, also from the replaceable resample original template where the original template plays the role of the crowd. On the other hand, this method also gives an estimate (ML) from the averaged sample, which tends to be close to the population estimate. From that, showing that the smaller the difference between the mean estimated by Bootstrap and the research model estimate with the initial sample, it can be concluded that the research model estimates can be trusted.

To develop a circular economy in Vietnam, it is necessary to understand the nature and justification of this development method. To create the circular economy, it is essential to summarize and evaluate the existing development models for the agricultural, industrial, and service sectors and fields, thereby identifying development methods close to the circular economy approach as the basis for development according to the circular economy criteria. Awareness of the opportunities to take advantage of them is necessary. On the other hand, one must also see the challenges to the development of the circular economy that will be encountered to take measures to overcome them.

4. Results and Discussion

4.1. Research Results

Vietnam has many opportunities and challenges. Vietnam continues to affirm that fast and sustainable development is a consistent and transparent policy and viewpoint in Vietnam's economic development strategy. Prioritize rapid development to avoid falling behind, reduce the income gap between Vietnam and developing countries in the region, and develop sustainably. Sustainable economic development harmoniously solves the relationship between the two countries regarding economic growth and environmental protection. The concretization and successful implementation of the application of the knowledge-based economy is significant and is the focus of priority in national development policy. Many countries have succeeded in developing the

local economy model and reaping many benefits. Vietnam has the opportunity to learn from the experiences of previous countries and draw lessons to apply accordingly to the domestic context.

Regarding opportunities, the participation of the entire Vietnamese political system in solving national problems and Vietnam's commitment to the world community in participating in the Millennium Development Goals, achieving the sustainable development goals is an opportunity for promoting the development of the knowledge economy in Vietnam.

The policy framework for developing the local economy model has not been clearly and precisely formulated about the challenge. Our country already has some eco-industrial models and eco-industrial parks in operation, but there is no legal corridor for developing the eco-industrial park. In the coming time, it is necessary to have conclusions and complete synchronous development institutions suitable for this economic model.

In addition, economic activities have been mainly based on a linear economic approach. The transition to a centralized economy needs a clear roadmap. Moreover, it is necessary to emphasize innovations in thinking and awareness and encourage initiatives in the production and supply chain to support the transformation to a market economy of enterprises. The correct understanding of the eco-economy needs to be made from input materials, design, consumption, deployment, reuse, recycling, and disposal for each industry. Each field needs consensus and agreement from leaders and management to each enterprise and people.

With the goal of sustainable development closely associated with environmental protection, Vietnam needs to continue investing heavily in improving human resources quality, perfecting institutions and policies, and raising awareness of the whole society about applying the knowledge economy in life, digital technology, waste treatment and recycling technology, and infrastructure of industrial parks and ecological agriculture.

Towards building a circular economy, the Government of Vietnam has made great efforts in environmental protection through many critical legal documents, strategies, and orientations, typi-

cally the Law on Environmental Protection, the National system on green growth for the period of 2021 - 2030, with a vision to 2050; Vietnam's renewable energy development strategy to 2030, vision to 2050; National strategy on integrated solid waste management to 2025, vision to 2050. At the same time, to achieve the set targets, Vietnam has been implementing a series of related programs to develop the circular economy.

Several circular economic models have been implemented in Vietnam, bringing specific efficiency (Thai, 2021). In addition, to gradually form and develop the circular economy, over the past time, the Government has given tax incentives, capital, and land support to build waste recycling facilities, giving priority to the circular economy in the industrial sector. In the agricultural industry, Vietnam continued recycling and reusing industrial waste as raw materials for cement, building, and paper production.

Vietnam has increased biomass energy and bio-gas, building a production model that combines waste treatment and energy regeneration. In the production chain, prioritize recycling and use of by-products and waste products from the fisheries, construction material production, textiles, footwear, etc., and promote energy production from quality urban waste. However, Vietnam is facing an increasing amount of waste generated while the source of raw and fossil materials is increasingly depleted, and technological difficulties exist.

