

---

**International Journal of Productivity and Performance Management - IJPPM-03-2022-0144.R1**

1 message

---

**International Journal of Productivity and Performance Management**Tue, May 24, 2022 at  
10:05 PM

&lt;onbehalfof@manuscriptcentral.com&gt;

Reply-To: jeniwebster123@gmail.com

To: wayanediarsawan@pnb.ac.id, victor-koval@ukr.net, dwi.suhartanto@polban.ac.id, dsuhartanto@hotmail.com, dessyhariyanti@pnb.ac.id, pnv20@ukr.net, bondarv1801@gmail.com, comorcid.org

24-May-2022

Dear Dr. Arsawan,

Your revised manuscript entitled "Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment" has been successfully submitted online and is presently being given full consideration for publication in the International Journal of Productivity and Performance Management.

Your manuscript ID is IJPPM-03-2022-0144.R1.

Please be aware that due to the current pandemic the editorial team are experiencing a significant rise in submissions, whilst also accommodating additional work from their respective institutions. We kindly request your patience with the review process at this time. Thank you.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/ijppm> and edit your user information as appropriate.

You can also view the status of your manuscript at any time by checking your Author Centre after logging in to <https://mc.manuscriptcentral.com/ijppm>

Please note that Emerald requires you to clear permission to re-use any material not created by you. If there are permissions outstanding, please upload these when you submit your revision or send directly to Emerald if your paper is accepted immediately. Emerald is unable to publish your paper with permissions outstanding.

Open Access?

All of our subscription journals give you the option of publishing your article open access, following payment of an article processing charge (APC). To find the APC for your journal, please refer to the APC price list: [http://www.emeraldgroupublishing.com/openaccess/apc\\_price\\_list.pdf](http://www.emeraldgroupublishing.com/openaccess/apc_price_list.pdf)

Emerald has established partnerships with national consortium bodies to offer a number of APC vouchers for eligible regions and institutions. To check your eligibility please refer to the open access partnerships page: <http://www.emeraldgroupublishing.com/openaccess/oapartnerships.htm>

If you would like to publish your article open access please contact [openaccess@emeraldgroup.com](mailto:openaccess@emeraldgroup.com)

Thank you for submitting your manuscript to the International Journal of Productivity and Performance Management.

Yours sincerely,  
Jennifer Webster  
International Journal of Productivity and Performance Management

<https://orcid.org/0000-0001-8493-5249>

---

**International Journal of Productivity and Performance Management - IJPPM-03-2022-0144.R2**

1 message

---

**International Journal of Productivity and Performance Management**Sun, Mar 5, 2023 at  
6:16 PM

&lt;onbehalf@manuscriptcentral.com&gt;

Reply-To: jeniwebster123@gmail.com

To: wayanediarsawan@pnb.ac.id, victor-koval@ukr.net, dwi.suhartanto@polban.ac.id, dsuhartanto@hotmail.com, dessyhariyanti@pnb.ac.id, pnv20@ukr.net, bondarv1801@gmail.com, comorcid.org

05-Mar-2023

Dear Dr. Arsawan,

Your revised manuscript entitled "Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment" has been successfully submitted online and is presently being given full consideration for publication in the International Journal of Productivity and Performance Management.

Your manuscript ID is IJPPM-03-2022-0144.R2.

Please be aware that the editorial team are experiencing a significant rise in submissions, whilst also accommodating additional work from their respective institutions. We kindly request your patience with the review process at this time. Thank you.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/ijppm> and edit your user information as appropriate.

You can also view the status of your manuscript at any time by checking your Author Centre after logging in to <https://mc.manuscriptcentral.com/ijppm>

Please note that Emerald requires you to clear permission to re-use any material not created by you. If there are permissions outstanding, please upload these when you submit your revision or send directly to Emerald if your paper is accepted immediately. Emerald is unable to publish your paper with permissions outstanding.

Thank you for submitting your manuscript to the International Journal of Productivity and Performance Management.

Yours sincerely,

Jennifer Webster

International Journal of Productivity and Performance Management

---

**International Journal of Productivity and Performance Management - IJPPM-03-2022-0144**

1 message

---

**International Journal of Productivity and Performance Management**Thu, Mar 17, 2022 at  
3:09 PM

&lt;onbehalf@manuscriptcentral.com&gt;

Reply-To: jeniwebster123@gmail.com

To: wayanediarsawan@pnb.ac.id, victor-koval@ukr.net, dwi.suhartanto@polban.ac.id, dsuhartanto@hotmail.com, dessyhariyanti@pnb.ac.id, pnv20@ukr.net, bondarv1801@gmail.com, comorcid.org

17-Mar-2022

Dear Dr. Arsawan,

Your manuscript entitled "Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment" has been successfully submitted online and is presently being given full consideration for publication in the International Journal of Productivity and Performance Management.

Your manuscript ID is IJPPM-03-2022-0144.

Please be aware that due to the current pandemic the editorial team are experiencing a significant rise in submissions, whilst also accommodating additional work from their respective institutions. We kindly request your patience with the review process at this time. Thank you.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/ijppm> and edit your user information as appropriate.

You can also view the status of your manuscript at any time by checking your Author Centre after logging in to <https://mc.manuscriptcentral.com/ijppm>.

Please note that Emerald requires you to clear permission to re-use any material not created by you. If there are permissions outstanding, please upload these when you submit your revision or send directly to Emerald if your paper is accepted immediately. Emerald is unable to publish your paper with permissions outstanding.

Open Access?

All of our subscription journals give you the option of publishing your article open access, following payment of an article processing charge (APC). To find the APC for your journal, please refer to the APC price list: [http://www.emeraldgrouppublishing.com/openaccess/apc\\_price\\_list.pdf](http://www.emeraldgrouppublishing.com/openaccess/apc_price_list.pdf)

Emerald has established partnerships with national consortium bodies to offer a number of APC vouchers for eligible regions and institutions. To check your eligibility please refer to the open access partnerships page: <http://www.emeraldgrouppublishing.com/openaccess/oapartnerships.htm>

If you would like to publish your article open access please contact [openaccess@emeraldgroup.com](mailto:openaccess@emeraldgroup.com)

Thank you for submitting your manuscript to the International Journal of Productivity and Performance Management.

Yours sincerely,  
Jennifer Webster  
International Journal of Productivity and Performance Management

<https://orcid.org/0000-0001-8493-5249>

---

**International Journal of Productivity and Performance Management - Decision on Manuscript ID IJPPM-03-2022-0144.R2**

1 message

**International Journal of Productivity and Performance Management**

Tue, Mar 14, 2023 at

&lt;onbehalfof@manuscriptcentral.com&gt;

12:44 AM

Reply-To: luisa.huatuco@york.ac.uk

To: wayanediarsawan@pnb.ac.id, victor-koval@ukr.net, dwi.suhartanto@polban.ac.id, dsuhartanto@hotmail.com, dessyhariyanti@pnb.ac.id, pnv20@ukr.net, bondarv1801@gmail.com, bondarv1801@gmail.com

13-Mar-2023

Dear Arsawan, I Wayan; Koval, Viktor; suhartanto, dwi; Hariyanti, Ni Kadek Dessy; Polishchuk, Nataliia ; Bondar, Viktoriia

It is a pleasure to accept your manuscript IJPPM-03-2022-0144.R2, entitled "Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment" in its current form for publication in International Journal of Productivity and Performance Management. Please note, no further changes can be made to your manuscript.

This email will be followed by a second message containing a copy of your author accepted manuscript (AAM) which is the version that we will typeset and publish in the journal.

Your article will now go through editorial checks by Emerald's editorial team to ensure it meets our publication standards. These checks can take up to five days; we'll be in touch if we have any queries at this stage. Once this step has been completed you will receive an email directing you to Emerald Submit to select your publishing licence and submit your article to production. If you are publishing in one of our subscription journals and wish to make your article open access you can choose this option in Emerald Submit.

If you have not received an email with editorial queries or an invitation to complete licensing on Emerald Submit within 10 working days of acceptance, please do contact the JEO (Journal Editorial Office), you can find their details on the journal homepage:

<https://www.emeraldgroupublishing.com/journal/ijppm>

Once you have completed licensing on Emerald Submit, your article will enter the production process and you'll be provided with a proof. You will need to approve your proof before your article is published. If you have any queries about the proofing system you can contact the journal's Supplier Project Manager (SPM) whose contact details are on the journal homepage: <https://www.emeraldgroupublishing.com/journal/ijppm>.

By publishing in this journal your work will benefit from Emerald EarlyCite. Once the above steps are completed your article will be published online in EarlyCite. EarlyCite is the author proofed, typeset version of record, fully citable by DOI. The EarlyCite article sits outside of a journal issue and is paginated in isolation. The EarlyCite article will later be collated into a journal issue according to the journals' publication schedule.

Thank you for your contribution. On behalf of the Editors of International Journal of Productivity and Performance Management, we look forward to your continued contributions to the Journal.

Yours sincerely,  
Dr Luisa Huaccho Huatuco  
Co-Editor, International Journal of Productivity and Performance Management  
[luisa.huatuco@york.ac.uk](mailto:luisa.huatuco@york.ac.uk)

Tell us how we're doing! We'd love to hear your feedback on the submission and review process to help us to continue to support your needs on the publishing journey.

Simply click this link <https://eu.surveymonkey.com/r/F8GZ2XW> to complete a short survey and as a thank you for taking part you have the option to be entered into a prize draw to win £100 in Amazon vouchers. To enter the prize draw you will need to provide your email address.

---

## Emerald's green open access policy and self-archiving Instructions

1 message

---

**International Journal of Productivity and Performance Management**

Tue, Mar 14, 2023 at  
12:44 AM

<onbehalf@manuscriptcentral.com>

Reply-To: permissions@emerald.com

To: wayanediarsawan@pnb.ac.id, victor-koval@ukr.net, dwi.suhartanto@polban.ac.id, dsuhartanto@hotmail.com, dessyhariyanti@pnb.ac.id, pnv20@ukr.net, bondarv1801@gmail.com, orcid.org

13-Mar-2023

Dear Arsawan, I Wayan; Koval, Viktor; suhartanto, dwi; Hariyanti, Ni Kadek Dessy; Polishchuk, Nataliia ; Bondar, Viktoriia,

"Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment" - IJPPM-03-2022-0144.R2

Congratulations on having your article accepted for publication.

Please find a PDF of your Author Accepted Manuscript (AAM) attached. Please ensure you store this safely, as you will need it if you want to self-archive your work. This PDF is not a proof of your work; you will be sent a proof once your article has been typeset.

Please note: The PDF must be opened with Adobe Acrobat Reader. Download the PDF, open Adobe Acrobat Reader then go to File, select Open, locate the PDF in your Downloads folder and open it.

### Next steps

Your article will now go through editorial checks by Emerald's editorial team to ensure it meets our publication standards; we'll be in touch if we have any queries. Once this stage is complete you will then receive an email directing you to Emerald Submit to complete your publishing licence.

Once the licence is completed, your article will enter the production process and you'll be provided with a proof. You will need to approve your proof before your article is published.

### Emerald's self-archiving policy

Emerald is aware that many authors wish to make their work available in institutional repositories or are mandated to do so by their funders. Emerald operates a zero embargo policy across all of its journals; this enables all of our authors to make their article open access via a 'green' route.

This means that as soon as your article has been published in the journal on Emerald insight, you may make the full text of your AAM available within your personal website, institutional repository (IR), or SCN signed up to the Voluntary STM Sharing Principles. The AAM may also be shared with interested individuals, for teaching and training purposes at your own institution and for grant applications.

### How to deposit the AAM of your article

For full information on how to deposit your work, please visit our author rights page. Please refer to the terms of your own institution or funder to ensure full compliance.

If you are required to deposit your article in your institution's repository, you will need to:

- Either manually deposit the accepted manuscript attached to this email or a version from your own records (it must be the version accepted for publication by the journal's Editor) into your repository;

Or, if applicable, forward your AAM to your institution's Repository Manager.

To deposit your AAM, you will need to adhere to the following conditions:

- You must include the DOI (10.1108/IJPPM-03-2022-0144) of your article;
- Include all of the relevant metadata (article title, journal name, volume, issue no. etc.).
- Include the date your article was accepted for publication, which was:  
(13-Mar-2023)
- The AAM must clearly indicate where the article was published, or where it is forthcoming;
- Include a clear licensing statement (see below).
- Include the article abstract (see below):

The present study aimed to examine the relationship between green economic incentives and environmental commitment as

drivers of the circular economy practices in Small and Medium Enterprises.

A cross-sectional study of 594 assistant managers and SME managers was used while data was analyzed through Smart PLS. The results showed that green economic incentives positively affect the SMEs' environmental commitment and the circular economy practice model. Furthermore, environmental commitment is the mediator between green economic incentives and the three circular economy practices: internal environmental management, eco-design, and corporate asset management and recovery.

The present study provided a basis for understanding the relevance of SMEs' circular economy practices and designing a strategic plan for its implementation. Also, it provides insight into that collaboration between triple helix (the government, SMEs, and the community) is needed in increasing environmental awareness towards sustainability.

This study enhanced the natural resource-based view (NRBV), describing the mechanisms that view green economic incentives (GEI) and environmental commitment (EC) as pollution prevention in circular economy practice.

#### Deposit licences

Emerald allows authors to deposit their AAM under the Creative Commons Attribution Non-commercial International Licence 4.0 (CC BY-NC 4.0). To do this, the deposit must clearly state that the AAM is deposited under this licence and that any reuse is allowed in accordance with the terms outlined by the licence. To reuse the AAM for commercial purposes, permission should be sought by contacting [permissions@emerald.com](mailto:permissions@emerald.com).

Emerald appreciates that some authors may not wish to use the CC BY-NC licence; in this case, you should deposit the AAM and include the copyright line of the published article. Should you have any questions about our licensing policies, please contact [permissions@emerald.com](mailto:permissions@emerald.com). For more information on the deposit licenses, please see our deposit information: <https://www.emeraldgroupublishing.com/our-services/authors/author-policies/author-rights#deposit>

Please note that the full text of the AAM must only appear in the institutional repository once the final version of the article has been published on Emerald insight ([www.emeraldinsight.com](http://www.emeraldinsight.com)). You do not need to wait for the article to be assigned to an issue.

If you have any questions about Emerald's repository policy, please contact [permissions@emerald.com](mailto:permissions@emerald.com).

Congratulations once more on having your article accepted and thank you for choosing to publish with Emerald.

Kind Regards,

Laura Wilson

Head of Research Integrity, Rights & Policy, Emerald Publishing

---

 **PDF\_Proof.PDF**  
604K

---

## Your paper has been assigned to an issue

1 message

---

noreplies@emerald.com <noreplies@emerald.com>

Wed, Mar 13, 2024 at 9:00 PM

Reply-To: "noreplies@emerald.com" <reply-fe851c777262027971-409\_HTML-731818996-7214338-

305@email.emeraldinsight.com>

To: dessyhariyanti@pnb.ac.id

[View this message online](#) | [Forward to a friend](#)



*\*\* Please note that this email has been sent from a mailbox which is not monitored. If you have a query in relation to your role as an author, please refer to the FAQs within this message. \*\**

Dear Assistant Hariyanti,

We're pleased to let you know that your paper '[Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment](#)' has now been assigned a volume and page numbers.

You can find lots of information including [copyright information](#) and contacts on our [author pages](#).

If you have any questions regarding your access, please contact [support@emerald.com](mailto:support@emerald.com).

Kind regards

The Emerald Team



**Want to keep up-to-date with the latest research in your field?** You can review your email preferences [here](#).

---

Together we can make a Real Impact.



*You are receiving this service communication as it contains important information relevant to your role as a valued Emerald customer or contributor. Please note that this is not a marketing email.*

**Your privacy:**

We are contacting you at the following address - [dessyhariyanti@pnb.ac.id](mailto:dessyhariyanti@pnb.ac.id). Emerald is committed to protecting your personal information and we will only process your data in line with our privacy notice, [available here](#), which explains how we use and share your personal information and your rights in relation to this.

If you are no longer the correct person to receive this information or your contact details have changed, please [email noreplies@emerald.com](mailto:noreplies@emerald.com).

**Company information:**

Emerald Publishing Limited is a company registered in England with number 3080506, VAT No. GB 665 3593 06 and registered office at Howard House, Wagon Lane, Bingley, West Yorkshire, BD16 1WA, United Kingdom.

© Emerald Publishing Limited



---

## Congratulations Assistant Hariyanti, your article has been published!

1 message

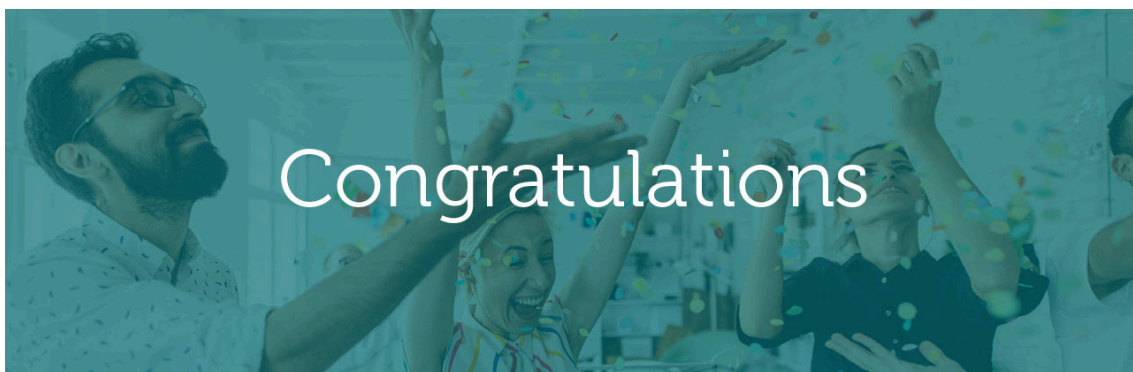
noreplies@emerald.com <noreplies@emerald.com>

Wed, Apr 19, 2023 at 8:01 PM

Reply-To: "noreplies@emerald.com" <reply-fe80137770630d7872-409\_HTML-731818996-7214338-259@email.emeraldinsight.com>

To: dessyhariyanti@pnb.ac.id

[View this message online](#) | [Forward to a friend](#)



*\*\* Please note that this email has been sent from a mailbox which is not monitored. If you have a query in relation to your role as an author, please refer to the FAQs within this message. \*\**

Dear Assistant Hariyanti,

Your work has now been published as EarlyCite to ensure there is no delay in your research being read and driving change. It's the final version of your work and can be cited, downloaded and shared. It does not yet have an issue number or page number, but you will be contacted again when this has been finalised.

To thank you for publishing '[Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment](#)' in *International Journal of Productivity and Performance Management*, we have given you access to our extensive collection of peer-reviewed journals (excluding Backfiles) where you'll be able to download up to 40 articles for your own personal use, within 90 days of receiving this email.

Download your articles [now](#).

For a detailed **step-by-step guide** on how to use your tokens please visit this [website](#).

If you have any questions regarding your access, please contact [support@emerald.com](mailto:support@emerald.com).

---

### Need help with your article?

If you have a query that relates to one of the below, please contact your Supplier Project Manager (SPM). Their details can be found on the journal homepage.

- Post-publication corrections
- I have found an error in my paper
- When will I be given an issue number or a page number?
- My affiliation has changed
- The publication year on my published article is wrong

For all other queries relating to your article please view our [FAQs](#).

---

You can also find lots of information including [copyright information](#) and contacts on our [author pages](#).



Kind regards

The Emerald Team  
[emerald.com/insight](https://emerald.com/insight)



**Want to keep up-to-date with the latest research in your field?** You can review your email preferences [here](#).

---

Together we can make a Real Impact.



You have received this email because you've recently published an article with Emerald. As part of your publishing journey, we will send you a series of emails which are designed to support you by providing useful resources to help you make the most of your research. If you'd prefer not to receive subsequent emails in this series, you can [opt out here](#).

**Your privacy:**

We are contacting you at the following address - [dessyhariyanti@pnb.ac.id](mailto:dessyhariyanti@pnb.ac.id). Emerald is committed to protecting your personal information and we will only process your data in line with our privacy notice, [available here](#), which explains how we use and share your personal information and your rights in relation to this.

If your contact details have changed, please email [replies@emerald.com](mailto:replies@emerald.com).

**Company information:**

Emerald Publishing Limited is a company registered in England with number 3080506, VAT No. GB 665 3593 06 and registered office at Howard House, Wagon Lane, Bingley, West Yorkshire, BD16 1WA, United Kingdom.

© Emerald Publishing Limited

# Circular economy practices in SMEs: aligning model of green economic incentives and environmental commitment

Circular  
economy  
practices in  
SMEs

775

I. Wayan Edi Arsawan

*Department of Business Administration, Politeknik Negeri Bali, Tuban, Indonesia*

Viktor Koval

*Izmail State University of Humanities, Odessa, Ukraine*

Dwi Suhartanto

*Department of Business Administration, Politeknik Negeri Bandung, Bandung, Indonesia*

Ni Kadek Dessy Hariyanti

*Department of Business Administration, Politeknik Negeri Bali, Tuban, Indonesia*

Nataliia Polishchuk

*Vocational Education, Labor Training and Technology, Rivne State University for Humanities, Rivne, Ukraine, and*

Viktoriiia Bondar

*Odesa National University of Technology, Odessa, Ukraine*

Received 17 March 2022

Revised 24 May 2022

5 March 2023

Accepted 13 March 2023

## Abstract

**Purpose** – The present study aims to examine the relationship between green economic incentives (GEIs) and environmental commitment (EC) as drivers of the circular economy (CE) practices in small and medium enterprises (SMEs).

**Design/methodology/approach** – A cross-sectional study of 594 assistant managers and SME managers was used while data were analyzed through Smart PLS.

**Findings** – The results showed that GEIs positively affect the SMEs' EC and the CE practice model. Furthermore, EC is the mediator between GEIs and the three CE practices: internal environmental management, eco-design and corporate asset management and recovery (CAM&R).

**Practical implications** – The present study provided a basis for understanding the relevance of SMEs' CE practices and designing a strategic plan for its implementation. Also, it provides insight into that collaboration between triple helix (the government, SMEs and the community) is needed in increasing environmental awareness toward sustainability.

**Originality/value** – This study enhanced the natural resource-based view (NRBV), describing the mechanisms that view GEIs and EC as pollution prevention in CE practice.

**Keywords** Green economic incentives, Environmental commitment, Internal environmental management, Eco-design, Corporate asset management and recovery, Circular economy practices

**Paper type** Research paper



The authors expand their gratitude to the reviewers for their valuable and insightful comments, feedback, and recommendations for the paper improvements.

**Funding:** Thank you to the Ministry of Education and Cultural, Research Technology and Higher Education of the Republic of Indonesia, Directorate of Research, Technology and Community Service (DRTPM) for the research grant no. 085/SPK/D4/PPK.01.APTV/VII/2022 and 3163/PL8/PG/2022.

International Journal of  
Productivity and Performance  
Management  
Vol. 73 No. 3, 2024  
pp. 775-793  
© Emerald Publishing Limited  
1741-0401  
DOI 10.1108/IJPPM-03-2022-0144

## 1. Introduction

The circular economy (CE) is an essential environmental strategy concept for waste minimization, nature recuperation (Bag *et al.*, 2021), sharpening environmental conservation and efficient energy consumption for a sustainable business (Gupta *et al.*, 2021; Arsawan *et al.*, 2021) by paying great attention to the environment and resources (Korhonen *et al.*, 2018). As a result, industrial waste is a valuable input that can be repaired, reused and recycled (Bag *et al.*, 2021; Yadav *et al.*, 2020). It leads to oriented and environmental value products, methods and processes (Schroeder *et al.*, 2019). A CE approach benefits businesses and society with improved environmental awareness (Khan *et al.*, 2021; Centobelli *et al.*, 2021), lower resource price volatility, better customer relations and job opportunities (Ellen MacArthur Foundation, 2013).

The CE is affected by the internal and external environment. Internal factors include behavior (Ling and Xu, 2021; Saleem *et al.*, 2021), environmental commitment (EC) (Galkina, 2021; Lin *et al.*, 2015) and organizational capabilities (Prieto-Sandoval *et al.*, 2019; Singh *et al.*, 2018). Meanwhile, government pro-environmental regulations and support are considered external factors for CE practices (Bhupendra and Sangle, 2016; Lozano, 2012). The present study aimed to address various gaps, including the unavailability of studies on the SMEs' readiness for the CE (Singh *et al.*, 2018). First, although it affects economic growth (Suryantini *et al.*, 2021), the role of SMEs in saving the environment needs to be examined (Saleem *et al.*, 2021). A supportive ecosystem should be maintained to build sustainability through green-oriented strategies and innovation optimization (Arsawan *et al.*, 2021). Second, CE has not been comprehensively studied, especially in the SMEs sector, due to limited behavior and internal resource capabilities (Luthra *et al.*, 2022; Temminck *et al.*, 2015). It can be an opportunity for SMEs to improve internal capabilities (Centobelli *et al.*, 2021) for effective green marketing and new markets creation and design process, and circular products and attract a value-oriented talent environment (Barros *et al.*, 2021; Diaz *et al.*, 2021). Third, Singh *et al.* (2018) showed that green economic incentives (GEIs) do not contribute to building EC. However, the importance of green incentives in building EC was demonstrated by Centobelli *et al.* (2021). This divergence shows the need for more research on GEIs and EC to support SMEs' need for environmental self-regulation for environmental improvements (Lin *et al.*, 2015; Ling and Xu, 2021).

The present study was motivated by the research gaps and examined the relationship between GEIs, EC, internal environmental management (CE-IEM), eco-design (CE-ED), corporate asset management and recovery (CE-CAM&R) on SMEs in Indonesia for three reasons. First, Indonesia is a developing country with 64.5 million SMEs continuously growing and potentially boosting national economic growth (Arsawan *et al.*, 2022a). Consequently, government regulations must sustain environmental attention (Nurdiana *et al.*, 2021). Second, CE is at an early implementation stage and faces many challenges, particularly infrastructure and regulation (Fatimah *et al.*, 2020; Nurdiana *et al.*, 2021). For that reason, the government's role and efforts are crucial in making consistent regulations (Rizos *et al.*, 2015), increasing commitment environment (Singh *et al.*, 2016; Lin *et al.*, 2015) and providing GEIs for its implementation (Centobelli *et al.*, 2021; Singh *et al.*, 2018). Third, data from Schwab and World Economic Forum-WEF (2019) stated that this country lacks internal resources, particularly business dynamics capability, developing a sustainable innovation (Arsawan *et al.*, 2022b). However, the innovations should be environmentally oriented and environmentally friendly technologies (Agnello *et al.*, 2015). Furthermore, the second part of this study is the literature review, which includes the hypotheses formulation, while the third and fourth describes the method and the analysis, respectively. Finally, the last part contains a discussion, theoretical and managerial contributions, conclusions, research limitations and suggestions for further research.

## 2. Literature review and hypothesis development

### 2.1 *Natural resource-based view*

Hart (1995) coined the natural resource-based view (NRBV) to extend the resource-based view (Barney, 1991). Three additions were suggested, including (1) environmental-oriented capabilities for enhanced organizational profitability, (2) pollution preventive action and (3) product stewardship for reaching sustainable development (Hart, 1995). Pollution preventive action refers to effective waste and emissions management during the production process (Hart and Dowell, 2011). On the other side, product stewardship refers to the development of integrated design (Hart, 1995). Finally sustainable development refers to a production configuration “sustained indefinitely into the future” (Hart and Dowell, 2011). The influence of NRBV was tested by Hart and Dowell (2011) and found that previous research only focused on pollution prevention capabilities, leaving the other two capabilities unexplored. Based on this, this study examined the three NRBV capabilities role, namely GEIs as an effort to take precautions (Hart and Dowell, 2011), EC, also known as an effort to build environmentally oriented products, product life cycle strategies for enhanced product stewardship (Green *et al.*, 2015) while the CE is a sustainable development implementation (Liu *et al.*, 2018; Sarkis, 2012).

### 2.2 *Circular economy practices in small and medium enterprises*

The present study considered CE practices that require SMEs to integrate ecological requirements, including efficiency and reduction of raw, recycling, reuse and replacement of materials into organizational routine activities (Botezat *et al.*, 2018; Masi *et al.*, 2017). Circularity is considered as a solution-based framework system capable of addressing many social challenges such as waste management, climate change, pollution and loss of biodiversity (Appolloni *et al.*, 2023). In addition, CE practices provide new perspectives for developing efficient strategies and methodologies for sustainable environmental management (Sundar *et al.*, 2023). CE practices are divided into three main dimensions, including internal environmental management (Schmidt *et al.*, 2021), environmentally friendly design (Zhu *et al.*, 2011) and company assets management and recovery (Zhu *et al.*, 2011). First, internal environmental management is the preparation of environmentally-oriented procedures, such as green human resource management practices (Marrucci *et al.*, 2021; Bag *et al.*, 2021), training and development programs (Persis *et al.*, 2021) and environmental-based performance evaluation systems (Zhu *et al.*, 2011) and supporting organizational environmental objectives (Yadegaridehkordi *et al.*, 2023), building environmental ethics (York, 2009) and improving ecological performance (Lin *et al.*, 2015; Parker *et al.*, 2009; Pimenova and Van der Vorst, 2004). Second, eco-design describes the product design process considering environmental impacts (Lozano, 2012) and is an effective strategy to achieve eco-efficiency (Polverini, 2021; Dalhammar *et al.*, 2021). Therefore, product design must be environmentally oriented (Longo *et al.*, 2021). Apart from environmental efficiency, environmentally friendly design practices help companies to provide different products in the market (Dalhammar, 2016) and increase the global value proposition (Le Blévenec *et al.*, 2022). Third, the organizational assets management and recovery refers to the capability to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020) and recycle materials (Zhu *et al.*, 2011). For this reason, companies are required to implement strategies that mitigate emerging issues to gain greater value (Jain *et al.*, 2022), and it is a CE's substantial objective to be reached (Lieder and Rashid, 2016).

### 2.3 *Green economic incentives (GEI)*

GEIs from the government are needed by the organization to build and motivate pro-environmental behavior (Clemens, 2006) through financial (Ling and Xu, 2021) and supporting regulations (Parker *et al.*, 2009). Financial rewards support waste management (Ling and Xu, 2021), recycling and resource efficiency (Rizos *et al.*, 2015), as well as environmentally oriented innovations (Pieroni *et al.*, 2019). Supporting regulatory incentives

enhances environmentally-oriented product creation (Kurniawan *et al.*, 2021) and promotes self-regulation (Lin *et al.*, 2015). Meanwhile, GEI strengthens internal capabilities (Singh *et al.*, 2018) and positively influences the internal organizational decision-making processes (Rizos *et al.*, 2015). Incentives through subsidies, environmental grants, loans and tax concessions influence the behavior of owners/managers (Bradford and Fraser, 2008; Chang *et al.*, 2011) toward a CE (Roxas and Coetzer, 2012). Similarly, the government, supported by marketing and procurement of recycled raw materials helps SMEs enhance in pro-environmental practices (Pimenova and Van der Vorst, 2004; Tsimoshynska *et al.*, 2021). Therefore, economic support strengthens internal capabilities (Prieto-Sandoval *et al.*, 2019), stimulating green-oriented commitments (Sezen and Çankaya, 2013; Chang *et al.*, 2011). Thus, the government's important role in supporting the transition process from a linear economy to a CE is to provide financial support in the form of incentives to stakeholders (Sundar *et al.*, 2023). The GEI can be allocated to carry out sustainable procurement. Thus, it will lead to product life cycle costs, sustainable oriented innovation (Koval *et al.*, 2023), return on social investment, reduction of waste and the ability to produce environmentally friendly products (Shaikh *et al.*, 2023). The present study considered three indicators as green economy incentives determinants, namely (1) government subsidies and tax benefits (GSTB), (2) premium prices for green products (PP) and (3) cheaper recycled raw materials (CP).

#### 2.4 Environmental commitment

A company must have an internal and external environmental orientation to protect the environment (Saleem *et al.*, 2021) and to design green strategies (Arsawan *et al.*, 2021; Bradford and Fraser, 2008), as evidenced in environmental saving actions (Singh *et al.*, 2014). In this case, EC is an organization's ethical value in protecting the environment (Chang *et al.*, 2011) and green activities to reduce environmental degradation (Suryantini *et al.*, 2021), protecting business, society and its ecology (Appolloni *et al.*, 2021; York, 2009). It is viewed as a strategic business orientation (Singh *et al.*, 2014) which reflects the company's sustainable business attitude (Green *et al.*, 2015). EC involves manner, behavior, perspectives and economic benefits (Saleem *et al.*, 2021). Furthermore, Stone (2006) revealed the EC role in increasing green awareness and responsibility (Saleem *et al.*, 2021), which led to organizational pro-environmental sustainability, enhanced business performance and effective waste management (Singh *et al.*, 2016). However, considering the diversity of SMEs' effective implementation commitments (Parker *et al.*, 2009), environmental awareness is still low (Singh *et al.*, 2018) due to the assumption that waste management is not related to productivity (Saleem *et al.*, 2021; Parker *et al.*, 2009) and organizational profits (Bhupendra and Sangle, 2016). Therefore, the present study considered environmental products and processes (EPP) awareness, resource reuse and recycling (RRR) and environmental responsibility (ER) to measure the company's ECs.

#### 2.5 Hypothesis development

**2.5.1 Green economic incentives and environmental commitment.** The NRBV postulates that both orientations toward the environment and prevention of pollution are key for sustainable development (Hart, 1995). To be successful in this sustainable development, the government's involvement in implementing regulations (Fatimah *et al.*, 2020) and providing financial incentives is crucial (Botezat *et al.*, 2018). It means that GEI stimulates an organizational solution to increase EC (Zhang *et al.*, 2013; Clemens, 2006). Furthermore, the important role of the government in making regulations related to providing green incentives will change the perspective of SME managers about the importance of contributing to saving the environment (Singh *et al.*, 2018). GEIs are allocated to build sustainable oriented innovation (Koval *et al.*, 2023), return on social investment, reduction of waste and the ability to produce environmentally

friendly products (Shaikh *et al.*, 2023). Thus, green incentives have an impact on increasing EC. Based on the above description, the following hypothesis is formulated:

H1. GEI has a significant positive effect on EC.

*2.5.2 Green economic incentives and circular economy practices.* Several studies revealed that green incentives provided through financial (Clemens, 2006) and non-financial (Ling and Xu, 2021) could be allocated to make the internal environment guidelines such as the procurement process or recruiting employees with environmental conservation knowledge (Marrucci *et al.*, 2021; Bag *et al.*, 2021), preparation of training and development programs aimed to save the environment (Persis *et al.*, 2021) and environmentally sustainable strategies (Green *et al.*, 2015). Furthermore, the GEI is important in manufacturing of environmentally friendly products (Longo *et al.*, 2021; Lozano, 2012), enhancing environmental efficiency (Polverini, 2021). The green economy incentives increase the organization's internal capabilities for investment recovery (Schmidt *et al.*, 2021), reselling used materials and goods (Susanty *et al.*, 2020) and recycling materials (Zhu *et al.*, 2011), prolonging the product life cycle (Corona *et al.*, 2019). Consequently, the company adopts a better sustainability system (Lozano, 2012). Thus, by facilitating the adoption of CE strategies, organizations will be able to meet growing consumer demands, balancing economic growth, profit orientation and sustainable environmental management (Appolloni *et al.*, 2021). This discussion leads to the following hypotheses in line with the NRBV (Hart, 1995).

H2. GEI positively affects IEM.

H3. GEI positively affects ED.

H4. GEI positively affects CAM&R.

*2.5.3 Environmental commitment and circular economy practices.* The NRBV (Hart, 1995) implies that EC is considered the organization's first step in its role to save the environment for sustaining the development. It enhances the CE, especially in the internal environmental management, including planning, drafting, implementing and evaluating the internal sustainable programs such as pollution prevention and waste reduction (Schmidt *et al.*, 2021) and quality environment management (Zhang and Ma, 2021; York, 2009). In addition, commitment to the environment triggers cross-functional collaboration for environmental improvement (Appolloni *et al.*, 2022; Parker *et al.*, 2009). The collaborative structure built aims to identify environmental needs and enhance strong interactions in the value chain (Shaikh *et al.*, 2023). Further, EC is a starting point for SMEs to design energy-efficient products (Koval *et al.*, 2023), recyclable, safe raw materials and minimize waste (Schmidt *et al.*, 2021). Therefore, it can affect investment recovery, inventory effectiveness and sales of used goods and materials (Schmidt *et al.*, 2021). Based on the above description, the hypothesis is formulated as follows:

H5. EC positively affects IEM.

H6. EC positively affects ED.

H7. EC positively affects CAM&R.

*2.5.4 Mediating role of environmental commitment.* GEIs are significant in building organizational involvement and commitment to saving the environment. The government and non-governmental organizations benefit from adopting environmental initiatives (Singh *et al.*, 2018; Agnello *et al.*, 2015). Incentives include additional or financial rewards (Ling and Xu, 2021) that encourage organizations to design or implement environmental practices (Kahupi *et al.*, 2021). Previous studies stated that GEIs are allocated to design policies related to sustainable innovation (Koval *et al.*, 2023), return on social investment, waste reduction and



the ability to produce environmentally friendly products (Shaikh *et al.*, 2023) to provide added value economic, social and environmental (Gupta *et al.*, 2021; Yadegaridehkordi *et al.*, 2023). In addition, the incentive improves recycling techniques (Bag *et al.*, 2021) and facilitates the transition to a CE (Ling and Xu, 2021). Also, green economy incentives enhance dynamic capabilities (Prieto-Sandoval *et al.*, 2019) that affect decision-making processes. However, some SMEs perceive that investing in the CE increases costs more than the expected return (Rizos *et al.*, 2015). Consequently, the increasing EC will motivate SME managers to implement a CE (Kuo and Chang, 2021). Furthermore, the EC will strengthen the internal capabilities of SMEs (Marrucci *et al.*, 2021; Bag *et al.*, 2021), manufacture environmentally-friendly designed products (Longo *et al.*, 2021) and improve asset recovery and investment capabilities (Schmidt *et al.*, 2021). Therefore, the green economy incentives will increase EC and improve CE practices in SMEs. This discussion suggests that, for sustaining the development using the natural resource-based (Hart, 1995), EC has a key role in mediating the environmental effect on the circular practice modes. Thus, the following hypotheses are stated.

- H8. EC partially mediates the relationship of GEIs to internal environment management.
- H9. EC partially mediates the relationship of GEIs to eco-design.
- H10. EC partially mediates the relationship between GEIs on corporate asset management and recovery (CAM&R).

### 3. Methodology

The use of quantitative approaches such as surveys, statistics and structural modeling is intended to test the framework of the hypothesis or assess the relationship (correlation) between constructs (Appolloni *et al.*, 2022). In the social science context, this methodology has been used extensively, but a precise definition of the field of analysis is required (Sovacool *et al.*, 2018). Thus, to achieve the objectives of this study, a quantitative approach is relevant because it tests hypotheses based on structural equations.

#### 3.1 Data and sampling method

The present study uses a quantitative approach by distributing questionnaires that focus on SME-producing companies (with 50–200 full-time employees), which are the essential sector of the Indonesian economy that still grows and develops (Arsawan *et al.*, 2022a; Parwita *et al.*, 2021). The population is 1,299 SMEs located in nine regencies of Bali Province. A formula from Krejcie and Morgan (1970) was used to determine the sample frames, obtaining 297 SMEs. This selection was carried out using random sampling (lottery method). From the 297 SMEs, two respondents were recruited from each to fill out the research questionnaire. The total number of participants was 594 people including managers and assistant managers. The characteristics of SMEs were manufacturing, medical pharma/chemical, food, textile and woodcraft which is recommended by the government to reduce their production waste and carry out environmental conservation in a sustainable manner. Thus, the selection was triggered by assuming that they possess organizational characteristics and knowledge of CE practices. Data were collected from March to June 2021 via email and Google Forms and direct visits by first sending email notifications on this study agenda. The 594 responses were analyzed to achieve the aims of the present study. Table 1 presents the population information, sample frame and the number of respondents.

#### 3.2 Measurement

The magnitude of the variable construct used was based on previous empirical studies. Therefore, the previous study measurement was adopted for the subject: SMEs in Bali Province over nine districts. The construct indicators assessment used a seven-point Likert



scale, “1: strongly disagree to 7: strongly agree”. In order to avoid ambiguity, the questionnaire (in Indonesian) was tested on 30 SME CEOs with knowledge of the CE. The GEI variable was adopted from Singh *et al.* (2018) and Esfahbodi *et al.* (2016), consisting of 3 indicators. The EC variable was adopted from Singh *et al.* (2018) and Liu and Bai (2014), consisting of three indicators. In addition, the CE-IEM was adopted from Schmidt *et al.* (2021) and Zhu *et al.* (2011), consisting of 8 indicators. The CE-ED variable was adopted from Schmidt *et al.* (2021) and Zhu *et al.* (2011) with four indicators. Moreover, CE-CAM&R was adopted from Schmidt *et al.* (2021) and Zhu *et al.* (2011) with three indicators.