Table 1 shows that all of Cronbach's Alpha have over 0.6 values. This is the scientific basis for leaders to make appropriate decisions and recommendations for improving the circular economy. That is the best way to deal with the relationship between economic growth and adverse effects on resource depletion, pollution, and environmental degradation. In other words, we no longer have to trade-off between development and ecological degradation, economic and environmental protection, simultaneously realizing many sustainable development goals. To realize this orientation requires the efforts of all sectors of society, especially businesses are the central driving force, the State plays the role of creating, leading, and the community participates in the real world to change the perception and behavior of the whole so-

ciety. Table 1 shows all items have a mean value of around 3.0. Besides, the Std. Deviation has a value of approximately 1.0. This data is perfect for improving the circular economy in Vietnam.

Figure 2 showed that the assessment of the factors affecting the circular economy in Vietnam: CMIN/DF = 3.120 (<5.0), GFI = 0.881 (>0.800), TLI = 0.934 (>0.900), CFI = 0.944 (> 0.9) and RMSEA = 0.071 (<0.08).

Table 2 shows five factors affecting the circular economy in Vietnam with a significance level of 0.01. Besides, these results are science evident for policy implications to develop factors affecting the circular economy in Vietnam. From the argument about the circular economy, considering the nature, content, formation, and development process that has questioned the circular economy in Vietnam, it can be seen that there are factors affecting the circular economy this year. However, many other factors affect but have not been included in the research model, such as environmental law, sustainable development policy, and so on.

Figure 3 showed that the assessment of the factors affecting the circular economy in Vietnam: CMIN/DF = 2.221 (< 5.0), GFI = 0.915 (>0.800), TLI = 0.962 (>0.900), CFI = 0.970 (> 0.900) and RMSEA = 0.054 (<5.0).

Table 3 tested Bootstrap 2000 samples for factors affecting the circular economy in Vietnam with a significance level of 0.01. Besides, these results are science evident for policy implications to develop factors affecting the circular economy in Vietnam.

4.2. Research Result Discussion

From the practical experience of many countries in the world and the perspectives on the circular economy, to promote this economic model in Vietnam, the following recommendation should be synchronously implemented:

1. The research result showed that the "reduce" factor affected the circular economy in Vietnam with a significance level of 0.01 and a standardized estimate is 0.380. The study results are consistent with reality and the same results as the study (Geissdoerfer et al., 2018). The circular economy in Vietnam still faces many difficulties and challenges. The biggest challenge in adopting the circu-

Table 1*Descriptive Statistical and Cronbach's Alpha Results for the Circular Economy*

Code	Content of circular economy	Cronbach's Alpha if Item Deleted	Mean	Std. Deviation
Reduce (Red)	Red1: Reduce unnecessary things you are still using, such as resources	0.921	3.3824	0.94797
	Red2: Reduce unnecessary things you are still using, such as energy consumption	0.882	3.2375	1.01213
	Red3: Reduce unnecessary things you are still using, such as waste generated	0.870	3.2684	0.97915
Reuse (Reu)	Reu1: Reuse anything used repeatedly to prolong the life of the items for the same purpose	0.910	3.0618	0.93655
	Reu2: Reuse anything used repeatedly to prolong the life of the items for another purpose before replacing them	0.926	3.0000	0.97101
	Reu3: Reuse to encourage the development of a market for the reuse of waste products	0.936	2.9905	0.97096
	Reu4: Reuse garbage; mobilize resources in society to implement a circular economy	0.901	3.0380	0.96287
Recycle (Rec)	Rec1: Recycle discarded items	0.813	3.4038	0.85266
	Rec2: Recycle discarded items, convert waste into resources and energy	0.816	3.5154	0.90389
	Rec3: Recycle unnecessary items into useful ones	0.839	3.3777	0.92961
	Rec4: Recycle waste into resources by applying new technologies & techniques	0.808	3.3872	0.87545
Rethink (Ret)	Ret1: Rethink to change your mind/rethink about maintaining the ecosystem	0.916	3.0261	0.93441
	Ret2: Rethink to change your mind/rethink about developing the ecosystem	0.932	3.0261	0.95707
	Ret3: Rethink their impact on the environment	0.935	3.0665	0.91305
	Ret4: Rethink the design and selection of production materials and packaging most optimally for the ecosystem	0.912	3.0594	0.94556
Recover/ Refuse (Ref)	Ref1: Recover practices to put waste to use values	0.913	3.0356	0.98617
	Ref2: Recover practices to put waste to repair destroyed ecosystems values	0.935	3.0238	1.01625
	Ref3: Recover practices to put waste to restore values	0.927	3.0831	0.96126
	Ref4: Refuse to use environmentally unfriendly products and give priority to green products	0.905	3.0713	0.99267
Circular economy (CE)	CE1: Reduce affecting the circular economy	0.836	2.3135	0.64846
	CE2: Reuse affecting the circular economy	0.790	2.4584	0.73115
	CE3: Recycle affecting the circular economy	0.861	2.3492	0.65769
	CE4: Rethink and recover affecting the circular economy	0.802	2.4181	0.70445

*Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$* *Source: Data processed by SPSS*

Figure 2
Testing CFA for Factors Affecting the Circular Economy in Vietnam

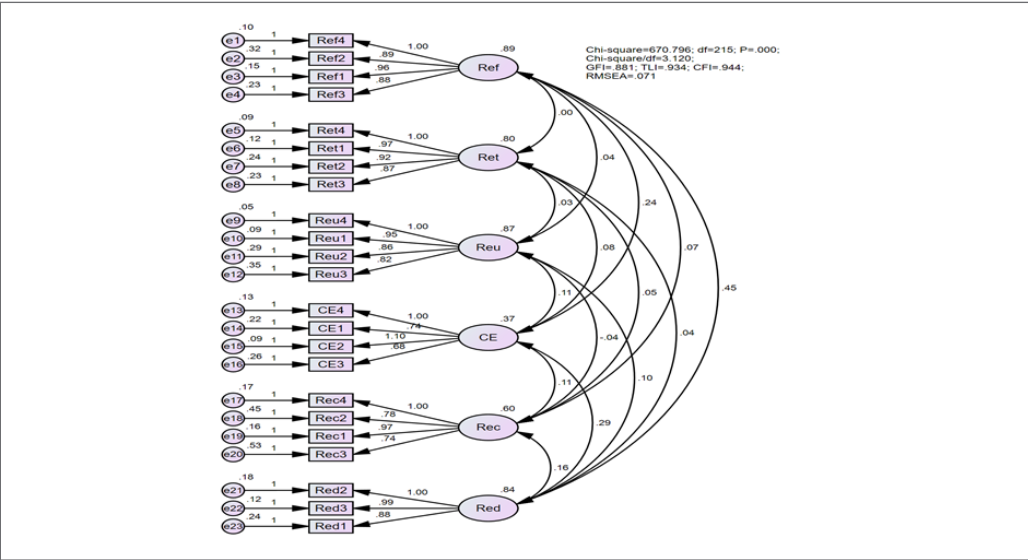


Table 2
Testing Factors Affecting the Circular Economy

Relationships			Standardized Estimate	S.E	C.R	P	Result
CE	<---	Ref	0.190	0.037	3.477	***	Accepted
CE	<---	Ret	0.128	0.031	2.836	0.005	Accepted
CE	<---	Reu	0.127	0.027	2.862	0.004	Accepted
CE	<---	Rec	0.139	0.037	2.882	0.004	Accepted
CE	<---	Red	0.380	0.043	6.219	***	Accepted

Note: *** $p < 0.01$

Source: Data processed by SPSS, Amos

lar economy model is the cost of recovering value from waste. The circular economy is a closed model that uses the waste of one cycle to input the new cycle. In Vietnam, garbage is forecasted to double in the next 15 years. Vietnam's waste recycling rate is less than 10% of total waste. This is a small percentage compared to countries implementing the circular economy model. Thus, Vietnam continues promoting the dissemination and research of the theory and practice of circular economy development to equip management agencies with complete, comprehensive, and correct knowledge

of this economic model. Building an appropriate management legal system in the circular economy development; formulating and developing a policy and legal framework to manage the circular economy model according to market demand, shifting towards pollution prevention and efficient use of recyclable materials; developing and strictly applying standards for product quality management and quality of input materials.