The present study used the variance-based partial least squares to test the hypothesis (PLS-SEM) with Smart PLS 3.2.9 software. The PLS-SEM was used to assess the relationship between constructs and their predictive power on endogenous variables (Hair *et al.*, 2014). The present study validated the CE practices model. The data were not assessed as normally distributed data, making the CE model assessment associated with GEIs and EC predictors using PLS-SEM appropriate (Hair *et al.*, 2016a, b).

#### 4. Results

Table 2 describes the characteristics of the 594 respondents.

##### 4.1 Measurement model

The VIFs test was used to evaluate the collinearity problem, scoring 2.872 (green economics incentives), 1.826 (EC), 3.558 (CE-Internal Environment Management), 1.832 (CE-Eco-Design) and 2.119 (CE-CAM&R). All VIF coefficients were lower than 5, which is the recommended limit value by Hair *et al.* (2016a) that the data do not have general variance problems. The outer model was tested to evaluate the reliability and validity of the construct variables. Table 3 shows that each item of factor loadings is more than 0.6. The convergent validity test explains that the validity requirements are met because the average extracted variance (AVE) is more than 0.5 and the factor loading is more than 0.6 (Hair *et al.*, 2016b). It shows that the discriminant validity conditions of all constructs have been met.

The Heterotrait-Monotrait Ratio (HTMT) assessed the discriminant constructs validity. According to Hair *et al.* (2016b) for this criteria, the value was lower than 0.9. Due to the values ranging from 0.384 to 0.701, the HTMT test showed that discriminant validity was achieved. The composite reliability values in both samples were above the recommended level of 0.7; therefore, the construct was reliable.

##### 4.2 Inner model measurement

The present study applied the bootstrap method with 5,000 samples to assess the research indicators and path coefficient's significance (Chin *et al.*, 2008). The results showed that the

No	SMEs business field (1)	Research population (2)	Population's percentage (3)	No of sample (4)	No of respondents (5)
1	Manufacturing	100	7.6	23	46
2	Medical	171	13.2	39	78
3	pharma/chemical				
4	Food	188	14.5	43	86
5	Textile	331	25.5	76	152
6	Woodcraft	405	31.2	92	184
	Others	104	8.0	24	48
	Total	1.299	100	297	594

Source(s): Bali Central Bureau of Statistics, 2021

**Table 1.**  
Population and  
sample frame

**Table 2.**  
Characteristics  
of respondents

Criteria	Data	Frequency	Percentage
Gender	Male	450	75.8
	Female	144	24.2
Age	21–30	39	6.6
	31–40	272	45.8
	41–50	238	40.1
	51–60	45	7.6
	61–70	550	92.6
Educational level	Bachelor	38	6.4
	Master	6	1.0
	Doctoral	56	9.4
Experience (years)	<5	157	26.4
	6–10	204	34.3
	11–15	134	22.6
	16–20	43	7.3
	>21 or more	305	51.3
Position	General managers	289	48.7
	Assistant managers		
<b>Source(s):</b> Authors calculation			

goodness-of-fit (GoF) model has a value of 0.367 which stated that the model is fit. In addition, testing on the standard residual root means square (SRMR) and normed fit index (NFI) shows that the SRMR value was 0.081 while the NFI was 0.716. The SRMR cut-off value was 0.8, and the NFI was below 0.9, which indicates that all criteria are met. The results showed that GEI explains EC by 0.268 (26.8%). The explanatory power of EC at CE-IEM was 0.347 (34.7%); at CE-ED, it was 0.224 (22.4%), and at CE-CAM&R, it was 0.212 (21.2%). In addition, the value of  $Q^2$  showed that all constructs have positive values and good predictive relevance (Chin, 2010).

4.3 Hypothesis testing

Table 4 shows the results of the relationship between GEIs, EC, internal environment management (CE-IEM), eco-design (CE-ED) and CE-CAM&R. We use path coefficients ( $\beta$ ),  $t$  values, and  $p$  values to test the hypotheses. According to Hair *et al.* (2016a,b), if the path coefficient is greater than 0.1,  $t$  value greater than 1.96, and 0.05 level of significance, the hypotheses are supported. The results support the significant role of GEI in achieving EC (H1) with CE-IEM (H2), CE-ED (H3) and CE-CAM&R (H4). Furthermore, EC has an important role in achieving CE-IEM (H5), CE-ED (H6) and CE-CAM&R (H7).

After examining the direct relationship, the next step was determining the mediating role as shown in Table 5. The present study tested three mediation patterns. According to Hair *et al.* (2014), the method used is to measure the VAF value < 0.20, meaning there is no mediation, while 0.20–0.80 indicates partial and the VAF value > 0.80 means full mediation. In order to test the model mediation effect, non-parametric bootstrap was used (Hair *et al.*, 2016a, b). Finally, variance values (VAF) were calculated to obtain indirect and total link sizes. When the VAF is greater than 80%, it shows full mediation; between 20 and 80% is partial; below 20% means no mediating effect (Hair *et al.*, 2013) (see Figure 1).

The mediating role in the causal relationship between GEI and CE-IEM, CE-ED and CE-CAM&R was examined using VAF assays. This study tested three mediation pathways and concluded that EC partially mediates the relationship between GEI and CE-IEM, where the VAF value is 35.90%, indicating that hypothesis 8 is accepted. EC also functions as a partial mediating relationship between GEI and CE-ED, with a VAF value of 24.10%, which means that hypothesis 9 is accepted. At the same time, EC functions as a partial mediating relationship between GEI and CE-CAM&R, with a VAF value of 65.50%, which means that hypothesis 10 is accepted (Figure 2).

Description	Loading	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
Green Economic Incentives		0.848	0.847	0.908	0.768
The government provides subsidies and tax benefits for the implementation of CE practices (GSTB)	0.879				
Industrial/direct buyers are ready to pay a premium price for green products (PP)	0.930				
Availability of cheaper recycled raw material than virgin raw material (CP)	0.817				
Environmental Commitment		0.755	0.767	0.860	0.672
My firm considers the potential environmental consciousness of the product and production process (EPP)	0.877				
My firm reduces the use of virgin resources by emphasizing the reuse and recycling of EC resources (RRR)	0.821				
My firm values the environment and describes itself as an environmentally EC responsible firm (ER)	0.756				
Circular economy practices—Internal environmental management		0.860	0.873	0.891	0.507
Cross-functional cooperation for environmental improvements	0.803				
Special training for workers on environmental issues	0.762				
Total quality environmental management	0.671				
Existence of pollution prevention programs such as cleaner production	0.626				
Internal performance evaluation system incorporating environmental factors	0.652				
Generate environmental reports for internal evaluation	0.763				
Commitment to named practices from senior managers	0.773				
Support for named practices from mid-level managers	0.622				
Circular economy practices—Eco-design		0.839	0.850	0.892	0.675
Design of products for reduced consumption of materials/energy	0.761				
Design of products for reuse, recycling, and recovery of material parts	0.804				
Design of products to avoid or reduce the use of hazardous products	0.865				
Design of processes for minimization of waste	0.852				
Circular economy practices—Corporate asset management		0.777	0.782	0.871	0.693
Investment recovery (sale) of excess inventories/materials	0.886				
Sale of scrap and used materials	0.826				
Sale of excess capital equipment	0.782				
<b>Source(s):</b> Authors calculation					

**Table 3.**  
Construct validity and  
reliability

**Table 4.**  
Path coefficients

Path (hypothesis)	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	p values	Remarks
- Green Economic Incentives → Environmental Commitment (H1)	0.518	0.520	0.036	14.202	0.000	Supported
- Green Economic Incentives → Internal environment management (H2)	0.326	0.326	0.048	6.795	0.000	Supported
- Green Economic Incentives → Eco Design (H3)	0.333	0.333	0.055	6.051	0.000	Supported
- Green Economic Incentives → Corporate Asset Management and Recovery (H4)	0.108	0.104	0.048	2.258	0.024	Supported
- Environmental Commitment → Internal Environment Management (H5)	0.351	0.353	0.042	8.292	0.000	Supported
- Environmental Commitment → Eco Design (H6)	0.205	0.207	0.042	4.855	0.000	Supported
- Environmental Commitment → Corporate Asset Management and Recovery (H7)	0.395	0.399	0.044	9.033	0.000	Supported

**Source(s):** Authors calculation

**Table 5.**  
Testing of mediation effects

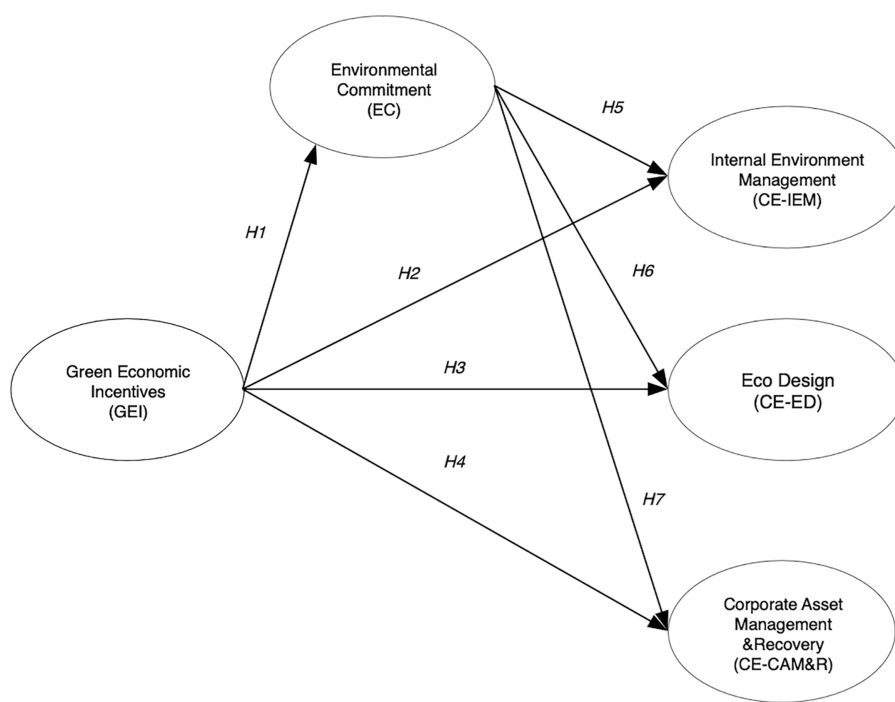
Link*	Mediator*	Independent variable-mediator	Mediator-dependent variable	Direct	Indirect	Total effect	VAF (%)	Decision
GEI-CE-IEM	EC	0.518	0.351	0.326	0.182	0.507	0.359	Partial mediation
GEI-CE-ED	EC	0.518	0.205	0.333	0.106	0.440	0.241	Partial mediation
GEI-CE-CAM&R	EC	0.518	0.395	0.108	0.205	0.313	0.655	Partial mediation

**Source(s):** Authors calculation

*4.4 Discussion and theoretical contribution*

There is increased attention by policymakers, researchers and practitioners, for CE practices that can advance sustainable development goals (SDGs). Therefore, this study explained the mechanisms that SMEs can utilize to successfully implement CE practices, including the role of GEI and EC. It complemented previous studies that failed to show antecedents for specific CE practices (Green *et al.*, 2015; Liu *et al.*, 2018; Schmidt *et al.*, 2021). Furthermore, very few studies that exclusively focused on the direct relationship between GEI and the implementation of CE practices. In contrast, this study showed that EC influences the relationship between GEI and three CE practices in Indonesian SMEs, specifically internal environmental management, eco-design and CAM&R.

This study contributed to the fourth folds' CE literature and related theories. First, this study proposes and examines the supporting integration model of GEIs and EC in SMEs, where the combination of GEIs and EC is the key to building environmental sustainability. This new CE practice model was found to have a good fit and explanatory power, so it confirms that the GEIs and EC constructs are generally accepted (Clemens, 2006; Lin *et al.*, 2015) is also an important



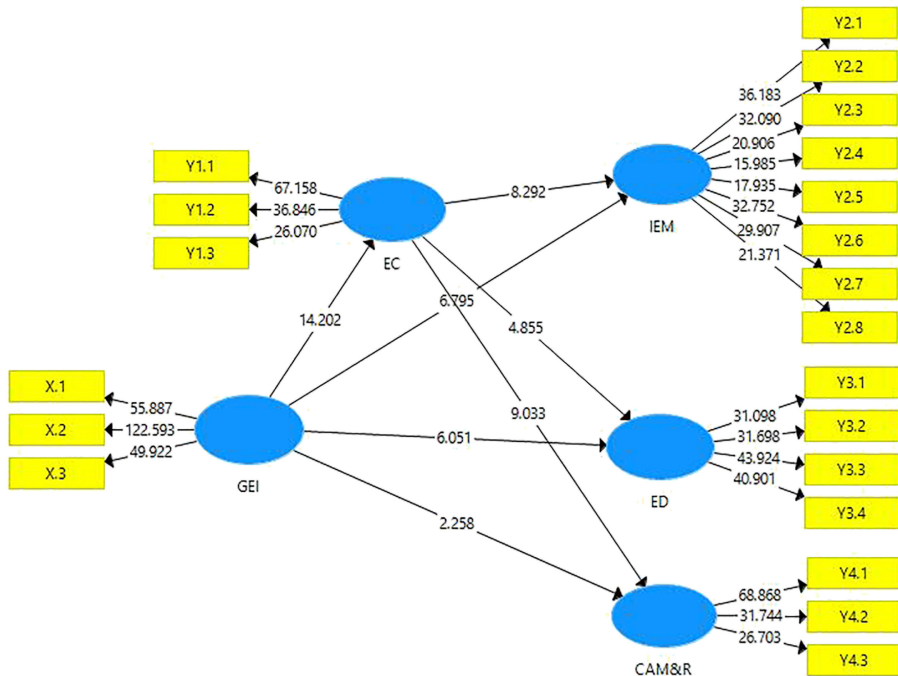
Source(s): Authors elaboration

**Figure 1.**  
Proposed conceptual  
framework

driver of CE practices for SMEs (Centobelli *et al.*, 2021). More specifically, GEIs play an important role in increasing EC and, at the same time, encouraging SMEs to carry out CE practices as an important activity in efforts to save the environment. Thus, the results prove that GEIs and EC form the basis for creating CE practices in the SME sector.

This study assesses CE practices by integrating GEIs into the CE practices model. The results of data analysis show that the CE practices integration model for SMEs is appropriate. Furthermore, the inclusion of EC in the CE practices model increases the explanatory power of the CE practices model. Conceptually, the results of this study strengthen the commitment-CE practices model (Saleem *et al.*, 2021; Schmidt *et al.*, 2021) in the SME sector. This finding shows that in SMEs, GEIs can simultaneously strengthen the influence of EC on CE practices. Thus, the CE practices model in the context of SMEs is conceptually expanded into a green incentives-commitment-CE practices model. Furthermore, these findings provide further evidence for the conclusions of previous studies (Galkina, 2021), which claim that EC with environmentally oriented partner selection is an important determinant of strengthening future CE practices for environmental saving efforts.

Second, the results revealed that EC is a mediator of the relationship between GEIs and internal environmental management (IEM), eco-design (ED) and CAM&R. Although the three tested mediation relationships are significant, GEI-EC and asset management and recovery (CAM&R) have more influence. This result proved that SMEs strongly focus on resource recovery to develop enterprise asset management and recovery practices. It requires the involvement of purchasing managers in investment recovery practices (Betancourt Morales and Zartha Sossa, 2020) to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020) and recycle materials (Zhu *et al.*, 2011) through selective investment, excess inventory,



**Figure 2.**  
Output analysis

Source(s): Authors calculation

sales of used goods and materials (Schmidt *et al.*, 2021). Thus, SMEs must be concerned about inventory recovery practices and make it a serious concern for organizational sustainability, increasing productivity and innovation and environmental sustainability orientation.

Third, the CE is an interesting topic for academics, policymakers and practitioners, but the literature is not thorough on how Indonesian SMEs can develop CE practices. Most studies focused on the European context, whereas this study contributed to the CE literature in developing countries and supported findings in the European context (Schmidt *et al.*, 2021). The results showed that GEI and EC influence the implementation of all three CE practices. Furthermore, this is the first study linking GEI and EC as antecedents of CE practice in an emerging country. In contrast, GEI is common in developed countries such as the USA (Clemens, 2006), India (Singh *et al.*, 2018) and Italy (Centobelli *et al.*, 2021). It is supported by Zhang *et al.* (2013), which stated that external references, such as financial incentives, affect organizational attitude and commitment to the CE concept implementation (Centobelli *et al.*, 2021; Clemens, 2006). However, Singh *et al.* (2018) established that GEI does not affect building EC. Overall, these findings have helped to the theory and generated evidence that incorporating the sub-constructs of CE practice may not always work, especially for developed countries like Germany. In addition, these results provided practitioners with insights for implementing CE practices in their companies.

Fourth, the present study enhanced the NRBV, describing the mechanisms that view GEI and EC as pollution prevention in CE practices. The results showed that GEI and EC are translated in strategic orientation. The implementation of CE practices can be affected by an organization's failure to commit to the environment. This study examined antecedents used to overcome these barriers (de Oliveira *et al.*, 2018). The finding contributed to the literature

by integrating previous research on GEI (Centobelli *et al.*, 2021) and EC (Galkina, 2021) as CE practice implementation drivers. Notably, it showed that GEI could trigger the emergence of EC in CE practices, positively affecting internal environmental management and eco-design and strengthening asset management and recovery. From a natural resource-based perspective, the results demonstrated the importance of companies building a commitment culture to implement CE practices.

#### 4.5 Managerial contribution

The governments and countries concerned about saving the environment must provide green economy subsidies, tax incentives, soft loans and subsidized materials to increase sustainable waste management strategies (Singh *et al.*, 2018; Mölemann, 2016). First, the regulations can strengthen the commitment and consistency of SMEs to saving the environment efforts (Kahupi *et al.*, 2021; Lin *et al.*, 2015; Roxas and Coetzer, 2012). Second, proper utilization of the government's GEIs by SMEs managers will increase commitment to the environment. The GEI enabled SMEs to build a strong culture with higher trust in the environment, implement green actions for sustainable development and create innovative sustainable business models to increase economic growth. The incentives also influence the implementation of environmentally oriented standards and building environmental ethics. Furthermore, GEIs facilitate SMEs' collaboration with large companies to achieve organizational sustainability, especially in the provision of raw materials and supply chains management. Such actions develop a strong attitude and increase the company's EC to the CE implementation.

#### 4.6 Conclusion, limitations and further study

Most previous studies examined the CE practices but did not focus on combining GEIs and EC, especially in the SMEs sector. The CE practice provides opportunities and encourages every country, industry and business entity to maintain sustainability and protect the environment jointly. The present study examines the role of GEI and EC on CE practices (CE) in the SMEs sector.

Three important conclusions can be drawn from this study. First, CE practices are complex constructions, which consist not only internal environmental management (IEM) and eco-design (ED), but also CAM&R. Second, the role of the government in providing GEI has been proven to increase EC, which in turn increases the practice of CE as an effort to preserve the environment. Finally, EC is a mediator of the relationship between GEI and CEP, where the most important path is through CAM&R.

This study broadens our understanding of how GEI and EC impact CE practices, especially in the SME sector, which can help SME managers, the government and related stakeholders to develop strategies for providing green incentives, both financial and non-financial. When we begin to study CE practices in SMEs and the interest of CE stakeholders in this issue will increase, further assessment of the CE in SMEs is critical.

This study identified several limitations causing a gap for future studies. First, the study design used assistant managers and managers for information. Future studies can overcome this common method bias and choose a proper design. Second, this study focused on the mechanisms influencing the development of CE practices and assumed that GEI and EC are prerequisites for companies to implement this. Meanwhile, future studies can establish additional aspects that influence the proposed mechanism, such as environmental supply chain collaboration, or green strategies and green innovation. Third, previous studies, including this, focused on the antecedents of CE practice in developed and developing countries. Therefore, future studies can therefore make comparisons to expand and generalize these findings by considering the differences in institutional contexts between countries.



**References**

- Agnello, X., Naveen, J., Ravichandran, M. and Balamurugan, J. (2015), "Clean technology and its efficacy: strategies of environmental management", *Journal of Environmental and Social Sciences*, Vol. 2 No. 2, pp. 110-116.
- Appolloni, A., D'Adamo, I., Gastaldi, M., Santibanez-Gonzalez, E.D.R. and Settembre-Blundo, D. (2021), "Growing e-waste management risk awareness points towards new recycling scenarios: the view of the big four's youngest consultants", *Environmental Technology and Innovation*, Vol. 23, pp. 1-14, doi: [10.1016/j.eti.2021.101716](https://doi.org/10.1016/j.eti.2021.101716).
- Appolloni, A., D'Adamo, I., Gastaldi, M., Yazdani, M. and Settembre-Blundo, D. (2022), "Reflective backward analysis to assess the operational performance and eco-efficiency of two industrial districts", *International Journal of Productivity and Performance Management*, Emerald Group Holdings Limited, Vol. ahead-of-print No. ahead-of-print, doi: [10.1108/IJPPM-08-2021-0442](https://doi.org/10.1108/IJPPM-08-2021-0442).
- Appolloni, A., Centi, G. and Yang, N. (2023), "Promoting carbon circularity for a sustainable and resilience fashion industry", *Current Opinion in Green and Sustainable Chemistry*, Vol. 39, February 2023, 100719, doi: [10.1016/j.cogsc.2022.100719](https://doi.org/10.1016/j.cogsc.2022.100719).
- Arsawan, I.W.E., Koval, V., Duginets, G., Kalinin, O. and Korostova, I. (2021), "The impact of green innovation on environmental performance of SMEs in an emerging economy", *E3S Web of Conferences*, Vol. 255, p. 1012, EDP Sciences.
- Arsawan, I.W.E., ssy de Hariyanti, N.K., Atmaja, I.M.A.D.S., Suhartanto, D. and Koval, V. (2022a), "Developing organizational agility in SMEs: an investigation of innovation's roles and strategic flexibility", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 8 No. 3, p. 149, doi: [10.3390/joitmc8030149](https://doi.org/10.3390/joitmc8030149).
- Arsawan, I.W.E., Koval, V., Rajiani, I., Rustiari, N.W., Supartha, W.G. and Suryantini, N.P.S. (2022b), "Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage", *International Journal of Productivity and Performance Management*, Vol. 71 No. 2, pp. 405-428, doi: [10.1108/IJPPM-04-2020-0192](https://doi.org/10.1108/IJPPM-04-2020-0192).
- Bag, S., Yadav, G., Dhamija, P. and Kataria, K.K. (2021), "Key resources for industry 4.0 adoption and its effect on sustainable production and circular economy: an empirical study", *Journal of Cleaner Production*, Vol. 281, 125233, doi: [10.1016/j.jclepro.2020.125233](https://doi.org/10.1016/j.jclepro.2020.125233).
- Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120, doi: [10.1177/014920639101700108](https://doi.org/10.1177/014920639101700108).
- Barros, M.V., Salvador, R., do Prado, G.F., de Francisco, A.C. and Piekarski, C.M. (2021), "Circular economy as a driver to sustainable businesses", *Cleaner Environmental Systems*, Vol. 2, 100006, doi: [10.1016/j.cesys.2020.100006](https://doi.org/10.1016/j.cesys.2020.100006).
- Betancourt Morales, C.M. and Zartha Sossa, J.W. (2020), "Circular economy in Latin America: a systematic literature review", *Business Strategy and the Environment*, Vol. 29 No. 6, pp. 2479-2497.
- Bhupendra, K.V. and Sangle, S. (2016), "Pollution prevention strategy: a study of Indian firms", *Journal of Cleaner Production*, Vol. 133, pp. 795-802, doi: [10.1016/j.jclepro.2016.05.169](https://doi.org/10.1016/j.jclepro.2016.05.169).
- Botezat, E.A., Dodescu, A.O., Vaduva, S. and Fotea, S.L. (2018), "An exploration of circular economy practices and performance among Romanian producers", *Sustainability*, Vol. 10 No. 9, pp. 1-17, doi: [10.3390/su10093191](https://doi.org/10.3390/su10093191).
- Bradford, J. and Fraser, E.D.G. (2008), "Local authorities, climate change and small and medium enterprises: identifying effective policy instruments to reduce energy use and carbon emissions", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 3, pp. 156-172, doi: [10.1002/csr.151](https://doi.org/10.1002/csr.151).
- Centobelli, P., Cerchione, R., Esposito, E., Passaro, R. and Shashi (2021), "Determinants of the transition towards circular economy in SMEs: a sustainable supply chain management perspective", *International Journal of Production Economics*, Vol. 242, 108297, doi: [10.1016/j.ijpe.2021.108297](https://doi.org/10.1016/j.ijpe.2021.108297).

- Chang, S., Gong, Y. and Shum, C. (2011), "Promoting innovation in hospitality companies through human resource management practices", *International Journal of Hospitality Management*, Vol. 30 No. 4, pp. 812-818, doi: [10.1016/j.ijhm.2011.01.001](https://doi.org/10.1016/j.ijhm.2011.01.001).
- Chin, W.W. (2010), "How to write up and report PLS analyses", *Handbook of Partial Least Squares*, pp. 655-690.
- Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), "Structural equation modeling in marketing: some practical reminders", *Journal of Marketing Theory and Practice*, Vol. 16 No. 4, pp. 287-298.
- Clemens, B. (2006), "Economic incentives and small firms: does it pay to be green?", *Journal of Business Research*, Vol. 59 No. 4, pp. 492-500, doi: [10.1016/j.jbusres.2005.08.006](https://doi.org/10.1016/j.jbusres.2005.08.006).
- Corona, B., Shen, L., Reike, D., Rosales Carreón, J. and Worrell, E. (2019), "Towards sustainable development through the circular economy—a review and critical assessment on current circularity metrics", *Resources, Conservation and Recycling*, Vol. 151, 104498, doi: [10.1016/j.resconrec.2019.104498](https://doi.org/10.1016/j.resconrec.2019.104498).
- Dalhammar, C. (2016), "Industry attitudes towards ecodesign standards for improved resource efficiency", *Journal of Cleaner Production*, Vol. 123, pp. 155-166.
- Dalhammar, C., Milios, L. and Richter, J.L. (2021), "Ecodesign and the circular economy: conflicting policies in Europe", *EcoDesign and Sustainability I*, Vol. 123, 1 June 2016, pp. 155-166.
- de Oliveira, U.R., Espindola, L.S., da Silva, I.R., da Silva, I.N. and Rocha, H.M. (2018), "A systematic literature review on green supply chain management: research implications and future perspectives", *Journal of Cleaner Production*, Vol. 187, pp. 537-561.
- Diaz, A., Schöggel, J.P., Reyes, T. and Baumgartner, R.J. (2021), "Sustainable product development in a circular economy: implications for products, actors, decision-making support and lifecycle information management", *Sustainable Production and Consumption*, Vol. 26, pp. 1031-1045, doi: [10.1016/j.spc.2020.12.044](https://doi.org/10.1016/j.spc.2020.12.044).
- Ellen MacArthur Foundation (2013), "Towards the circular economy", *Journal of Industrial Ecology*, Vol. 1.
- Esfahbodi, A., Zhang, Y. and Watson, G. (2016), "Sustainable supply chain management in emerging economies: trade-offs between environmental and cost performance", *International Journal of Production Economics*, Vol. 181, pp. 350-366.
- Fatimah, Y.A., Govindan, K., Murniningsih, R. and Setiawan, A. (2020), "Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: a case study of Indonesia", *Journal of Cleaner Production*, Vol. 269, 122263, doi: [10.1016/j.jclepro.2020.122263](https://doi.org/10.1016/j.jclepro.2020.122263).
- Galkina, T. (2021), "International ECO preneurship: environmental commitment and international partner selection of finnish firms from the energy sector", *Journal of International Entrepreneurship*, Vol. 19 No. 2, pp. 300-320, doi: [10.1007/s10843-021-00286-8](https://doi.org/10.1007/s10843-021-00286-8).
- Green, K.W., Toms, L.C. and Clark, J. (2015), "Impact of market orientation on environmental sustainability strategy", *Management Research Review*, Vol. 38 No. 2, pp. 217-238, doi: [10.1108/MRR-10-2013-0240](https://doi.org/10.1108/MRR-10-2013-0240).
- Gupta, H., Kumar, A. and Wasan, P. (2021), "Industry 4.0, cleaner production and circular economy: an integrative framework for evaluating ethical and sustainable business performance of manufacturing organizations", *Journal of Cleaner Production*, Vol. 295, 126253, doi: [10.1016/j.jclepro.2021.126253](https://doi.org/10.1016/j.jclepro.2021.126253).
- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), "Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance", *Long Range Planning*, Vol. 46 Nos 1-2, pp. 1-12, doi: [10.1016/j.lrp.2013.01.001](https://doi.org/10.1016/j.lrp.2013.01.001).
- Hair, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014), "Partial least squares structural equation modeling (PLS-SEM)", *European Business Review*, Vol. 26 No. 2, pp. 106-121.
- Hair, J.F., Hult, G., Tomas, M., Ringle, C.M. and Sarstedt, M. (2016a), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage Publications, Thousand Oaks, CA.

- Hair, J.F., Jr. Sarstedt, M., Matthews, L.M. and Ringle, C.M. (2016b), "Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I-method", *European Business Review*, Vol. 28 No. 1, pp. 63-76, doi: [10.1108/EBR-09-2015-0094](https://doi.org/10.1108/EBR-09-2015-0094).
- Hart, S. (1995), "A natural-resources based view of the firm", *Academy of Management Review*, Vol. 51 No. 3, pp. 49-51.
- Hart, S.L. and Dowell, G. (2011), "A natural-resource-based view of the firm: fifteen years after", *Journal of Management*, Vol. 37 No. 5, pp. 1464-1479, doi: [10.1177/0149206310390219](https://doi.org/10.1177/0149206310390219).
- Jain, A., Sarsaiya, S., Awasthi, M.K., Singh, R., Rajput, R., Mishra, U.C., Chen, J. and Shi, J. (2022), "Bioenergy and bio-products from bio-waste and its associated modern circular economy: current research trends, challenges, and future outlooks", *Fuel*, Vol. 307, 121859.
- Kahupi, I., Eirikur Hull, C., Okorie, O. and Millette, S. (2021), "Building competitive advantage with sustainable products – a case study perspective of stakeholders", *Journal of Cleaner Production*, Vol. 289, 125699, doi: [10.1016/j.jclepro.2020.125699](https://doi.org/10.1016/j.jclepro.2020.125699).
- Khan, S.A.R., Yu, Z. and Umar, M. (2021), "How environmental awareness and corporate social responsibility practices benefit the enterprise? An empirical study in the context of emerging economy", *Management of Environmental Quality: An International Journal*, Vol. 32 No. 5, pp. 863-885, doi: [10.1108/MEQ-08-2020-0178](https://doi.org/10.1108/MEQ-08-2020-0178).
- Korhonen, J., Honkasalo, A. and Seppälä, J. (2018), "Circular economy: the concept and its limitations", *Ecological Economics*, Vol. 143, pp. 37-46, doi: [10.1016/j.ecolecon.2017.06.041](https://doi.org/10.1016/j.ecolecon.2017.06.041).
- Koval, V., Arsawan, I., Suryantini, N.P.S., Kovbasenko, S., Fisunen, N. and Alosyna, T. (2023), "Circular economy and sustainability-oriented innovation: conceptual framework and energy future avenue, *energies*", *Multidisciplinary Digital Publishing Institute*, Vol. 16 No. 1, 243.
- Krejcie, R.V. and Morgan, D.W. (1970), "Determining sample size for research activities", *Educational and Psychological Measurement*, Vol. 30 No. 3, pp. 607-610.
- Kuo, L. and Chang, B.G. (2021), "The affecting factors of circular economy information and its impact on corporate economic sustainability-Evidence from China", *Sustainable Production and Consumption*, Vol. 27, pp. 986-997, doi: [10.1016/j.spc.2021.02.014](https://doi.org/10.1016/j.spc.2021.02.014).
- Kurniawan, T.A., Avtar, R., Singh, D., Xue, W., Othman, M.H.D., Hwang, G.H., Iswanto, I., Albadarin, A.B. and Kern, A.O. (2021), "Reforming MSWM in Sukunan (Yogyakarta, Indonesia): a case-study of applying a zero-waste approach based on circular economy paradigm", *Journal of Cleaner Production*, Vol. 284, 124775.
- Le Blévenec, K., Vercalsteren, A. and Boonen, K. (2022), "Ecodesign as a new lever to enhance the global value proposition: from space to corporate", *Towards a Sustainable Future-Life Cycle Management*, pp. 3-13.
- Lieder, M. and Rashid, A. (2016), "Towards circular economy implementation: a comprehensive review in context of manufacturing industry", *Journal of Cleaner Production*, Vol. 115, pp. 36-51.
- Lin, H., Zeng, S., Ma, H. and Chen, H. (2015), "Does commitment to environmental self-regulation matter? An empirical examination from China", *Management Decision*, Vol. 53 No. 5, pp. 932-956, doi: [10.1108/MD-07-2014-0441](https://doi.org/10.1108/MD-07-2014-0441).
- Ling, M. and Xu, L. (2021), "How and when financial incentives crowd out pro-environmental motivation: a longitudinal quasi-experimental study", *Journal of Environmental Psychology*, Vol. 78, 101715, doi: [10.1016/j.jenvp.2021.101715](https://doi.org/10.1016/j.jenvp.2021.101715).
- Liu, Y. and Bai, Y. (2014), "An exploration of firms' awareness and behavior of developing circular economy: an empirical research in China", *Resources, Conservation and Recycling*, Vol. 87, pp. 145-152, doi: [10.1016/j.resconrec.2014.04.002](https://doi.org/10.1016/j.resconrec.2014.04.002).
- Liu, J., Feng, Y., Zhu, Q. and Sarkis, J. (2018), "Green supply chain management and the circular economy: reviewing theory for advancement of both fields", *International Journal of Physical Distribution and Logistics Management*, Vol. 48 No. 8, pp. 794-817, doi: [10.1108/IJPDLM-01-2017-0049](https://doi.org/10.1108/IJPDLM-01-2017-0049).

- Longo, S., Cellura, M., Cusenza, M.A., Guarino, F., Mistretta, M., Panno, D., D'Urso, C., Leonardi, S.G., Briguglio, N., Tumminia, G. and Antonucci, V. (2021), "Life cycle assessment for supporting eco-design: the case study of sodium-nickel chloride cells", *Energies*, Vol. 14 No. 7, p. 1897.
- Lozano, R. (2012), "Towards better embedding sustainability into companies' systems: an analysis of voluntary corporate initiatives", *Journal of Cleaner Production*, Vol. 25, pp. 14-26, doi: [10.1016/j.jclepro.2011.11.060](https://doi.org/10.1016/j.jclepro.2011.11.060).
- Luthra, S., Kumar, A., Sharma, M., Garza-Reyes, J.A. and Kumar, V. (2022), "An analysis of operational behavioural factors and circular economy practices in SMEs: an emerging economy perspective", *Journal of Business Research*, Vol. 141, pp. 321-336.
- Marrucci, L., Daddi, T. and Iraldo, F. (2021), "The contribution of green human resource management to the circular economy and performance of environmental certified organisations", *Journal of Cleaner Production*, Vol. 319, 128859.
- Masi, D., Day, S. and Godsell, J. (2017), "Supply chain configurations in the circular economy: a systematic literature review", *Sustainability*, Vol. 9 No. 9, pp. 1-22, doi: [10.3390/su9091602](https://doi.org/10.3390/su9091602).
- Möllemann, D. (2016), *Framing the Climate Change Policies and Circular Economy Tenets for SMEs*, University of Twente, Enschede.
- Nurdiana, J., Franco-Garcia, M.L. and Heldeweg, M.A. (2021), "How shall we start? The importance of general indices for circular cities in Indonesia", *Sustainability*, Vol. 13 No. 20, pp. 1-22, doi: [10.3390/su132011168](https://doi.org/10.3390/su132011168).
- Parker, C.M., Redmond, J. and Simpson, M. (2009), "A review of interventions to encourage SMEs to make environmental improvements", *Environment and Planning C: Government and Policy*, Vol. 27 No. 2, pp. 279-301, doi: [10.1068/c0859b](https://doi.org/10.1068/c0859b).
- Parwita, G.B.S., Arsawan, I.W.E., Koval, V., Hrinchenko, R., Bogdanova, N. and Tamosiuniene, R. (2021), "Organizational innovation capability: integrating human resource management practice, knowledge management and individual creativity", *Intellectual Economics*, Vol. 15 No. 2, pp. 22-45.
- Persis, D.J., Venkatesh, V.G., Sreedharan, V.R., Shi, Y. and Sankaranarayanan, B. (2021), "Modelling and analysing the impact of circular economy; internet of things and ethical business practices in the VUCA world: evidence from the food processing industry", *Journal of Cleaner Production*, Vol. 301, 126871.
- Pieroni, M.P.P., McAlone, T.C. and Pigosso, D.C.A. (2019), "Business model innovation for circular economy and sustainability: a review of approaches", *Journal of Cleaner Production*, Vol. 215, pp. 198-216, doi: [10.1016/j.jclepro.2019.01.036](https://doi.org/10.1016/j.jclepro.2019.01.036).
- Pimenova, P. and Van der Vorst, R. (2004), "The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies", *Journal of Cleaner Production*, Vol. 12 No. 6, pp. 549-559, doi: [10.1016/j.jclepro.2003.07.001](https://doi.org/10.1016/j.jclepro.2003.07.001).
- Polverini, D. (2021), "Regulating the circular economy within the ecodesign directive: progress so far, methodological challenges and outlook", *Sustainable Production and Consumption*, Vol. 27, pp. 1113-1123, doi: [10.1016/j.spc.2021.02.023](https://doi.org/10.1016/j.spc.2021.02.023).
- Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R.J. and Ormazabal, M. (2019), "Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 6, pp. 1473-1484, doi: [10.1002/csr.1761](https://doi.org/10.1002/csr.1761).
- Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbera, M. and Ioannou, A. (2015), *The circular economy: barriers and opportunities for SMEs*, CEPS Working Documents, Pittsburgh, PA.
- Roxas, B. and Coetzer, A. (2012), "Institutional environment, managerial attitudes and environmental sustainability orientation of small firms", *Journal of Business Ethics*, Vol. 111 No. 4, pp. 461-476, doi: [10.1007/s10551-012-1211-z](https://doi.org/10.1007/s10551-012-1211-z).
- Saleem, F., Qureshi, S.S. and Malik, M.I. (2021), "Impact of environmental orientation on proactive and reactive environmental strategies: mediating role of business environmental commitment", *Sustainability*, Vol. 13 No. 15, pp. 1-16, doi: [10.3390/su13158361](https://doi.org/10.3390/su13158361).