Besides, Vietnam applies new technology for the sustainable development of the country. To promote the development of a circular economy in Vietnam,

Figure 3
Testing SEM for Factors Affecting the Circular Economy in Vietnam

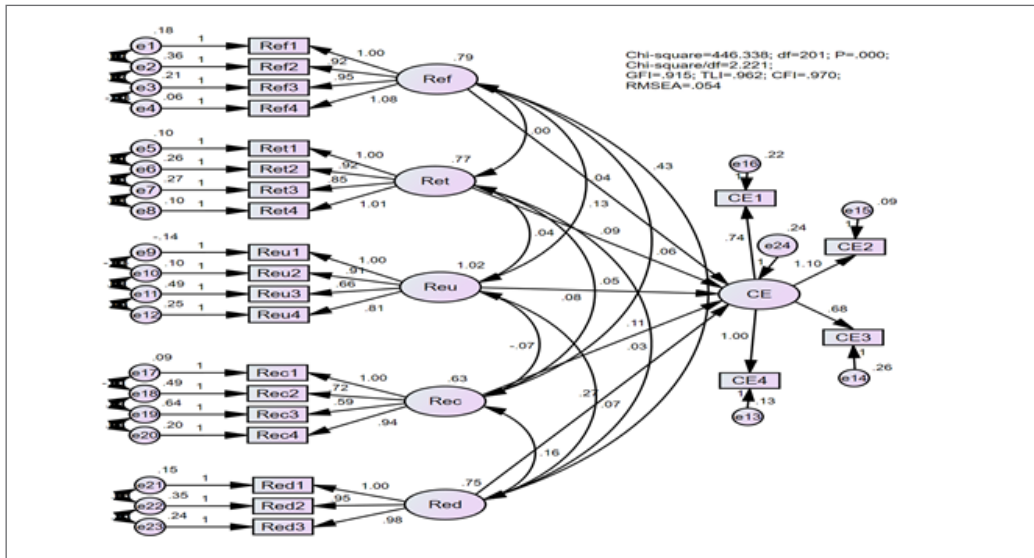


Table 3
Testing Bootstrap for Factors Affecting the Circular Economy in Vietnam

Relationships			SE	SE-SE	Mean	Bias	SE-Bias
CE	<---	Ref	0.041	0.001	0.127	-0.003	0.002
CE	<---	Ret	0.034	0.001	0.087	-0.002	0.001
CE	<---	Reu	0.033	0.001	0.076	0.003	0.001
CE	<---	Rec	0.041	0.001	0.101	-0.006	0.004
CE	<---	Red	0.046	0.001	0.267	0.004	0.003

Note: *** $p < 0.01$

Source: Data processed by SPSS, Amos

it is necessary to implement synchronous solutions, from raising awareness to perfecting institutions and organizing implementation. Accordingly, right from the early years of the 2021 - 2030 period, it is necessary to focus on implementing solutions to promote the circular economy in Vietnam to take advantage of cooperation opportunities in accessing and receiving technology transfer. In particular, the State needs to perform the tectonic role well so businesses and people can play a central role

in building and developing a circular economy in Vietnam.

2. The research result showed that the “recycling” factor affected the circular economy in Vietnam with a significance level of 0.01 and a standardized estimate of 0.139. The study results are consistent with reality and the same results as the study (Geissdoerfer et al., 2017). The current economic system in Vietnam is geared towards the needs of a linear economy. When making economic decisions,

enterprises prioritize considering market signals, not paying much attention to external factors that are positive or negative to society and the environment. The production and business models under the circular economy are not widespread because most businesses are still operating according to the logic of the linear economy, whose goals are to create value short-term. In contrast, the circular economy is a model of long-term value creation. Thus, the State and ministries, departments, and branches need guidelines and practical actions to promote the circular economy in all components; policies to support capital sources and production locations, and expand access to information technology. In addition, the State should establish a center to help enterprises to deploy the circular economy in production and research activities; at the same time, promote the development of science, technique, technology, and advanced products in the field of recycling materials and new energy from waste, satisfying environmental conditions and saving costs.

Vietnam continues completing the legal corridor for the development of the circular economy. The State needs to continue to improve the system of policies and laws to issue regulations and standards for the development of the local economy in line with new trends in the region and the world. In particular, it is necessary to specify the responsibilities of manufacturers and distributors in the recovery, classification, recycling, or payment of disposal costs for discarded products based on the number of products sold on the market, project management according to the life cycle, establish a roadmap for construction and apply environmental standards and regulations. Using technical measures, environment, tax tools... to limit the excessive use of resources, limit waste in the production process. Strongly renovate the economic growth model based on the efficient use of capital and labor inputs and sustainable economic growth associated with the financial and efficient use of resources.

3. The research result showed that the “rethink” factor affected the circular economy in Vietnam with a significance level of 0.01 and a standardized estimate is 0.128. The study results are consistent with reality and the same results as the study (Es-

posito et al., 2017; Beitzten-Heineke et al., 2017). Legal conditions and infrastructure for the development of the circular economy are still lacking, with many inadequacies, making it difficult to deploy new business models. The circular economy requires a production and development strategy that uses the product as long as possible from the outset and a plan to bring materials back into production later. Achieving that requires enormous waste collection, sorting, and recycling infrastructure investments. Thus, Vietnam continues to research to create a mechanism to encourage the implementation of this economic model by providing incentives, tax priorities, and other support policies. In the long term, it is necessary to form enterprises that provide support services to manufacturing enterprises in implementing the circular economy.

Vietnam continues building an in-depth economic growth model, effectively using input resources and applying science and technology to industries, especially waste treatment, to regenerate new materials. Regulating a roadmap to replace fuels, products using hazardous materials, single-use products with environmentally friendly fuels and materials, and reusable products prolonging their useful life. Build a database on the knowledge economy associated with digital economic transformation and the Fourth Industrial Revolution. Promote cooperation and linkage between economic sectors and social organizations in developing the knowledge economy in Vietnam, in which the Government plays a leading and creating role.

4. The research result showed that the “reuse” factor affected the circular economy in Vietnam with a significant level of 0.01 and a standardized estimate is 0.127. The study results are consistent with reality and the same results as the study (Geissdoerfer et al., 2017; Gardas et al., 2019). Difficulties and challenges still come from the small demand for cyclic products and substitutes; the lack of qualified and technical experts to implement this new economic model; The current measure of gross domestic product (GDP) index does not focus on considering social and environmental factors, and does not encourage value creation in both these areas. Thus, Vietnam must refer to the successful experience of developed countries, such as France, Sweden, etc.,

on waste management and treatment technology. Accordingly, it is necessary to soon issue standards, regulations, and guidelines for collecting, transporting, and reusing ash and slag from coal-fired power plants.

Vietnam should have incentives for enterprises to process ash consumption. In the context that the Fourth Industrial Revolution is taking place firmly, affecting all areas of social life, research, and promotion of technological innovation, moving from the real world to the digital world will be the foundation of significant future opportunities to implement circular economy development, bringing higher growth efficiency. To raise awareness among manufacturers and the public about their responsibilities towards products throughout their life cycle. Focus on prioritizing financial resources to transform production methods; at the same time, the development of the circular economy must be associated with scientific innovation and access to advanced technology. To develop a circular economy, it is necessary to soon build a team of sound experts, to solve problems well from the beginning to the end of the process.