- Sarkis, J. (2012), "A boundaries and flows perspective of green supply chain management", *Supply Chain Management*, Vol. 17 No. 2, pp. 202-216, doi: [10.1108/13598541211212924](https://doi.org/10.1108/13598541211212924).
- Schmidt, C.V.H., Kindermann, B., Behlau, C.F. and Flatten, T.C. (2021), "Understanding the effect of market orientation on circular economy practices: the mediating role of closed-loop orientation in German SMEs", *Business Strategy and the Environment*, Vol. 30 No. 8, pp. 4171-4187, doi: [10.1002/bse.2863](https://doi.org/10.1002/bse.2863).
- Schroeder, P., Anggraeni, K. and Weber, U. (2019), "The relevance of circular economy practices to the sustainable development goals", *Journal of Industrial Ecology*, Vol. 23 No. 1, pp. 77-95, doi: [10.1111/jiec.12732](https://doi.org/10.1111/jiec.12732).
- Schwab, K. and World Economic Forum-WEF. (2019), "The global competitiveness report 2019".
- Sezen, B. and Çankaya, S.Y. (2013), "Effects of green manufacturing and eco-innovation on sustainability performance", *Procedia - Social and Behavioral Sciences*, Vol. 99, pp. 154-163, doi: [10.1016/j.sbspro.2013.10.481](https://doi.org/10.1016/j.sbspro.2013.10.481).
- Shaikh, A.R., Qazi, A., Ali, I. and Appolloni, A. (2023), "Analyzing the barriers to sustainable procurement in an emerging economy: an interpretive structural modeling approach", *International Journal of Emerging Markets*, Vol. ahead-of-print No. ahead-of-print, doi: [10.1108/IJOEM-07-2022-1082](https://doi.org/10.1108/IJOEM-07-2022-1082).
- Singh, N., Jain, S. and Sharma, P. (2014), "Determinants of proactive environmental management practices in Indian firms: an empirical study", *Journal of Cleaner Production*, Vol. 66, pp. 469-478, doi: [10.1016/j.jclepro.2013.11.055](https://doi.org/10.1016/j.jclepro.2013.11.055).
- Singh, M.P., Chakraborty, A. and Roy, M. (2016), "Entrepreneurial commitment, organizational sustainability and business performance of manufacturing MSMEs: evidence from India", *International Journal of Applied Business and Economic Research*, Vol. 14 No. 6, pp. 4615-4631.
- Singh, M.P., Chakraborty, A. and Roy, M. (2018), "Developing an extended theory of planned behavior model to explore circular economy readiness in manufacturing MSMEs, India", *Resources, Conservation and Recycling*, Vol. 135, pp. 313-322, doi: [10.1016/j.resconrec.2017.07.015](https://doi.org/10.1016/j.resconrec.2017.07.015).
- Sovacool, B.K., Axsen, J. and Sorrell, S. (2018), "Promoting novelty, rigor, and style in energy social science: towards codes of practice for appropriate methods and research design", *Energy Research and Social Science*, Vol. 45, November 2018, pp. 12-42, doi: [10.1016/j.erss.2018.07.007](https://doi.org/10.1016/j.erss.2018.07.007).
- Stone, L.J. (2006), "Limitations of cleaner production programmes as organisational change agents. II. Leadership, support, communication, involvement and programme design", *Journal of Cleaner Production*, Vol. 14 No. 1, pp. 15-30, doi: [10.1016/j.jclepro.2004.12.009](https://doi.org/10.1016/j.jclepro.2004.12.009).
- Sundar, D., Mathiyazhagan, K., Agarwal, V., Janardhanan, M. and Appolloni, A. (2023), "From linear to a circular economy in the e-waste management sector: experience from the transition barriers in the United Kingdom", *Business Strategy and the Environment*, John Wiley & Sons, Ltd, Vol. ahead-of-print No. ahead-of-print, doi: [10.1002/bse.3365](https://doi.org/10.1002/bse.3365).
- Suryantini, N.P.S., Wayan Edi Arsawan, I., Darmayanti, N.P.A., Moskalenko, S. and Gorokhova, T. (2021), "Circular economy: barrier and opportunities for SMEs", *E3S Web of Conferences*, Les Ulis, Vol. 255, doi: [10.1051/e3sconf/202125501017](https://doi.org/10.1051/e3sconf/202125501017).
- Susanty, A., Tjahjono, B. and Sulistyani, R.E. (2020), "An investigation into circular economy practices in the traditional wooden furniture industry, Production Planning and Control", *Taylor and Francis*, Vol. 31 No. 16, pp. 1336-1348.
- Temminck, E., Mearns, K. and Fruhen, L. (2015), "Motivating employees towards sustainable behaviour", *Business Strategy and the Environment*, Vol. 24 No. 6, pp. 402-412, doi: [10.1002/bse.1827](https://doi.org/10.1002/bse.1827).
- Tsimoshynska, O., Koval, M., Kryshchal, H., Filipishyna, L. and Koval, V. (2021), "Investing in road construction infrastructure projects under public-private partnership in the form of concession", *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, Vol. 2 No. 2, pp. 184-192.

- Yadav, G., Luthra, S., Huisingh, D., Mangla, S.K., Narkhede, B.E. and Liu, Y. (2020), "Development of a lean manufacturing framework to enhance its adoption within manufacturing companies in developing economies", *Journal of Cleaner Production*, Vol. 245, 18726, doi: [10.1016/j.jclepro.2019.118726](https://doi.org/10.1016/j.jclepro.2019.118726).
- Yadegaridehkordi, E., Foroughi, B., Iranmanesh, M., Nilashi, M. and Ghobakhloo, M. (2023), "Determinants of environmental, financial, and social sustainable performance of manufacturing SMEs in Malaysia", *Sustainable Production and Consumption*, Vol. 35, pp. 129-140.
- York, J.G. (2009), "Pragmatic sustainability: translating environmental ethics into competitive advantage", *Journal of Business Ethics*, Vol. 85, pp. 97-109, doi: [10.1007/s10551-008-9950-6](https://doi.org/10.1007/s10551-008-9950-6).
- Zhang, Q. and Ma, Y. (2021), "The impact of environmental management on firm economic performance: the mediating effect of green innovation and the moderating effect of environmental leadership", *Journal of Cleaner Production*, Vol. 292, 126057.
- Zhang, B., Yang, S. and Bi, J. (2013), "Enterprises' willingness to adopt/develop cleaner production technologies: an empirical study in Changshu, China", *Journal of Cleaner Production*, Vol. 40, pp. 62-70, doi: [10.1016/j.jclepro.2010.12.009](https://doi.org/10.1016/j.jclepro.2010.12.009).
- Zhu, Q., Geng, Y. and Lai, K.hung. (2011), "Environmental supply chain cooperation and its effect on the circular economy practice-performance relationship among Chinese manufacturers", *Journal of Industrial Ecology*, Vol. 15 No. 3, pp. 405-419, doi: [10.1111/j.1530-9290.2011.00329.x](https://doi.org/10.1111/j.1530-9290.2011.00329.x).

#### About the authors

I. Wayan Edi Arsawan is an Associate Professor at Department of Business Administration, Politeknik Negeri Bali Indonesia. His areas of research interest are human resource management; organizational behavior; leadership; strategic management; knowledge management, marketing and sustainability. I. Wayan Edi Arsawan is the corresponding author and can be contacted at: [wayanediarsawan@pnb.ac.id](mailto:wayanediarsawan@pnb.ac.id)

Viktor Koval is the professor and Head of Department of Accounting, Economics and Management of Odessa Institute of Trade and Economics of Kyiv National University, Ukraine. His research interest are earth and planetary sciences; business, management and accounting; environmental science; energy; engineering; decision sciences economics, econometrics and finance.

Dwi Suhartanto is a Professor in Marketing at the Business Administration Department, Politeknik Negeri Bandung, Indonesia. His research interests include consumer behavior, hospitality and tourism and green products. His works have been published in various reputable journals including Journal of Cleaner Production, Journal of Business Research and Current Issues in Tourism.

Ni Kadek Dessy Hariyanti is a Senior Lecturer of Department of Business Administration, Politeknik Negeri Bali Indonesia. Her areas of research interest are computers; management information system; finance management; knowledge management, and artificial intelligence.

Nataliia Polishchuk is an Associate Professor of Vocational Education, Labor Training and Technology, Rivne State University for Humanities. Research interests: philosophy of education; pedagogy; economics and organization of production; Sustainability; the science of the Earth and the planet.

Viktoriia Bondar is an Associate Professor of National Academy of Municipal Economy Kharkiv, Ukraine. Research interests: philosophy of education; pedagogy; economics and organization of production; Sustainability; the science of the Earth and the planet, agriculture.





**Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment**

Journal:	<i>International Journal of Productivity and Performance Management</i>
Manuscript ID	Draft
Manuscript Type:	Standard Paper
Keywords:	Green economic incentives, environmental commitment, internal environmental management, eco-design, corporate asset management and recovery, circular economy practices



**Circular Economy Practices in Small and Medium Enterprises: Aligning Model of Green Economic Incentives and Environmental Commitment**

**Abstract**

**Purpose** - The present study aimed to examine the relationship between green economic incentives and environmental commitment as drivers of the circular economy practices in Small and Medium Enterprises.

**Design/methodology/approach** -A cross-sectional study of 594 assistant managers and SME managers was used while data was analyzed through Smart PLS.

**Findings** - The results showed that green economic incentives positively affect the SMEs' environmental commitment and the circular economy practice model. Furthermore, environmental commitment is the triple mediator between green economic incentives and the three circular economy practices: internal environmental management, eco-design, and corporate asset management and recovery.

**Originality** - This study enhanced the natural resource-based view (NRBV), describing the mechanisms that view green economic incentives (GEI) and environmental commitment (EC) as pollution prevention in circular economy practice.

**Practical implications** - The present study provided a basis for understanding the relevance of SMEs' circular economy practices and designing a strategic plan for its implementation. Also, it provides insight that collaboration between triple helix (the government, SMEs, and the community) is needed in increasing environmental awareness towards sustainability.

**Keywords** - Green economic incentives, environmental commitment, internal environmental management, eco-design, corporate asset management and recovery, circular economy practices

**Paper type** - Research paper

**1 Introduction**

The circular economy (CE) is an essential environmental strategy concept for waste minimization, nature recuperation (Bag *et al.*, 2021), sharpening environmental conservation, and efficient energy consumption for a sustainable business (Gupta *et al.*, 2021; Arsawan *et al.*, 2021) by paying great attention to the environment and resources (Korhonen *et al.*, 2018). As a result, industrial waste is a valuable input that can be repaired, reused, and recycled (Bag *et al.*, 2021; Yadav *et al.*, 2020). It leads to oriented and environmental value products, methods, and processes (Schroeder *et al.*, 2019). A circular economy approach benefits businesses and society with improved environmental awareness (Khan *et al.*, 2021; Centobelli *et al.*, 2021), lower resource price volatility, better customer relations, and job opportunities (Ellen MacArthur Foundation, 2013).

The circular economy is affected by the internal and external environment. Internal factors include behavior (Ling and Xu, 2021; Saleem *et al.*, 2021), environmental commitment (Galkina, 2021; Lin *et al.*, 2015), and organizational capabilities (Prieto-Sandoval *et al.*, 2019; Singh *et al.*, 2018). Meanwhile, government pro-environmental regulations and support are considered external factors for CE practices (Bhupendra and Sangle, 2016; Lozano, 2012). The present study aimed to address various gaps, including the unavailability of studies on the SMEs' readiness of the circular economy (Singh *et al.*, 2018). First, although it affects economic growth (Suryantini *et al.*, 2021),

the role of SMEs in saving the environment needs to be examined (Saleem *et al.*, 2021). A supportive ecosystem should be maintained to build sustainability (Koval *et al.*, 2021) through green-oriented strategies and innovation optimization (Arsawan *et al.*, 2021). Second, CE has not been comprehensively studied, especially in the SMEs sector, due to limited behavior and internal resource capabilities (Luthra *et al.*, 2022; Temminck *et al.*, 2015). It can be an opportunity for SMEs to improve internal capabilities (Centobelli *et al.*, 2021) for effective green marketing and new markets creation and design process, and circular products and attract a value-oriented talent environment (Barros *et al.*, 2021; Diaz *et al.*, 2021). Third, the results from Singh *et al.* (2018) showed that Green Economic Incentives (GEI) do not contribute to building environmental commitment. However, the importance of green incentives in building environmental commitment was demonstrated by Centobelli *et al.* (2021). This divergence shows the need for more research on GEI and CE to support SMEs' need for environmental self-regulation for environmental improvements (Lin *et al.*, 2015; Ling and Xu, 2021).

The present study was motivated by the research gaps and examined the relationship between GEI, environmental commitment, CE-IEM, CE-ED, CE-CAM&R on SMEs in Indonesia for three reasons. First, Indonesia is a developing country with 63 million SMEs continuously growing, classified as 62 million medium enterprises and 750.000 small businesses, potentially boosting national economic growth (Surya *et al.*, 2021). Consequently, government regulations are needed to sustain environmental attention (Nurdiana *et al.*, 2021). Second, CE is at an early implementation stage and faces many challenges, particularly infrastructure and regulation (Fatimah *et al.*, 2020; Nurdiana *et al.*, 2021). For that reason, the government's role and efforts are crucial in making consistent regulations (Rizos *et al.*, 2015), increasing commitment environment (Singh *et al.*, 2016; Lin *et al.*, 2015), and providing green economic incentives for its implementation (Centobelli *et al.*, 2021; Singh *et al.*, 2018). Three, data from Schwab and World Economic Forum-WEF (2019) stated that this country lacks internal resources, particularly business dynamics capability, developing a sustainable innovation (Arsawan *et al.*, 2020). However, the innovations should be environmentally oriented and environmentally friendly technologies (Agnello *et al.*, 2015). Furthermore, the second part of this study is the literature review, which includes the hypotheses formulation, while the third and fourth describes the method and the analysis respectively. The last part contains conclusions, theoretical and managerial contributions, research limitations, and suggest for further research.

## 2. Literature Review and Hypothesis Development

### 2.1 Natural Resource-Based View

The natural resource-based view was coined by Hart (1995) as an extension of the resource-based view (Barney, 1991). Three additions were suggested including 1) environmental-oriented capabilities for enhanced organizational profitability, 2) pollution preventive action, and 3) product stewardship for reach sustainable development (Hart, 1995). Pollution preventive action refers to effective waste and emissions management during production process (Hart and Dowell, 2011) and the other side, product stewardship refers to development for integrated design (Hart, 1995). Sustainable development refers to a production configuration "sustained indefinitely into the future" (Hart and Dowell, 2011). The influence of NRBV was tested by Hart and Dowell (2011) and found that previous research only focused on pollution prevention capabilities, leaving the other two capabilities unexplored. Based on this, this study examined the three NRBV capabilities role, namely GEI as an effort to take precautions (Hart and Dowell, 2011), EC also known as an

effort to build environmentally oriented products, product life cycle strategies for enhanced product stewardship (Green *et al.*, 2015) while CE is a sustainable development implementation (Liu *et al.*, 2018; Sarkis, 2012).

**2.2 Circular Economy Practices in Small and Medium Enterprises**

The present study considered CE practices that require SMEs to integrate ecological requirement, including efficiency and reduction of raw , recycling, reuse, and replacement of materials into organizational routine activities (Botezat *et al.*, 2018; Masi *et al.*, 2017). CE Practices are divided into 3 main dimensions, including internal environmental management (Schmidt *et al.*, 2021), environmentally friendly design (Zhu *et al.*, 2011), and company assets management and recovery (Zhu *et al.*, 2011). First, internal environmental management is the preparation of environmentally-oriented procedures, such as green human resource management practices (Marrucci *et al.*, 2021; Bag *et al.*, 2021), training and development programs (Persis *et al.*, 2021), and environmental-based performance evaluation systems (Zhu *et al.*, 2011), in supporting organizational environmental objectives (Koval *et al.*, 2021), building environmental ethics (York, 2009) and improving ecological performance (Lin *et al.*, 2015; Parker *et al.*, 2009; Pimenova and Van der Vorst, 2004). Second, eco-design describes the product design process considering environmental impacts (Lozano, 2012), and is an effective strategy to achieve eco-efficiency (Polverini, 2021; Dalhammar *et al.*, 2021). Therefore, product design must be environmentally oriented (Longo *et al.*, 2021). Apart from environmental efficiency, environmentally friendly design practices help companies to provide different products in the market (Dalhammar, 2016) and increase the global value proposition (Blévennec *et al.*, 2022). Third, the organizational’s assets management and recovery refers to the capability to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011). For this reason, companies required to implement strategies that mitigate emerging issues to gain greater value (Jain *et al.*, 2022) and is a CE’s substantial objective to be reached (Lieder and Rashid, 2016).

**2.3 Green Economic Incentives (GEI)**

Green economy incentives (GEI) from government needed by organization to build and motivate pro-environmental behavior (Clemens, 2006) through financial (Ling and Xu, 2021) and supporting regulations (Parker *et al.*, 2009). Financial rewards support waste management (Ling and Xu, 2021), recycling, and resource efficiency (Rizos *et al.*, 2015) as well as environmentally oriented innovations (Pieroni *et al.*, 2019). Supporting regulatory incentives enhances environmentally-oriented products creation (Agustiono *et al.*, 2020) and promotes self-regulation (Lin *et al.*, 2015). Meanwhile, GEI strengthens internal capabilities (Singh *et al.*, 2018) and positively influences the organizational's internal decision-making processes (Rizos *et al.*, 2015). Incentives through subsidies, environmental grants, loans, and tax concessions influence the behavior of owners/managers (Bradford and Fraser, 2008; Chang *et al.*, 2011) towards a circular economy (Roxas and Coetzer, 2012). Similarly, the government support by marketing and procurement of recycled raw materials helps SMEs to enhance in pro environmental practices (Pimenova and Van der Vorst, 2004). Therefore, economic support strengthens internal capabilities (Prieto-Sandoval *et al.*, 2019), stimulating green-oriented commitments (Sezen and Çankaya, 2013; Chang *et al.*, 2011). The present study considered three indicators as green economy incentives determinants, namely 1) Government Subsidies and Tax Benefits (GSTB), 2) premium prices for green products (PP), and 3) cheaper recycled raw materials (CP).

## 2.4 Environmental Commitment

A company must have an internal and external environmental orientation to protect the environment (Saleem *et al.*, 2021), and design green strategies (Arsawan *et al.*, 2021; Bradford and Fraser, 2008) as evidenced in environmental saving actions (Singh *et al.*, 2014). In this case, environmental commitment is an organization's ethical value in protecting the environment (Chang *et al.*, 2011) and green activities to reduce environmental degradation (Suryantini *et al.*, 2021), protecting business, society, and its ecology (York, 2009). This is viewed as a strategic business orientation (Singh *et al.*, 2014) which reflects the company's sustainable business attitude (Green *et al.*, 2015). Environmental commitment involves manner, behavior, perspectives and economic benefits (Saleem *et al.*, 2021). Furthermore, Stone (2006) revealed the environmental commitment role in increasing green awareness and responsibility (Saleem *et al.*, 2021), which led to organizational pro-environmental sustainability, enhanced business performance, and effective waste management (Singh *et al.*, 2016). Considering the diversity of SMEs effective implementation commitments (Parker *et al.*, 2009), environmental awareness is still low (Singh *et al.*, 2018) due to the assumption that waste management is not related to productivity (Saleem *et al.*, 2021; Parker *et al.*, 2009) and organizational profits (Bhupendra and Sangle, 2016). Therefore, the present study considered the Environmental Products and Processes awareness (EPP), Resource Reuse and Recycling (RRR), and Environmental Responsibility (ER) to measure the company's environmental commitments.

## 2.4 Hypothesis Development

The natural resource-based view suggested an environmentally oriented and pollution-preventing capability for sustainable development (Hart, 1995). This is the government's basis to be involved by implementing regulations (Fatimah *et al.*, 2020) and financial incentives (Botezat *et al.*, 2018). This means that GEI stimulates an organizational solution to increase environmental commitment (Zhang *et al.*, 2013; Clemens, 2006). The important role of the government in making regulations related to providing green incentives will change the perspective of SME managers about the importance of contributing to saving the environment (Singh *et al.*, 2018). Thus, green incentives have an impact on increasing environment commitment. Based on the above description, the following hypothesis is formulated:

*H1: GEI has a significant positive effect on EC*

Several studies revealed that green incentives provided through financial (Clemens, 2006) and non-financial (Ling and Xu, 2021) can be allocated to make the internal environment guidelines such as the procurement process or recruiting employees with environmental conservation knowledge (Marrucci *et al.*, 2021; Bag *et al.*, 2021), preparation of training and development programs aimed to save the environment (Persis *et al.*, 2021) and environmentally sustainable strategies (Green *et al.*, 2015). Furthermore, GEI is important in the manufacture of environmentally friendly products (Longo *et al.*, 2021; Lozano, 2012), enhancing environmental efficiency (Polverini, 2021). The green economy incentives increase the organization's internal capabilities for investment recovery (Schmidt *et al.*, 2021), reselling used materials and goods (Susanty *et al.*, 2020), and recycling materials (Zhu *et al.*, 2011), prolonging the product life cycle (Corona *et al.*, 2019). Consequently, the company adopts a better sustainability system (Lozano, 2012). Based on the above description, the hypothesis is formulated as follows:

*H2: GEI positively affects IEM*



*H3: GEI positively affects ED*

*H4: GEI positively affects CAM&R*

Environmental commitment is considered as the organization's first step in its role to save the environment. It enhances the circular economy, especially in the internal environmental management, including planning, drafting, implementing, and evaluating the internal sustainable programs such as pollution prevention and waste reduction (Schmidt *et al.*, 2021), building cross-functional collaboration for environmental improvement (Parker *et al.*, 2009), and quality environment management (Zhang and Ma, 2021; York, 2009). Further, environmental commitment is a starting point for SMEs to design energy-efficient products, recyclable, safe raw materials, and minimize waste (Schmidt *et al.*, 2021). Therefore, it can affect investment recovery, inventory effectiveness, and sales of used goods and materials (Schmidt *et al.*, 2021). Based on the above description, the hypothesis is formulated as follows:

*H5: EC positively affects IEM.*

*H6: EC positively affects ECO*

*H7: EC positively affects CAM&R*

Green Economy Incentives (GEI) is significant in building organizational involvement and commitment to save the environment. It is the government and non-governmental organizations benefit to adopt environmental initiatives (Singh *et al.*, 2018; Agnello *et al.*, 2015). Incentives include additional or financial rewards (Ling and Xu, 2021) that encourage organizations to design or implement environmental practices (Kahupi *et al.*, 2021). The incentive improves recycling techniques (Bag *et al.*, 2021) and facilitates the transition to CE (Ling and Xu, 2021). Also, GEI enhances dynamic capabilities (Prieto-Sandoval *et al.*, 2019) that affect decision-making processes (Diaz *et al.*, 2021) although some SMEs perceive that investing in CE increases cost than expected return (Rizos *et al.*, 2015). Consequently, the increasing environmental commitment will motivate SME managers to implement CE (Kuo and Chang, 2021). The environmental commitment will strengthen the internal capabilities of SMEs (Marrucci *et al.*, 2021; Bag *et al.*, 2021), manufacture environmentally-friendly designed products (Longo *et al.*, 2021), and improve asset recovery and investment capabilities (Schmidt *et al.*, 2021). Therefore, the green economy incentives will increase environmental commitment and improve CE practices in SMEs. Based on the above description, the hypothesis is formulated as follows:

*H8: Environmental commitment partially mediates the relationship of green economic incentives to internal environment management*

*H9: Environmental commitment partially mediates the relationship of green economic incentives to eco-design*

*H10: Environmental commitment partially mediates the relationship between green economic incentives on corporate asset management and recovery*

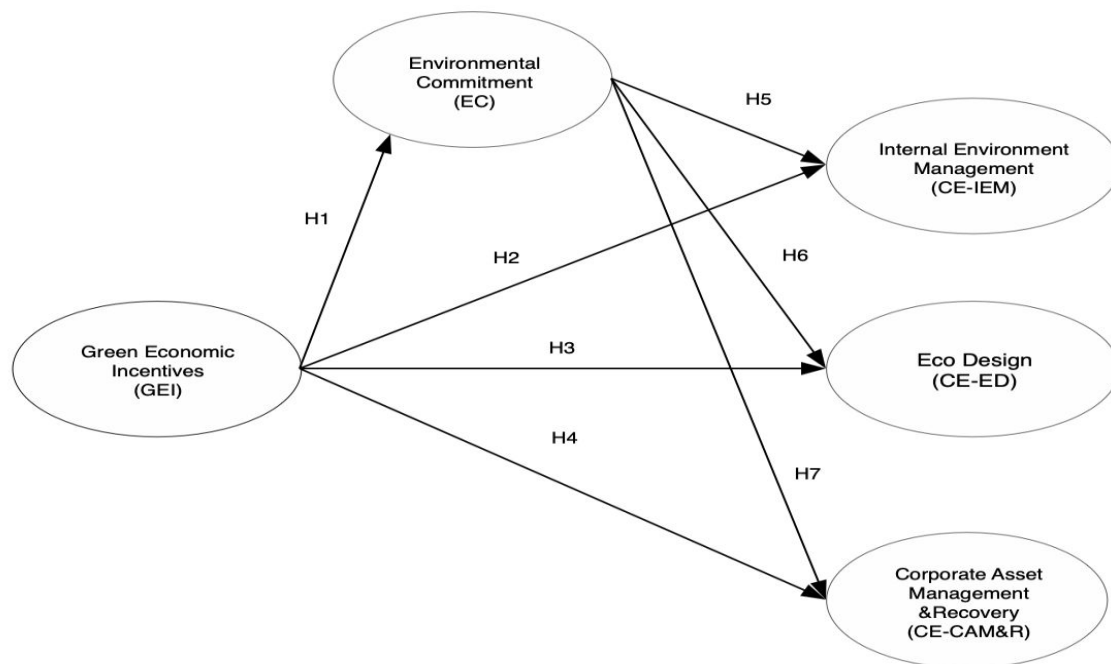


Figure 1. Proposed Conceptual Framework

### 3 Methodology

#### 3.1 Data and Sampling Method

The present study uses a quantitative approach through the distribution of questionnaires which focused on SME-producing companies (with 50–200 full time employees), which are the essential sector of the Indonesian economy that still growth and develop (Surya *et al.*, 2021). Population is 1,299 SMEs located in 9 regencies of Bali Province. Formula from Krejcie and Morgan, (1970) were used to determine the sample frames, obtaining a total of 297 SMEs. This selection was carried out using random sampling (lottery method). From the 297 SMEs, two respondents were recruited from each to fill out the research questionnaire. The total number of the participants was 594 people which include managers and assistant managers. Their selection was triggered by the assumption that they possess organizational characteristics and knowledge on circular economy practices. Data were collected from March to June 2021 via email and Google Forms and direct visits by first sending email notification on this study agenda. The 594 responses were analyzed to achieve the aims of the present study. Table 1 presents the population information, sample frame, and the number of respondents.

\*\*Insert Table 1\*\*

3.2 Measurement

The magnitude of the variable construct used was based on the previous empirical studies. The previous study measurement was adopted to the subject namely, SMEs in Bali Province over 9 districts. The construct indicators assessment used a 7-point Likert scale, "1: strongly disagree to 7: strongly agree". To avoid ambiguity, the questionnaire (in Indonesian) was tested on 30 SME CEOs with knowledge of the Circular Economy (CE). The Green Economic Incentive (GEI) variable was adopted from (Singh *et al.*, 2018; Esfahbodi *et al.*, 2016), consisting of 3 indicators. The environmental commitment variable was adopted from (Singh *et al.*, 2018; Liu and Bai, 2014), consisting of 3 indicators. While, the CE-IEM was adopted from (Schmidt *et al.*, 2021) and (Zhu *et al.*, 2011), consisting of 8 indicators. The CE-ED variable was adopted from (Schmidt *et al.*, 2021; Zhu *et al.*, 2011) with 4 indicators. Moreover, CE-CAM&R was adopted from (Schmidt *et al.*, 2021) and (Zhu *et al.*, 2011) with 3 indicators.

The present study used the variance-based partial least squares to test the hypothesis (PLS-SEM) with Smart PLS 3.2.9 software. The PLS-SEM was used to assess the relationship between constructs and their predictive power on endogenous variables (Hair *et al.*, 2014). The present study validated the circular economy practices model and the data was not assessed as normally distributed data, making the CE model assessment associated with GEI and EC predictors using PLS-SEM appropriate (Hair *et al.*, 2016).

4 Results and Discussion

Table 2 describes the characteristics of the 594 respondents.

\*\*Insert Table 2\*\*

4.1 Measurement Model

The VIFs test was used to evaluate the collinearity problem, scoring 2.872 (Green Economics Incentives), 1.826 (Environmental commitment), 3.558 (CE-Internal Environment Management), 1.832 (CE-Eco-Design, and 2.119 (CE-Corporate Asset Management and Recovery). All VIF coefficients were lower than 5 which is the recommended limit value by Hair *et al.*, (2016) that the data do not have general variance problems. The outer model was tested to evaluate the reliability and validity of the construct variables. Table 2 shows the results that each item of factor loadings is more than 0.6. The convergent validity test explains that the validity requirements are met because the average extracted variance (AVE) is more than 0.5 and the factor loading is more than 0.6 (Hair Jr *et al.*, 2016). This shows that the discriminant validity conditions of all constructs have been met.

\*\* Insert Table 3\*\*

The Heterotrait-Monotrait Ratio (HTMT) was used to assess the discriminant constructs validity. For this criteria according to Hair Jr *et al.* (2016) the value was lower than 0.9. Due to the values ranging from 0.384 to 0.701, the HTMT test showed that discriminant validity was achieved. The composite reliability values in both samples were above the recommended level of 0.7 therefore, the construct was reliable.



## 4.2 Inner Model Measurement

The present study applied the bootstrap method with 5000 samples to assess the research indicators and path coefficient's significance (Chin *et al.*, 2008). The results showed that the goodness-of-fit (GoF) model has a value of 0.367 which stated that the model is fit. In addition, testing on the standard residual root means square (SRMR) and normed fit index (NFI) shows that the SRMR value was 0.081 while the NFI was 0.716. The SRMR cut-off value was 0.8 and the NFI was below 0.9 which indicates that all criteria are met. The results showed that GEI explains EC by 0.268 (26.8%). The explanatory power of EC at CE-IEM was 0.347 (34.7%), at CE-ED, it was 0.224 (22.4%) and at CE-CAM&R it was 0.212 (21.2%). In addition, the value of  $Q^2$  showed that all constructs have positive values and good predictive relevance (Chin, 2010).

## 4.3 Hypothesis Testing

Table 4 shows the results of the relationship between GEI, EC and CE-IEM, CE-ED and CE-CAM&R. To test the hypotheses, we use path coefficients ( $\beta$ ), t values, and p values. According to Hair *et al.* (2016) if the path coefficient greater than 0.1, t value greater than 1.96 and 0.05 level of significance that means the hypotheses are supported. The results support the significant role of GEI in achieving EC ( $H_1$ ) with, CE-IEM ( $H_2$ ), CE-ED ( $H_3$ ), and CE-CAM&R ( $H_4$ ). Furthermore, EC has an important role in achieving CE-IEM ( $H_5$ ), CE-ED ( $H_6$ ), and CE-CAM&R ( $H_7$ ).

**\*\*Insert Table 4\*\***

After examining direct relationship, the next step was to determine mediating role as shown in Table 5. The present study tested three mediation patterns. According to Hair *et al.* (2014), the method used is to measure the VAF value  $< 0.20$ , meaning there is no mediation, while 0.20-0.80 indicates partial and the VAF value  $> 0.80$  means full mediation. To test the model mediation effect, non-parametric bootstrap was used (Hair *et al.*, 2016). Finally, variance values (VAF) were calculated to obtain indirect and total link sizes. When the VAF is greater than 80%, it shows full mediation; between 20 and 80% is partial; and below 20% means no mediating effect (Hair *et al.*, 2013).

The mediating role in the causal relationship between GEI and CE-IEM, CE-ED, and CE-CAM&R was examined using VAF assays. This study tested three mediation pathways and concluded that environmental commitment partially mediates the relationship between GEI and CE-IEM, where the VAF value is 35.90%, indicating that hypothesis 8 is accepted. EC also functions as a partial mediating relationship between GEI and CE-ED, with a VAF value of 24.10%, which means that hypothesis 9 is accepted. At the same time, EC functions as a partial mediating relationship between GEI and CE-CAM&R, with a VAF value of 65.50%, which means that hypothesis 10 is accepted.

**\*\*Insert Table 5\*\***

**\*\*Insert Figure 2\*\***

## 5 Conclusion

Most previous studies examined the circular economy but did not focus on combining green economic incentives and environmental commitment, especially in the SMEs sector. The CE

provides opportunities and encourages every country, industry, and business entity to jointly maintain sustainability and protect the environment. This study examined the role of GEI and EC in achieving CE for environmental sustainability. The results showed that GEI plays a significant role in environmental sustainability efforts to achieve CE. This is support study by Zhang *et al.* (2013), which stated external references, such as financial incentives, affect organizational attitude and commitment in the CE concept implementation (Centobelli *et al.*, 2021; Clemens, 2006). However, Singh *et al.* (2018) established that GEI does not affect building environmental commitment. Furthermore, the relationship between GEI and CE-IEM was significant (H2). The green economic incentives (Clemens, 2006) financial and non-financial (Ling and Xu, 2021) can help develop environmentally-oriented procedures, such as employee procurement processes (Marrucci *et al.*, 2021; Bag *et al.*, 2021), implementing environmental training and development programs (Persis *et al.*, 2021) and environmentally sustainable strategy (Green *et al.*, 2015). Hypothesis 3 proposed the relationship between GEI and CE-ED and showed positive results. Therefore, the role of GEI on Eco-design is incentives optimization to manufacture environmentally friendly products (Longo *et al.*, 2021; Lozano, 2012), enhancing environmental efficiency (Polverini, 2021). Furthermore, GEI positively affects CE-CAM&R. Incentives optimization can increase the organization's capability to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011). The hypothesis 5 showed a positive relationship between EC and CE-IEM, meaning that internal commitment and environmental management improves CE practices. Environmental commitment is achieved through internal organizational programs, such as pollution prevention (Schmidt *et al.*, 2021), cross-functional collaboration (Parker *et al.*, 2009), and quality environment management (Zhang and Ma, 2021; York, 2009). The relationship between EC and CE-ED was positive, hence hypothesis 6 was accepted. This proved that environmental commitment is the first step for SMEs to design energy-efficient products, recyclable, safe materials, and minimize waste (Schmidt *et al.*, 2021). Moreover, the relationship between EC and CE-CAM&R turned positive therefore hypothesis 7 was accepted. Environmental commitments can affect CE-CAM&R through investment recovery, excess inventory, sales of used goods and materials (Schmidt *et al.*, 2021).

**5.1 Theoretical Contribution**

There is increased attention by policymakers, researchers, and practitioners, for CE practices that can advance sustainable development goals. Therefore, this study explained the mechanisms that SMEs can utilize to successfully implement CE practices, including the role of GEI and EC. It complemented previous studies that failed to show antecedents for specific CE practices (Green *et al.*, 2015; Schmidt *et al.*, 2021; Liu *et al.*, 2018). There are very few studies that exclusively focused on the direct relationship between GEI and the implementation of CE practices. In contrast, this study showed that EC influences the relationship between GEI and three CE practices in Indonesian SMEs, specifically internal environmental management, green design, and CAM&R.

This study contributed to the CE literature and related theories in three folds. Firstly, it contributed to enhanced the natural resource-based view, describing the mechanisms that view GEI and EC as pollution prevention in CE practice. The results showed that GEI and EC are translated in a strategic orientation. The CE practices implementation can be affected by an organizations failure to commit to the environment. This study examined antecedents used to overcome these barriers (de Oliveira *et al.*, 2018). The finding contributed to the literature by integrating previous research

on GEI (Centobelli *et al.*, 2021) and environmental commitment (Galkina, 2021) as CE practice implementation drivers. Particularly, it showed that GEI can trigger the emergence of EC in CE practices, positively affecting internal environmental management and green design, and strengthens asset management and recovery. From a natural resource-based perspective, the results demonstrated the importance of companies building a commitment culture to implement CE practices.

Second, this study expanded the literature by dividing CE practices into three main dimensions namely internal environmental management, green design, and enterprise asset management and recovery. As mentioned by Centobelli *et al.* (2021) and Singh *et al.* (2018), the present study distinguished these three practices. The results showed that EC influences the relationship between GEI and internal environmental management, green design, and corporate asset management and recovery, acting as a triple mediator. Although the three tested mediation relationships are significant, GEI-EC and asset management and recovery have more influence. This result proved that SMEs strongly focus on resource recovery to develop enterprise asset management and recovery practices easily. It requires the involvement of purchasing managers in Indonesian SME in investment recovery practices (Betancourt Morales and Zartha Sossa, 2020). The Indonesian SME business have had inventory recovery practices for decades, making it a serious concern for organizational sustainability, increasing productivity and innovation, and environmental sustainability orientation.

Third, CE is an interesting topic for academics, policymakers, and practitioners, but the literature is not thorough on how Indonesian SMEs can develop CE practices. Most studies focused on the European context whereas this study contributed to the CE literature in developing countries and supported findings in the European context (Schmidt *et al.*, 2021). The results showed that GEI and EC influences the implementation of all three CE practices. Furthermore, this is the first study linking GEI and EC as antecedents of CE practice in an emerging country. Whereas, GEI is common in developed countries such as the US (Clemens, 2006), India (Singh *et al.*, 2018), and Italy (Centobelli *et al.*, 2021). Overall, these findings helped academics by contributing to the theory and generating evidence that incorporating the sub-constructs of CE practice may not always work, especially for developed countries like Germany. These results provided practitioners with insights for implementing CE practices in their companies.

## 5.2 Managerial Contribution

The governments and countries concerned about saving the environment must provide green economy subsidies, tax incentives, soft loans, and subsidized materials, to increase sustainable waste management strategies (Singh *et al.*, 2018; Möllemann, 2016). The regulations can strengthen the commitment and consistency of SMEs to saving the environment efforts (Kahupi *et al.*, 2021; Lin *et al.*, 2015; Roxas and Coetzer, 2012). Second, proper utilization of government's green economic incentives by SMEs managers will increase commitment to the environment. The GEI enabled SMEs to build a strong culture with higher trust in the environment, implementing green actions for sustainable development, and creating innovative sustainable business models to increase economic growth. The incentives also influence the implementation of environmentally oriented standards and building environmental ethics. Furthermore, green economic incentives facilitate SMEs collaboration with large companies to achieve organizational sustainability especially the raw materials provision, and supply chain management. Such actions develop a

strong attitude and increases the company's environmental commitment to the circular economy implementation.

### 5.3 Limitations and Further Study

This study identified several limitations causing a gap for future studies. First, the study design used assistant managers and managers for information. Future studies can overcome this common method bias and choose a proper design. Second, this study focused on the mechanisms influencing development of CE practices and assumed that GEI and EC are prerequisites for companies to implement this. Meanwhile, future studies can establish additional aspects that influence the proposed mechanism, such as environmental supply chain collaboration or green strategies and innovation. Third, previous studies including this, focused on the antecedents of CE practice in developed and developing countries. Future studies can therefore make comparisons to expand and generalize these findings by considering the differences in institutional contexts between countries.

### References

- Agnello, X., Naveen, J., Ravichandran, M. and Balamurugan, J. (2015), "Clean Technology and its Efficacy: Strategies of Environmental Management", *Journal of Environmental and Social Sciences*, Vol. 2 No. 2, pp. 110–116.
- Agustiono, T., Avtar, R., Singh, D. and Xue, W. (2020), "Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information ", No. January.
- Arsawan, I.W.E., Koval, V., Duginets, G., Kalinin, O. and Korostova, I. (2021), "The impact of green innovation on environmental performance of SMEs in an emerging economy", *E3S Web of Conferences*, Vol. 255, EDP Sciences, p. 1012.
- Arsawan, I.W.E., Koval, V., Rajiani, I., Rustiarini, N.W., Supartha, W.G. and Suryantini, N.P.S. (2020), "Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage", *International Journal of Productivity and Performance Management*, available at:<https://doi.org/10.1108/IJPPM-04-2020-0192>.
- Bag, S., Yadav, G., Dhamija, P. and Kataria, K.K. (2021), "Key resources for industry 4.0 adoption and its effect on sustainable production and circular economy: An empirical study", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 281, p. 125233.
- Barney, J. (1991), "Firm Resources and Sustained Competitive Advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99–120.
- Barros, M.V., Salvador, R., do Prado, G.F., de Francisco, A.C. and Piekarski, C.M. (2021), "Circular economy as a driver to sustainable businesses", *Cleaner Environmental Systems*, Elsevier Ltd, Vol. 2 No. December 2020, p. 100006.
- Betancourt Morales, C.M. and Zartha Sossa, J.W. (2020), "Circular economy in Latin America: A systematic literature review", *Business Strategy and the Environment*, Wiley Online Library, Vol. 29 No. 6, pp. 2479–2497.
- Bhupendra, K.V. and Sangle, S. (2016), "Pollution prevention strategy: a study of Indian firms", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 133, pp. 795–802.
- Blévennec, K. Le, Vercalsteren, A. and Boonen, K. (2022), "Ecodesign as a New Lever to Enhance the Global Value Proposition: From Space to Corporate", *Towards a Sustainable Future-Life Cycle Management*, Springer, pp. 3–13.