5. The research result showed that the “recover/refuse” factor affected the circular economy in Vietnam with a significance level of 0.01 and a standardized estimate is 0.190. The study results are consistent with reality and the same results as the study (Geissdoerfer et al., 2017; Wang et al., 2014). The circular economy requires the classification and cleaning of waste before being reused or recycled, which is a significant challenge for the practical operation of the Vietnamese economy and the sense of quality classification of waste at people's source. Thus, Vietnam continues optimizing input materials; control and management should be considered and implemented throughout the system, including all processes and infrastructure closely related to resources or activities. Human production, as well as the distribution of the generated energy. At the same time, it strengthens international cooperation and promotes the role of the non-state business community in the pilot implementation of the supposed new model in Vietnam today.

Businesses must consider solving problems for the immediate short-term benefit or accepting to

go slower to accelerate in the future. Because investment in new technology will push up product prices, which may affect the consumption and competitiveness of products and services in the short term. However, if we continue to follow the path of the current production model, we will face risks in the future when the source of raw materials and fossil materials is increasingly depleted. Vietnam should put into the education - training program at all levels the knowledge about the mathematical economy to provide the basic knowledge about the mathematical economy; at the same time, training human resources capable of operating the knowledge-based economy model associated with innovation and use of high technology.

The circular economy is not just about mitigating the harmful effects of the traditional, linear economy but also a systemic change that creates long-term resilience, business opportunities, and environmental and social benefits. At the same time, this is also a premise to realize the Sustainable Development Goals by ensuring sustainable production and consumption, such as reducing the rate of “declining” resources, preserving to meet the needs of future generations, raising people's awareness about reuse, waste recycling, and limit unnecessary consumption of single-use items; Extend manufacturer responsibility to support 100% waste-to-material recycling.

Shifting from a linear to a circular economy is a global trend, and Vietnam is no exception. That is the best way to solve the relationship between economic growth and the adverse effects of resource depletion, pollution, and environmental degradation, or in other words, no longer have to trade-off between economic development and ecological protection, realizing multiple goals of sustainable development simultaneously.

Finally, Vietnam needs to build a specialized agency to manage the operation and development of the circular economy, ensuring the implementation of this model follows its correct trajectory. The State plays a constructive role in the circular economy model, and businesses are the central driving force. Through law, the State creates a specific roadmap, clearly defining the responsibilities of manufacturers, distributors, and individual consumers

in classifying and recycling used waste products... However, the inspection and supervision of the implementation of these entities have not been mentioned. Therefore, Vietnam needs a specialized agency to supervise this activity, ensuring that each person and each production facility implements legal policies and practices of green production well, clean, and treat waste to regenerate new materials. In addition, developing strategies and roadmaps for businesses also need to have people checking and approving to provide timely recommendations and solutions, avoiding mistakes affecting the environment and wasting resources. For the smooth transition to a circular economy, the State needs to focus financial and technological resources, train highly specialized human resources, and proactively access advanced technology, especially in the current 4.0 technology era.

5. Conclusions

Based on research results, the article found five critical determinants of the circular economy with a significance of 1.0 percent. To realize this orientation requires the efforts of all sectors of society, especially businesses are the central driving force, the State plays the role of creating, leading, and the community participates in the real world to change the perception and behavior of the whole society. Proposals and recommendations for circular economy development in Vietnam following. First, for the circular economy to develop, it is necessary to have a legal framework and policies to create conditions and support for circular business, helping businesses applying this model to solve resource difficulties, especially in the early stages when the cost of the circular business model is relatively high due to the application of new and modern technologies, high-quality human resources, and increased risks during operation. It is necessary to have a clear legal corridor for the formation and development of the circular economy, from the Party's guidelines to the State's laws. Countries implementing the circular economy have clear directions and legal regulations. Vietnam needs to have a roadmap and move towards developing rules for circular economy development. Secondly, it is necessary to conduct extensive research on circular economy