- Botezat, E.A., Dodescu, A.O., Vaduva, S. and Fotea, S.L. (2018), "An exploration of circular economy practices and performance among Romanian producers", *Sustainability (Switzerland)*, Vol. 10 No. 9, pp. 1–17.
- Bradford, J. and Fraser, E.D.G. (2008), "Local authorities, climate change and small and medium enterprises: Identifying effective policy instruments to reduce energy use and carbon emissions", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 3, pp. 156–172.
- Centobelli, P., Cerchione, R., Esposito, E., Passaro, R. and Shashi. (2021), "Determinants of the transition towards circular economy in SMEs: A sustainable supply chain management perspective", *International Journal of Production Economics*, Elsevier B.V., Vol. 242 No. September 2020, p. 108297.
- Chang, S., Gong, Y. and Shum, C. (2011), "Promoting innovation in hospitality companies through human resource management practices", *International Journal of Hospitality Management*, Elsevier Ltd, Vol. 30 No. 4, pp. 812–818.
- Chin, W.W. (2010), "How to Write Up and Report PLS Analyses", *Handbook of Partial Least Squares*, pp. 655–690.
- Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), "Structural equation modeling in marketing: Some practical reminders", *Journal of Marketing Theory and Practice*, Taylor & Francis, Vol. 16 No. 4, pp. 287–298.
- Clemens, B. (2006), "Economic incentives and small firms: Does it pay to be green?", *Journal of Business Research*, Vol. 59 No. 4, pp. 492–500.
- Corona, B., Shen, L., Reike, D., Rosales Carreón, J. and Worrell, E. (2019), "Towards sustainable development through the circular economy—A review and critical assessment on current circularity metrics", *Resources, Conservation and Recycling*, Elsevier, Vol. 151 No. May, p. 104498.
- Dalhammar, C. (2016), "Industry attitudes towards ecodesign standards for improved resource efficiency", *Journal of Cleaner Production*, Elsevier, Vol. 123, pp. 155–166.
- Dalhammar, C., Milios, L. and Richter, J.L. (2021), "Ecodesign and the circular economy: conflicting policies in Europe", *EcoDesign and Sustainability I*, Springer, pp. 187–198.
- Diaz, A., Schöggel, J.P., Reyes, T. and Baumgartner, R.J. (2021), "Sustainable product development in a circular economy: Implications for products, actors, decision-making support and lifecycle information management", *Sustainable Production and Consumption*, Elsevier B.V., Vol. 26, pp. 1031–1045.
- Ellen MacArthur Foundation. (2013), "Towards the circular economy. *Journal of Industrial Ecology*", Vol. 1.
- Esfahbodi, A., Zhang, Y. and Watson, G. (2016), "Sustainable supply chain management in emerging economies: Trade-offs between environmental and cost performance", *International Journal of Production Economics*, Elsevier, Vol. 181, pp. 350–366.
- Fatimah, Y.A., Govindan, K., Murniningsih, R. and Setiawan, A. (2020), "Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 269, p. 122263.
- Galkina, T. (2021), "International ECOpreneurship: Environmental commitment and international partner selection of Finnish firms from the energy sector", *Journal of International Entrepreneurship*, Springer US, Vol. 19 No. 2, pp. 300–320.
- Green, K.W., Toms, L.C. and Clark, J. (2015), "Impact of market orientation on environmental

- sustainability strategy”, *Management Research Review*, Vol. 38 No. 2, pp. 217–238.
- Gupta, H., Kumar, A. and Wasan, P. (2021), “Industry 4.0, cleaner production and circular economy: An integrative framework for evaluating ethical and sustainable business performance of manufacturing organizations”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 295, p. 126253.
- Hair, J.F., Hult, G., Tomas, M., Ringle, C.M. and Sarstedt, M. (2016), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage publications.
- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), “Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance”, *Long Range Planning*, Vol. 46 No. 1–2, pp. 1–12.
- Hair, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014), “Partial least squares structural equation modeling (PLS-SEM)”, *European Business Review*, Vol. 26 No. 2, pp. 106–121.
- Hair Jr, J.F., Sarstedt, M., Matthews, L.M. and Ringle, C.M. (2016), “Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I–method”, *European Business Review*, Vol. 28 No. 1, pp. 63–76.
- Hart, S. (1995), “A Natural-Resources Based View of the Firm”, *Academy of Management Review*, Vol. 51 No. 3, pp. 49–51.
- Hart, S.L. and Dowell, G. (2011), “A natural-resource-based view of the firm: Fifteen years after”, *Journal of Management*, Vol. 37 No. 5, pp. 1464–1479.
- Jain, A., Sarsaiya, S., Awasthi, M.K., Singh, R., Rajput, R., Mishra, U.C., Chen, J., et al. (2022), “Bioenergy and bio-products from bio-waste and its associated modern circular economy: Current research trends, challenges, and future outlooks”, *Fuel*, Elsevier, Vol. 307, p. 121859.
- Kahupi, I., Eirikur Hull, C., Okorie, O. and Millette, S. (2021), “Building competitive advantage with sustainable products – A case study perspective of stakeholders”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 289, p. 125699.
- Khan, S.A.R., Yu, Z. and Umar, M. (2021), “How environmental awareness and corporate social responsibility practices benefit the enterprise? An empirical study in the context of emerging economy”, *Management of Environmental Quality: An International Journal*, Emerald Publishing Limited, Vol. 32 No. 5, pp. 863–885.
- Korhonen, J., Honkasalo, A. and Seppälä, J. (2018), “Circular Economy: The Concept and its Limitations”, *Ecological Economics*, Elsevier B.V., Vol. 143, pp. 37–46.
- Koval, V., Olczak, P., Vdovenko, N., Boiko, O., Matuszewska, D. and Mikhno, I. (2021), “Ecosystem of environmentally sustainable municipal infrastructure in the Ukraine”, *Sustainability (Switzerland)*, Vol. 13 No. 18, pp. 1–22.
- Krejcie, R. V and Morgan, D.W. (1970), “Determining sample size for research activities”, *Educational and Psychological Measurement*, Vol. 30 No. 3, pp. 607–610.
- Kuo, L. and Chang, B.G. (2021), “The affecting factors of circular economy information and its impact on corporate economic sustainability-Evidence from China”, *Sustainable Production and Consumption*, Elsevier B.V., Vol. 27, pp. 986–997.
- Lieder, M. and Rashid, A. (2016), “Towards circular economy implementation: a comprehensive review in context of manufacturing industry”, *Journal of Cleaner Production*, Elsevier, Vol. 115, pp. 36–51.
- Lin, H., Zeng, S., Ma, H. and Chen, H. (2015), “Does commitment to environmental self-regulation matter? An empirical examination from China”, *Management Decision*, Vol. 53

- No. 5, pp. 932–956.
- Ling, M. and Xu, L. (2021), “How and when financial incentives crowd out pro-environmental motivation: A longitudinal quasi-experimental study”, *Journal of Environmental Psychology*, Elsevier Ltd, Vol. 78 No. October, p. 101715.
- Liu, J., Feng, Y., Zhu, Q. and Sarkis, J. (2018), “Green supply chain management and the circular economy: Reviewing theory for advancement of both fields”, *International Journal of Physical Distribution and Logistics Management*, Vol. 48 No. 8, pp. 794–817.
- Liu, Y. and Bai, Y. (2014), “An exploration of firms’ awareness and behavior of developing circular economy: An empirical research in China”, *Resources, Conservation and Recycling*, Elsevier B.V., Vol. 87, pp. 145–152.
- Longo, S., Cellura, M., Cusenza, M.A., Guarino, F., Mistretta, M., Panno, D., D’Urso, C., *et al.* (2021), “Life Cycle Assessment for Supporting Eco-Design: The Case Study of Sodium–Nickel Chloride Cells”, *Energies*, Multidisciplinary Digital Publishing Institute, Vol. 14 No. 7, p. 1897.
- Lozano, R. (2012), “Towards better embedding sustainability into companies’ systems: An analysis of voluntary corporate initiatives”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 25, pp. 14–26.
- Luthra, S., Kumar, A., Sharma, M., Garza-Reyes, J.A. and Kumar, V. (2022), “An analysis of operational behavioural factors and circular economy practices in SMEs: An emerging economy perspective”, *Journal of Business Research*, Elsevier, Vol. 141, pp. 321–336.
- Marrucci, L., Daddi, T. and Iraldo, F. (2021), “The contribution of green human resource management to the circular economy and performance of environmental certified organisations”, *Journal of Cleaner Production*, Elsevier, Vol. 319, p. 128859.
- Masi, D., Day, S. and Godsell, J. (2017), “Supply chain configurations in the circular economy: A systematic literature review”, *Sustainability (Switzerland)*, Vol. 9 No. 9, available at: <https://doi.org/10.3390/su9091602>.
- Möllemann, D. (2016), “Framing the climate change policies and circular economy tenets for SMEs”, University of Twente.
- Nurdiana, J., Franco-Garcia, M.L. and Heldeweg, M.A. (2021), “How shall we start? The importance of general indices for circular cities in Indonesia”, *Sustainability (Switzerland)*, Vol. 13 No. 20, available at: <https://doi.org/10.3390/su132011168>.
- de Oliveira, U.R., Espindola, L.S., da Silva, I.R., da Silva, I.N. and Rocha, H.M. (2018), “A systematic literature review on green supply chain management: Research implications and future perspectives”, *Journal of Cleaner Production*, Elsevier, Vol. 187, pp. 537–561.
- Parker, C.M., Redmond, J. and Simpson, M. (2009), “A review of interventions to encourage SMEs to make environmental improvements”, *Environment and Planning C: Government and Policy*, Vol. 27 No. 2, pp. 279–301.
- Persis, D.J., Venkatesh, V.G., Sreedharan, V.R., Shi, Y. and Sankaranarayanan, B. (2021), “Modelling and analysing the impact of Circular Economy; Internet of Things and ethical business practices in the VUCA world: Evidence from the food processing industry”, *Journal of Cleaner Production*, Elsevier, Vol. 301, p. 126871.
- Pieroni, M.P.P., McAloone, T.C. and Pigosso, D.C.A. (2019), “Business model innovation for circular economy and sustainability: A review of approaches”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 215, pp. 198–216.
- Pimenova, P. and Van der Vorst, R. (2004), “The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies”,



- Journal of Cleaner Production*, Vol. 12 No. 6, pp. 549–559.
- Polverini, D. (2021), “Regulating the circular economy within the ecodesign directive: Progress so far, methodological challenges and outlook”, *Sustainable Production and Consumption*, Vol. 27, pp. 1113–1123.
- Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R.J. and Ormazabal, M. (2019), “Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises”, *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 6, pp. 1473–1484.
- Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbera, M. and Ioannou, A. (2015), “The Circular Economy: Barriers and Opportunities for SMEs. CEPS Working Documents No. 412/September 2015”, No. 412.
- Roxas, B. and Coetzer, A. (2012), “Institutional Environment, Managerial Attitudes and Environmental Sustainability Orientation of Small Firms”, *Journal of Business Ethics*, Vol. 111 No. 4, pp. 461–476.
- Saleem, F., Qureshi, S.S. and Malik, M.I. (2021), “Impact of environmental orientation on proactive and reactive environmental strategies: Mediating role of business environmental commitment”, *Sustainability (Switzerland)*, Vol. 13 No. 15, available at: <https://doi.org/10.3390/su13158361>.
- Sarkis, J. (2012), “A boundaries and flows perspective of green supply chain management”, *Supply Chain Management*, Vol. 17 No. 2, pp. 202–216.
- Schmidt, C.V.H., Kindermann, B., Behlau, C.F. and Flatten, T.C. (2021), “Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs”, *Business Strategy and the Environment*, No. July, pp. 1–17.
- Schroeder, P., Anggraeni, K. and Weber, U. (2019), “The Relevance of Circular Economy Practices to the Sustainable Development Goals”, *Journal of Industrial Ecology*, Vol. 23 No. 1, pp. 77–95.
- Schwab, K. and World Economic Forum-WEF. (2019), *The Global Competitiveness Report 2019*.
- Sezen, B. and Çankaya, S.Y. (2013), “Effects of Green Manufacturing and Eco-innovation on Sustainability Performance”, *Procedia - Social and Behavioral Sciences*, Vol. 99, pp. 154–163.
- Singh, M.P., Chakraborty, A. and Roy, M. (2016), “Entrepreneurial commitment, organizational sustainability and business performance of manufacturing msme: Evidence from India”, *International Journal of Applied Business and Economic Research*, Vol. 14 No. 6, pp. 4615–4631.
- Singh, M.P., Chakraborty, A. and Roy, M. (2018), “Developing an extended theory of planned behavior model to explore circular economy readiness in manufacturing MSMEs, India”, *Resources, Conservation and Recycling*, Vol. 135 No. January 2017, pp. 313–322.
- Singh, N., Jain, S. and Sharma, P. (2014), “Determinants of proactive environmental management practices in Indian firms: An empirical study”, *Journal of Cleaner Production*, Vol. 66, pp. 469–478.
- Stone, L.J. (2006), “Limitations of cleaner production programmes as organisational change agents. II. Leadership, support, communication, involvement and programme design”, *Journal of Cleaner Production*, Vol. 14 No. 1, pp. 15–30.
- Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H. and Idris, M. (2021), “Economic

- growth, increasing productivity of smes, and open innovation”, *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 7 No. 1, pp. 1–37.
- Suryantini, N.P.S., Wayan Edi Arsawan, I., Darmayanti, N.P.A., Moskalenko, S. and Gorokhova, T. (2021), “Circular economy: Barrier and opportunities for SMEs”, *E3S Web of Conferences*, Vol. 255, available at: <https://doi.org/10.1051/e3sconf/202125501017>.
- Susanty, A., Tjahjono, B. and Sulistyani, R.E. (2020), “An investigation into circular economy practices in the traditional wooden furniture industry”, *Production Planning & Control*, Taylor & Francis, Vol. 31 No. 16, pp. 1336–1348.
- Temminck, E., Mearns, K. and Fruhen, L. (2015), “Motivating Employees towards Sustainable Behaviour”, *Business Strategy and the Environment*, Vol. 24 No. 6, pp. 402–412.
- Yadav, G., Luthra, S., Huisingh, D., Mangla, S.K., Narkhede, B.E. and Liu, Y. (2020), “Development of a lean manufacturing framework to enhance its adoption within manufacturing companies in developing economies”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 245, p. 118726.
- York, J.G. (2009), “Pragmatic sustainability: Translating environmental ethics into competitive advantage”, *Journal of Business Ethics*, Vol. 85 No. SUPPL. 1, pp. 97–109.
- Zhang, B., Yang, S. and Bi, J. (2013), “Enterprises’ willingness to adopt/develop cleaner production technologies: An empirical study in Changshu, China”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 40, pp. 62–70.
- Zhang, Q. and Ma, Y. (2021), “The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership”, *Journal of Cleaner Production*, Elsevier, Vol. 292, p. 126057.
- Zhu, Q., Geng, Y. and Lai, K. hung. (2011), “Environmental supply chain cooperation and its effect on the circular economy practice-performance relationship among Chinese manufacturers”, *Journal of Industrial Ecology*, Vol. 15 No. 3, pp. 405–419.

Table

Table 1. Population and Sample Frame

No	SMEs Business Field (1)	Research Population (2)	Population's percentage (3)	No. of Sample (4)	No. of Respondents (5)
1	Manufacturing	100	7.6	23	46
2	Medical pharma/chemical	171	13.2	39	78
3	Food	188	14.5	43	86
4	Textile	331	25.5	76	152
5	Woodcraft	405	31.2	92	184
6	Others	104	8.0	24	48
	Total	1.299	100	297	594

Table 2. Characteristics of Respondents

Criteria	Data	Frequency	Percentage
<i>Gender</i>	Male	450	75,8
	Female	144	24,2
<i>Age</i>	21-30	39	6,6
	31-40	272	45,8
	41-50	238	40,1
	51-60	45	7,6
<i>Educational level</i>	Bachelor	550	92,6
	Master	38	6,4
	Doctoral	6	1,0
<i>Experience (years)</i>	<5	56	9,4
	6-10	157	26,4
	11-15	204	34,3
	16-20	134	22,6
	>21 or more	43	7,3
<i>Position</i>	General managers	305	51,3
	Assistant managers	289	48,7

Table 3. Construct Validity and Reliability

Description	Loading	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Green Economic Incentives		0.848	0.847	0.908	0.768
The government provides subsidies and tax benefits for the implementation of CE practices (GSTB).	0,879				
Industrial/direct buyers are ready to pay a premium price for green products (PP)	0,930				
Availability of cheaper recycled raw material than virgin raw material (CP)	0,817				
Environmental Commitment		0.755	0.767	0.860	0.672
My firm considers the potential environmental consciousness of the product and production process (EPP).	0,877				
My firm reduces the use of virgin resources by emphasizing the reuse and recycling of EC resources (RRR).	0,821				
My firm values the environment and describes itself as an environmentally EC responsible firm (ER).	0,756				
Circular economy practices—Internal environmental management		0.860	0.873	0.891	0.507
Cross-functional cooperation for environmental improvements	0,803				
Special training for workers on environmental issues	0,762				
Total quality environmental management	0,671				
Existence of pollution prevention programs such as cleaner production	0,626				
Internal performance evaluation system incorporating environmental factors	0,652				
Generate environmental reports for internal evaluation	0,763				
Commitment to named practices from senior managers	0,773				
Support for named practices from mid-level managers	0,622				
Circular economy practices—Eco-design		0.839	0.850	0.892	0.675
Design of products for reduced consumption of materials/energy	0,761				
Design of products for reuse, recycling, and recovery of material parts	0,804				
Design of products to avoid or reduce the use of hazardous products	0,865				
Design of processes for minimization of waste	0,852				
Circular economy practices—Corporate asset management		0.777	0.782	0.871	0.693
Investment recovery (sale) of excess inventories/materials	0,886				
Sale of scrap and used materials	0,826				
Sale of excess capital equipment	0,782				

Table 4. Path Coefficients

Path (Hypothesis)	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Remarks
- Green Economic Incentives -> Environmental Commitment (H1)	0.518	0.520	0.036	14.202	0.000	Supported
- Green Economic Incentives -> Internal environment management (H2)	0.326	0.326	0.048	6.795	0.000	Supported
- Green Economic Incentives -> Eco Design (H3)	0.333	0.333	0.055	6.051	0.000	Supported

- Green Economic Incentives -> Corporate Asset Management and Recovery (H4)	0.108	0.104	0.048	2.258	0.024	Supported
- Environmental Commitment -> Internal Environment Management (H5)	0.351	0.353	0.042	8.292	0.000	Supported
- Environmental Commitment -> Eco Design (H6)	0.205	0.207	0.042	4.855	0.000	Supported
- Environmental Commitment -> Corporate Asset Management and Recovery (H7)	0.395	0.399	0.044	9.033	0.000	Supported

Table 5. Testing of mediation effects

Link*	Mediator*	Independent Variable-Mediator	Mediator-Dependent Variable	Direct	Indirect	Total effect	VAF (%)	Decision
GEI-CE-IEM	EC	0.518	0.351	0.326	0.182	0.507	0.359	Partial mediation
GEI-CE-ED	EC	0.518	0.205	0.333	0.106	0.440	0.241	Partial mediation
GEI-CE-CAM&R	EC	0.518	0.395	0.108	0.205	0.313	0.655	Partial mediation

Figure

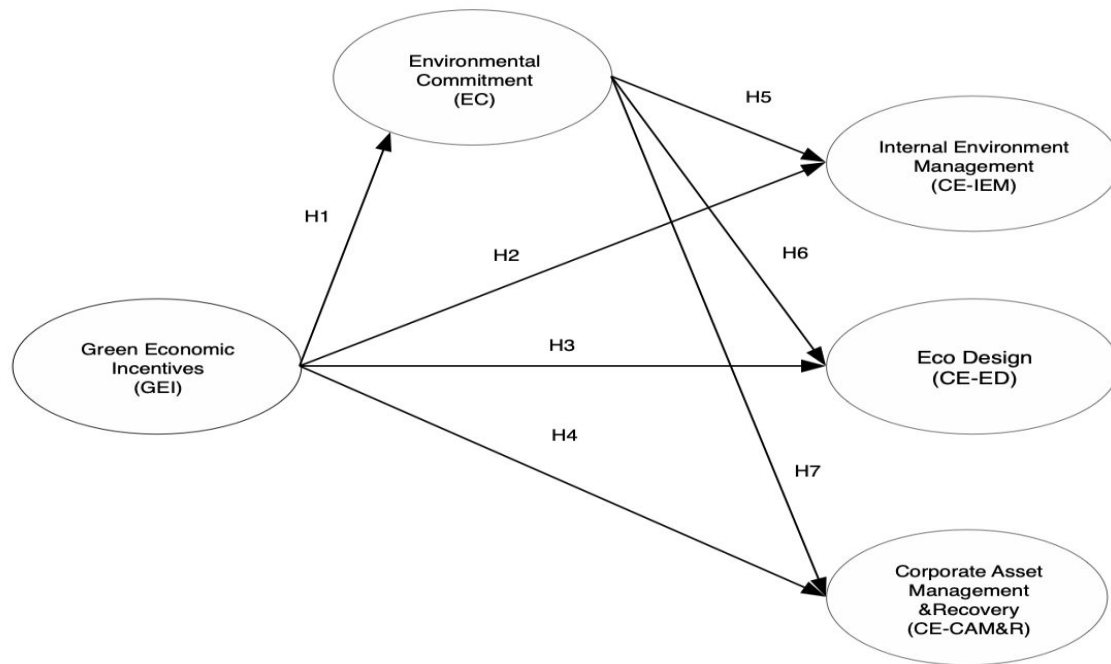


Figure 1. Proposed Conceptual Framework

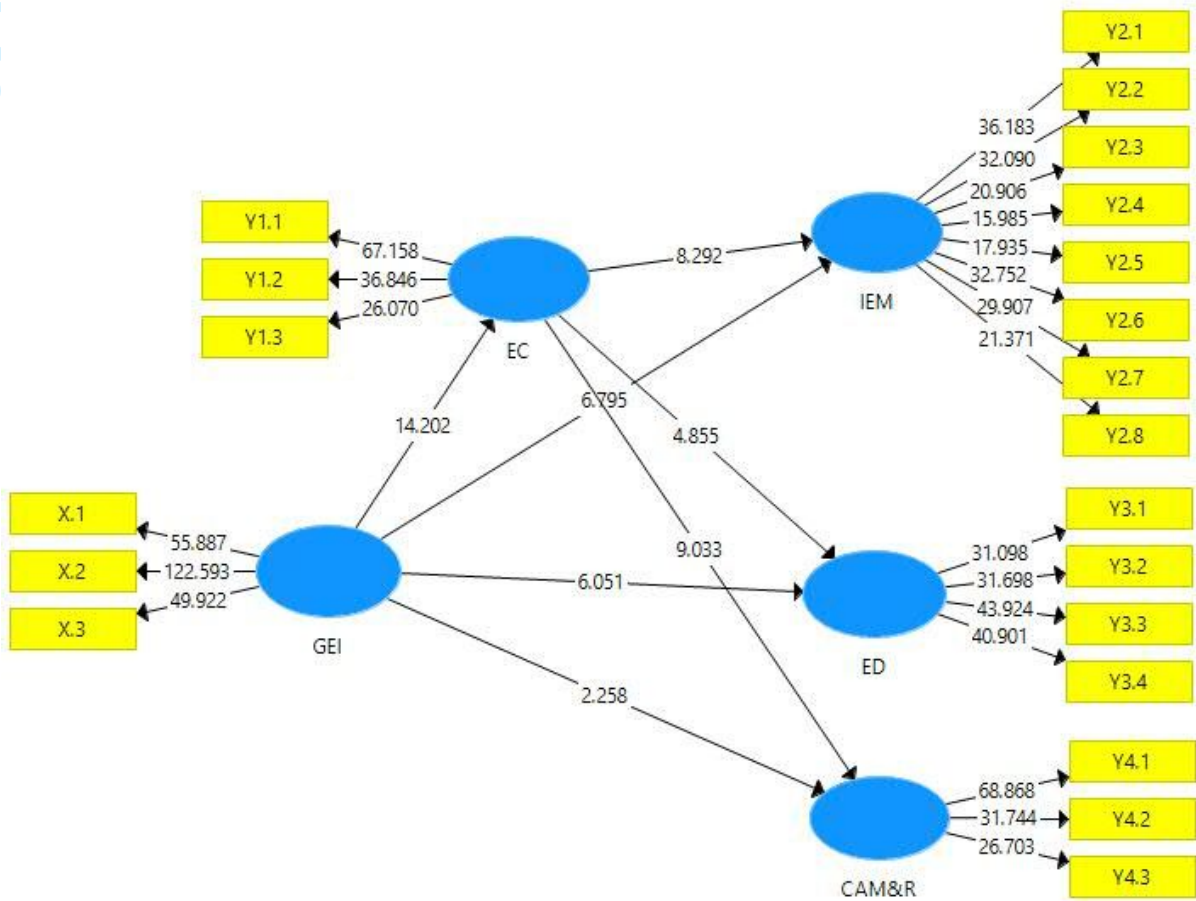











Figure 2. Output analysis



# Q1Q3Q4Q5 Circular economy practices in SMEs: aligning model of green economic incentives and environmental commitment

## Q2 Circular economy practices in SMEs

 In this section only the affiliation field can be edited. If any other changes are required in this section please add a comment.


I. Wayan Edi Arsawan,   wayanediarsawan@pnb.ac.id, Viktor Koval,   victor-koval@ukr.net, Dwi Suhartanto  dwi.suhartanto@polban.ac.id, Ni Kadek Dessy Hariyanti  dessyhariyanti@pnb.ac.id, Nataliia Polishchuk  pnv20@ukr.net and Viktoriia Bondar  bondarv1801@gmail.com or cid.org

 ~~Department of International Business Management,~~ Department of Business Administration, Politeknik Negeri State Polytechnic Bali, Bali, Bali, Indonesia

 ~~Odessa Institute of Trade and Economics of Kyiv National University of Trade and Economics~~ Izmail State University of Humanities, ~~Odessa,~~ Ukraine

 Department of Business Administration, Politeknik Negeri Bandung, Bandung, Indonesia

 ~~Politeknik Negeri Bali, Jimbaran~~ Department of Business Administration, Politeknik Negeri Bali, ~~Bali,~~ Indonesia

 ~~Kharkiv Institute of Business and Management, Kharkov, Ukraine~~ Odesa National University of Technology, Ukraine

I. Wayan Edi Arsawan is the corresponding author and can be contacted at: [wayanediarsawan@pnb.ac.id](mailto:wayanediarsawan@pnb.ac.id)

### About the authors

I. Wayan Edi Arsawan is an Associate Professor at Department of Business Administration, Politeknik Negeri Bali Indonesia. His areas of research interest are human resource management; organizational behavior; leadership; strategic management; knowledge management, marketing and sustainability.

Viktor Koval is the professor and Head of Department of Accounting, Economics and Management of Odessa Institute of Trade and Economics of Kyiv National University, Ukraine. His research interest are earth and planetary sciences; business, management and accounting; environmental science; energy; engineering; decision sciences economics, econometrics and finance.

Dwi Suhartanto is a Professor in Marketing at the Business Administration Department, Politeknik Negeri Bandung, Indonesia. His research interests include consumer behavior, hospitality and tourism and green products. His works have been published in various reputable journals including Journal of Cleaner Production, Journal of Business Research and Current Issues in Tourism.

Ni Kadek Dessy Hariyanti is a Senior Lecturer of Department of Business Administration, Politeknik Negeri Bali Indonesia. Her areas of research interest are computers; management information system; finance management; knowledge management, and artificial intelligence.

Nataliia Polishchuk is an Associate Professor of Vocational Education, Labor Training and Technology, Rivne State University for Humanities. Research interests: philosophy of education; pedagogy; economics and organization of production; Sustainability; the science of the Earth and the planet.

Viktoriia Bondar is an Associate Professor of National Academy of Municipal Economy Kharkiv, Ukraine. Research interests: philosophy of education; pedagogy; economics and organization of production; Sustainability; the science of the Earth and the planet, agriculture.

## Purpose

The present study aimed to examine the relationship between green economic incentives (GEIs) and environmental commitment (EC) as drivers of the circular economy (CE) practices in small and medium enterprises (SMEs).

## Design/methodology/approach

A cross-sectional study of 594 assistant managers and SME managers was used while data was analyzed through Smart PLS.

## Findings

The results showed that green economic incentive (GEIs) positively affect the SMEs' environmental commitment (EC) and the circular economy (CE) practice model. Furthermore, environmental commitment (EC) is the mediator between green economic incentive (GEIs) and the three circular economy (CE) practices: internal environmental management, eco-design, and corporate asset management and recovery (CAM&R).

## Practical implications

The present study provided a basis for understanding the relevance of SMEs' circular economy (CE) practices and designing a strategic plan for its implementation. Also, it provides insight into that collaboration between triple helix (the government, SMEs, and the community) is needed in increasing environmental awareness towards sustainability.

## Originality/value

This study enhanced the natural resource-based view (NRBV), describing the mechanisms that view green economic incentives (GEIs) and environmental commitment (EC) as pollution prevention in circular economy (CE) practice.

**Keywords:** Green economic incentives, Environmental commitment, Internal environmental management, Eco-design, Corporate asset management and recovery, Circular economy practices

## 1. Introduction

**Q6** The circular economy (CE) is an essential environmental strategy concept for waste minimization, nature recuperation (Bag *et al.*, 2021), sharpening environmental conservation, and efficient energy consumption for a sustainable business (Gupta *et al.*, 2021; Arsawan *et al.*, 2021) by paying great attention to the environment and resources (Korhonen *et al.*, 2018). As a result, industrial waste is a valuable input that can be repaired, reused, and recycled (Bag *et al.*, 2021; Yadav *et al.*, 2020). It leads to oriented and environmental value products, methods, and processes (Schroeder *et al.*, 2019). A circular economy (CE) approach benefits businesses and society with improved environmental awareness (Khan *et al.*, 2021; Centobelli *et al.*, 2021), lower resource price volatility, better customer relations, and job opportunities (Ellen MacArthur Foundation, 2013).

The circular economy (CE) is affected by the internal and external environment. Internal factors include behavior (Ling and Xu, 2021; Saleem *et al.*, 2021), environmental commitment (EC) (Galkina, 2021; Lin *et al.*, 2015), and organizational capabilities (Prieto-Sandoval *et al.*, 2019; Singh *et al.*, 2018). Meanwhile, government pro-environmental regulations and support are considered external factors for CE practices (Bhupendra and Sangle, 2016; Lozano, 2012). The present study aimed to address various gaps, including the unavailability of studies on the SMEs' readiness for the circular economy (CE) (Singh *et al.*, 2018). First, although it affects economic growth (Suryantini *et al.*, 2021), the role of SMEs in saving the environment needs to be examined (Saleem *et al.*, 2021). A supportive

ecosystem should be maintained to build sustainability through green-oriented strategies and innovation optimization (Arsawan *et al.*, 2021). Second, CE has not been comprehensively studied, especially in the SMEs sector, due to limited behavior and internal resource capabilities (Luthra *et al.*, 2022; Temminck *et al.*, 2015). It can be an opportunity for SMEs to improve internal capabilities (Centobelli *et al.*, 2021) for effective green marketing and new markets creation and design process, and circular products and attract a value-oriented talent environment (Barros *et al.*, 2021; Diaz *et al.*, 2021). Third, Singh *et al.* (2018) showed that green economic incentives (GEIs) do not contribute to building environmental commitment (EC). However, the importance of green incentives in building environmental commitment (EC) was demonstrated by Centobelli *et al.* (2021). This divergence shows the need for more research on green economic incentive (GEIs) and environmental commitment (EC) to support SMEs' need for environmental self-regulation for environmental improvements (Lin *et al.*, 2015; Ling and Xu, 2021).

The present study was motivated by the research gaps and examined the relationship between green economic incentive (GEIs), environmental commitment (EC), internal environmental management (CE-IEM), eco-design (CE-ED), corporate asset management and recovery (CE-CAM&R) on SMEs in Indonesia for three reasons. First, Indonesia is a developing country with 64.5 million SMEs continuously growing and potentially boosting national economic growth (Arsawan *et al.*, 2022a). Consequently, government regulations must sustain environmental attention (Nurdiana *et al.*, 2021). Second, CE is at an early implementation stage and faces many challenges, particularly infrastructure and regulation (Fatimah *et al.*, 2020; Nurdiana *et al.*, 2021). For that reason, the government's role and efforts are crucial in making consistent regulations (Rizos *et al.*, 2015), increasing commitment environment (Singh *et al.*, 2016; Lin *et al.*, 2015), and providing green economic incentive (GEIs) for its implementation (Centobelli *et al.*, 2021; Singh *et al.*, 2018). Third, data from Schwab and World Economic Forum-WEF (2019) stated that this country lacks internal resources, particularly business dynamics capability, developing a sustainable innovation (Arsawan *et al.*, 2022b). However, the innovations should be environmentally oriented and environmentally friendly technologies (Agnello *et al.*, 2015). Furthermore, the second part of this study is the literature review, which includes the hypotheses formulation, while the third and fourth describes the method and the analysis, respectively. Finally, the last part contains a discussion, theoretical and managerial contributions, conclusions, research limitations, and suggestions for further research.

## 2. Literature review and hypothesis development

### 2.1 Natural resource-based view

Hart (1995) coined the natural resource-based view (NRBV) to extend the resource-based view (Barney, 1991). Three additions were suggested, including (1) environmental-oriented capabilities for enhanced organizational profitability, (2) pollution preventive action, and (3) product stewardship for reaching sustainable development (Hart, 1995). Pollution preventive action refers to effective waste and emissions management during the production process (Hart and Dowell, 2011). On the other side, product stewardship refers to the development of integrated design (Hart, 1995). Finally sustainable development refers to a production configuration "sustained indefinitely into the future" (Hart and Dowell, 2011). The influence of NRBV was tested by Hart and Dowell (2011) and found that previous research only focused on pollution prevention capabilities, leaving the other two capabilities unexplored. Based on this, this study examined the three NRBV capabilities role, namely green economic incentive (GEIs) as an effort to take precautions (Hart and Dowell, 2011), environmental commitment (EC), also known as an effort to build environmentally oriented products, product life cycle strategies for enhanced product stewardship (Green *et al.*, 2015) while the circular economy (CE) is a sustainable development implementation (Liu *et al.*, 2018; Sarkis, 2012).

### 2.2 Circular economy practices in small and medium enterprises

The present study considered circular economy (CE) practices that require SMEs to integrate ecological requirements, including efficiency and reduction of raw, recycling, reuse, and replacement of materials into organizational routine activities (Botezat *et al.*, 2018; Masi *et al.*, 2017). Circularity is considered as a solution-based framework system capable of addressing many social challenges such as waste management, climate change, pollution and loss of biodiversity (Appolloni *et al.*, 2023). In addition, circular economy (CE) practices provide new perspectives for developing efficient strategies and methodologies for sustainable environmental management (Sundar *et al.*, 2023). Circular economy (CE) practices are divided into three main dimensions, including internal environmental management (Schmidt *et al.*, 2021), environmentally friendly design (Zhu *et al.*, 2011), and company assets management and recovery (Zhu *et al.*, 2011). First, internal environmental management is the preparation of environmentally-oriented

procedures, such as green human resource management practices (Marrucci *et al.*, 2021; Bag *et al.*, 2021), training and development programs (Persis *et al.*, 2021), and environmental-based performance evaluation systems (Zhu *et al.*, 2011), and supporting organizational environmental objectives (Yadegaridehkordi *et al.*, 2023), building environmental ethics (York, 2009) and improving ecological performance (Lin *et al.*, 2015; Parker *et al.*, 2009; Pimenova and Van der Vorst, 2004). Second, eco-design describes the product design process considering environmental impacts (Lozano, 2012) and is an effective strategy to achieve eco-efficiency (Polverini, 2021; Dalhammar *et al.*, 2021). Therefore, product design must be environmentally oriented (Longo *et al.*, 2021). Apart from environmental efficiency, environmentally friendly design practices help companies to provide different products in the market (Dalhammar, 2016) and increase the global value proposition (Le Blévennec *et al.*, 2022). Third, the organizational assets management and recovery refers to the capability to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011). For this reason, companies are required to implement strategies that mitigate emerging issues to gain greater value (Jain *et al.*, 2022), and it is a CE's substantial objective to be reached (Lieder and Rashid, 2016).

## 2.3 Green economic incentives (GEI)

~~Green economy incentives (GEIs)~~ from the government are needed by the organization to build and motivate pro-environmental behavior (Clemens, 2006) through financial (Ling and Xu, 2021) and supporting regulations (Parker *et al.*, 2009). Financial rewards support waste management (Ling and Xu, 2021), recycling, and resource efficiency (Rizos *et al.*, 2015), as well as environmentally oriented innovations (Pieroni *et al.*, 2019). Supporting regulatory incentives enhances environmentally-oriented product creation (Agustiono *et al.*, 2020) and promotes self-regulation (Lin *et al.*, 2015). Meanwhile, GEI strengthens internal capabilities (Singh *et al.*, 2018) and positively influences the internal organizational decision-making processes (Rizos *et al.*, 2015). Incentives through subsidies, environmental grants, loans, and tax concessions influence the behavior of owners/managers (Bradford and Fraser, 2008; Chang *et al.*, 2011) toward a ~~circular economy~~ CE (Roxas and Coetzer, 2012). Similarly, the government, supported by marketing and procurement of recycled raw materials helps SMEs enhance in pro-environmental practices (Pimenova and Van der Vorst, 2004; Tsimoshynska *et al.*, 2021). Therefore, economic support strengthens internal capabilities (Prieto-Sandoval *et al.*, 2019), stimulating green-oriented commitments (Sezen and Çankaya, 2013; Chang *et al.*, 2011). Thus, the government's important role in supporting the transition process from a linear economy to a ~~circular economy~~ CE is to provide financial support in the form of incentives to stakeholders (Sundar *et al.*, 2023). The ~~green-economic incentive~~ GEI can be allocated to carry out sustainable procurement. Thus, it will lead to product life cycle costs, sustainable oriented innovation (Koval *et al.*, 2023), return on social investment, reduction of waste, and the ability to produce environmentally friendly products (Shaikh *et al.*, 2023). The present study considered three indicators as green economy incentives determinants, namely (1) government subsidies and tax benefits (GSTB), (2) premium prices for green products (PP), and (3) cheaper recycled raw materials (CP).

## 2.4 Environmental commitment

A company must have an internal and external environmental orientation to protect the environment (Saleem *et al.*, 2021) and to design green strategies (Arsawan *et al.*, 2021; Bradford and Fraser, 2008), as evidenced in environmental saving actions (Singh *et al.*, 2014). In this case, ~~environmental commitment~~ EC is an organization's ethical value in protecting the environment (Chang *et al.*, 2011) and green activities to reduce environmental degradation (Suryantini *et al.*, 2021), protecting business, society, and its ecology (Appolloni *et al.*, 2021; York, 2009). It is viewed as a strategic business orientation (Singh *et al.*, 2014) which reflects the company's sustainable business attitude (Green *et al.*, 2015). ~~Environmental commitment~~ EC involves manner, behavior, perspectives, and economic benefits (Saleem *et al.*, 2021). Furthermore, Stone (2006) revealed the ~~environmental commitment~~ EC role in increasing green awareness and responsibility (Saleem *et al.*, 2021), which led to organizational pro-environmental sustainability, enhanced business performance, and effective waste management (Singh *et al.*, 2016). However, considering the diversity of SMEs' effective implementation commitments (Parker *et al.*, 2009), environmental awareness is still low (Singh *et al.*, 2018) due to the assumption that waste management is not related to productivity (Saleem *et al.*, 2021; Parker *et al.*, 2009) and organizational profits (Bhupendra and Sangle, 2016). Therefore, the present study considered environmental products and processes (EPP), awareness (EPP), resource reuse and recycling (RRR), and environmental responsibility (ER) to measure the company's ~~environmental commitment~~ ECs.

## 2.5 Hypothesis development

### 2.5.1 Green economic incentives and environmental commitment

The ~~NRBV natural resource-based view~~ postulates that both orientations toward the environment and prevention of pollution are key for sustainable development (Hart, 1995). To be successful in this sustainable development, the government's involvement in implementing regulations (Fatimah *et al.*, 2020) and providing financial incentives is crucial (Botezat *et al.*, 2018). It means that GEI stimulates an organizational solution to increase ~~environmental commitment~~EC (Zhang *et al.*, 2013; Clemens, 2006). Furthermore, the important role of the government in making regulations related to providing green incentives will change the perspective of SME managers about the importance of contributing to saving the environment (Singh *et al.*, 2018). ~~Green economic incentive~~GEIs are allocated to build sustainable oriented innovation (Koval *et al.*, 2023), return on social investment, reduction of waste, and the ability to produce environmentally friendly products (Shaikh *et al.*, 2023). Thus, green incentives have an impact on increasing ~~environmental commitment~~EC. Based on the above description, the following hypothesis is formulated:

**H1.** GEI has a significant positive effect on EC.

### 2.5.2 Green economic incentives and circular economy practices

Several studies revealed that green incentives provided through financial (Clemens, 2006) and non-financial (Ling and Xu, 2021) could be allocated to make the internal environment guidelines such as the procurement process or recruiting employees with environmental conservation knowledge (Marrucci *et al.*, 2021; Bag *et al.*, 2021), preparation of training and development programs aimed to save the environment (Persis *et al.*, 2021) and environmentally sustainable strategies (Green *et al.*, 2015). Furthermore, the ~~green economic incentive~~GEI is important in manufacturing of environmentally friendly products (Longo *et al.*, 2021; Lozano, 2012), enhancing environmental efficiency (Polverini, 2021). The green economy incentives increase the organization's internal capabilities for investment recovery (Schmidt *et al.*, 2021), reselling used materials and goods (Susanty *et al.*, 2020), and recycling materials (Zhu *et al.*, 2011), prolonging the product life cycle (Corona *et al.*, 2019). Consequently, the company adopts a better sustainability system (Lozano, 2012). Thus, by facilitating the adoption of ~~circular economy~~CE strategies, organizations will be able to meet growing consumer demands, balancing economic growth, profit orientation and sustainable environmental management (Appolloni *et al.*, 2021). This discussion leads to the following hypotheses in line with the ~~NRBV natural resource-based view~~ (Hart, 1995).