development from the global common approach, principles established by industry and field, deploy models and criteria of the circular economy model, thereby choosing to apply specifically to practical situations in Vietnam and widely disseminate to businesses, people, managers to have the correct recognition. Third, circular economy development must be based on sectors and localities implementing economic models close to the circular economy approach, complementing and making appropriate choices for each industry and field from pilot to replication. Fourth, create mechanisms to form market dynamics based on the criteria of investment efficiency, encourage enterprises and people, especially the private sector, to invest and develop the fields of the circular economy, clearly establishing the role of enterprises in implementing circular economy development. Circular economy models are associated with high technology and the Fourth Industrial Revolution, so there should be mechanisms and policies to develop clean technology, reuse, and waste recycling. Waste must become a resource in the economy in terms of both production and consumption. Fifth, enhance exchange and learn from international experiences, especially countries that have successfully implemented the circular economy, thereby transferring and applying to specific circumstances of Vietnam.

To realize practical implications and this orientation requires the efforts of all sectors of society, especially those that are the central driving force; the State plays the role of creating leading, and the community participates in implementation to change both awareness and behavior of the whole society. The circular economy is one of the breakthrough recommendations for harmoniously resolving the relationship between economic development and environmental protection. Developing a circular economy is not possible in a short period; this is a long-term process requiring efforts, efforts, and consensus from all people in different fields, not only the environmental field. Every person, production facility, organization, and business needs to be aware of the importance of the environment to their lives and implement circular economic development well. Vietnam must complete a solid and comprehensive legal corridor for this economic

model to become popular, widespread, and highly effective. From there, contributing to promoting the development of the national economy, protecting the living environment, saving natural resources, and creating the economic value we create are truly meaningful. Vietnam will grow stronger and advance internationally by demonstrating the nation's responsibility and obligations towards common global difficulties.

Acknowledgments

The authors thank all lecturers and managers of the University of Finance - Marketing (UFM), Ho Chi Minh City. This article is supported and funded by UFM, Vietnam.

References

- Accorsi, R., Manzini, R., Pini, C., & Penazzi, S. (2015). On the design of closed-loop networks for product life cycle management: Economic, environmental and geography considerations. *Journal of Transport Geography*, 48(3), 121-134. <https://doi.org/10.1016/j.jtrangeo.2015.09.005>.
- Adams, K., Osmani, M., Thorpe, T., & Thornback, J. (2017). Circular economy in construction: current awareness, challenges, and enablers. In *Proceedings of the Institution of Civil Engineers-waste and Resource Management*, 170(1), 15-24. <https://doi.org/10.1680/jwarm.16.00011>.
- Adler, G., Duval, R., Furceri, D., Celik, S., Koloskova, K., & Poblowski-Ribeiro, M. (2017). *Gone with the headwinds: Global productivity*. IMF Staff Discussion Note 17/04, International Monetary Fund, Washington, DC.
- Allwood, J. M., Ashby, M. F., Gutowski, T. G., & Worrell, E. (2011). Material efficiency: A white paper. *Resources, Conservation, and Recycling*, 55(3), 362-381. <https://doi.org/10.1016/j.resconrec.2010.11.002>.
- Beitzen-Heineke, E. F., Balta-Ozkan, N., & Reefke, H. (2017). The prospects of zero-packaging grocery stores to improve the social and environmental impacts of the food supply chain. *Journal of Cleaner Production*, 140(3), 1528-1541. <https://doi.org/10.1016/j.jclepro.2016.09.227>.
- Dong, L., Fujita, T., Dai, M., Geng, Y., Ren, J., Fujii, M., & Ohnishi, S. (2016). Towards preventative eco-industrial development: an industrial and urban symbiosis case in one typical industrial city in China. *Journal of cleaner production*, 114(15), 387-400. <https://doi.org/10.1016/j.jclepro.2015.05.015>.
- Esposito, M., Tse, T., & Soufani, K. (2017). Is the circular economy a new fast-expanding market?. *Thunderbird International Business Review*, 59(1), 9-14. <https://doi.org/10.1002/tie.21764>.
- Gardas, B. B., Raut, R. D., & Narkhede, B. (2019). Identifying critical success factors to facilitate reusable plastic packaging towards sustainable supply chain management. *Journal of environmental management*, 236(3), 81-92. <https://doi.org/10.1016/j.jenvman.2019.01.113>.
- Geissdoerfer, M., Morioka, S. N., de Carvalho, M. M., & Evans, S. (2018). Business models and supply chains for the circular economy. *Journal of Cleaner Production*, 190(20), 712-721. <https://doi.org/10.1016/j.jclepro.2018.04.159>.
- Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The circular economy—a new sustainability paradigm?. *Journal of Cleaner Production*, 143(1), 757-768. <https://doi.org/10.1016/j.jclepro.2016.12.048>.
- Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114(15), 11-32. <https://doi.org/10.1016/j.jclepro.2015.09.007>.
- Govindan, K., & Hasanagic, M. (2018). A systematic review on drivers, barriers, and practices towards a circular economy: A supply chain perspective. *International Journal of Production Research*, 56(1), 278-311. <https://doi.org/10.1080/00207543.2017.1402141>.
- Hair, J., Anderson, R., Tatham, R., & Black, W. (2021). *Multivariate data analysis*. US: Prentice-Hall: Upper Saddle River, NJ, USA.
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127(3), 221-232. <https://doi.org/10.1016/j.resconrec.2017.09.005>.
- Korhonen, J., Nuur, C., Feldmann, A., & Birkie, S. E. (2018). The circular economy is an essentially contested concept. *Journal of Cleaner Production*, 175(20), 544-552. <https://doi.org/10.1016/j.jclepro.2017.12.111>.
- Lahti, T., Wincent, J., & Parida, V. (2018). A definition and theoretical review of the circular economy, value creation, and sustainable business models: Where are we now and where should research move in the future?. *Sustainability*, 10, 2799-2798.
- Meyer, D. F., Masehla, T. M., & Kot, S. (2017). The relationship between economic growth and economic development: A regional assessment in South Af-