**H2.** GEI positively affects IEM.

**H3.** GEI positively affects ED.

**H4.** GEI positively affects CAM&R.

### 2.5.3 Environmental commitment and circular economy practices

The ~~NRBV natural resource-based view~~ (Hart, 1995) implies that ~~environmental commitment~~EC is considered the organization's first step in its role to save the environment for sustaining the development. It enhances the ~~circular economy~~CE, especially in the internal environmental management, including planning, drafting, implementing, and evaluating the internal sustainable programs such as pollution prevention and waste reduction (Schmidt *et al.*, 2021) and quality environment management (Zhang and Ma, 2021; York, 2009). In addition, commitment to the environment triggers cross-functional collaboration for environmental improvement (Appolloni *et al.*, 2022; Parker *et al.*, 2009). The collaborative structure built aims to identify environmental needs and enhance strong interactions in the value chain (Shaikh *et al.*, 2023). Further, ~~environmental commitment~~EC is a starting point for SMEs to design energy-efficient products (Koval *et al.*, 2023), recyclable, safe raw materials, and minimize waste (Schmidt *et al.*, 2021). Therefore, it can affect investment recovery, inventory effectiveness, and sales of used goods and materials (Schmidt *et al.*, 2021). Based on the above description, the hypothesis is formulated as follows:

**H5.** EC positively affects IEM.

**H6.** EC positively affects ED.

**H7.** EC positively affects CAM&R.

### 2.5.4 Mediating role of environmental commitment



~~Green economy incentives (GEIs)~~ are significant in building organizational involvement and commitment to saving the environment. The government and non-governmental organizations benefit from adopting environmental initiatives (Singh *et al.*, 2018; Agnello *et al.*, 2015). Incentives include additional or financial rewards (Ling and Xu, 2021) that encourage organizations to design or implement environmental practices (Kahupi *et al.*, 2021). Previous studies stated that ~~green economic incentive~~ ~~GEIs~~ are allocated to design policies related to sustainable innovation (Koval *et al.*, 2023), return on social investment, waste reduction, and the ability to produce environmentally friendly products (Shaikh *et al.*, 2023) to provide added value economic, social and environmental (Gupta *et al.*, 2021; Yadegaridehkordi *et al.*, 2023). In addition, the incentive improves recycling techniques (Bag *et al.*, 2021) and facilitates the transition to a ~~circular economy~~ ~~CE~~ (Ling and Xu, 2021). Also, green economy incentives enhance dynamic capabilities (Prieto-Sandoval *et al.*, 2019) that affect decision-making processes. However, some SMEs perceive that investing in the ~~circular economy~~ ~~CE~~ increases costs more than the expected return (Rizos *et al.*, 2015). Consequently, the increasing ~~environmental commitment~~ ~~EC~~ will motivate SME managers to implement a ~~circular economy~~ ~~CE~~ (Kuo and Chang, 2021). Furthermore, the ~~environmental commitment~~ ~~EC~~ will strengthen the internal capabilities of SMEs (Marrucci *et al.*, 2021; Bag *et al.*, 2021), manufacture environmentally-friendly designed products (Longo *et al.*, 2021), and improve asset recovery and investment capabilities (Schmidt *et al.*, 2021). Therefore, the green economy incentives will increase ~~environmental commitment~~ ~~EC~~ and improve ~~circular economy~~ ~~CE~~ practices in SMEs. This discussion suggests that, for sustaining the development using the natural resource-based (Hart, 1995), ~~environmental commitment~~ ~~EC~~ has a key role in mediating the environmental effect on the circular practice modes. Thus, the following hypotheses are stated.

**H8.** ~~Environmental commitment~~ ~~EC~~ partially mediates the relationship of ~~green economic incentive~~ ~~GEIs~~ to internal environment management.

**H9.** ~~Environmental commitment~~ ~~EC~~ partially mediates the relationship of ~~green economic incentive~~ ~~GEIs~~ to eco-design.

**H10.** ~~Environmental commitment~~ ~~EC~~ partially mediates the relationship between ~~green economic incentive~~ ~~GEIs~~ on corporate asset management and recovery ~~(CAM&R)~~.

### 3. Methodology

The use of quantitative approaches such as surveys, statistics and structural modeling is intended to test the framework of the hypothesis or assess the relationship (correlation) between constructs (Appolloni *et al.*, 2022). In the social science context, this methodology has been used extensively, but a precise definition of the field of analysis is required (Sovacool *et al.*, 2018). Thus, to achieve the objectives of this study, a quantitative approach is relevant because it tests hypotheses based on structural equations.

#### 3.1 Data and sampling method

The present study uses a quantitative approach by distributing questionnaires that focus on SME-producing companies (with 50–200 full-time employees), which are the essential sector of the Indonesian economy that still grows and develops (Arsawan *et al.*, 2022a; Parwita *et al.*, 2021). The population is 1,299 SMEs located in ~~9-nine~~ regencies of Bali Province. A formula from Krejcie and Morgan (1970) was used to determine the sample frames, obtaining 297 SMEs. This selection was carried out using random sampling (lottery method). From the 297 SMEs, two respondents were recruited from each to fill out the research questionnaire. The total number of participants was 594 people including managers and assistant managers. The characteristics of SMEs were manufacturing, medical pharma/chemical, food, textile and woodcraft which is recommended by the government to reduce their production waste and carry out environmental conservation in a sustainable manner. Thus, the selection was triggered by assuming that they possess organizational characteristics and knowledge of ~~circular economy~~ ~~CE~~ practices. Data were collected from March to June 2021 via email and Google Forms and direct visits by first sending email notifications on this study agenda. The 594 responses were analyzed to achieve the aims of the present study. Table 1 presents the population information, sample frame, and the number of respondents.

Table 1

#### Population and sample frame

No	SMEs business field (1)	Research population (2)	Population's percentage (3)	No of sample (4)	No of respondents (5)
1	Manufacturing	100	7.6	23	46
2	Medical pharma/chemical	171	13.2	39	78
3	Food	188	14.5	43	86
4	Textile	331	25.5	76	152
5	Woodcraft	405	31.2	92	184
6	Others	104	8.0	24	48
	Total	1.299	100	297	594

#### Table Footnotes

Source(s): Bali Central Bureau of Statistics, 2021

### 3.2 Measurement

The magnitude of the variable construct used was based on previous empirical studies. Therefore, the previous study measurement was adopted for the subject: SMEs in Bali Province over nine districts. The construct indicators assessment used a ~~7seven~~-point Likert scale, “1: strongly disagree to 7: strongly agree”. In order to avoid ambiguity, the questionnaire (in Indonesian) was tested on 30 SME CEOs with knowledge of the ~~circular economy (CE)~~. The ~~green economic incentive (GEI)~~ variable was adopted from Singh *et al.* (2018) and Esfahbodi *et al.* (2016), consisting of 3 indicators. The ~~environmental commitment EC~~ variable was adopted from Singh *et al.* (2018) and Liu and Bai (2014), consisting of ~~3three~~ indicators. In addition, the ~~circular economy CE~~-IEM was adopted from Schmidt *et al.* (2021) and Zhu *et al.* (2011), consisting of 8 indicators. The CE-ED variable was adopted from Schmidt *et al.* (2021) and Zhu *et al.* (2011) with ~~4four~~ indicators. Moreover, CE-CAM&R was adopted from Schmidt *et al.* (2021) and Zhu *et al.* (2011) with ~~3three~~ indicators.

The present study used the variance-based partial least squares to test the hypothesis (PLS-SEM) with Smart PLS 3.2.9 software. The PLS-SEM was used to assess the relationship between constructs and their predictive power on endogenous variables (Hair *et al.*, 2014). The present study validated the ~~circular economy CE~~ practices model. The data ~~was were~~ not assessed as normally distributed data, making the ~~circular economy CE~~ model assessment associated with ~~green economic incentive GEIs~~ and ~~environmental commitment EC~~ predictors using PLS-SEM appropriate (Hair *et al.*, 2016a, b).

## 4. Results

**Q7** Table 2 describes the characteristics of the 594 respondents (see Table 3).

Table 2

*i* The table layout displayed in this section is not how it will appear in the final version. The representation below is solely purposed for providing corrections to the table. To preview the actual presentation of the table, please view the Proof.

Previous version

[Expand](#)

Characteristics of respondents



Criteria	Data	Frequency	Percentage
----------	------	-----------	------------

#### Updated version


#### Characteristics of respondents

Criteria	Data	Frequency	Percentage
Gender	Male	450	75.8
	Female	144	24.2
Age	21–30	39	6.6
	31–40	272	45.8
	41–50	238	40.1
	51–60	45	7.6
Educational level	Bachelor	550	92.6
	Master	38	6.4
	Doctoral	6	1.0
Experience (years)	<5	56	9.4
	6–10	157	26.4
	11–15	204	34.3
	16–20	134	22.6
	>21 or more	43	7.3
Position	General managers	305	51.3
	Assistant managers	289	48.7

#### Table Footnotes

Source(s): Authors calculation

Table 3

 The table layout displayed in this section is not how it will appear in the final version. The representation below is solely purposed for providing corrections to the table. To preview the actual presentation of the table, please view the Proof.

#### Construct validity and reliability

Description	Loading	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
Green Economic Incentives		0.848	0.847	0.908	0.768
The government provides subsidies and tax benefits for the implementation of CE practices (GSTB)	0.879				
Industrial/direct buyers are ready to pay a premium price for green products (PP)	0.930				
Availability of cheaper recycled raw material than virgin raw material (CP)	0.817				
Environmental Commitment		0.755	0.767	0.860	0.672

My firm considers the potential environmental consciousness of the product and production process (EPP)	0.877				
My firm reduces the use of virgin resources by emphasizing the reuse and recycling of EC resources (RRR)	0.821				
My firm values the environment and describes itself as an environmentally EC responsible firm (ER)	0.756				
Circular economy practices—Internal environmental management		0.860	0.873	0.891	0.507
Cross-functional cooperation for environmental improvements	0.803				
Special training for workers on environmental issues	0.762				
Total quality environmental management	0.671				
Existence of pollution prevention programs such as cleaner production	0.626				
Internal performance evaluation system incorporating environmental factors	0.652				
Generate environmental reports for internal evaluation	0.763				
Commitment to named practices from senior managers	0.773				
Support for named practices from mid-level managers	0.622				
Circular economy practices—Eco-design		0.839	0.850	0.892	0.675
Design of products for reduced consumption of materials/energy	0.761				
Design of products for reuse, recycling, and recovery of material parts	0.804				
Design of products to avoid or reduce the use of hazardous products	0.865				
Design of processes for minimization of waste	0.852				
Circular economy practices—Corporate asset management		0.777	0.782	0.871	0.693
Investment recovery (sale) of excess inventories/materials	0.886				
Sale of scrap and used materials	0.826				
Sale of excess capital equipment	0.782				

#### Table Footnotes

Source(s): Authors calculation

## 4.1 Measurement model

The VIFs test was used to evaluate the collinearity problem, scoring 2.872 (green economics incentives), 1.826 (environmental commitment~~EC~~), 3.558 (CE-Internal Environment Management), 1.832 (CE-Eco-Design), and 2.119 (CE-CAM&R~~Corporate Asset Management and Recovery~~). All VIF coefficients were lower than 5, which is the recommended limit value by Hair *et al.* (2016a) that the data do not have general variance problems. The outer model was tested to evaluate the reliability and validity of the construct variables. Table 2 shows that each item of factor loadings is more than 0.6. The convergent validity test explains that the validity requirements are met because the average extracted variance (AVE) is more than 0.5 and the factor loading is more than 0.6 (Hair *et al.*, 2016b). It shows that the discriminant validity conditions of all constructs have been met.

The Heterotrait-Monotrait Ratio (HTMT) assessed the discriminant constructs validity. According to Hair *et al.* (2016b) for this criteria, the value was lower than 0.9. Due to the values ranging from 0.384 to 0.701, the HTMT test showed

that discriminant validity was achieved. The composite reliability values in both samples were above the recommended level of 0.7; therefore, the construct was reliable.

## 4.2 Inner model measurement

The present study applied the bootstrap method with 5,000 samples to assess the research indicators and path coefficient's significance (Chin *et al.*, 2008). The results showed that the goodness-of-fit (GoF) model has a value of 0.367 which stated that the model is fit. In addition, testing on the standard residual root means square (SRMR) and normed fit index (NFI) shows that the SRMR value was 0.081 while the NFI was 0.716. The SRMR cut-off value was 0.8, and the NFI was below 0.9, which indicates that all criteria are met. The results showed that GEI explains EC by 0.268 (26.8%). The explanatory power of EC at CE-IEM was 0.347 (34.7%); at CE-ED, it was 0.224 (22.4%), and at CE-CAM&R, it was 0.212 (21.2%). In addition, the value of  $Q^2$  showed that all constructs have positive values and good predictive relevance (Chin, 2010).

## 4.3 Hypothesis testing

Table 4 shows the results of the relationship between green economies incentives (GEIs), environmental commitment (EC), internal environment management (CE-IEM), eco-design (CE-ED) and corporate asset management and recovery (CE-CAM&R). We use path coefficients ( $\beta$ ),  $t$  values, and  $p$  values to test the hypotheses. According to Hair *et al.* (2016a,b), if the path coefficient is greater than 0.1,  $t$  value greater than 1.96, and 0.05 level of significance, the hypotheses are supported. The results support the significant role of GEI in achieving EC (H1) with CE-IEM (H2), CE-ED (H3), and CE-CAM&R (H4). Furthermore, EC has an important role in achieving CE-IEM (H5), CE-ED (H6), and CE-CAM&R (H7).

Table 4

*i* The table layout displayed in this section is not how it will appear in the final version. The representation below is solely purposed for providing corrections to the table. To preview the actual presentation of the table, please view the Proof.

### Path coefficients

Path (hypothesis)	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	$p$ values	Remarks
- Green Economic Incentives → Environmental Commitment (H1)	0.518	0.520	0.036	14.202	0.000	Supported
- Green Economic Incentives → Internal environment management (H2)	0.326	0.326	0.048	6.795	0.000	Supported
- Green Economic Incentives → Eco Design (H3)	0.333	0.333	0.055	6.051	0.000	Supported
- Green Economic Incentives → Corporate Asset Management and Recovery (H4)	0.108	0.104	0.048	2.258	0.024	Supported
- Environmental Commitment → Internal Environment Management (H5)	0.351	0.353	0.042	8.292	0.000	Supported
- Environmental Commitment → Eco Design (H6)	0.205	0.207	0.042	4.855	0.000	Supported
- Environmental Commitment → Corporate Asset Management and Recovery (H7)	0.395	0.399	0.044	9.033	0.000	Supported

### Table Footnotes

Source(s): Authors calculation

After examining the direct relationship, the next step was determining the mediating role as shown in [Table 5](#). The present study tested three mediation patterns. According to [Hair et al. \(2014\)](#), the method used is to measure the VAF value  $< 0.20$ , meaning there is no mediation, while  $0.20-0.80$  indicates partial and the VAF value  $> 0.80$  means full mediation. In order to test the model mediation effect, non-parametric bootstrap was used ([Hair et al., 2016a, b](#)). Finally, variance values (VAF) were calculated to obtain indirect and total link sizes. When the VAF is greater than **Q8** 80%, it shows full mediation; between 20 and 80% is partial; below 20% means no mediating effect ([Hair et al., 2013](#)) (see [Figure 1](#)).

Table 5

*i* The table layout displayed in this section is not how it will appear in the final version. The representation below is solely purposed for providing corrections to the table. To preview the actual presentation of the table, please view the Proof.

#### Testing of mediation effects

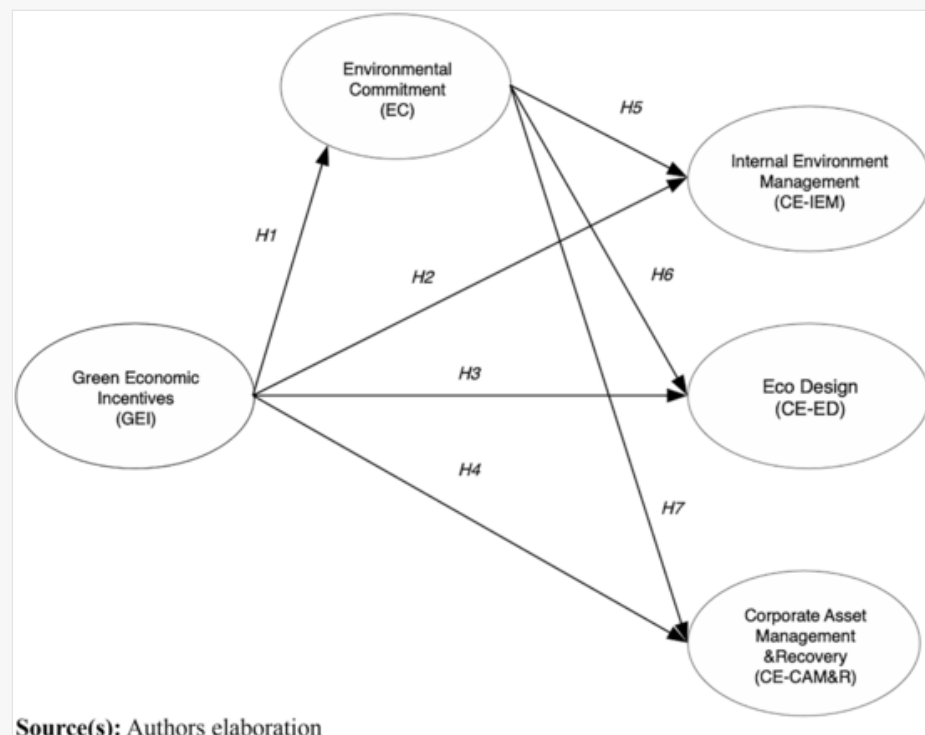
Link*	Mediator*	Independent variable- mediator	Mediator- dependent variable	Direct	Indirect	Total effect	VAF (%)	Decision
GEI-CE-IEM	EC	0.518	0.351	0.326	0.182	0.507	0.359	Partial mediation
GEI-CE-ED	EC	0.518	0.205	0.333	0.106	0.440	0.241	Partial mediation
GEI-CE- CAM&R	EC	0.518	0.395	0.108	0.205	0.313	0.655	Partial mediation

#### Table Footnotes

Source(s): Authors calculation

*i* Images are optimised for fast web viewing. Click on the image to view the original version.

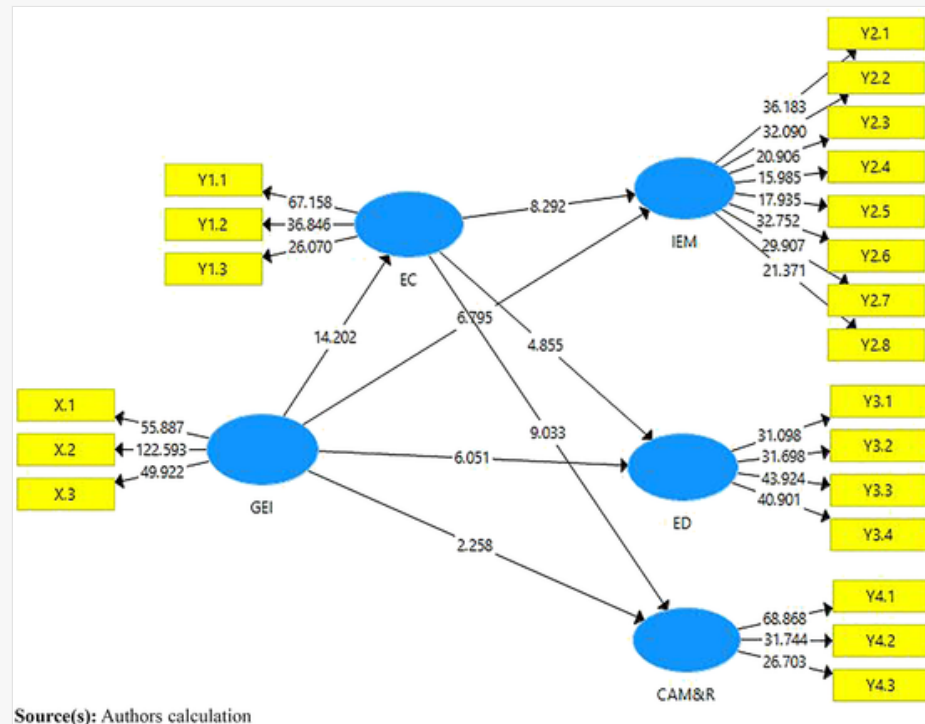
Figure 1



The mediating role in the causal relationship between GEI and CE-IEM, CE-ED, and CE-CAM&R was examined using VAF assays. This study tested three mediation pathways and concluded that **environmental-commitment** EC partially mediates the relationship between GEI and CE-IEM, where the VAF value is 35.90%, indicating that hypothesis 8 is accepted. EC also functions as a partial mediating relationship between GEI and CE-ED, with a VAF value of 24.10%, which means that hypothesis 9 is accepted. At the same time, EC functions as a partial mediating relationship between GEI and CE-CAM&R, with a VAF value of 65.50%, which means that hypothesis 10 is accepted (Figure 2).

 Images are optimised for fast web viewing. Click on the image to view the original version.

**Figure 2**



Output analysis

#### 4.4 Discussion and theoretical contribution

There is increased attention by policymakers, researchers, and practitioners, for **circular-economy** CE practices that can advance sustainable development goals (SDGs). Therefore, this study explained the mechanisms that SMEs can utilize to successfully implement **circular-economy** CE practices, including the role of GEI and EC. It complemented previous studies that failed to show antecedents for specific **circular-economy** CE practices (Green *et al.*, 2015; Liu *et al.*, 2018; Schmidt *et al.*, 2021). Furthermore, very few studies that exclusively focused on the direct relationship between GEI and the implementation of **circular-economy** CE practices. In contrast, this study showed that EC influences the relationship between GEI and three **circular-economy** CE practices in Indonesian SMEs, specifically internal environmental management, eco-design, and CAM&R.

This study contributed to the fourth folds' **circular-economy** CE literature and related theories. First, this study proposes and examines the supporting integration model of **green-economic-incentive** GEIs and **environmental-commitment** EC in SMEs, where the combination of **green-economic-incentive** GEIs and **environmental-commitment** EC is the key to building environmental sustainability. This new **circular-economy** CE practice model was found to have a good fit and explanatory power, so it confirms that the **green-economic-incentive** GEIs and **environmental-commitment** EC constructs are generally accepted (Clemens, 2006; Lin *et al.*, 2015) is also an important driver of **circular-economy** CE practices for SMEs (Centobelli *et al.*, 2021). More specifically, **green-economic-incentive** GEIs play an important role in

increasing ~~environmental commitment~~EC and, at the same time, encouraging SMEs to carry out ~~circular economy~~CE practices as an important activity in efforts to save the environment. Thus, the results prove that ~~green economic incentive~~GEIs and ~~environmental commitment~~EC form the basis for creating ~~circular economy~~CE practices in the SME sector.

This study assesses ~~circular economy~~CE practices by integrating ~~green economic incentive~~GEIs into the ~~circular economy~~CE practices model. The results of data analysis show that the ~~circular economy~~CE practices integration model for SMEs is appropriate. Furthermore, the inclusion of ~~environmental commitment~~EC in the ~~circular economy~~CE practices model increases the explanatory power of the ~~circular economy~~CE practices model. Conceptually, the results of this study strengthen the commitment-~~circular economy~~CE practices model (Saleem *et al.*, 2021; Schmidt *et al.*, 2021) in the SME sector. This finding shows that in SMEs, ~~green economic incentive~~GEIs can simultaneously strengthen the influence of ~~environmental commitment~~EC on ~~circular economy~~CE practices. Thus, the ~~circular economy~~CE practices model in the context of SMEs is conceptually expanded into a green incentives-commitment-~~circular economy~~CE practices model. Furthermore, these findings provide further evidence for the conclusions of previous studies (Galkina, 2021), which claim that ~~environmental commitment~~EC with environmentally oriented partner selection is an important determinant of strengthening future ~~circular economy~~CE practices for environmental saving efforts.

Second, the results revealed that ~~environmental commitment~~EC is a mediator of the relationship between ~~green economic incentive~~GEIs and internal environmental management (IEM), eco-design (ED), and ~~corporate asset management and recovery~~(CAM&R). Although the three tested mediation relationships are significant, GEI-EC and asset management and recovery (CAM&R) have more influence. This result proved that SMEs strongly focus on resource recovery to develop enterprise asset management and recovery practices. It requires the involvement of purchasing managers in investment recovery practices (Betancourt Morales and Zartha Sossa, 2020) to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011) through selective investment, excess inventory, sales of used goods and materials (Schmidt *et al.*, 2021). Thus, ~~small-medium enterprise~~SMEs must be concerned about inventory recovery practices and make it a serious concern for organizational sustainability, increasing productivity and innovation, and environmental sustainability orientation.

Third, the ~~circular economy~~CE is an interesting topic for academics, policymakers, and practitioners, but the literature is not thorough on how Indonesian SMEs can develop ~~circular economy~~CE practices. Most studies focused on the European context, whereas this study contributed to the ~~circular economy~~CE literature in developing countries and supported findings in the European context (Schmidt *et al.*, 2021). The results showed that GEI and EC influence the implementation of all three ~~circular economy~~CE practices. Furthermore, this is the first study linking GEI and EC as antecedents of ~~circular economy~~CE practice in an emerging country. In contrast, GEI is common in developed countries such as the USA (Clemens, 2006), India (Singh *et al.*, 2018), and Italy (Centobelli *et al.*, 2021). It is supported by Zhang *et al.* (2013), which stated that external references, such as financial incentives, affect organizational attitude and commitment to the ~~circular economy~~CE concept implementation (Centobelli *et al.*, 2021; Clemens, 2006). However, Singh *et al.* (2018) established that GEI does not affect building ~~environmental commitment~~EC. Overall, these findings have helped to the theory and generated evidence that incorporating the sub-constructs of ~~circular economy~~CE practice may not always work, especially for developed countries like Germany. In addition, these results provided practitioners with insights for implementing ~~circular economy~~CE practices in their companies.

Fourth, the present study enhanced the ~~natural resource-based view~~(NRBV), describing the mechanisms that view GEI and EC as pollution prevention in ~~circular economy~~CE practices. The results showed that GEI and EC are translated in strategic orientation. The implementation of ~~circular economy~~CE practices can be affected by an organization's failure to commit to the environment. This study examined antecedents used to overcome these barriers (de Oliveira *et al.*, 2018). The finding contributed to the literature by integrating previous research on GEI (Centobelli *et al.*, 2021) and ~~environmental commitment~~EC (Galkina, 2021) as ~~circular economy~~CE practice implementation drivers. Notably, it showed that GEI could trigger the emergence of EC in ~~circular economy~~CE practices, positively affecting internal environmental management and eco-design and strengthening asset management and recovery. From a natural resource-based perspective, the results demonstrated the importance of companies building a commitment culture to implement ~~circular economy~~CE practices.



#### 4.5 Managerial contribution

The governments and countries concerned about saving the environment must provide green economy subsidies, tax incentives, soft loans, and subsidized materials to increase sustainable waste management strategies (Singh *et al.*, 2018; Mölemann, 2016). First, the regulations can strengthen the commitment and consistency of SMEs to saving the environment efforts (Kahupi *et al.*, 2021; Lin *et al.*, 2015; Roxas and Coetzer, 2012). Second, proper utilization of the government's green economic incentive (GEI) by SMEs managers will increase commitment to the environment. The GEI enabled SMEs to build a strong culture with higher trust in the environment, implement green actions for sustainable development, and create innovative sustainable business models to increase economic growth. The incentives also influence the implementation of environmentally oriented standards and building environmental ethics. Furthermore, green economic incentive (GEI) facilitates SMEs' collaboration with large companies to achieve organizational sustainability, especially in the provision of raw materials, and supply chains management. Such actions develop a strong attitude and increase the company's environmental commitment (EC) to the circular economy (CE) implementation.

#### 4.6 Conclusion, limitations, and further study

Most previous studies examined the circular economy (CE) practices but did not focus on combining green economic incentives (GEIs) and environmental commitment (EC), especially in the SMEs sector. The circular economy (CE) practice provides opportunities and encourages every country, industry, and business entity to maintain sustainability and protect the environment jointly. The present study examines the role of green economic incentive (GEI) and environmental commitment (EC) on circular economy (CE) practices (CE) in the SMEs sector.

Three important conclusions can be drawn from this study. First, circular economy (CE) practices are complex constructions, which consist not only internal environmental management (IEM) and eco-design (ED), but also corporate asset management and recovery (CAM&R). Second, the role of the government in providing green economic incentives (GEI) has been proven to increase environmental commitment (EC), which in turn increases the practice of circular economy (CE) as an effort to preserve the environment. Finally, environmental commitment (EC) is a mediator of the relationship between GEI and CEP, where the most important path is through corporate asset management and recovery (CAM&R).

This study broadens our understanding of how GEI and EC impact circular economy (CE) practices, especially in the SME sector, which can help SME managers, the government and related stakeholders to develop strategies for providing green incentives, both financial and non-financial. When we begin to study circular economy (CE) practices in SMEs and the interest of circular economy (CE) stakeholders in this issue will increase, further assessment of the circular economy (CE) in SMEs is critical.

This study identified several limitations causing a gap for future studies. First, the study design used assistant managers and managers for information. Future studies can overcome this common method bias and choose a proper design. Second, this study focused on the mechanisms influencing the development of CE practices and assumed that GEI and EC are prerequisites for companies to implement this. Meanwhile, future studies can establish additional aspects that influence the proposed mechanism, such as environmental supply chain collaboration, or green strategies and green innovation. Third, previous studies, including this, focused on the antecedents of circular economy (CE) practice in developed and developing countries. Therefore, future studies can therefore make comparisons to expand and generalize these findings by considering the differences in institutional contexts between countries.

## References

Agnello, X., Naveen, J., Ravichandran, M. and Balamurugan, J. (2015), "Clean technology and its efficacy: strategies of environmental management", *Journal of Environmental and Social Sciences*, Vol. 2 No. 2, pp. 110-116.

- Q11** Appolloni, A., D'Adamo, I., Gastaldi, M., Santibanez-Gonzalez, E.D.R. and Settembre-Blundo, D. (2021), "Growing e-waste management risk awareness points towards new recycling scenarios: the view of the big four's youngest consultants", *Environmental Technology and Innovation*, Vol. 23, doi: 10.1016/j.eti.2021.101716.
- Q12** Appolloni, A., D'Adamo, I., Gastaldi, M., Yazdani, M. and Settembre-Blundo, D. (2022), "Reflective backward analysis to assess the operational performance and eco-efficiency of two industrial districts", *International Journal of Productivity and Performance Management*, Emerald Group Holdings Limited. doi: 10.1108/IJPPM-08-2021-0442.
- Appolloni, A., Centi, G. and Yang, N. (2023), "Promoting carbon circularity for a sustainable and resilience fashion industry", *Current Opinion in Green and Sustainable Chemistry*, doi: 10.1016/j.cogsc.2022.100719.
- Arsawan, I.W.E., Koval, V., Duginets, G., Kalinin, O. and Korostova, I. (2021), "The impact of green innovation on environmental performance of SMEs in an emerging economy", *E3S Web of Conferences*, Vol. 255, p. 1012, EDP Sciences.
- Q13** Arsawan, I.W.E., ssy de Hariyanti, N.K., Atmaja, I.M.A.D.S., Suhartanto, D. and Koval, V. (2022a), "Developing organizational agility in SMEs: an investigation of innovation's roles and strategic flexibility", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 8 No. 3, p. 149, doi: 10.3390/joitmc8030149.
- Arsawan, I.W.E., Koval, V., Rajiani, I., Rustiarini, N.W., Supartha, W.G. and Suryantini, N.P.S. (2022b), "Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage", *International Journal of Productivity and Performance Management*, Vol. 71 No. 2, pp. 405-428, doi: 10.1108/IJPPM-04-2020-0192.
- Bag, S., Yadav, G., Dhamija, P. and Kataria, K.K. (2021), "Key resources for industry 4.0 adoption and its effect on sustainable production and circular economy: an empirical study", *Journal of Cleaner Production*, Vol. 281, 125233, doi: 10.1016/j.jclepro.2020.125233.
- Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120, doi: 10.1177/014920639101700108.
- Barros, M.V., Salvador, R., do Prado, G.F., de Francisco, A.C. and Piekarski, C.M. (2021), "Circular economy as a driver to sustainable businesses", *Cleaner Environmental Systems*, Vol. 2, 100006, doi: 10.1016/j.cesys.2020.100006.
- Betancourt Morales, C.M. and Zartha Sossa, J.W. (2020), "Circular economy in Latin America: a systematic literature review", *Business Strategy and the Environment*, Vol. 29 No. 6, pp. 2479-2497.
- Bhupendra, K.V. and Sangle, S. (2016), "Pollution prevention strategy: a study of Indian firms", *Journal of Cleaner Production*, Vol. 133, pp. 795-802, doi: 10.1016/j.jclepro.2016.05.169.
- Botezat, E.A., Dodescu, A.O., Vaduva, S. and Fotea, S.L. (2018), "An exploration of circular economy practices and performance among Romanian producers", *Sustainability*, Vol. 10 No. 9, pp. 1-17, doi: 10.3390/su10093191.
- Bradford, J. and Fraser, E.D.G. (2008), "Local authorities, climate change and small and medium enterprises: identifying effective policy instruments to reduce energy use and carbon emissions", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 3, pp. 156-172, doi: 10.1002/csr.151.

Centobelli, P., Cerchione, R., Esposito, E., Passaro, R. and Shashi (2021), “Determinants of the transition towards circular economy in SMEs: a sustainable supply chain management perspective”, *International Journal of Production Economics*, Vol. 242, 108297, doi: 10.1016/j.ijpe.2021.108297.

Chang, S., Gong, Y. and Shum, C. (2011), “Promoting innovation in hospitality companies through human resource management practices”, *International Journal of Hospitality Management*, Vol. 30 No. 4, pp. 812-818, doi: 10.1016/j.ijhm.2011.01.001.

Chin, W.W. (2010), “How to write up and report PLS analyses”, *Handbook of Partial Least Squares*, pp. 655-690.

Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), “Structural equation modeling in marketing: some practical reminders”, *Journal of Marketing Theory and Practice*, Vol. 16 No. 4, pp. 287-298.

Clemens, B. (2006), “Economic incentives and small firms: does it pay to be green?”, *Journal of Business Research*, Vol. 59 No. 4, pp. 492-500, doi: 10.1016/j.jbusres.2005.08.006.

Corona, B., Shen, L., Reike, D., Rosales Carreón, J. and Worrell, E. (2019), “Towards sustainable development through the circular economy—a review and critical assessment on current circularity metrics”, *Resources, Conservation and Recycling*, Vol. 151, 104498, doi: 10.1016/j.resconrec.2019.104498.

Dalhammar, C. (2016), “Industry attitudes towards ecodesign standards for improved resource efficiency”, *Journal of Cleaner Production*, Vol. 123, pp. 155-166.

Dalhammar, C., Milios, L. and Richter, J.L. (2021), “Ecodesign and the circular economy: conflicting policies in Europe”, *EcoDesign and Sustainability I*, pp. 187-198.

de Oliveira, U.R., Espindola, L.S., da Silva, I.R., da Silva, I.N. and Rocha, H.M. (2018), “A systematic literature review on green supply chain management: research implications and future perspectives”, *Journal of Cleaner Production*, Vol. 187, pp. 537-561.

Diaz, A., Schöggel, J.P., Reyes, T. and Baumgartner, R.J. (2021), “Sustainable product development in a circular economy: implications for products, actors, decision-making support and lifecycle information management”, *Sustainable Production and Consumption*, Vol. 26, pp. 1031-1045, doi: 10.1016/j.spc.2020.12.044.

Ellen MacArthur Foundation (2013), “Towards the circular economy”, *Journal of Industrial Ecology*, Vol. 1.

Esfahbodi, A., Zhang, Y. and Watson, G. (2016), “Sustainable supply chain management in emerging economies: trade-offs between environmental and cost performance”, *International Journal of Production Economics*, Vol. 181, pp. 350-366.

Fatimah, Y.A., Govindan, K., Murniningsih, R. and Setiawan, A. (2020), “Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: a case study of Indonesia”, *Journal of Cleaner Production*, Vol. 269, 122263, doi: 10.1016/j.jclepro.2020.122263.

Galkina, T. (2021), “International ECO preneurship: environmental commitment and international partner selection of finnish firms from the energy sector”, *Journal of International Entrepreneurship*, Vol. 19 No. 2, pp. 300-320, doi: 10.1007/s10843-021-00286-8.

Green, K.W., Toms, L.C. and Clark, J. (2015), "Impact of market orientation on environmental sustainability strategy", *Management Research Review*, Vol. 38 No. 2, pp. 217-238, doi: 10.1108/MRR-10-2013-0240.

Gupta, H., Kumar, A. and Wasan, P. (2021), "Industry 4.0, cleaner production and circular economy: an integrative framework for evaluating ethical and sustainable business performance of manufacturing organizations", *Journal of Cleaner Production*, Vol. 295, 126253, doi: 10.1016/j.jclepro.2021.126253.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), "Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance", *Long Range Planning*, Vol. 46 Nos 1-2, pp. 1-12, doi: 10.1016/j.lrp.2013.01.001.

Hair, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014), "Partial least squares structural equation modeling (PLS-SEM)", *European Business Review*, Vol. 26 No. 2, pp. 106-121.

**Q14**

Hair, J.F., Hult, G., Tomas, M., Ringle, C.M. and Sarstedt, M. (2016a), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage Publications.

Hair, J.F., Jr., Sarstedt, M., Matthews, L.M. and Ringle, C.M. (2016b), "Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I—method", *European Business Review*, Vol. 28 No. 1, pp. 63-76, doi: 10.1108/EBR-09-2015-0094.

Hart, S. (1995), "A natural-resources based view of the firm", *Academy of Management Review*, Vol. 51 No. 3, pp. 49-51.

Hart, S.L. and Dowell, G. (2011), "A natural-resource-based view of the firm: fifteen years after", *Journal of Management*, Vol. 37 No. 5, pp. 1464-1479, doi: 10.1177/0149206310390219.

**Q15**

Jain, A., Sarsaiya, S., Awasthi, M.K., Singh, R., Rajput, R., Mishra, U.C., Chen, J., et al. (2022), "Bioenergy and bio-products from bio-waste and its associated modern circular economy: current research trends, challenges, and future outlooks", *Fuel*, Vol. 307, 121859.

Kahupi, I., Eiríkur Hull, C., Okorie, O. and Millette, S. (2021), "Building competitive advantage with sustainable products – a case study perspective of stakeholders", *Journal of Cleaner Production*, Vol. 289, 125699, doi: 10.1016/j.jclepro.2020.125699.

Khan, S.A.R., Yu, Z. and Umar, M. (2021), "How environmental awareness and corporate social responsibility practices benefit the enterprise? An empirical study in the context of emerging economy", *Management of Environmental Quality: An International Journal*, Vol. 32 No. 5, pp. 863-885, doi: 10.1108/MEQ-08-2020-0178.

Korhonen, J., Honkasalo, A. and Seppälä, J. (2018), "Circular economy: the concept and its limitations", *Ecological Economics*, Vol. 143, pp. 37-46, doi: 10.1016/j.ecolecon.2017.06.041.

Koval, V., Arsawan, I., Suryantini, N.P.S., Kovbasenko, S., Fisunen, N. and Alosyna, T. (2023), "Circular economy and sustainability-oriented innovation: conceptual framework and energy future avenue, energies", *Multidisciplinary Digital Publishing Institute*, Vol. 16 No. 1, 243.

Krejcie, R.V. and Morgan, D.W. (1970), "Determining sample size for research activities", *Educational and Psychological Measurement*, Vol. 30 No. 3, pp. 607-610.

Kuo, L. and Chang, B.G. (2021), "The affecting factors of circular economy information and its impact on corporate economic sustainability-Evidence from China", *Sustainable Production and Consumption*, Vol. 27, pp. 986-997, doi: 10.1016/j.spc.2021.02.014.

Le Blévennec, K., Vercalsteren, A. and Boonen, K. (2022), "Ecodesign as a new lever to enhance the global value proposition: from space to corporate", *Towards a Sustainable Future-Life Cycle Management*, pp. 3-13.

Lieder, M. and Rashid, A. (2016), "Towards circular economy implementation: a comprehensive review in context of manufacturing industry", *Journal of Cleaner Production*, Vol. 115, pp. 36-51.

Lin, H., Zeng, S., Ma, H. and Chen, H. (2015), "Does commitment to environmental self-regulation matter? An empirical examination from China", *Management Decision*, Vol. 53 No. 5, pp. 932-956, doi: 10.1108/MD-07-2014-0441.

Ling, M. and Xu, L. (2021), "How and when financial incentives crowd out pro-environmental motivation: a longitudinal quasi-experimental study", *Journal of Environmental Psychology*, Vol. 78, 101715, doi: 10.1016/j.jenvp.2021.101715.

Liu, Y. and Bai, Y. (2014), "An exploration of firms' awareness and behavior of developing circular economy: an empirical research in China", *Resources, Conservation and Recycling*, Vol. 87, pp. 145-152, doi: 10.1016/j.resconrec.2014.04.002.

Liu, J., Feng, Y., Zhu, Q. and Sarkis, J. (2018), "Green supply chain management and the circular economy: reviewing theory for advancement of both fields", *International Journal of Physical Distribution and Logistics Management*, Vol. 48 No. 8, pp. 794-817, doi: 10.1108/IJPDLM-01-2017-0049.

Longo, S., Cellura, M., Cusenza, M.A., Guarino, F., Mistretta, M., Panno, D., D'Urso, C., et al. (2021), "Life cycle assessment for supporting eco-design: the case study of sodium-nickel chloride cells, energies", *Multidisciplinary Digital Publishing Institute*, Vol. 14 No. 7, 1897.

Lozano, R. (2012), "Towards better embedding sustainability into companies' systems: an analysis of voluntary corporate initiatives", *Journal of Cleaner Production*, Vol. 25, pp. 14-26, doi: 10.1016/j.jclepro.2011.11.060.

Luthra, S., Kumar, A., Sharma, M., Garza-Reyes, J.A. and Kumar, V. (2022), "An analysis of operational behavioural factors and circular economy practices in SMEs: an emerging economy perspective", *Journal of Business Research*, Vol. 141, pp. 321-336.

Marrucci, L., Daddi, T. and Iraldo, F. (2021), "The contribution of green human resource management to the circular economy and performance of environmental certified organisations", *Journal of Cleaner Production*, Vol. 319, 128859.

Masi, D., Day, S. and Godsell, J. (2017), "Supply chain configurations in the circular economy: a systematic literature review", *Sustainability*, Vol. 9 No. 9, doi: 10.3390/su9091602.

Möllemann, D. (2016), *Framing the Climate Change Policies and Circular Economy Tenets for SMEs*, University of Twente.

Nurdiana, J., Franco-Garcia, M.L. and Heldeweg, M.A. (2021), "How shall we start? The importance of general indices for circular cities in Indonesia", *Sustainability*, Vol. 13 No. 20, doi: 10.3390/su132011168.

Parker, C.M., Redmond, J. and Simpson, M. (2009), "A review of interventions to encourage SMEs to make environmental improvements", *Environment and Planning C: Government and Policy*, Vol. 27 No. 2, pp. 279-301, doi: 10.1068/c0859b.

Parwita, G.B.S., Arsawan, I.W.E., Koval, V., Hrinchenko, R., Bogdanova, N. and Tamosiuniene, R. (2021), "Organizational innovation capability: integrating human resource management practice, knowledge management and individual creativity", *Intellectual Economics*, Vol. 15 No. 2.

Persis, D.J., Venkatesh, V.G., Sreedharan, V.R., Shi, Y. and Sankaranarayanan, B. (2021), "Modelling and analysing the impact of circular economy; internet of things and ethical business practices in the VUCA world: evidence from the food processing industry", *Journal of Cleaner Production*, Vol. 301, 126871.

Pieroni, M.P.P., McAloone, T.C. and Pigosso, D.C.A. (2019), "Business model innovation for circular economy and sustainability: a review of approaches", *Journal of Cleaner Production*, Vol. 215, pp. 198-216, doi: 10.1016/j.jclepro.2019.01.036.

Pimenova, P. and Van der Vorst, R. (2004), "The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies", *Journal of Cleaner Production*, Vol. 12 No. 6, pp. 549-559, doi: 10.1016/j.jclepro.2003.07.001.

Polverini, D. (2021), "Regulating the circular economy within the ecodesign directive: progress so far, methodological challenges and outlook", *Sustainable Production and Consumption*, Vol. 27, pp. 1113-1123, doi: 10.1016/j.spc.2021.02.023.

Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R.J. and Ormazabal, M. (2019), "Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 6, pp. 1473-1484, doi: 10.1002/csr.1761.

Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbera, M. and Ioannou, A. (2015), "The circular economy: barriers and opportunities for SMEs", CEPS Working Documents No. 412/September 2015, No. 412.

Roxas, B. and Coetzer, A. (2012), "Institutional environment, managerial attitudes and environmental sustainability orientation of small firms", *Journal of Business Ethics*, Vol. 111 No. 4, pp. 461-476, doi: 10.1007/s10551-012-1211-z.

Saleem, F., Qureshi, S.S. and Malik, M.I. (2021), "Impact of environmental orientation on proactive and reactive environmental strategies: mediating role of business environmental commitment", *Sustainability*, Vol. 13 No. 15, doi: 10.3390/su13158361.

Sarkis, J. (2012), "A boundaries and flows perspective of green supply chain management", *Supply Chain Management*, Vol. 17 No. 2, pp. 202-216, doi: 10.1108/13598541211212924.

Schmidt, C.V.H., Kindermann, B., Behlau, C.F. and Flatten, T.C. (2021), "Understanding the effect of market orientation on circular economy practices: the mediating role of closed-loop orientation in German SMEs", *Business Strategy and the Environment*, pp. 1-17, doi: 10.1002/bse.2863.

Schroeder, P., Anggraeni, K. and Weber, U. (2019), "The relevance of circular economy practices to the sustainable development goals", *Journal of Industrial Ecology*, Vol. 23 No. 1, pp. 77-95, doi: 10.1111/jiec.12732.

Schwab, K. and World Economic Forum-WEF (2019), "The global competitiveness report 2019".

Sezen, B. and Çankaya, S.Y. (2013), "Effects of green manufacturing and eco-innovation on sustainability performance", *Procedia - Social and Behavioral Sciences*, Vol. 99, pp. 154-163, doi: 10.1016/j.sbspro.2013.10.481.

Shaikh, A.R., Qazi, A., Ali, I. and Appolloni, A. (2023), "Analyzing the barriers to sustainable procurement in an emerging economy: an interpretive structural modeling approach", *International Journal of Emerging Markets*, doi: 10.1108/IJOEM-07-2022-1082.



Singh, N., Jain, S. and Sharma, P. (2014), “Determinants of proactive environmental management practices in Indian firms: an empirical study”, *Journal of Cleaner Production*, Vol. 66, pp. 469-478, doi: 10.1016/j.jclepro.2013.11.055.

Singh, M.P., Chakraborty, A. and Roy, M. (2016), “Entrepreneurial commitment, organizational sustainability and business performance of manufacturing MSMEs: evidence from India”, *International Journal of Applied Business and Economic Research*, Vol. 14 No. 6, pp. 4615-4631.

Singh, M.P., Chakraborty, A. and Roy, M. (2018), “Developing an extended theory of planned behavior model to explore circular economy readiness in manufacturing MSMEs, India”, *Resources, Conservation and Recycling*, Vol. 135, pp. 313-322, doi: 10.1016/j.resconrec.2017.07.015.

Sovacool, B.K., Axsen, J. and Sorrell, S. (2018), “Promoting novelty, rigor, and style in energy social science: towards codes of practice for appropriate methods and research design”, *Energy Research and Social Science*, doi: 10.1016/j.erss.2018.07.007.

Stone, L.J. (2006), “Limitations of cleaner production programmes as organisational change agents. II. Leadership, support, communication, involvement and programme design”, *Journal of Cleaner Production*, Vol. 14 No. 1, pp. 15-30, doi: 10.1016/j.jclepro.2004.12.009.

Sundar, D., Mathiyazhagan, K., Agarwal, V., Janardhanan, M. and Appolloni, A. (2023), “From linear to a circular economy in the e-waste management sector: experience from the transition barriers in the United Kingdom”, *Business Strategy and the Environment*, John Wiley & Sons, Ltd, doi: 10.1002/bse.3365.

Suryantini, N.P.S., Wayan Edi Arsawan, I., Darmayanti, N.P.A., Moskalenko, S. and Gorokhova, T. (2021), “Circular economy: barrier and opportunities for SMEs”, *E3S Web of Conferences*, Vol. 255, doi: 10.1051/e3sconf/202125501017.

Susanty, A., Tjahjono, B. and Sulistyani, R.E. (2020), “An investigation into circular economy practices in the traditional wooden furniture industry, Production Planning and Control”, *Taylor and Francis*, Vol. 31 No. 16, pp. 1336-1348.

**Q17** Temminck, E., Mearns, K. and Fruhen, L. (2015), “Motivating employees towards sustainable behaviour”, *Business Strategy and the Environment*, Vol. 24 No. 6, pp. 402-412, doi: 10.1002/bse.1827.

Tsimoshynska, O., Koval, M., Kryshchal, H., Filipishyna, L. and Koval, V. (2021), “Investing in road construction infrastructure projects under public-private partnership in the form of concession”, *Scientific Bulletin of National Mining University*, No. 2.

Yadav, G., Luthra, S., Huisingh, D., Mangla, S.K., Narkhede, B.E. and Liu, Y. (2020), “Development of a lean manufacturing framework to enhance its adoption within manufacturing companies in developing economies”, *Journal of Cleaner Production*, Vol. 245, 118726, doi: 10.1016/j.jclepro.2019.118726.

Yadegaridehkordi, E., Foroughi, B., Iranmanesh, M., Nilashi, M. and Ghobakhloo, M. (2023), “Determinants of environmental, financial, and social sustainable performance of manufacturing SMEs in Malaysia”, *Sustainable Production and Consumption*, Vol. 35, pp. 129-140.

York, J.G. (2009), “Pragmatic sustainability: translating environmental ethics into competitive advantage”, *Journal of Business Ethics*, Vol. 85, pp. 97-109, doi: 10.1007/s10551-008-9950-6.

Zhang, Q. and Ma, Y. (2021), “The impact of environmental management on firm economic performance: the mediating effect of green innovation and the moderating effect of environmental leadership”, *Journal of Cleaner Production*, Vol. 292, 126057.

Zhang, B., Yang, S. and Bi, J. (2013), “Enterprises’ willingness to adopt/develop cleaner production technologies: an empirical study in Changshu, China”, *Journal of Cleaner Production*, Vol. 40, pp. 62-70, doi: 10.1016/j.jclepro.2010.12.009.

Zhu, Q., Geng, Y. and Lai, K.hung. (2011), “Environmental supply chain cooperation and its effect on the circular economy practice-performance relationship among Chinese manufacturers”, *Journal of Industrial Ecology*, Vol. 15 No. 3, pp. 405-419, doi: 10.1111/j.1530-9290.2011.00329.x.

## Footnotes

### Text Footnotes

*Funding:* Thank you to the Ministry of Education and Cultural, Research Technology and Higher Education of the Republic of Indonesia, Directorate of Research, Technology and Community Service (DRTPM) for the research grant no. 085/SPK/D4/PPK.01.APTV/VII/2022 and 3163/PL8/PG/2022.

## Queries and Answers

Q1

**Query:** Please check the edit made in the article title.

**Answer:** Confirmed

Q2

**Query:** Please check the short title that has been created for this article (Refer to right side top of the first page in PDF and refer below article title in Proof Central), and amend if required. The short title must not exceed 45 characters, including spaces, and no word should exceed 13 characters.

**Answer:** Confirmed

Q3

**Query:** Please confirm that given name(s) [yellow] and surname(s) [green] have been identified correctly and are presented in the desired order, and please carefully verify the spelling of all authors’ names, including all special characters and accents.

Please note that no changes can be made to authorship at this point in the publication process.

**Answer:** Confirmed

Q4

**Query:** Please note the addition of “Department of” to the affiliations “Department of International Business Management, State Polytechnic Bali, Bali, Bali, Indonesia; Department of Business Administration, Politeknik Negeri Bandung, Bandung, Indonesia”. We request you to verify the accuracy and appropriateness of this.

**Answer:** I. Wayan Edi Arsawan and Ni Kadek Dessy Hariyanti are from the same affiliation (Department of Business Administration, Politeknik Negeri Bali, Indonesia)

Viktor Koval (Izmail State University of Humanities, Ukraine)

Dwi Suhartanto (Department of Business Administration, Politeknik Negeri Bandung, Indonesia)

Nataliia Polishchuk (Vocational Education, Labor Training and Technology, Rivne State University for Humanities, Ukraine)

Viktoriia Bondar (Odesa National University of Technology, Ukraine)

Q5

**Query:** Please confirm that the provided email “wayanediarsawan@pnb.ac.id” is the correct address for official communication.

**Answer:** confirmed

Q6

**Query:** There is currently no Acknowledgement included. Please confirm if this is correct or provide the Acknowledgement section.

**Answer:** The authors expand their gratitude to the reviewers for their valuable and insightful comments, feedback, and recommendations for the paper improvements.

Q7

**Query:** Please note that “Table 3” was not cited in the text. Please check that the citation suggested by the copyeditor are in the appropriate place, and correct if necessary.

**Answer:** it is supposed to be Table 2

Q8

**Query:** Please note that “Figure 1” was not cited in the text. Please check that the citation suggested by the copyeditor are in the appropriate place, and correct if necessary.

**Answer:** it is already correct

Q9

**Query:** The expansion “eco-design” has been abbreviated as “EC-DE” and “ED”. Please check, maintain consistency and amend accordingly.

**Answer:** "eco-design" has been abbreviated as "ED"

Q10

**Query:** Please provide complete details for the references “Agustiono et al., 2020; Rizos et al., 2015; Schwab and World Economic Forum-WEF, 2019”.

**Answer:** Kurniawan, T.A., Avtar, R., Singh, D., Xue, W., Othman, M.H.D., Hwang, G.H., Iswanto, I., Albadarin, A.B. and Kern, A.O., 2021. Reforming MSWM in Sukunan (Yogyakarta, Indonesia): A case-study of applying a zero-waste approach based on circular economy paradigm. *Journal of cleaner production*, 284, p.124775.

Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbers, M. and Ioannou, A., 2015. The circular economy: Barriers and opportunities for SMEs. *CEPS Working Documents*.

Schwab, K. and World Economic Forum-WEF (2019), “The global competitiveness report 2019”. (already correct)

Q11

**Query:** Please provide the page or article number for References “Appolloni et al., 2021; Ellen MacArthur Foundation, 2013; Masi et al., 2017; Nurdiana et al., 2021; Parwita et al., 2021; Saleem et al., 2021”.

**Answer:** “Appolloni et al., 2021 (page 1-14);

Ellen MacArthur Foundation, 2013 (no article number);

Masi et al., 2017 (page 1-22);

Nurdiana et al., 2021 (page 1-22);

Parwita et al., 2021 (page 22-45);

Saleem et al., 2021 (page 1-16)”.

Q12

**Query:** Please provide the volume or issue number and page range for References “Appolloni et al., 2022; Appolloni et al., 2023; Shaikh et al., 2023; Sovacool et al., 2018; Sundar et al., 2023”.

**Answer:** Appolloni et al., 2022 (Vol. ahead-of-print No. ahead-of-print);

Appolloni et al., 2023 (Volume 39, February 2023, 100719);

Shaikh et al., 2023 (Vol. ahead-of-print No. ahead-of-print);

Sovacool et al., 2018 (Volume 45, November 2018, Pages 12-42);

Sundar et al., 2023 (Vol. ahead-of-print No. ahead-of-print)”.

Q13

**Query:** The year in the first occurrence of Arsawan et al., 2022; Hair et al., 2016 in the list has been changed to 2022a,b; 2016a,b.

**Answer:** Confirmed

Q14

**Query:** Please provide publisher location for References “Hair et al., 2016a; Mölemann, 2016; Rizos et al., 2015; Suryantini et al., 2021”.

**Answer:** “Hair et al., 2016a (Thousand Oaks, CA: Sage Publications, Inc.);

Mölemann, 2016 (Drienerlolaan 5, 7522 NB Enschede, Netherlands);

Rizos et al., 2015 (4200 Fifth Ave, Pittsburgh, PA 15260, USA);

Suryantini et al., 2021 (Avenue du Hoggar Parc d'Activité de Courtabœuf BP 112 91944 Les Ulis Cedex A France)”.

**Query:** “et al.” is not allowed as per the journal style. Please list all author names in Refs. [Jain et al., 2022; Longo et al., 2021].

**Answer:**

et al has been change;

Jain, A., Sarsaiya, S., Awasthi, M.K., Singh, R., Rajput, R., Mishra, U.C., Chen, J. and Shi, J., 2022. Bioenergy and bio-products from bio-waste and its associated modern circular economy: Current research trends, challenges, and future outlooks. *Fuel*, 307, p.121859.

Longo, S., Cellura, M., Cusenza, M.A., Guarino, F., Mistretta, M., Panno, D., D’Urso, C., Leonardi, S.G., Briguglio, N., Tumminia, G. and Antonucci, V., 2021. Life cycle assessment for supporting eco-design: The case study of sodium–nickel chloride cells. *Energies*, 14(7), p.1897.

**Query:** Please provide the volume or issue number for References “Le Blévennec et al., 2022; Chin, 2010; Dalhammar et al., 2021; Schmidt et al., 2021”.

**Answer:** “Le Blévennec et al., 2022 (no volume);

Chin, 2010 (no volume);

Dalhammar et al., 2021 (Volume 123, 1 June 2016, Pages 155-166);

Schmidt et al., 2021 (Schmidt, C.V.H., Kindermann, B., Behlau, C.F. and Flatten, T.C., 2021. Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs. *Business Strategy and the Environment*, 30(8), pp.4171-4187.)”.

**Query:** Please provide the volume and page range for Reference “Tsimoshynska et al., 2021”.

**Answer:** “Tsimoshynska et al., 2021”.(Tsimoshynska, O., Koval, M., Kryshal, H., Filipishyna, L., Arsawan, I. and Koval, V., 2021. Investing in road construction infrastructure projects under public-private partnership in the form of concession. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 2(2), pp.184-192.)



**Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment**

Journal:	<i>International Journal of Productivity and Performance Management</i>
Manuscript ID	IJPPM-03-2022-0144.R1
Manuscript Type:	Standard Paper
Keywords:	Green economic incentives, environmental commitment, internal environmental management, eco-design, corporate asset management and recovery, circular economy practices

SCHOLARONE™  
Manuscripts



Circular Economy Practices in SMEs: Aligning Model of Green Economic  
Incentives and Environmental Commitment

Abstract

**Purpose** - The present study aimed to examine the relationship between green economic incentives and environmental commitment as drivers of the circular economy practices in Small and Medium Enterprises.

**Design/methodology/approach** -A cross-sectional study of 594 assistant managers and SME managers was used while data was analyzed through Smart PLS.

**Findings** - The results showed that green economic incentives positively affect the SMEs' environmental commitment and the circular economy practice model. Furthermore, environmental commitment is the mediator between green economic incentives and the three circular economy practices: internal environmental management, eco-design, and corporate asset management and recovery.

**Originality** - This study enhanced the natural resource-based view (NRBV), describing the mechanisms that view green economic incentives (GEI) and environmental commitment (EC) as pollution prevention in circular economy practice.

**Practical implications** - The present study provided a basis for understanding the relevance of SMEs' circular economy practices and designing a strategic plan for its implementation. Also, it provides insight into that collaboration between triple helix (the government, SMEs, and the community) is needed in increasing environmental awareness towards sustainability.

**Keywords** - Green economic incentives, environmental commitment, internal environmental management, eco-design, corporate asset management and recovery, circular economy practices

**Paper type** - Research paper

1 Introduction

The circular economy (CE) is an essential environmental strategy concept for waste minimization, nature recuperation (Bag *et al.*, 2021), sharpening environmental conservation, and efficient energy consumption for a sustainable business (Gupta *et al.*, 2021; Arsawan *et al.*, 2021) by paying

great attention to the environment and resources (Korhonen *et al.*, 2018). As a result, industrial waste is a valuable input that can be repaired, reused, and recycled (Bag *et al.*, 2021; Yadav *et al.*, 2020). It leads to oriented and environmental value products, methods, and processes (Schroeder *et al.*, 2019). A circular economy approach benefits businesses and society with improved environmental awareness (Khan *et al.*, 2021; Centobelli *et al.*, 2021), lower resource price volatility, better customer relations, and job opportunities (Ellen MacArthur Foundation, 2013).

The circular economy is affected by the internal and external environment. Internal factors include behavior (Ling and Xu, 2021; Saleem *et al.*, 2021), environmental commitment (Galkina, 2021; Lin *et al.*, 2015), and organizational capabilities (Prieto-Sandoval *et al.*, 2019; Singh *et al.*, 2018). Meanwhile, government pro-environmental regulations and support are considered external factors for CE practices (Bhupendra and Sangle, 2016; Lozano, 2012). The present study aimed to address various gaps, including the unavailability of studies on the SMEs' readiness for the circular economy (Singh *et al.*, 2018). First, although it affects economic growth (Suryantini *et al.*, 2021), the role of SMEs in saving the environment needs to be examined (Saleem *et al.*, 2021). A supportive ecosystem should be maintained to build sustainability (Koval *et al.*, 2021) through green-oriented strategies and innovation optimization (Arsawan *et al.*, 2021). Second, CE has not been comprehensively studied, especially in the SMEs sector, due to limited behavior and internal resource capabilities (Luthra *et al.*, 2022; Temminck *et al.*, 2015). It can be an opportunity for SMEs to improve internal capabilities (Centobelli *et al.*, 2021) for effective green marketing and new markets creation and design process, and circular products and attract a value-oriented talent environment (Barros *et al.*, 2021; Diaz *et al.*, 2021). Third, Singh *et al.*, (2018) showed that green economic incentives (GEI) do not contribute to building environmental commitment. However, the importance of green incentives in building environmental commitment was demonstrated by Centobelli *et al.*, (2021). This divergence shows the need for more research on green economic incentives and environmental commitment to support SMEs' need for environmental self-regulation for environmental improvements (Lin *et al.*, 2015; Ling and Xu, 2021).

The present study was motivated by the research gaps and examined the relationship between green economic incentives, environmental commitment, internal environmental management (CE-IEM), eco-design (CE-ED), corporate asset management, and recovery (CE-CAM&R) on SMEs in Indonesia for three reasons. First, Indonesia is a developing country with 63 million SMEs

continuously growing, classified as 62 million medium enterprises and 750.000 small businesses, potentially boosting national economic growth (Surya *et al.*, 2021). Consequently, government regulations must sustain environmental attention (Nurdiana *et al.*, 2021). Second, CE is at an early implementation stage and faces many challenges, particularly infrastructure and regulation (Fatimah *et al.*, 2020; Nurdiana *et al.*, 2021). For that reason, the government's role and efforts are crucial in making consistent regulations (Rizos *et al.*, 2015), increasing commitment environment (Singh *et al.*, 2016; Lin *et al.*, 2015), and providing green economic incentives for its implementation (Centobelli *et al.*, 2021; Singh *et al.*, 2018). Three, data from Schwab and World Economic Forum-WEF, (2019) stated that this country lacks internal resources, particularly business dynamics capability, developing a sustainable innovation (Arsawan *et al.*, 2020). However, the innovations should be environmentally oriented and environmentally friendly technologies (Agnello *et al.*, 2015). Furthermore, the second part of this study is the literature review, which includes the hypotheses formulation, while the third and fourth describes the method and the analysis, respectively. Finally, the last part contains a discussion, theoretical and managerial contributions, conclusions, research limitations, and suggestions for further research.

## 2. Literature Review and Hypothesis Development

### 2.1 Natural Resource-Based View

Hart (1995) coined the natural resource-based view to extend the resource-based view (Barney, 1991). Three additions were suggested, including 1) environmental-oriented capabilities for enhanced organizational profitability, 2) pollution preventive action, and 3) product stewardship for reaching sustainable development (Hart, 1995). Pollution preventive action refers to effective waste and emissions management during the production process (Hart and Dowell, 2011). On the other side, product stewardship refers to the development of integrated design (Hart, 1995). Finally, sustainable development refers to a production configuration "sustained indefinitely into the future" (Hart and Dowell, 2011). The influence of NRBV was tested by Hart and Dowell (2011) and found that previous research only focused on pollution prevention capabilities, leaving the other two capabilities unexplored. Based on this, this study examined the three NRBV capabilities role, namely green economic incentives as an effort to take precautions (Hart and Dowell, 2011), environmental commitment, also known as an effort to build environmentally oriented products, product life cycle strategies for enhanced product stewardship (Green *et al.*, 2015) while the circular economy is a sustainable development implementation (Liu *et al.*, 2018; Sarkis, 2012).

## 2.2 Circular Economy Practices in Small and Medium Enterprises

The present study considered circular economy practices that require SMEs to integrate ecological requirements, including efficiency and reduction of raw, recycling, reuse, and replacement of materials into organizational routine activities (Botezat et al., 2018; Masi et al., 2017). Circular economy practices are divided into 3 main dimensions, including internal environmental management (Schmidt et al., 2021), environmentally friendly design (Zhu et al., 2011), and company assets management and recovery (Zhu et al., 2011). First, internal environmental management is the preparation of environmentally-oriented procedures, such as green human resource management practices (Marrucci et al., 2021; Bag et al., 2021), training and development programs (Persis et al., 2021), and environmental-based performance evaluation systems (Zhu et al., 2011), and supporting organizational environmental objectives (Koval et al., 2021), building environmental ethics (York, 2009) and improving ecological performance (Lin et al., 2015; Parker et al., 2009; Pimenova and Van der Vorst, 2004). Second, eco-design describes the product design process considering environmental impacts (Lozano, 2012) and is an effective strategy to achieve eco-efficiency (Polverini, 2021; Dalhammar et al., 2021). Therefore, product design must be environmentally oriented (Longo et al., 2021). Apart from environmental efficiency, environmentally friendly design practices help companies to provide different products in the market (Dalhammar, 2016) and increase the global value proposition (Blévennec et al., 2022). Third, the organizational assets management and recovery refers to the capability to recover investment (Schmidt et al., 2021), resell (Susanty et al., 2020), and recycle materials (Zhu et al., 2011). For this reason, companies are required to implement strategies that mitigate emerging issues to gain greater value (Jain et al., 2022), and it is a CE's substantial objective to be reached (Lieder and Rashid, 2016).

## 2.3 Green Economic Incentives (GEI)

Green economy incentives (GEI) from the government are needed by the organization to build and motivate pro-environmental behavior (Clemens, 2006) through financial (Ling and Xu, 2021) and supporting regulations (Parker et al., 2009). Financial rewards support waste management (Ling and Xu, 2021), recycling, and resource efficiency (Rizos et al., 2015), as well as environmentally oriented innovations (Pieroni et al., 2019). Supporting regulatory incentives enhances environmentally-oriented products creation (Agustiono et al., 2020) and promotes self-regulation

(Lin *et al.*, 2015). Meanwhile, GEI strengthens internal capabilities (Singh *et al.*, 2018) and positively influences the internal organizational decision-making processes (Rizos *et al.*, 2015). Incentives through subsidies, environmental grants, loans, and tax concessions influence the behavior of owners/managers (Bradford and Fraser, 2008; Chang *et al.*, 2011) toward a circular economy (Roxas and Coetzer, 2012). Similarly, the government, supported by marketing and procurement of recycled raw materials helps SMEs to enhance in pro-environmental practices (Pimenova and Van der Vorst, 2004; Tsimoshynska *et al.*, 2021). Therefore, economic support strengthens internal capabilities (Prieto-Sandoval *et al.*, 2019), stimulating green-oriented commitments (Sezen and Çankaya, 2013; Chang *et al.*, 2011). The present study considered three indicators as green economy incentives determinants, namely 1) government subsidies and tax benefits (GSTB), 2) premium prices for green products (PP), and 3) cheaper recycled raw materials (CP).

**2.4 Environmental Commitment**

A company must have an internal and external environmental orientation to protect the environment (Saleem *et al.*, 2021) and to design green strategies (Arsawan *et al.*, 2021; Bradford and Fraser, 2008), as evidenced in environmental saving actions (Singh *et al.*, 2014). In this case, environmental commitment is an organization's ethical value in protecting the environment (Chang *et al.*, 2011) and green activities to reduce environmental degradation (Suryantini *et al.*, 2021), protecting business, society, and its ecology (York, 2009). It is viewed as a strategic business orientation (Singh *et al.*, 2014) which reflects the company's sustainable business attitude (Green *et al.*, 2015). Environmental commitment involves manner, behavior, perspectives, and economic benefits (Saleem *et al.*, 2021). Furthermore, Stone (2006) revealed the environmental commitment role in increasing green awareness and responsibility (Saleem *et al.*, 2021), which led to organizational pro-environmental sustainability, enhanced business performance, and effective waste management (Singh *et al.*, 2016). However, considering the diversity of SMEs' effective implementation commitments (Parker *et al.*, 2009), environmental awareness is still low (Singh *et al.*, 2018) due to the assumption that waste management is not related to productivity (Saleem *et al.*, 2021; Parker *et al.*, 2009) and organizational profits (Bhupendra and Sangle, 2016). Therefore, the present study considered environmental products and processes awareness (EPP), resource reuse and recycling (RRR), and environmental responsibility (ER) to measure the company's environmental commitments.

## 2.4 Hypothesis Development

The natural resource-based view (NRBV) postulates that both orientations toward the environment and prevention of pollution are key for sustainable development (Hart, 1995). To be successful in this sustainable development, the government's involvement in implementing regulations (Fatimah *et al.*, 2020) and providing financial incentives (Botezat *et al.*, 2018) is crucial. It means that GEI stimulates an organizational solution to increase environmental commitment (Zhang *et al.*, 2013);(Clemens, 2006). Furthermore, the important role of the government in making regulations related to providing green incentives will change the perspective of SME managers about the importance of contributing to saving the environment (Singh *et al.*, 2018). Thus, green incentives have an impact on increasing environmental commitment. Based on the above description, the following hypothesis is formulated:

*H1: GEI has a significant positive effect on EC*

Several studies revealed that green incentives provided through financial (Clemens, 2006) and non-financial (Ling and Xu, 2021) could be allocated to make the internal environment guidelines such as the procurement process or recruiting employees with environmental conservation knowledge (Marrucci *et al.*, 2021;Bag *et al.*, 2021), preparation of training and development programs aimed to save the environment (Persis *et al.*, 2021) and environmentally sustainable strategies (Green *et al.*, 2015). Furthermore, the green economic incentive is important in manufacturing of environmentally friendly products (Longo *et al.*, 2021; Lozano, 2012), enhancing environmental efficiency (Polverini, 2021). The green economy incentives increase the organization's internal capabilities for investment recovery (Schmidt *et al.*, 2021), reselling used materials and goods (Susanty *et al.*, 2020), and recycling materials (Zhu *et al.*, 2011), prolonging the product life cycle (Corona *et al.*, 2019). Consequently, the company adopts a better sustainability system (Lozano, 2012). This discussion leads to the following hypotheses in line with the natural resource-based view (Hart, 1995).

*H2: GEI positively affects IEM*

*H3: GEI positively affects ED*

*H4: GEI positively affects CAM&R*



The natural resource-based view (Hart, 1995) implies that environmental commitment is considered the organization's first step in its role to save the environment for sustaining the development. It enhances the circular economy, especially in the internal environmental management, including planning, drafting, implementing, and evaluating the internal sustainable programs such as pollution prevention and waste reduction (Schmidt *et al.*, 2021), building cross-functional collaboration for environmental improvement (Parker *et al.*, 2009), and quality environment management (Zhang and Ma, 2021; York, 2009). Further, environmental commitment is a starting point for SMEs to design energy-efficient products, recyclable, safe raw materials, and minimize waste (Schmidt *et al.*, 2021). Therefore, it can affect investment recovery, inventory effectiveness, and sales of used goods and materials (Schmidt *et al.*, 2021). Based on the above description, the hypothesis is formulated as follows:

*H5: EC positively affects IEM.*

*H6: EC positively affects ECO*

*H7: EC positively affects CAM&R*

Green economy incentives (GEI) are significant in building organizational involvement and commitment to saving the environment. The government and non-governmental organizations benefit from adopting environmental initiatives (Singh *et al.*, 2018; Agnello *et al.*, 2015). Incentives include additional or financial rewards (Ling and Xu, 2021) that encourage organizations to design or implement environmental practices (Kahupi *et al.*, 2021). In addition, the incentive improves recycling techniques (Bag *et al.*, 2021) and facilitates the transition to a circular economy (Ling and Xu, 2021). Also, green economy incentives enhance dynamic capabilities (Prieto-Sandoval *et al.*, 2019) that affect decision-making processes (Diaz *et al.*, 2021). However, some SMEs perceive that investing in the circular economy increases costs more than the expected return (Rizos *et al.*, 2015). Consequently, the increasing environmental commitment will motivate SME managers to implement a circular economy (Kuo and Chang, 2021). Furthermore, the environmental commitment will strengthen the internal capabilities of SMEs (Marrucci *et al.*, 2021; Bag *et al.*, 2021), manufacture environmentally-friendly designed products (Longo *et al.*, 2021), and improve asset recovery and investment capabilities (Schmidt *et al.*, 2021). Therefore, the green economy incentives will increase environmental commitment and improve circular economy practices in SMEs. This discussion suggests that, for sustaining the development using the natural resource-

based (Hart, 1995), environmental commitment has a key role in mediating the environmental effect on the circular practice modes. Thus, the following hypotheses are stated.

*H8: Environmental commitment partially mediates the relationship of green economic incentives to internal environment management*

*H9: Environmental commitment partially mediates the relationship of green economic incentives to eco-design*

*H10: Environmental commitment partially mediates the relationship between green economic incentives on corporate asset management and recovery*

**\*\*Insert Figure 1\*\***

### 3 Methodology

#### 3.1 Data and Sampling Method

The present study uses a quantitative approach by distributing questionnaires that focus on SME-producing companies (with 50–200 full-time employees), which are the essential sector of the Indonesian economy that still grows and develops (Surya *et al.*, 2021). The population is 1,299 SMEs located in 9 regencies of Bali Province. A formula from Krejcie and Morgan (1970) was used to determine the sample frames, obtaining 297 SMEs. This selection was carried out using random sampling (lottery method). From the 297 SMEs, two respondents were recruited from each to fill out the research questionnaire. The total number of participants was 594 people including managers and assistant managers. Their selection was triggered by assuming that they possess organizational characteristics and knowledge of circular economy practices. Data were collected from March to June 2021 via email and Google Forms and direct visits by first sending email notifications s on this study agenda. The 594 responses were analyzed to achieve the aims of the present study. Table 1 presents the population information, sample frame, and the number of respondents.

**\*\*Insert Table 1\*\***

#### 3.2 Measurement

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

The magnitude of the variable construct used was based on previous empirical studies. Therefore, the previous study measurement was adopted for the subject: SMEs in Bali Province over nine districts. The construct indicators assessment used a 7-point Likert scale, "1: strongly disagree to 7: strongly agree". In order to avoid ambiguity, the questionnaire (in Indonesian) was tested on 30 SME CEOs with knowledge of the circular economy (CE). The green economic incentive (GEI) variable was adopted from Singh *et al.*, (2018); Esfahbodi *et al.*, (2016), consisting of 3 indicators. The environmental commitment variable was adopted from Singh *et al.*, 2018; Liu and Bai, 2014, consisting of 3 indicators. In addition, the circular economy-IEM was adopted from Schmidt *et al.*, (2021) and Zhu *et al.*, (2011), consisting of 8 indicators. The CE-ED variable was adopted from Schmidt *et al.*, (2021); Zhu *et al.*, (2011) with 4 indicators. Moreover, CE-CAM&R was adopted from Schmidt *et al.*, (2021) and Zhu *et al.*, (2011) with 3 indicators.

The present study used the variance-based partial least squares to test the hypothesis (PLS-SEM) with Smart PLS 3.2.9 software. The PLS-SEM was used to assess the relationship between constructs and their predictive power on endogenous variables (Hair *et al.*, 2014). The present study validated the circular economy practices model. The data was not assessed as normally distributed data, making the circular economy model assessment associated with green economic incentives and environmental commitment predictors using PLS-SEM appropriate (Hair *et al.*, 2016).

4. Results

Table 2 describes the characteristics of the 594 respondents.

\*\*Insert Table 2\*\*

4.1 Measurement Model

The VIFs test was used to evaluate the collinearity problem, scoring 2.872 (green economics incentives), 1.826 (environmental commitment), 3,558 (CE-Internal Environment Management), 1.832 (CE-Eco-Design), and 2.119 (CE-Corporate Asset Management and Recovery). All VIF coefficients were lower than 5, which is the recommended limit value by Hair *et al.*, (2016) that

the data do not have general variance problems. The outer model was tested to evaluate the reliability and validity of the construct variables. Table 2 shows that each item of factor loadings is more than 0.6. The convergent validity test explains that the validity requirements are met because the average extracted variance (AVE) is more than 0.5 and the factor loading is more than 0.6 (Hair Jr *et al.*, 2016). It shows that the discriminant validity conditions of all constructs have been met.

**\*\*Insert Table 3\*\***

The Heterotrait-Monotrait Ratio (HTMT) assessed the discriminant constructs validity. According to Hair Jr *et al.*, (2016), for this criteria, the value was lower than 0.9. Due to the values ranging from 0.384 to 0.701, the HTMT test showed that discriminant validity was achieved. The composite reliability values in both samples were above the recommended level of 0.7; therefore, the construct was reliable.

#### 4.2 Inner Model Measurement

The present study applied the bootstrap method with 5000 samples to assess the research indicators and path coefficient's significance (Chin *et al.*, 2008). The results showed that the goodness-of-fit (GoF) model has a value of 0.367 which stated that the model is fit. In addition, testing on the standard residual root means square (SRMR) and normed fit index (NFI) shows that the SRMR value was 0.081 while the NFI was 0.716. The SRMR cut-off value was 0.8, and the NFI was below 0.9, which indicates that all criteria are met. The results showed that GEI explains EC by 0.268 (26.8%). The explanatory power of EC at CE-IEM was 0.347 (34.7%); at CE-ED, it was 0.224 (22.4%), and at CE-CAM&R, it was 0.212 (21.2%). In addition, the value of  $Q^2$  showed that all constructs have positive values and good predictive relevance (Chin, 2010).

#### 4.3 Hypothesis Testing

Table 4 shows the results of the relationship between green economics incentives (GEI), environmental commitment (EC), internal environment management (CE-IEM), eco-design (CE-ED) and corporate asset management and recovery (CE-CAM&R). We use path coefficients ( $\beta$ ), t values, and p values to test the hypotheses. According to Hair *et al.*, (2016), if the path coefficient is greater than 0.1, t value greater than 1.96, and 0.05 level of significance, the hypotheses are

supported. The results support the significant role of GEI in achieving EC ( $H_1$ ) with CE-IEM ( $H_2$ ), CE-ED ( $H_3$ ), and CE-CAM&R ( $H_4$ ). Furthermore, EC has an important role in achieving CE-IEM ( $H_5$ ), CE-ED ( $H_6$ ), and CE-CAM&R ( $H_7$ ).

**\*\*Insert Table 4\*\***

**\*\*Insert Table 5\*\***

After examining the direct relationship, the next step was determining the mediating role as shown in Table 5. The present study tested three mediation patterns. According to Hair *et al.*, (2014), the method used is to measure the VAF value  $< 0.20$ , meaning there is no mediation, while  $0.20-0.80$  indicates partial and the VAF value  $> 0.80$  means full mediation. In order to test the model mediation effect, non-parametric bootstrap was used (Hair *et al.*, 2016). Finally, variance values (VAF) were calculated to obtain indirect and total link sizes. When the VAF is greater than 80%, it shows full mediation; between 20 and 80% is partial; below 20% means no mediating effect (Hair *et al.*, 2013).

The mediating role in the causal relationship between GEI and CE-IEM, CE-ED, and CE-CAM&R was examined using VAF assays. This study tested three mediation pathways and concluded that environmental commitment partially mediates the relationship between GEI and CE-IEM, where the VAF value is 35.90%, indicating that hypothesis 8 is accepted. EC also functions as a partial mediating relationship between GEI and CE-ED, with a VAF value of 24.10%, which means that hypothesis 9 is accepted. At the same time, EC functions as a partial mediating relationship between GEI and CE-CAM&R, with a VAF value of 65.50%, which means that hypothesis 10 is accepted (Figure 2).