- rica. *Journal of Advanced Research in Law and Economics*, 10(8), 1377-1385. <https://doi.org/10.3390/su10082799>.
- Ormazabal, M., Prieto-Sandoval, V., Puga-Leal, R., & Jaca, C. (2018). Circular economy in Spanish SMEs: challenges and opportunities. *Journal of Cleaner Production*, 185(4), 157-167. <https://doi.org/10.1016/j.jclepro.2018.03.031>.
- Schroeder, P., Anggraeni, K., & Weber, U. (2019). The relevance of circular economy practices to sustainable development goals. *Journal of Industrial Ecology*, 23(1), 77-95. <https://doi.org/10.1111/jiec.12732>.
- Smol, M., Kulczycka, J., & Avdiushchenko, A. (2017). Circular economy indicators in relation to eco-innovation in European regions. *Clean Technologies and Environmental Policy*, 19(4), 669-678. <https://doi.org/10.1007/s10098-016-1323-8>.
- Thai, T. M. N (2021). Research on circular economy solutions - CE applied to small and medium enterprises in Vietnam. *Environmental Magazine*, 1(1), 12-23.
- Tseng, M. L., Tan, R. R., Chiu, A. S., Chien, C. F., & Kuo, T. C. (2018). Circular economy meets industry 4.0: Can big data drive industrial symbiosis?. *Resources, Conservation, and Recycling*, 131(4), 146-157. <https://doi.org/10.1016/j.resconrec.2017.12.028>.
- Ünal, E., Urbinati, A., & Chiaroni, D. (2019). Managerial practices for designing circular economy business models: IMS. *Journal of Manufacturing Technology Management*, 30(3), 561-589. <https://doi.org/10.1108/JMTM-02-2018-0061>.
- Wang, P., Che, F., Fan, S., & Chen, G. (2014). Ownership governance, institutional pressures, and circular economy accounting information disclosure. *Chinese Management Studies*, 8(3), 487-501. <https://doi.org/10.1108/CMS-10-2013-0192>.
- Zink, T., & Geyer, R. (2017). Circular economy rebound. *Journal of Industrial Ecology*, 21(3), 593-602. <https://doi.org/10.1111/jiec.12545>.