**\*\*Insert Figure 2\*\***

### 5.1 Discussion and Theoretical Contribution

There is increased attention by policymakers, researchers, and practitioners, for circular economy practices that can advance sustainable development goals (SDGs). Therefore, this study explained

the mechanisms that SMEs can utilize to successfully implement circular economy practices, including the role of GEI and EC. It complemented previous studies that failed to show antecedents for specific circular economy practices (Green *et al.*, 2015); (Schmidt *et al.*, 2021); (Liu *et al.*, 2018). Furthermore, very few studies that exclusively focused on the direct relationship between GEI and the implementation of circular economy practices. In contrast, this study showed that EC influences the relationship between GEI and three circular economy practices in Indonesian SMEs, specifically internal environmental management, eco-design, and CAM&R.

This study contributed to the fourth folds' circular economy literature and related theories. First, this study proposes and examines the supporting integration model of green economic incentives and environmental commitment in SMEs, where the combination of green economic incentives and environmental commitment is the key to building environmental sustainability. This new circular economy practice model was found to have a good fit and explanatory power, so it confirms that the green economic incentives and environmental commitment constructs are generally accepted (Clemens, 2006; Lin *et al.*, 2015) is also an important driver of circular economy practices for SMEs (Centobelli *et al.*, 2021). More specifically, green economic incentives play an important role in increasing environmental commitment and, at the same time, encouraging SMEs to carry out circular economy practices as an important activity in efforts to save the environment. Thus, the results prove that green economic incentives and environmental commitment form the basis for creating circular economy practices in the SME sector.

This study assesses circular economy practices by integrating green economic incentives into the circular economy practices model. The results of data analysis show that the circular economy practices integration model for SMEs is appropriate. Furthermore, the inclusion of environmental commitment in the circular economy practices model increases the explanatory power of the circular economy practices model. Conceptually, the results of this study strengthen the commitment-circular economy practices model (Saleem *et al.*, 2021; Schmidt *et al.*, 2021) in the SME sector. This finding shows that in SMEs, green economic incentives can simultaneously strengthen the influence of environmental commitment on circular economy practices. Thus, the circular economy practices model in the context of SMEs is conceptually expanded into a green incentives-commitment-circular economy practices model. Furthermore, these findings provide further evidence for the conclusions of previous studies (Galkina, 2021), which claim that

environmental commitment with environmentally oriented partner selection is an important determinant of strengthening future circular economy practices for environmental saving efforts.

Second, the results revealed that environmental commitment is a mediator of the relationship between green economic incentives and internal environmental management (IEM), eco-design (ED), and corporate asset management and recovery (CAM&R). Although the three tested mediation relationships are significant, GEI-EC and asset management and recovery (CAM&R) have more influence. This result proved that SMEs strongly focus on resource recovery to develop enterprise asset management and recovery practices. It requires the involvement of purchasing managers in investment recovery practices (Betancourt Morales and Zartha Sossa, 2020) to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011) through selective investment, excess inventory, sales of used goods and materials (Schmidt *et al.*, 2021). Thus, small-medium enterprises must be concerned about inventory recovery practices and make it a serious concern for organizational sustainability, increasing productivity and innovation, and environmental sustainability orientation.

Third, the circular economy is an interesting topic for academics, policymakers, and practitioners, but the literature is not thorough on how Indonesian SMEs can develop circular economy practices. Most studies focused on the European context, whereas this study contributed to the circular economy literature in developing countries and supported findings in the European context (Schmidt *et al.*, 2021). The results showed that GEI and EC influence the implementation of all three circular economy practices. Furthermore, this is the first study linking GEI and EC as antecedents of circular economy practice in an emerging country. In contrast, GEI is common in developed countries such as the US (Clemens, 2006), India (Singh *et al.*, 2018), and Italy (Centobelli *et al.*, 2021). It is supported by Zhang *et al.*, (2013), which stated that external references, such as financial incentives, affect organizational attitude and commitment to the circular economy concept implementation (Centobelli *et al.*, 2021; Clemens, 2006). However, Singh *et al.*, (2018) established that GEI does not affect building environmental commitment. Overall, these findings have helped to the theory and generated evidence that incorporating the sub-constructs of circular economy practice may not always work, especially for developed countries like Germany. In addition, these results provided practitioners with insights for implementing circular economy practices in their companies.



Fourth, the present study enhanced the natural resource-based view (NRBV), describing the mechanisms that view GEI and EC as pollution prevention in circular economy practice. The results showed that GEI and EC are translated in strategic orientation. The implementation of circular economy practices can be affected by an organization's failure to commit to the environment. This study examined antecedents used to overcome these barriers (de Oliveira *et al.*, 2018). The finding contributed to the literature by integrating previous research on GEI (Centobelli *et al.*, 2021) and environmental commitment (Galkina, 2021) as circular economy practice implementation drivers. Notably, it showed that GEI could trigger the emergence of EC in circular economy practices, positively affecting internal environmental management and eco-design and strengthening asset management and recovery. From a natural resource-based perspective, the results demonstrated the importance of companies building a commitment culture to implement circular economy practices.

## 5.2 Managerial Contribution

The governments and countries concerned about saving the environment must provide green economy subsidies, tax incentives, soft loans, and subsidized materials to increase sustainable waste management strategies (Singh *et al.*, 2018; Möllemann, 2016). First, the regulations can strengthen the commitment and consistency of SMEs to saving the environment efforts (Kahupi *et al.*, 2021; Lin *et al.*, 2015; Roxas and Coetzer, 2012). Second, proper utilization of the government's green economic incentives by SMEs managers will increase commitment to the environment. The GEI enabled SMEs to build a strong culture with higher trust in the environment, implement green actions for sustainable development, and create innovative sustainable business models to increase economic growth. The incentives also influence the implementation of environmentally oriented standards and building environmental ethics. Furthermore, green economic incentives facilitate SMEs' collaboration with large companies to achieve organizational sustainability, especially in the provision of raw materials; and supply chains management. Such actions develop a strong attitude and increases the company's environmental commitment to the circular economy implementation.

## 5.3 Conclusion, Limitations, and Further Study

Most previous studies examined the circular economy practices but did not focus on combining green economic incentives (GEI) and environmental commitment (EC), especially in the SMEs sector. The circular economy practice provides opportunities and encourages every country, industry, and business entity to maintain sustainability and protect the environment jointly. The present study examines the role of green economic incentive (GEI) and environmental commitment (EC) on circular economy practices (CE) in the SMEs sector.

Three important conclusions can be drawn from this study. First, circular economy practices are complex constructions, which consist not only internal environmental management (IEM) and eco-design (ED), but also corporate asset management and recovery (CAM&R). Second, the role of the government in providing green economic incentives (GEI) has been proven to increase environmental commitment, which in turn increases the practice of circular economy as an effort to preserve the environment. Finally, environmental commitment is a mediator of the relationship between GEI and CEP, where the most important path is through corporate asset management and recovery (CAM&R).

This study broadens our understanding of how GEI and EC impact on circular economy practices, especially in the SME sector, which can help SME managers, the government and related stakeholders to develop strategies for providing green incentives, both financial and non-financial. When we begin to study circular economy practices in SMEs and the interest of circular economy stakeholders in this issue will increase, further assessment of the circular economy in SMEs is critical.

This study identified several limitations causing a gap for future studies. First, the study design used assistant managers and managers for information. Future studies can overcome this common method bias and choose a proper design. Second, this study focused on the mechanisms influencing the development of CE practices and assumed that GEI and EC are prerequisites for companies to implement this. Meanwhile, future studies can establish additional aspects that influence the proposed mechanism, such as environmental supply chain collaboration, or green strategies and green innovation. Third, previous studies, including this, focused on the antecedents of circular economy practice in developed and developing countries. Therefore, future studies can

therefore make comparisons to expand and generalize these findings by considering the differences in institutional contexts between countries.

## References

- Agnello, X., Naveen, J., Ravichandran, M. and Balamurugan, J. (2015), "Clean Technology and its Efficacy: Strategies of Environmental Management", *Journal of Environmental and Social Sciences*, Vol. 2 No. 2, pp. 110–116.
- Agustiono, T., Avtar, R., Singh, D. and Xue, W. (2020), "Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information ", No. January.
- Arsawan, I.W.E., Koval, V., Duginets, G., Kalinin, O. and Korostova, I. (2021), "The impact of green innovation on environmental performance of SMEs in an emerging economy", *E3S Web of Conferences*, Vol. 255, EDP Sciences, p. 1012.
- Arsawan, I.W.E., Koval, V., Rajjani, I., Rustiarini, N.W., Supartha, W.G. and Suryantini, N.P.S. (2020), "Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage", *International Journal of Productivity and Performance Management*, available at:<https://doi.org/10.1108/IJPPM-04-2020-0192>.
- Bag, S., Yadav, G., Dhamija, P. and Kataria, K.K. (2021), "Key resources for industry 4.0 adoption and its effect on sustainable production and circular economy: An empirical study", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 281, p. 125233.
- Barney, J. (1991), "Firm Resources and Sustained Competitive Advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99–120.
- Barros, M.V., Salvador, R., do Prado, G.F., de Francisco, A.C. and Piekarski, C.M. (2021), "Circular economy as a driver to sustainable businesses", *Cleaner Environmental Systems*, Elsevier Ltd, Vol. 2 No. December 2020, p. 100006.
- Betancourt Morales, C.M. and Zartha Sossa, J.W. (2020), "Circular economy in Latin America: A systematic literature review", *Business Strategy and the Environment*, Wiley Online Library, Vol. 29 No. 6, pp. 2479–2497.
- Bhupendra, K.V. and Sangle, S. (2016), "Pollution prevention strategy: a study of Indian firms", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 133, pp. 795–802.

- Blévennec, K. Le, Vercalsteren, A. and Boonen, K. (2022), "Ecodesign as a New Lever to Enhance the Global Value Proposition: From Space to Corporate", *Towards a Sustainable Future-Life Cycle Management*, Springer, pp. 3–13.
- Botezat, E.A., Dodescu, A.O., Vaduva, S. and Fotea, S.L. (2018), "An exploration of circular economy practices and performance among Romanian producers", *Sustainability (Switzerland)*, Vol. 10 No. 9, pp. 1–17.
- Bradford, J. and Fraser, E.D.G. (2008), "Local authorities, climate change and small and medium enterprises: Identifying effective policy instruments to reduce energy use and carbon emissions", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 3, pp. 156–172.
- Centobelli, P., Cerchione, R., Esposito, E., Passaro, R. and Shashi. (2021), "Determinants of the transition towards circular economy in SMEs: A sustainable supply chain management perspective", *International Journal of Production Economics*, Elsevier B.V., Vol. 242 No. September 2020, p. 108297.
- Chang, S., Gong, Y. and Shum, C. (2011), "Promoting innovation in hospitality companies through human resource management practices", *International Journal of Hospitality Management*, Elsevier Ltd, Vol. 30 No. 4, pp. 812–818.
- Chin, W.W. (2010), "How to Write Up and Report PLS Analyses", *Handbook of Partial Least Squares*, pp. 655–690.
- Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), "Structural equation modeling in marketing: Some practical reminders", *Journal of Marketing Theory and Practice*, Taylor & Francis, Vol. 16 No. 4, pp. 287–298.
- Clemens, B. (2006), "Economic incentives and small firms: Does it pay to be green?", *Journal of Business Research*, Vol. 59 No. 4, pp. 492–500.
- Corona, B., Shen, L., Reike, D., Rosales Carreón, J. and Worrell, E. (2019), "Towards sustainable development through the circular economy—A review and critical assessment on current circularity metrics", *Resources, Conservation and Recycling*, Elsevier, Vol. 151 No. May, p. 104498.
- Dalhammar, C. (2016), "Industry attitudes towards ecodesign standards for improved resource efficiency", *Journal of Cleaner Production*, Elsevier, Vol. 123, pp. 155–166.
- Dalhammar, C., Milios, L. and Richter, J.L. (2021), "Ecodesign and the circular economy: conflicting policies in Europe", *EcoDesign and Sustainability I*, Springer, pp. 187–198.

- Diaz, A., Schöggl, J.P., Reyes, T. and Baumgartner, R.J. (2021), “Sustainable product development in a circular economy: Implications for products, actors, decision-making support and lifecycle information management”, *Sustainable Production and Consumption*, Elsevier B.V., Vol. 26, pp. 1031–1045.
- Ellen MacArthur Foundation. (2013), “Towards the circular economy. Journal of Industrial Ecology”, Vol. 1.
- Esfahbodi, A., Zhang, Y. and Watson, G. (2016), “Sustainable supply chain management in emerging economies: Trade-offs between environmental and cost performance”, *International Journal of Production Economics*, Elsevier, Vol. 181, pp. 350–366.
- Fatimah, Y.A., Govindan, K., Murniningsih, R. and Setiawan, A. (2020), “Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 269, p. 122263.
- Galkina, T. (2021), “International ECOpreneurship: Environmental commitment and international partner selection of Finnish firms from the energy sector”, *Journal of International Entrepreneurship*, Springer US, Vol. 19 No. 2, pp. 300–320.
- Green, K.W., Toms, L.C. and Clark, J. (2015), “Impact of market orientation on environmental sustainability strategy”, *Management Research Review*, Vol. 38 No. 2, pp. 217–238.
- Gupta, H., Kumar, A. and Wasan, P. (2021), “Industry 4.0, cleaner production and circular economy: An integrative framework for evaluating ethical and sustainable business performance of manufacturing organizations”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 295, p. 126253.
- Hair, J.F., Hult, G., Tomas, M., Ringle, C.M. and Sarstedt, M. (2016), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage publications.
- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), “Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance”, *Long Range Planning*, Vol. 46 No. 1–2, pp. 1–12.
- Hair, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014), “Partial least squares structural equation modeling (PLS-SEM)”, *European Business Review*, Vol. 26 No. 2, pp. 106–121.

- Hair Jr, J.F., Sarstedt, M., Matthews, L.M. and Ringle, C.M. (2016), "Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I—method", *European Business Review*, Vol. 28 No. 1, pp. 63–76.
- Hart, S. (1995), "A Natural-Resources Based View of the Firm", *Academy of Management Review*, Vol. 51 No. 3, pp. 49–51.
- Hart, S.L. and Dowell, G. (2011), "A natural-resource-based view of the firm: Fifteen years after", *Journal of Management*, Vol. 37 No. 5, pp. 1464–1479.
- Jain, A., Sarsaiya, S., Awasthi, M.K., Singh, R., Rajput, R., Mishra, U.C., Chen, J., *et al.* (2022), "Bioenergy and bio-products from bio-waste and its associated modern circular economy: Current research trends, challenges, and future outlooks", *Fuel*, Elsevier, Vol. 307, p. 121859.
- Kahupi, I., Eiríkur Hull, C., Okorie, O. and Millette, S. (2021), "Building competitive advantage with sustainable products – A case study perspective of stakeholders", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 289, p. 125699.
- Khan, S.A.R., Yu, Z. and Umar, M. (2021), "How environmental awareness and corporate social responsibility practices benefit the enterprise? An empirical study in the context of emerging economy", *Management of Environmental Quality: An International Journal*, Emerald Publishing Limited, Vol. 32 No. 5, pp. 863–885.
- Korhonen, J., Honkasalo, A. and Seppälä, J. (2018), "Circular Economy: The Concept and its Limitations", *Ecological Economics*, Elsevier B.V., Vol. 143, pp. 37–46.
- Koval, V., Olczak, P., Vdovenko, N., Boiko, O., Matuszewska, D. and Mikhno, I. (2021), "Ecosystem of environmentally sustainable municipal infrastructure in the Ukraine", *Sustainability (Switzerland)*, Vol. 13 No. 18, pp. 1–22.
- Krejcie, R. V and Morgan, D.W. (1970), "Determining sample size for research activities", *Educational and Psychological Measurement*, Vol. 30 No. 3, pp. 607–610.
- Kuo, L. and Chang, B.G. (2021), "The affecting factors of circular economy information and its impact on corporate economic sustainability-Evidence from China", *Sustainable Production and Consumption*, Elsevier B.V., Vol. 27, pp. 986–997.
- Lieder, M. and Rashid, A. (2016), "Towards circular economy implementation: a comprehensive review in context of manufacturing industry", *Journal of Cleaner Production*, Elsevier, Vol. 115, pp. 36–51.



- Lin, H., Zeng, S., Ma, H. and Chen, H. (2015), "Does commitment to environmental self-regulation matter? An empirical examination from China", *Management Decision*, Vol. 53 No. 5, pp. 932–956.
- Ling, M. and Xu, L. (2021), "How and when financial incentives crowd out pro-environmental motivation: A longitudinal quasi-experimental study", *Journal of Environmental Psychology*, Elsevier Ltd, Vol. 78 No. October, p. 101715.
- Liu, J., Feng, Y., Zhu, Q. and Sarkis, J. (2018), "Green supply chain management and the circular economy: Reviewing theory for advancement of both fields", *International Journal of Physical Distribution and Logistics Management*, Vol. 48 No. 8, pp. 794–817.
- Liu, Y. and Bai, Y. (2014), "An exploration of firms' awareness and behavior of developing circular economy: An empirical research in China", *Resources, Conservation and Recycling*, Elsevier B.V., Vol. 87, pp. 145–152.
- Longo, S., Cellura, M., Cusenza, M.A., Guarino, F., Mistretta, M., Panno, D., D'Urso, C., *et al.* (2021), "Life Cycle Assessment for Supporting Eco-Design: The Case Study of Sodium–Nickel Chloride Cells", *Energies*, Multidisciplinary Digital Publishing Institute, Vol. 14 No. 7, p. 1897.
- Lozano, R. (2012), "Towards better embedding sustainability into companies' systems: An analysis of voluntary corporate initiatives", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 25, pp. 14–26.
- Luthra, S., Kumar, A., Sharma, M., Garza-Reyes, J.A. and Kumar, V. (2022), "An analysis of operational behavioural factors and circular economy practices in SMEs: An emerging economy perspective", *Journal of Business Research*, Elsevier, Vol. 141, pp. 321–336.
- Marrucci, L., Daddi, T. and Iraldo, F. (2021), "The contribution of green human resource management to the circular economy and performance of environmental certified organisations", *Journal of Cleaner Production*, Elsevier, Vol. 319, p. 128859.
- Masi, D., Day, S. and Godsell, J. (2017), "Supply chain configurations in the circular economy: A systematic literature review", *Sustainability (Switzerland)*, Vol. 9 No. 9, available at: <https://doi.org/10.3390/su9091602>.
- Möllemann, D. (2016), "Framing the climate change policies and circular economy tenets for SMEs", University of Twente.



- Nurdiana, J., Franco-Garcia, M.L. and Heldeweg, M.A. (2021), "How shall we start? The importance of general indices for circular cities in Indonesia", *Sustainability (Switzerland)*, Vol. 13 No. 20, available at: <https://doi.org/10.3390/su132011168>.
- de Oliveira, U.R., Espindola, L.S., da Silva, I.R., da Silva, I.N. and Rocha, H.M. (2018), "A systematic literature review on green supply chain management: Research implications and future perspectives", *Journal of Cleaner Production*, Elsevier, Vol. 187, pp. 537–561.
- Parker, C.M., Redmond, J. and Simpson, M. (2009), "A review of interventions to encourage SMEs to make environmental improvements", *Environment and Planning C: Government and Policy*, Vol. 27 No. 2, pp. 279–301.
- Persis, D.J., Venkatesh, V.G., Sreedharan, V.R., Shi, Y. and Sankaranarayanan, B. (2021), "Modelling and analysing the impact of Circular Economy; Internet of Things and ethical business practices in the VUCA world: Evidence from the food processing industry", *Journal of Cleaner Production*, Elsevier, Vol. 301, p. 126871.
- Pieroni, M.P.P., McAloone, T.C. and Pigosso, D.C.A. (2019), "Business model innovation for circular economy and sustainability: A review of approaches", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 215, pp. 198–216.
- Pimenova, P. and Van der Vorst, R. (2004), "The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies", *Journal of Cleaner Production*, Vol. 12 No. 6, pp. 549–559.
- Polverini, D. (2021), "Regulating the circular economy within the ecodesign directive: Progress so far, methodological challenges and outlook", *Sustainable Production and Consumption*, Vol. 27, pp. 1113–1123.
- Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R.J. and Ormazabal, M. (2019), "Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 6, pp. 1473–1484.
- Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbera, M. and Ioannou, A. (2015), "The Circular Economy: Barriers and Opportunities for SMEs. CEPS Working Documents No. 412/September 2015", No. 412.
- Roxas, B. and Coetzer, A. (2012), "Institutional Environment, Managerial Attitudes and Environmental Sustainability Orientation of Small Firms", *Journal of Business Ethics*, Vol. 111 No. 4, pp. 461–476.

- Saleem, F., Qureshi, S.S. and Malik, M.I. (2021), "Impact of environmental orientation on proactive and reactive environmental strategies: Mediating role of business environmental commitment", *Sustainability (Switzerland)*, Vol. 13 No. 15, available at: <https://doi.org/10.3390/su13158361>.
- Sarkis, J. (2012), "A boundaries and flows perspective of green supply chain management", *Supply Chain Management*, Vol. 17 No. 2, pp. 202–216.
- Schmidt, C.V.H., Kindermann, B., Behlau, C.F. and Flatten, T.C. (2021), "Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs", *Business Strategy and the Environment*, No. July, pp. 1–17.
- Schroeder, P., Anggraeni, K. and Weber, U. (2019), "The Relevance of Circular Economy Practices to the Sustainable Development Goals", *Journal of Industrial Ecology*, Vol. 23 No. 1, pp. 77–95.
- Schwab, K. and World Economic Forum-WEF. (2019), *The Global Competitiveness Report 2019*.
- Sezen, B. and Çankaya, S.Y. (2013), "Effects of Green Manufacturing and Eco-innovation on Sustainability Performance", *Procedia - Social and Behavioral Sciences*, Vol. 99, pp. 154–163.
- Singh, M.P., Chakraborty, A. and Roy, M. (2016), "Entrepreneurial commitment, organizational sustainability and business performance of manufacturing msme: Evidence from India", *International Journal of Applied Business and Economic Research*, Vol. 14 No. 6, pp. 4615–4631.
- Singh, M.P., Chakraborty, A. and Roy, M. (2018), "Developing an extended theory of planned behavior model to explore circular economy readiness in manufacturing MSMEs, India", *Resources, Conservation and Recycling*, Vol. 135 No. January 2017, pp. 313–322.
- Singh, N., Jain, S. and Sharma, P. (2014), "Determinants of proactive environmental management practices in Indian firms: An empirical study", *Journal of Cleaner Production*, Vol. 66, pp. 469–478.
- Stone, L.J. (2006), "Limitations of cleaner production programmes as organisational change agents. II. Leadership, support, communication, involvement and programme design", *Journal of Cleaner Production*, Vol. 14 No. 1, pp. 15–30.

- Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H. and Idris, M. (2021), "Economic growth, increasing productivity of smes, and open innovation", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 7 No. 1, pp. 1–37.
- Suryantini, N.P.S., Wayan Edi Arsawan, I., Darmayanti, N.P.A., Moskalenko, S. and Gorokhova, T. (2021), "Circular economy: Barrier and opportunities for SMEs", *E3S Web of Conferences*, Vol. 255, available at:<https://doi.org/10.1051/e3sconf/202125501017>.
- Susanty, A., Tjahjono, B. and Sulistyani, R.E. (2020), "An investigation into circular economy practices in the traditional wooden furniture industry", *Production Planning & Control*, Taylor & Francis, Vol. 31 No. 16, pp. 1336–1348.
- Temminck, E., Mearns, K. and Fruhen, L. (2015), "Motivating Employees towards Sustainable Behaviour", *Business Strategy and the Environment*, Vol. 24 No. 6, pp. 402–412.
- Tsimoshynska, O., Koval, M., Kryshchal, H., Filipishyna, L. and Koval, V. (2021), "INVESTING IN ROAD CONSTRUCTION INFRASTRUCTURE PROJECTS UNDER PUBLIC-PRIVATE PARTNERSHIP IN THE FORM OF CONCESSION.", *Scientific Bulletin of National Mining University*, No. 2.
- Yadav, G., Luthra, S., Huisingh, D., Mangla, S.K., Narkhede, B.E. and Liu, Y. (2020), "Development of a lean manufacturing framework to enhance its adoption within manufacturing companies in developing economies", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 245, p. 118726.
- York, J.G. (2009), "Pragmatic sustainability: Translating environmental ethics into competitive advantage", *Journal of Business Ethics*, Vol. 85 No. SUPPL. 1, pp. 97–109.
- Zhang, B., Yang, S. and Bi, J. (2013), "Enterprises' willingness to adopt/develop cleaner production technologies: An empirical study in Changshu, China", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 40, pp. 62–70.
- Zhang, Q. and Ma, Y. (2021), "The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership", *Journal of Cleaner Production*, Elsevier, Vol. 292, p. 126057.
- Zhu, Q., Geng, Y. and Lai, K. hung. (2011), "Environmental supply chain cooperation and its effect on the circular economy practice-performance relationship among Chinese manufacturers", *Journal of Industrial Ecology*, Vol. 15 No. 3, pp. 405–419.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Table

Table 1. Population and Sample Frame

No	SMEs Business Field (1)	Research Population (2)	Population's percentage (3)	No. of Sample (4)	No. of Respondents (5)
1	Manufacturing	100	7.6	23	46
2	Medical pharma/chemical	171	13.2	39	78
3	Food	188	14.5	43	86
4	Textile	331	25.5	76	152
5	Woodcraft	405	31.2	92	184
6	Others	104	8.0	24	48
	Total	1.299	100	297	594

Table 2. Characteristics of Respondents

Criteria	Data	Frequency	Percentage
<i>Gender</i>	Male	450	75,8
	Female	144	24,2
<i>Age</i>	21-30	39	6,6
	31-40	272	45,8
	41-50	238	40,1
	51-60	45	7,6
<i>Educational level</i>	Bachelor	550	92,6
	Master	38	6,4
	Doctoral	6	1,0
<i>Experience (years)</i>	<5	56	9,4
	6-10	157	26,4
	11-15	204	34,3
	16-20	134	22,6
	>21 or more	43	7,3
<i>Position</i>	General managers	305	51,3
	Assistant managers	289	48,7

Table 3. Construct Validity and Reliability

Description	Loading	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Green Economic Incentives		0.848	0.847	0.908	0.768
The government provides subsidies and tax benefits for the implementation of CE practices (GSTB).	0,879				
Industrial/direct buyers are ready to pay a premium price for green products (PP)	0,930				
Availability of cheaper recycled raw material than virgin raw material (CP)	0,817				
Environmental Commitment		0.755	0.767	0.860	0.672
My firm considers the potential environmental consciousness of the product and production process (EPP).	0,877				
My firm reduces the use of virgin resources by emphasizing the reuse and recycling of EC resources (RRR).	0,821				
My firm values the environment and describes itself as an environmentally EC responsible firm (ER).	0,756				
Circular economy practices—Internal environmental management		0.860	0.873	0.891	0.507
Cross-functional cooperation for environmental improvements	0,803				
Special training for workers on environmental issues	0,762				
Total quality environmental management	0,671				
Existence of pollution prevention programs such as cleaner production	0,626				
Internal performance evaluation system incorporating environmental factors	0,652				
Generate environmental reports for internal evaluation	0,763				
Commitment to named practices from senior managers	0,773				
Support for named practices from mid-level managers	0,622				
Circular economy practices—Eco-design		0.839	0.850	0.892	0.675
Design of products for reduced consumption of materials/energy	0,761				
Design of products for reuse, recycling, and recovery of material parts	0,804				
Design of products to avoid or reduce the use of hazardous products	0,865				
Design of processes for minimization of waste	0,852				
Circular economy practices—Corporate asset management		0.777	0.782	0.871	0.693
Investment recovery (sale) of excess inventories/materials	0,886				
Sale of scrap and used materials	0,826				
Sale of excess capital equipment	0,782				

Table 4. Path Coefficients

Path (Hypothesis)	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Remarks
- Green Economic Incentives -> Environmental Commitment (H1)	0.518	0.520	0.036	14.202	0.000	Supported
- Green Economic Incentives -> Internal environment management (H2)	0.326	0.326	0.048	6.795	0.000	Supported
- Green Economic Incentives -> Eco Design (H3)	0.333	0.333	0.055	6.051	0.000	Supported

- Green Economic Incentives -> Corporate Asset Management and Recovery (H4)	0.108	0.104	0.048	2.258	0.024	Supported
- Environmental Commitment -> Internal Environment Management (H5)	0.351	0.353	0.042	8.292	0.000	Supported
- Environmental Commitment -> Eco Design (H6)	0.205	0.207	0.042	4.855	0.000	Supported
- Environmental Commitment -> Corporate Asset Management and Recovery (H7)	0.395	0.399	0.044	9.033	0.000	Supported

Table 5. Testing of mediation effects

Link*	Mediator*	Independent Variable-Mediator	Mediator-Dependent Variable	Direct	Indirect	Total effect	VAF (%)	Decision
GEI-CE-IEM	EC	0.518	0.351	0.326	0.182	0.507	0.359	Partial mediation
GEI-CE-ED	EC	0.518	0.205	0.333	0.106	0.440	0.241	Partial mediation
GEI-CE-CAM&R	EC	0.518	0.395	0.108	0.205	0.313	0.655	Partial mediation



Figure

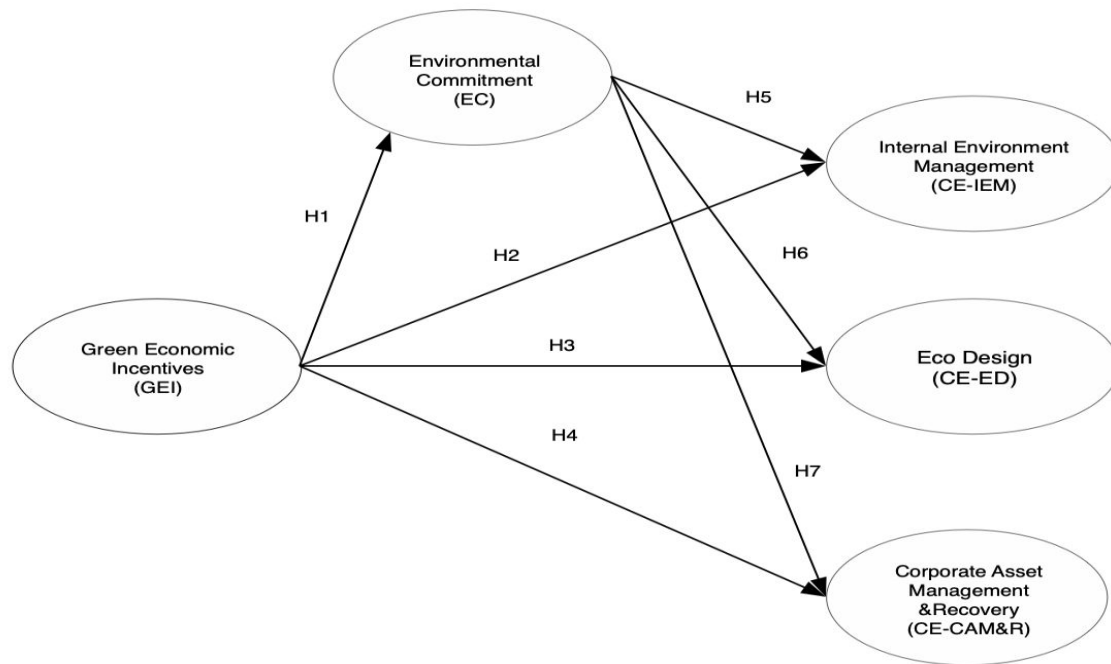


Figure 1. Proposed Conceptual Framework

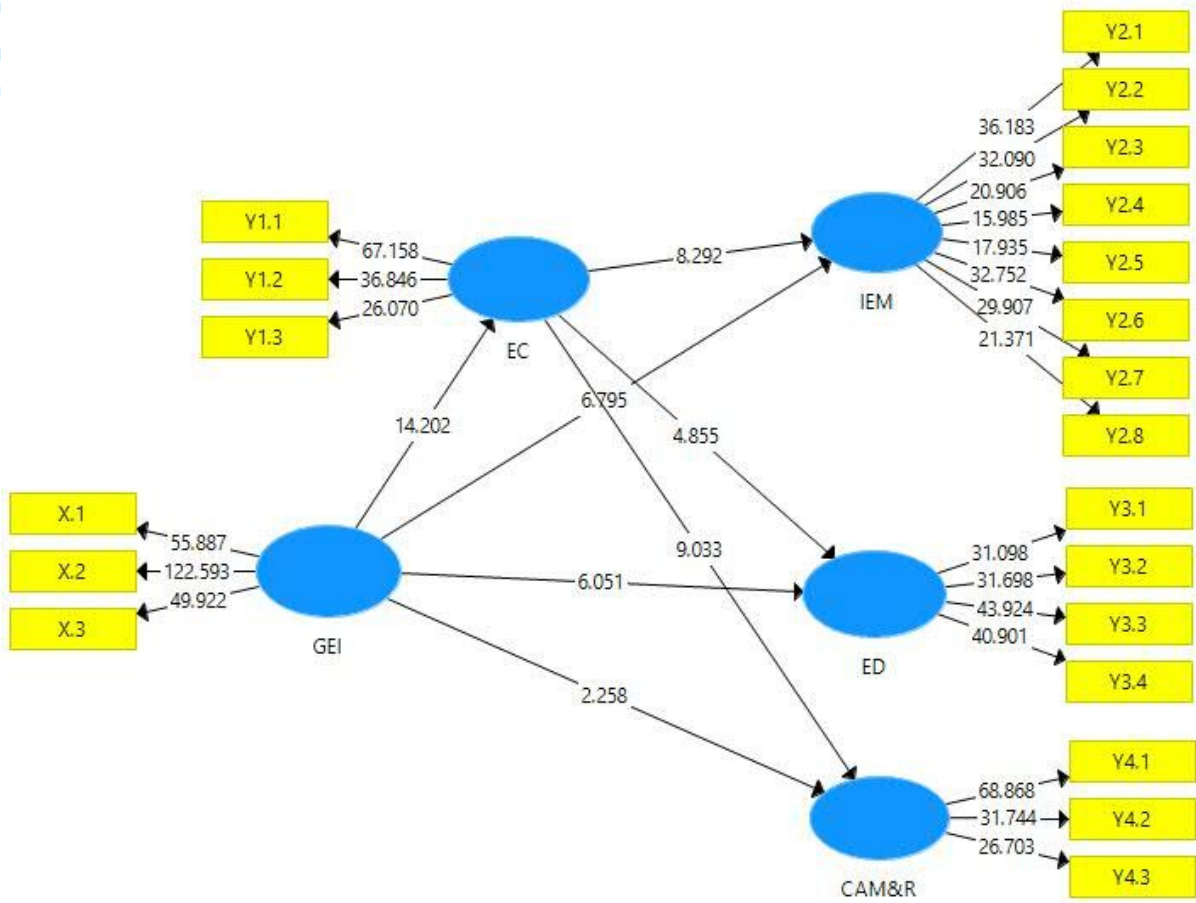


Figure 2. Output analysis

## Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment

### Abstract

**Purpose** - The present study aimed to examine the relationship between green economic incentives and environmental commitment as drivers of the circular economy practices in Small and Medium Enterprises.

**Design/methodology/approach** -A cross-sectional study of 594 assistant managers and SME managers was used while data was analyzed through Smart PLS.

**Findings** - The results showed that green economic incentives positively affect the SMEs' environmental commitment and the circular economy practice model. Furthermore, environmental commitment is the mediator between green economic incentives and the three circular economy practices: internal environmental management, eco-design, and corporate asset management and recovery.

**Originality** - This study enhanced the natural resource-based view (NRBV), describing the mechanisms that view green economic incentives (GEI) and environmental commitment (EC) as pollution prevention in circular economy practice.

**Practical implications** - The present study provided a basis for understanding the relevance of SMEs' circular economy practices and designing a strategic plan for its implementation. Also, it provides insight [into](#) that collaboration between triple helix (the government, SMEs, and the community) is needed in increasing environmental awareness towards sustainability.

**Keywords** - Green economic incentives, environmental commitment, internal environmental management, eco-design, corporate asset management and recovery, circular economy practices

**Paper type** - Research paper

### 1 Introduction

The circular economy (CE) is an essential environmental strategy concept for waste minimization, nature recuperation (Bag *et al.*, 2021), sharpening environmental conservation, and efficient energy consumption for a sustainable business (Gupta *et al.*, 2021; Arsawan *et al.*, 2021) by paying

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

great attention to the environment and resources (Korhonen *et al.*, 2018). As a result, industrial waste is a valuable input that can be repaired, reused, and recycled (Bag *et al.*, 2021; Yadav *et al.*, 2020). It leads to oriented and environmental value products, methods, and processes (Schroeder *et al.*, 2019). A circular economy approach benefits businesses and society with improved environmental awareness (Khan *et al.*, 2021; Centobelli *et al.*, 2021), lower resource price volatility, better customer relations, and job opportunities (Ellen MacArthur Foundation, 2013).

The circular economy is affected by the internal and external environment. Internal factors include behavior (Ling and Xu, 2021; Saleem *et al.*, 2021), environmental commitment (Galkina, 2021; Lin *et al.*, 2015), and organizational capabilities (Prieto-Sandoval *et al.*, 2019; Singh *et al.*, 2018). Meanwhile, government pro-environmental regulations and support are considered external factors for CE practices (Bhupendra and Sangle, 2016; Lozano, 2012). The present study aimed to address various gaps, including the unavailability of studies on the SMEs' readiness ~~of~~ *for* the circular economy (Singh *et al.*, 2018). First, although it affects economic growth (Suryantini *et al.*, 2021), the role of SMEs in saving the environment needs to be examined (Saleem *et al.*, 2021). A supportive ecosystem should be maintained to build sustainability (Koval *et al.*, 2021) through green-oriented strategies and innovation optimization (Arsawan *et al.*, 2021). Second, CE has not been comprehensively studied, especially in the SMEs sector, due to limited behavior and internal resource capabilities (Luthra *et al.*, 2022; Temminck *et al.*, 2015). It can be an opportunity for SMEs to improve internal capabilities (Centobelli *et al.*, 2021) for effective green marketing and new markets creation and design process, and circular products and attract a value-oriented talent environment (Barros *et al.*, 2021; Diaz *et al.*, 2021). Third, ~~the results from~~ Singh *et al.*, (2018) showed that green economic incentives (GEI) do not contribute to building environmental commitment. However, the importance of green incentives in building environmental commitment was demonstrated by Centobelli *et al.*, (2021). This divergence shows the need for more research on green economic incentives and environmental commitment to support SMEs' need for environmental self-regulation for environmental improvements (Lin *et al.*, 2015; Ling and Xu, 2021).

The present study was motivated by the research gaps and examined the relationship between green economic incentives, environmental commitment, internal environmental management (CE-IEM), eco-design (CE-ED), corporate asset management, and recovery (CE-CAM&R) on SMEs

in Indonesia for three reasons. First, Indonesia is a developing country with 63 million SMEs continuously growing, classified as 62 million medium enterprises and 750.000 small businesses, potentially boosting national economic growth (Surya *et al.*, 2021). Consequently, government regulations ~~are needed to~~ must sustain environmental attention (Nurdiana *et al.*, 2021). Second, CE is at an early implementation stage and faces many challenges, particularly infrastructure and regulation (Fatimah *et al.*, 2020; Nurdiana *et al.*, 2021). For that reason, the government's role and efforts are crucial in making consistent regulations (Rizos *et al.*, 2015), increasing commitment environment (Singh *et al.*, 2016; Lin *et al.*, 2015), and providing green economic incentives for its implementation (Centobelli *et al.*, 2021; Singh *et al.*, 2018). Three, data from Schwab and World Economic Forum-WEF, (2019) stated that this country lacks internal resources, particularly business dynamics capability, developing a sustainable innovation (Arsawan *et al.*, 2020). However, the innovations should be environmentally oriented and environmentally friendly technologies (Agnello *et al.*, 2015). Furthermore, the second part of this study is the literature review, which includes the hypotheses formulation, while the third and fourth describes the method and the analysis, respectively. Finally, ~~t~~The last part contains a discussion, theoretical and managerial contributions, conclusions, research limitations, and suggestions for further research.

## 2. Literature Review and Hypothesis Development

### 2.1 Natural Resource-Based View

The ~~natural resource-based view~~ was coined by Hart, (1995) coined the natural resource-based view as an extension to extend of the resource-based view (Barney, 1991). Three additions were suggested, including 1) environmental-oriented capabilities for enhanced organizational profitability, 2) pollution preventive action, and 3) product stewardship for reaching sustainable development (Hart, 1995). Pollution preventive action refers to effective waste and emissions management during the production process (Hart and Dowell, 2011). ~~Oand-n~~ the other side, product stewardship refers to the development ~~for~~ of integrated design (Hart, 1995). Finally, ~~s~~Sustainable development refers to a production configuration "sustained indefinitely into the future" (Hart and Dowell, 2011). The influence of NRBV was tested by Hart and Dowell, (2011) and found that previous research only focused on pollution prevention capabilities, leaving the other two capabilities unexplored. Based on this, this study examined the three NRBV capabilities role, namely green economic incentives as an effort to take precautions (Hart and Dowell, 2011), environmental commitment, also known as an effort to build environmentally oriented products,

1  
2  
3  
4  
5  
6  
7  
8  
9  
10 product life cycle strategies for enhanced product stewardship (Green *et al.*, 2015) while the  
11 circular economy is a sustainable development implementation (Liu *et al.*, 2018; Sarkis, 2012).  
12

13  
14 **2.2 Circular Economy Practices in Small and Medium Enterprises**

15 The present study considered circular economy practices that require SMEs to integrate ecological  
16 requirements, including -efficiency and reduction of raw-, recycling, reuse, and replacement of  
17 materials into organizational routine activities (Botezat *et al.*, 2018;Masi *et al.*, 2017). CE Practices  
18 are divided into 3 three main dimensions, including internal environmental management (Schmidt  
19 *et al.*, 2021), environmentally friendly design (Zhu *et al.*, 2011), and company assets management  
20 and recovery (Zhu *et al.*, 2011). First, internal environmental management is the preparation of  
21 environmentally-oriented procedures, such as green human resource management practices  
22 (Marrucci *et al.*, 2021;Bag *et al.*, 2021), training and development programs (Persis *et al.*, 2021),  
23 and environmental-based performance evaluation systems (Zhu *et al.*, 2011), in and supporting  
24 organizational environmental objectives (Koval *et al.*, 2021), building environmental ethics (York,  
25 2009) and improving ecological performance (Lin *et al.*, 2015; Parker *et al.*, 2009; Pimenova and  
26 Van der Vorst, 2004). Second, eco-design describes the product design process considering  
27 environmental impacts (Lozano, 2012); and is an effective strategy to achieve eco-efficiency  
28 (Polverini, 2021; Dalhammar *et al.*, 2021). Therefore, product design must be environmentally  
29 oriented (Longo *et al.*, 2021). Apart from environmental efficiency, environmentally friendly  
30 design practices help companies to provide different products in the market (Dalhammar, 2016)  
31 and increase the global value proposition (Blévennec *et al.*, 2022). Third, the organizational's  
32 assets management and recovery refers to the capability to recover investment (Schmidt *et al.*,  
33 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011). For this reason,  
34 companies are required to implement strategies that mitigate emerging issues to gain greater value  
35 (Jain *et al.*, 2022), and it is a CE's substantial objective to be reached (Lieder and Rashid, 2016).  
36  
37  
38  
39  
40  
41  
42

43 **2.3 Green Economic Incentives (GEI)**

44 Green economy incentives (GEI) from the government are needed by the organization to build and  
45 motivate pro-environmental behavior (Clemens, 2006) through financial (Ling and Xu, 2021) and  
46 supporting regulations (Parker *et al.*, 2009). Financial rewards support waste management (Ling  
47 and Xu, 2021), recycling, and resource efficiency (Rizos *et al.*, 2015), as well as environmentally  
48 oriented innovations (Pieroni *et al.*, 2019). Supporting regulatory incentives enhances  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

environmentally-oriented products creation (Agustiono *et al.*, 2020) and promotes self-regulation (Lin *et al.*, 2015). Meanwhile, GEI strengthens internal capabilities (Singh *et al.*, 2018) and positively influences the internal organizational's ~~internal~~ decision-making processes (Rizos *et al.*, 2015). Incentives through subsidies, environmental grants, loans, and tax concessions influence the behavior of owners/managers (Bradford and Fraser, 2008; Chang *et al.*, 2011) towards a circular economy (Roxas and Coetzer, 2012). Similarly, the government, supported by marketing and procurement of recycled raw materials helps SMEs to enhance in pro-environmental practices (Pimenova and Van der Vorst, 2004; Tsimoshynska *et al.*, 2021). Therefore, economic support strengthens internal capabilities (Prieto-Sandoval *et al.*, 2019), stimulating green-oriented commitments (Sezen and Çankaya, 2013; Chang *et al.*, 2011). The present study considered three indicators as green economy incentives determinants, namely 1) government subsidies and tax benefits (GSTB), 2) premium prices for green products (PP), and 3) cheaper recycled raw materials (CP).

#### 2.4 Environmental Commitment

A company must have an internal and external environmental orientation to protect the environment (Saleem *et al.*, 2021), and to design green strategies (Arsawan *et al.*, 2021; Bradford and Fraser, 2008), as evidenced in environmental saving actions (Singh *et al.*, 2014). In this case, environmental commitment is an organization's ethical value in protecting the environment (Chang *et al.*, 2011) and green activities to reduce environmental degradation (Suryantini *et al.*, 2021), protecting business, society, and its ecology (York, 2009). This it is viewed as a strategic business orientation (Singh *et al.*, 2014) which reflects the company's sustainable business attitude (Green *et al.*, 2015). Environmental commitment involves manner, behavior, perspectives, and economic benefits (Saleem *et al.*, 2021). Furthermore, Stone, (2006) revealed the environmental commitment role in increasing green awareness and responsibility (Saleem *et al.*, 2021), which led to organizational pro-environmental sustainability, enhanced business performance, and effective waste management (Singh *et al.*, 2016). However, cConsidering the diversity of SMEs' effective implementation commitments (Parker *et al.*, 2009), environmental awareness is still low (Singh *et al.*, 2018) due to the assumption that waste management is not related to productivity (Saleem *et al.*, 2021; Parker *et al.*, 2009) and organizational profits (Bhupendra and Sangle, 2016). Therefore, the present study considered the environmental products and processes awareness (EPP), resource

**Commented [MOU1]:** 'This' is normally followed by noun, e.g. this study, this research, this finding. If you use 'this' followed by verb such as 'this is viewed, then 'this' in your sentence is unprecedented, meaning we never know what is this 'this' refers to.



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

reuse and recycling (RRR), and environmental responsibility (ER) to measure the company's environmental commitments.

2.4 Hypothesis Development

The natural resource-based view (NRBV) postulates that both orientations ~~on~~ toward the environment and prevention ~~on~~ of pollution are key for sustainable development (Hart, 1995). To be successful ~~on~~ in this sustainably sustainable development, the government's involvement ~~by~~ in implementing regulations (Fatimah *et al.*, 2020) and providing financial incentives (Botezat *et al.*, 2018) ~~are~~ is crucial. This ~~It~~ means that GEI stimulates an organizational solution to increase environmental commitment (Zhang *et al.*, 2013);(Clemens, 2006). Furthermore, ~~t~~The important role of the government in making regulations related to providing green incentives will change the perspective of SME managers about the importance of contributing to saving the environment (Singh *et al.*, 2018). Thus, green incentives have an impact on increasing environmental commitment. Based on the above description, the following hypothesis is formulated:

H1: GEI has a significant positive effect on EC

Several studies revealed that green incentives provided through financial (Clemens, 2006) and non-financial (Ling and Xu, 2021) ~~can~~ could be allocated to make the internal environment guidelines such as the procurement process or recruiting employees with environmental conservation knowledge (Marrucci *et al.*, 2021;Bag *et al.*, 2021), preparation of training and development programs aimed to save the environment (Persis *et al.*, 2021) and environmentally sustainable strategies (Green *et al.*, 2015). Furthermore, ~~the~~ green economic incentive is important in the manufactureing of environmentally friendly products (Longo *et al.*, 2021; Lozano, 2012), enhancing environmental efficiency (Polverini, 2021). The green economy incentives increase the organization's internal capabilities for investment recovery (Schmidt *et al.*, 2021), reselling used materials and goods (Susanty *et al.*, 2020), and recycling materials (Zhu *et al.*, 2011), prolonging the product life cycle (Corona *et al.*, 2019). Consequently, the company adopts a better sustainability system (Lozano, 2012). ~~This discussion leads to the following hypotheses i~~In line with the natural resource-based view (Hart, 1995), ~~this discussion leads to the following hypotheses.~~

H2: GEI positively affects IEM

H3: GEI positively affects ED

Commented [MOU2]: I think it's better this way, but just revert it back if you like your version. Applies it whenever you feel necessary.

*H4: GEI positively affects CAM&R*

The natural resource-based view (Hart, 1995) implies that for sustaining the development, environmental commitment is considered as the organization's first step in its role to save the environment for sustaining the development. It enhances the circular economy, especially in the internal environmental management, including planning, drafting, implementing, and evaluating the internal sustainable programs such as pollution prevention and waste reduction (Schmidt *et al.*, 2021), building cross-functional collaboration for environmental improvement (Parker *et al.*, 2009), and quality environment management (Zhang and Ma, 2021; York, 2009). Further, environmental commitment is a starting point for SMEs to design energy-efficient products, recyclable, safe raw materials, and minimize waste (Schmidt *et al.*, 2021). Therefore, it can affect investment recovery, inventory effectiveness, and sales of used goods and materials (Schmidt *et al.*, 2021). Based on the above description, the hypothesis is formulated as follows:

*H5: EC positively affects IEM.*

*H6: EC positively affects ECO*

*H7: EC positively affects CAM&R*

Green economy incentives (GEI) is are significant in building organizational involvement and commitment to saveing the environment. It is The government and non-governmental organizations benefit to adopt from adopting environmental initiatives (Singh *et al.*, 2018; Agnello *et al.*, 2015). Incentives include additional or financial rewards (Ling and Xu, 2021) that encourage organizations to design or implement environmental practices (Kahupi *et al.*, 2021). In addition, tThe incentive improves recycling techniques (Bag *et al.*, 2021) and facilitates the transition to a circular economy (Ling and Xu, 2021). Also, green economy incentives enhances dynamic capabilities (Prieto-Sandoval *et al.*, 2019) that affect decision-making processes (Diaz *et al.*, 2021). However, although some SMEs perceive that investing in the circular economy increases costs more than the expected return (Rizos *et al.*, 2015). Consequently, the increasing environmental commitment will motivate SME managers to implement a circular economy (Kuo and Chang, 2021). Furthermore, tThe environmental commitment will strengthen the internal capabilities of SMEs (Marrucci *et al.*, 2021; Bag *et al.*, 2021), manufacture environmentally-friendly designed products (Longo *et al.*, 2021), and improve asset recovery and investment capabilities (Schmidt *et*

1  
2  
3  
4  
5  
6  
7  
8  
9  
10 *al.*, 2021). Therefore, the green economy incentives will increase environmental commitment and  
11 improve circular economy practices in SMEs. This discussion suggests that, for sustaining the  
12 development using the natural resource-based (Hart, 1995), environmental commitment has a key  
13 role as the *in* mediating on the effect of environmental *effect* on the circular practice modes. Thus,  
14 the following hypotheses are stated.

15  
16 *H8: Environmental commitment partially mediates the relationship of green economic incentives*  
17 *to internal environment management*

18  
19 *H9: Environmental commitment partially mediates the relationship of green economic incentives*  
20 *to eco-design*

21  
22 *H10: Environmental commitment partially mediates the relationship between green economic*  
23 *incentives on corporate asset management and recovery*

24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

\*\*Insert Figure 1\*\*

### 3 Methodology

#### 3.1 Data and Sampling Method

The present study uses a quantitative approach ~~through the distribution of~~ *by distributing*  
questionnaires ~~which that~~ focused on SME-producing companies (with 50–200 full-time  
employees), which are the essential sector of the Indonesian economy that still ~~growth and develop~~  
*grows and develops* (Surya *et al.*, 2021). ~~The p~~Population is 1,299 SMEs located in 9 regencies of  
Bali Province. ~~A f~~Formula from Krejcie and Morgan, (1970) ~~were was~~ used to determine the  
sample frames, obtaining ~~a total of~~ 297 SMEs. This selection was carried out using random  
sampling (lottery method). From the 297 SMEs, two respondents were recruited from each to fill  
out the research questionnaire. The total number of ~~the~~ participants was 594 people ~~which~~  
*includeing* managers and assistant managers. Their selection was triggered by ~~the assumption~~  
*assuming* that they possess organizational characteristics and knowledge ~~on of~~ circular economy  
practices. Data were collected from March to June 2021 via email and Google Forms and direct  
visits by first sending email notification*s* on this study agenda. The 594 responses were analyzed  
to achieve the aims of the present study. Table 1 presents the population information, sample  
frame, and the number of respondents.

\*\*Insert Table 1\*\*

### 3.2 Measurement

The magnitude of the variable construct used was based on the previous empirical studies. ~~Therefore, the~~ previous study measurement was adopted ~~to~~ for the subject; ~~namely~~, SMEs in Bali Province over ~~9~~ nine districts. The construct indicators assessment used a 7-point Likert scale, "1: strongly disagree to 7: strongly agree". ~~In order~~ To avoid ambiguity, the questionnaire (in Indonesian) was tested on 30 SME CEOs with knowledge of the circular economy (CE). The green economic incentive (GEI) variable was adopted from Singh *et al.*, (2018); Esfahbodi *et al.*, (2016), consisting of 3 indicators. The environmental commitment variable was adopted from Singh *et al.*, 2018; Liu and Bai, 2014, consisting of 3 indicators. ~~While~~ In addition, the circular economy-IEM was adopted from Schmidt *et al.*, (2021) and Zhu *et al.*, (2011), consisting of 8 indicators. The CE-ED variable was adopted from Schmidt *et al.*, (2021); Zhu *et al.*, (2011) with 4 indicators. Moreover, CE-CAM&R was adopted from Schmidt *et al.*, (2021) and Zhu *et al.*, (2011) with 3 indicators.

The present study used the variance-based partial least squares to test the hypothesis (PLS-SEM) with Smart PLS 3.2.9 software. The PLS-SEM was used to assess the relationship between constructs and their predictive power on endogenous variables (Hair *et al.*, 2014). The present study validated the circular economy practices model, ~~and~~ The data was not assessed as normally distributed data, making the circular economy model assessment associated with green economic incentives and environmental -commitment predictors using PLS-SEM appropriate (Hair *et al.*, 2016).

## 4. Results

Table 2 describes the characteristics of the 594 respondents.

\*\*Insert Table 2\*\*

### 4.1 Measurement Model

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

The VIFs test was used to evaluate the collinearity problem, scoring 2.872 (green economics incentives), 1.826 (environmental commitment), 3.558 (CE-Internal Environment Management), 1.832 (CE-Eco-Design), and 2.119 (CE-Corporate Asset Management and Recovery). All VIF coefficients were lower than 5, which is the recommended limit value by Hair *et al.*, (2016) that the data do not have general variance problems. The outer model was tested to evaluate the reliability and validity of the construct variables. Table 2 shows the results that each item of factor loadings is more than 0.6. The convergent validity test explains that the validity requirements are met because the average extracted variance (AVE) is more than 0.5 and the factor loading is more than 0.6 (Hair Jr *et al.*, 2016). This It shows that the discriminant validity conditions of all constructs have been met.

**\*\*Insert Table 3\*\***

The Heterotrait-Monotrait Ratio (HTMT) ~~was used to assess~~ed the discriminant constructs validity. ~~For this criteria~~ According to Hair Jr *et al.*, (2016), for this criteria, the value was lower than 0.9. Due to the values ranging from 0.384 to 0.701, the HTMT test showed that discriminant validity was achieved. The composite reliability values in both samples were above the recommended level of 0.7; therefore, the construct was reliable.

**4.2 Inner Model Measurement**

The present study applied the bootstrap method with 5000 samples to assess the research indicators and path coefficient's significance (Chin *et al.*, 2008). The results showed that the goodness-of-fit (GoF) model has a value of 0.367 which stated that the model is fit. In addition, testing on the standard residual root means square (SRMR) and normed fit index (NFI) shows that the SRMR value was 0.081 while the NFI was 0.716. The SRMR cut-off value was 0.8, and the NFI was below 0.9, which indicates that all criteria are met. The results showed that GEI explains EC by 0.268 (26.8%). The explanatory power of EC at CE-IEM was 0.347 (34.7%); at CE-ED, it was 0.224 (22.4%), and at CE-CAM%R, it was 0.212 (21.2%). In addition, the value of Q<sup>2</sup> showed that all constructs have positive values and good predictive relevance (Chin, 2010).

**4.3 Hypothesis Testing**

Table 4 shows the results of the relationship between green economics incentives (GEI), environmental commitment (EC), and internal environment management (CE-IEM), eco-design (CE-ED) and corporate asset management and recovery (CE-CAM&R). To test the hypotheses, we use path coefficients ( $\beta$ ), t values, and p values to test the hypotheses. According to Hair *et al.*, (2016), if the path coefficient is greater than 0.1, t value greater than 1.96, and 0.05 level of significance, that means the hypotheses are supported. The results support the significant role of GEI in achieving EC ( $H_1$ ) with CE-IEM ( $H_2$ ), CE-ED ( $H_3$ ), and CE-CAM&R ( $H_4$ ). Furthermore, EC has an important role in achieving CE-IEM ( $H_5$ ), CE-ED ( $H_6$ ), and CE-CAM&R ( $H_7$ ).

\*\*Insert Table 4\*\*

\*\*Insert Table 5\*\*

After examining the direct relationship, the next step was to determine the mediating role as shown in Table 5. The present study tested three mediation patterns. According to Hair *et al.*, (2014), the method used is to measure the VAF value  $< 0.20$ , meaning there is no mediation, while  $0.20-0.80$  indicates partial and the VAF value  $> 0.80$  means full mediation. In order to test the model mediation effect, non-parametric bootstrap was used (Hair *et al.*, 2016). Finally, variance values (VAF) were calculated to obtain indirect and total link sizes. When the VAF is greater than 80%, it shows full mediation; between 20 and 80% is partial; and below 20% means no mediating effect (Hair *et al.*, 2013).

The mediating role in the causal relationship between GEI and CE-IEM, CE-ED, and CE-CAM&R was examined using VAF assays. This study tested three mediation pathways and concluded that environmental commitment partially mediates the relationship between GEI and CE-IEM, where the VAF value is 35.90%, indicating that hypothesis 8 is accepted. EC also functions as a partial mediating relationship between GEI and CE-ED, with a VAF value of 24.10%, which means that hypothesis 9 is accepted. At the same time, EC functions as a partial mediating relationship between GEI and CE-CAM&R, with a VAF value of 65.50%, which means that hypothesis 10 is accepted (Figure 2).

\*\*Insert Figure 2\*\*

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

5.1 Discussion and Theoretical Contribution

There is increased attention by policymakers, researchers, and practitioners, for circular economy practices that can advance sustainable development goals (SDGs). Therefore, this study explained the mechanisms that SMEs can utilize to successfully implement circular economy practices, including the role of GEI and EC. It complemented previous studies that failed to show antecedents for specific circular economy practices (Green *et al.*, 2015); (Schmidt *et al.*, 2021); (Liu *et al.*, 2018). There are Furthermore, very few studies that exclusively focused on the direct relationship between GEI and the implementation of circular economy practices. In contrast, this study showed that EC influences the relationship between GEI and three circular economy practices in Indonesian SMEs, specifically internal environmental management, eco-design, and CAM&R.

This study contributed to the 'fourth folds' circular economy literature and related theories in fourth folds. First, this study proposes and examines the supporting integration model of green economic incentives and environmental commitment in the context of SMEs, where the combination of green economic incentives and environmental commitment is the key in to building environmental sustainability. This new circular economy practice model was found to have a good fit and explanatory power, so it confirms that the green economic incentives and environmental commitment constructs are generally accepted (Clemens, 2006; Lin *et al.*, 2015) is also an important driver of circular economy practices for SMEs (Centobelli *et al.*, 2021). More specifically, green economic incentives plays an important role in increasing environmental commitment and, at the same time, encouraging SMEs to carry out circular economy practices as an important activity in efforts to save the environment. Thus, the results provide evidence prove that green economic incentives and environmental commitment form the basis for creating circular economy practices in the SME sector.

This study assesses circular economy practices by integrating green economic incentives into the circular economy practices model. The results of data analysis show that the circular economy practices integration model for SMEs is appropriate. Furthermore, the inclusion of environmental commitment in the circular economy practices model increases the explanatory power of the circular economy practices model. Conceptually, the results of this study strengthen the



commitment-circular economy practices model (Saleem *et al.*, 2021; Schmidt *et al.*, 2021) in the SME sector. This finding shows that in SMEs, the existence of green economic incentives can simultaneously strengthen the influence of environmental commitment on circular economy practices. Thus, the circular economy practices model in the context of SMEs is conceptually expanded into a green incentives-commitment-circular economy practices model. Furthermore, these findings provide further evidence for the conclusions of previous studies (Galkina, 2021), which claim that environmental commitment with environmentally oriented partner selection is an important determinant of strengthening future circular economy practices for environmental saving efforts.

Second, the results revealed that environmental commitment as is a mediator of the relationship between green economic incentives and internal environmental management (IEM), eco-design (ED), and corporate asset management and recovery (CAM&R). Although the three tested mediation relationships are significant, GEI-EC and asset management and recovery (CAM&R) have more influence. This result proved that SMEs strongly focus on resource recovery to develop enterprise asset management and recovery practices. It requires the involvement of purchasing managers in investment recovery practices (Betancourt Morales and Zartha Sossa, 2020) to recover investment (Schmidt *et al.*, 2021), resell (Susanty *et al.*, 2020), and recycle materials (Zhu *et al.*, 2011) through selective investment, excess inventory, sales of used goods and materials (Schmidt *et al.*, 2021). Thus, small-medium enterprises must be concerned about an inventory recovery practices and making it a serious concern for organizational sustainability, increasing productivity and innovation, and environmental sustainability orientation.

Third, the circular economy is an interesting topic for academics, policymakers, and practitioners, but the literature is not thorough on how Indonesian SMEs can develop circular economy practices. Most studies focused on the European context, whereas this study contributed to the circular economy literature in developing countries and supported findings in the European context (Schmidt *et al.*, 2021). The results showed that GEI and EC influence the implementation of all three circular economy practices. Furthermore, this is the first study linking GEI and EC as antecedents of circular economy practice in an emerging country. Whereas in contrast, GEI is common in developed countries such as the US (Clemens, 2006), India (Singh *et al.*, 2018), and Italy (Centobelli *et al.*, 2021). This It is supported by study by Zhang *et al.*, (2013), which stated

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

that external references, such as financial incentives, affect organizational attitude and commitment in to the circular economy concept implementation (Centobelli *et al.*, 2021; Clemens, 2006). However, Singh *et al.*, (2018) established that GEI does not affect building environmental commitment. Overall, these findings have helped academics by contributing to the theory and generating evidence that incorporating the sub-constructs of circular economy practice may not always work, especially for developed countries like Germany. In addition, these results provided practitioners with insights for implementing circular economy practices in their companies.

Fourth, the present study contributed to enhanced the natural resource-based view (NRBV), describing the mechanisms that view GEI and EC as pollution prevention in circular economy practice. The results showed that GEI and EC are translated in a strategic orientation. The implementation of circular economy practices implementation can be affected by an organization's failure to commit to the environment. This study examined antecedents used to overcome these barriers (de Oliveira *et al.*, 2018). The finding contributed to the literature by integrating previous research on GEI (Centobelli *et al.*, 2021) and environmental commitment (Galkina, 2021) as circular economy practice implementation drivers. Particularly Notably, it showed that GEI can could trigger the emergence of EC in circular economy practices, positively affecting internal environmental management and eco-design, and strengthening asset management and recovery. From a natural resource-based perspective, the results demonstrated the importance of companies building a commitment culture to implement circular economy practices.

5.2 Managerial Contribution

The governments and countries concerned about saving the environment must provide green economy subsidies, tax incentives, soft loans, and subsidized materials, to increase sustainable waste management strategies (Singh *et al.*, 2018; Möllemann, 2016). First, the regulations can strengthen the commitment and consistency of SMEs to saving the environment efforts (Kahupi *et al.*, 2021; Lin *et al.*, 2015; Roxas and Coetzer, 2012). Second, proper utilization of the government's green economic incentives by SMEs managers will increase commitment to the environment. The GEI enabled SMEs to build a strong culture with higher trust in the environment, implementing green actions for sustainable development, and creating innovative sustainable business models to increase economic growth. The incentives also influence the implementation of environmentally oriented standards and building environmental ethics. Furthermore, green

economic incentives facilitate SMEs' collaboration with large companies to achieve organizational sustainability, especially in the provision of raw materials provision, and supply chains management. Such actions develop a strong attitude and increases the company's environmental commitment to the circular economy implementation.

### 5.3 Conclusion, Limitations, and Further Study

Most previous studies examined the circular economy practices but did not focus on combining green economic incentives (GEI) and environmental commitment (EC), especially in the SMEs sector. The circular economy practice provides opportunities and encourages every country, industry, and business entity to jointly maintain sustainability and protect the environment jointly. The present study examines the role of green economic incentive (GEI) and environmental commitment (EC) on circular economy practices (CE) in the SMEs sector.

Three important conclusions can be drawn from this study. First, circular economy practices are complex constructions, which not only consist not only of internal environmental management (IEM) and eco-design (ED), but also corporate asset management and recovery (CAM&R). Second, the role of the government in providing green economic incentives (GEI) has been proven to increase environmental commitment, which in turn increases the practice of circular economy as an effort to preserve the environment. Finally, environmental commitment is a mediator of the relationship between GEI and CEP, where the most important path is through corporate asset management and recovery (CAM&R).

This study broadens our understanding of how GEI and EC impact on circular economy practices, especially in the SME sector, which can help SME managers, the government and related stakeholders to develop strategies for providing green incentives, both financial and non-financial. When we begin to study circular economy practices in SMEs and the interest of circular economy stakeholders about in this issue will increase, further assessment of the circular economy in SMEs is very important critical.

This study identified several limitations causing a gap for future studies. First, the study design used assistant managers and managers for information. Future studies can overcome this common method bias and choose a proper design. Second, this study focused on the mechanisms

**Commented [MOU3]:** Consider changing the word 'important'. I found that this word is overused in this article. Here are some alternatives: fundamental, essential, vital, crucial, principal that may suit your paper.

influencing the development of CE practices and assumed that GEI and EC are prerequisites for companies to implement this. Meanwhile, future studies can establish additional aspects that influence the proposed mechanism, such as environmental supply chain collaboration, or green strategies and green innovation. Third, previous studies, including this, focused on the antecedents of circular economy practice in developed and developing countries. Therefore, future studies can therefore make comparisons to expand and generalize these findings by considering the differences in institutional contexts between countries.

References

Agnello, X., Naveen, J., Ravichandran, M. and Balamurugan, J. (2015), "Clean Technology and its Efficacy: Strategies of Environmental Management", *Journal of Environmental and Social Sciences*, Vol. 2 No. 2, pp. 110–116.

Agustiono, T., Avtar, R., Singh, D. and Xue, W. (2020), "Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information ", No. January.

Arsawan, I.W.E., Koval, V., Duginets, G., Kalinin, O. and Korostova, I. (2021), "The impact of green innovation on environmental performance of SMEs in an emerging economy", *E3S Web of Conferences*, Vol. 255, EDP Sciences, p. 1012.

Arsawan, I.W.E., Koval, V., Rajiani, I., Rustiarini, N.W., Supartha, W.G. and Suryantini, N.P.S. (2020), "Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage", *International Journal of Productivity and Performance Management*, available at:<https://doi.org/10.1108/IJPPM-04-2020-0192>.

Bag, S., Yadav, G., Dhamija, P. and Kataria, K.K. (2021), "Key resources for industry 4.0 adoption and its effect on sustainable production and circular economy: An empirical study", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 281, p. 125233.

Barney, J. (1991), "Firm Resources and Sustained Competitive Advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99–120.

Barros, M.V., Salvador, R., do Prado, G.F., de Francisco, A.C. and Piekarski, C.M. (2021), "Circular economy as a driver to sustainable businesses", *Cleaner Environmental Systems*, Elsevier Ltd, Vol. 2 No. December 2020, p. 100006.

- Betancourt Morales, C.M. and Zartha Sossa, J.W. (2020), "Circular economy in Latin America: A systematic literature review", *Business Strategy and the Environment*, Wiley Online Library, Vol. 29 No. 6, pp. 2479–2497.
- Bhupendra, K.V. and Sangle, S. (2016), "Pollution prevention strategy: a study of Indian firms", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 133, pp. 795–802.
- Blévennec, K. Le, Vercalsteren, A. and Boonen, K. (2022), "Ecodesign as a New Lever to Enhance the Global Value Proposition: From Space to Corporate", *Towards a Sustainable Future-Life Cycle Management*, Springer, pp. 3–13.
- Botezat, E.A., Dodescu, A.O., Vaduva, S. and Fotea, S.L. (2018), "An exploration of circular economy practices and performance among Romanian producers", *Sustainability (Switzerland)*, Vol. 10 No. 9, pp. 1–17.
- Bradford, J. and Fraser, E.D.G. (2008), "Local authorities, climate change and small and medium enterprises: Identifying effective policy instruments to reduce energy use and carbon emissions", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 3, pp. 156–172.
- Centobelli, P., Cerchione, R., Esposito, E., Passaro, R. and Shashi. (2021), "Determinants of the transition towards circular economy in SMEs: A sustainable supply chain management perspective", *International Journal of Production Economics*, Elsevier B.V., Vol. 242 No. September 2020, p. 108297.
- Chang, S., Gong, Y. and Shum, C. (2011), "Promoting innovation in hospitality companies through human resource management practices", *International Journal of Hospitality Management*, Elsevier Ltd, Vol. 30 No. 4, pp. 812–818.
- Chin, W.W. (2010), "How to Write Up and Report PLS Analyses", *Handbook of Partial Least Squares*, pp. 655–690.
- Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), "Structural equation modeling in marketing: Some practical reminders", *Journal of Marketing Theory and Practice*, Taylor & Francis, Vol. 16 No. 4, pp. 287–298.
- Clemens, B. (2006), "Economic incentives and small firms: Does it pay to be green?", *Journal of Business Research*, Vol. 59 No. 4, pp. 492–500.
- Corona, B., Shen, L., Reike, D., Rosales Carreón, J. and Worrell, E. (2019), "Towards sustainable development through the circular economy—A review and critical assessment

on current circularity metrics”, *Resources, Conservation and Recycling*, Elsevier, Vol. 151 No. May, p. 104498.

Dalhammar, C. (2016), “Industry attitudes towards ecodesign standards for improved resource efficiency”, *Journal of Cleaner Production*, Elsevier, Vol. 123, pp. 155–166.

Dalhammar, C., Milios, L. and Richter, J.L. (2021), “Ecodesign and the circular economy: conflicting policies in Europe”, *EcoDesign and Sustainability I*, Springer, pp. 187–198.

Diaz, A., Schöggel, J.P., Reyes, T. and Baumgartner, R.J. (2021), “Sustainable product development in a circular economy: Implications for products, actors, decision-making support and lifecycle information management”, *Sustainable Production and Consumption*, Elsevier B.V., Vol. 26, pp. 1031–1045.

Ellen MacArthur Foundation. (2013), “Towards the circular economy. *Journal of Industrial Ecology*”, Vol. 1.

Esfahbodi, A., Zhang, Y. and Watson, G. (2016), “Sustainable supply chain management in emerging economies: Trade-offs between environmental and cost performance”, *International Journal of Production Economics*, Elsevier, Vol. 181, pp. 350–366.

Fatimah, Y.A., Govindan, K., Murniningsih, R. and Setiawan, A. (2020), “Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 269, p. 122263.

Galkina, T. (2021), “International ECOpreneurship: Environmental commitment and international partner selection of Finnish firms from the energy sector”, *Journal of International Entrepreneurship*, Springer US, Vol. 19 No. 2, pp. 300–320.

Green, K.W., Toms, L.C. and Clark, J. (2015), “Impact of market orientation on environmental sustainability strategy”, *Management Research Review*, Vol. 38 No. 2, pp. 217–238.

Gupta, H., Kumar, A. and Wasan, P. (2021), “Industry 4.0, cleaner production and circular economy: An integrative framework for evaluating ethical and sustainable business performance of manufacturing organizations”, *Journal of Cleaner Production*, Elsevier Ltd, Vol. 295, p. 126253.

Hair, J.F., Hult, G., Tomas, M., Ringle, C.M. and Sarstedt, M. (2016), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage publications.

- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), "Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance", *Long Range Planning*, Vol. 46 No. 1–2, pp. 1–12.
- Hair, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014), "Partial least squares structural equation modeling (PLS-SEM)", *European Business Review*, Vol. 26 No. 2, pp. 106–121.
- Hair Jr, J.F., Sarstedt, M., Matthews, L.M. and Ringle, C.M. (2016), "Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I–method", *European Business Review*, Vol. 28 No. 1, pp. 63–76.
- Hart, S. (1995), "A Natural-Resources Based View of the Firm", *Academy of Management Review*, Vol. 20 No. 3, pp. 49–51.
- Hart, S.L. and Dowell, G. (2011), "A natural-resource-based view of the firm: Fifteen years after", *Journal of Management*, Vol. 37 No. 5, pp. 1464–1479.
- Jain, A., Sarsaiya, S., Awasthi, M.K., Singh, R., Rajput, R., Mishra, U.C., Chen, J., *et al.* (2022), "Bioenergy and bio-products from bio-waste and its associated modern circular economy: Current research trends, challenges, and future outlooks", *Fuel*, Elsevier, Vol. 307, p. 121859.
- Kahupi, I., Eiríkur Hull, C., Okorie, O. and Millette, S. (2021), "Building competitive advantage with sustainable products – A case study perspective of stakeholders", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 289, p. 125699.
- Khan, S.A.R., Yu, Z. and Umar, M. (2021), "How environmental awareness and corporate social responsibility practices benefit the enterprise? An empirical study in the context of emerging economy", *Management of Environmental Quality: An International Journal*, Emerald Publishing Limited, Vol. 32 No. 5, pp. 863–885.
- Korhonen, J., Honkasalo, A. and Seppälä, J. (2018), "Circular Economy: The Concept and its Limitations", *Ecological Economics*, Elsevier B.V., Vol. 143, pp. 37–46.
- Koval, V., Olczak, P., Vdovenko, N., Boiko, O., Matuszewska, D. and Mikhno, I. (2021), "Ecosystem of environmentally sustainable municipal infrastructure in the Ukraine", *Sustainability (Switzerland)*, Vol. 13 No. 18, pp. 1–22.
- Krejcie, R. V and Morgan, D.W. (1970), "Determining sample size for research activities", *Educational and Psychological Measurement*, Vol. 30 No. 3, pp. 607–610.



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Kuo, L. and Chang, B.G. (2021), "The affecting factors of circular economy information and its impact on corporate economic sustainability-Evidence from China", *Sustainable Production and Consumption*, Elsevier B.V., Vol. 27, pp. 986–997.

Lieder, M. and Rashid, A. (2016), "Towards circular economy implementation: a comprehensive review in context of manufacturing industry", *Journal of Cleaner Production*, Elsevier, Vol. 115, pp. 36–51.

Lin, H., Zeng, S., Ma, H. and Chen, H. (2015), "Does commitment to environmental self-regulation matter? An empirical examination from China", *Management Decision*, Vol. 53 No. 5, pp. 932–956.

Ling, M. and Xu, L. (2021), "How and when financial incentives crowd out pro-environmental motivation: A longitudinal quasi-experimental study", *Journal of Environmental Psychology*, Elsevier Ltd, Vol. 78 No. October, p. 101715.

Liu, J., Feng, Y., Zhu, Q. and Sarkis, J. (2018), "Green supply chain management and the circular economy: Reviewing theory for advancement of both fields", *International Journal of Physical Distribution and Logistics Management*, Vol. 48 No. 8, pp. 794–817.

Liu, Y. and Bai, Y. (2014), "An exploration of firms' awareness and behavior of developing circular economy: An empirical research in China", *Resources, Conservation and Recycling*, Elsevier B.V., Vol. 87, pp. 145–152.

Longo, S., Cellura, M., Cusenza, M.A., Guarino, F., Mistretta, M., Panno, D., D'Urso, C., *et al.* (2021), "Life Cycle Assessment for Supporting Eco-Design: The Case Study of Sodium–Nickel Chloride Cells", *Energies*, Multidisciplinary Digital Publishing Institute, Vol. 14 No. 7, p. 1897.

Lozano, R. (2012), "Towards better embedding sustainability into companies' systems: An analysis of voluntary corporate initiatives", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 25, pp. 14–26.

Luthra, S., Kumar, A., Sharma, M., Garza-Reyes, J.A. and Kumar, V. (2022), "An analysis of operational behavioural factors and circular economy practices in SMEs: An emerging economy perspective", *Journal of Business Research*, Elsevier, Vol. 141, pp. 321–336.

Marrucci, L., Daddi, T. and Iraldo, F. (2021), "The contribution of green human resource management to the circular economy and performance of environmental certified organisations", *Journal of Cleaner Production*, Elsevier, Vol. 319, p. 128859.

- Masi, D., Day, S. and Godsell, J. (2017), "Supply chain configurations in the circular economy: A systematic literature review", *Sustainability (Switzerland)*, Vol. 9 No. 9, available at: <https://doi.org/10.3390/su9091602>.
- Möllemann, D. (2016), "Framing the climate change policies and circular economy tenets for SMEs", University of Twente.
- Nurdiana, J., Franco-Garcia, M.L. and Heldeweg, M.A. (2021), "How shall we start? The importance of general indices for circular cities in Indonesia", *Sustainability (Switzerland)*, Vol. 13 No. 20, available at: <https://doi.org/10.3390/su132011168>.
- de Oliveira, U.R., Espindola, L.S., da Silva, I.R., da Silva, I.N. and Rocha, H.M. (2018), "A systematic literature review on green supply chain management: Research implications and future perspectives", *Journal of Cleaner Production*, Elsevier, Vol. 187, pp. 537–561.
- Parker, C.M., Redmond, J. and Simpson, M. (2009), "A review of interventions to encourage SMEs to make environmental improvements", *Environment and Planning C: Government and Policy*, Vol. 27 No. 2, pp. 279–301.
- Persis, D.J., Venkatesh, V.G., Sreedharan, V.R., Shi, Y. and Sankaranarayanan, B. (2021), "Modelling and analysing the impact of Circular Economy; Internet of Things and ethical business practices in the VUCA world: Evidence from the food processing industry", *Journal of Cleaner Production*, Elsevier, Vol. 301, p. 126871.
- Pieroni, M.P.P., McAloone, T.C. and Pigosso, D.C.A. (2019), "Business model innovation for circular economy and sustainability: A review of approaches", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 215, pp. 198–216.
- Pimenova, P. and Van der Vorst, R. (2004), "The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies", *Journal of Cleaner Production*, Vol. 12 No. 6, pp. 549–559.
- Polverini, D. (2021), "Regulating the circular economy within the ecodesign directive: Progress so far, methodological challenges and outlook", *Sustainable Production and Consumption*, Vol. 27, pp. 1113–1123.
- Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R.J. and Ormazabal, M. (2019), "Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 6, pp. 1473–1484.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbera, M. and Ioannou, A. (2015), "The Circular Economy: Barriers and Opportunities for SMEs. CEPS Working Documents No. 412/September 2015", No. 412.

Roxas, B. and Coetzer, A. (2012), "Institutional Environment, Managerial Attitudes and Environmental Sustainability Orientation of Small Firms", *Journal of Business Ethics*, Vol. 111 No. 4, pp. 461–476.

Saleem, F., Qureshi, S.S. and Malik, M.I. (2021), "Impact of environmental orientation on proactive and reactive environmental strategies: Mediating role of business environmental commitment", *Sustainability (Switzerland)*, Vol. 13 No. 15, available at:<https://doi.org/10.3390/su13158361>.

Sarkis, J. (2012), "A boundaries and flows perspective of green supply chain management", *Supply Chain Management*, Vol. 17 No. 2, pp. 202–216.

Schmidt, C.V.H., Kindermann, B., Behlau, C.F. and Flatten, T.C. (2021), "Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs", *Business Strategy and the Environment*, No. July, pp. 1–17.

Schroeder, P., Anggraeni, K. and Weber, U. (2019), "The Relevance of Circular Economy Practices to the Sustainable Development Goals", *Journal of Industrial Ecology*, Vol. 23 No. 1, pp. 77–95.

Schwab, K. and World Economic Forum-WEF. (2019), *The Global Competitiveness Report 2019*.

Sezen, B. and Çankaya, S.Y. (2013), "Effects of Green Manufacturing and Eco-innovation on Sustainability Performance", *Procedia - Social and Behavioral Sciences*, Vol. 99, pp. 154–163.

Singh, M.P., Chakraborty, A. and Roy, M. (2016), "Entrepreneurial commitment, organizational sustainability and business performance of manufacturing msme: Evidence from India", *International Journal of Applied Business and Economic Research*, Vol. 14 No. 6, pp. 4615–4631.

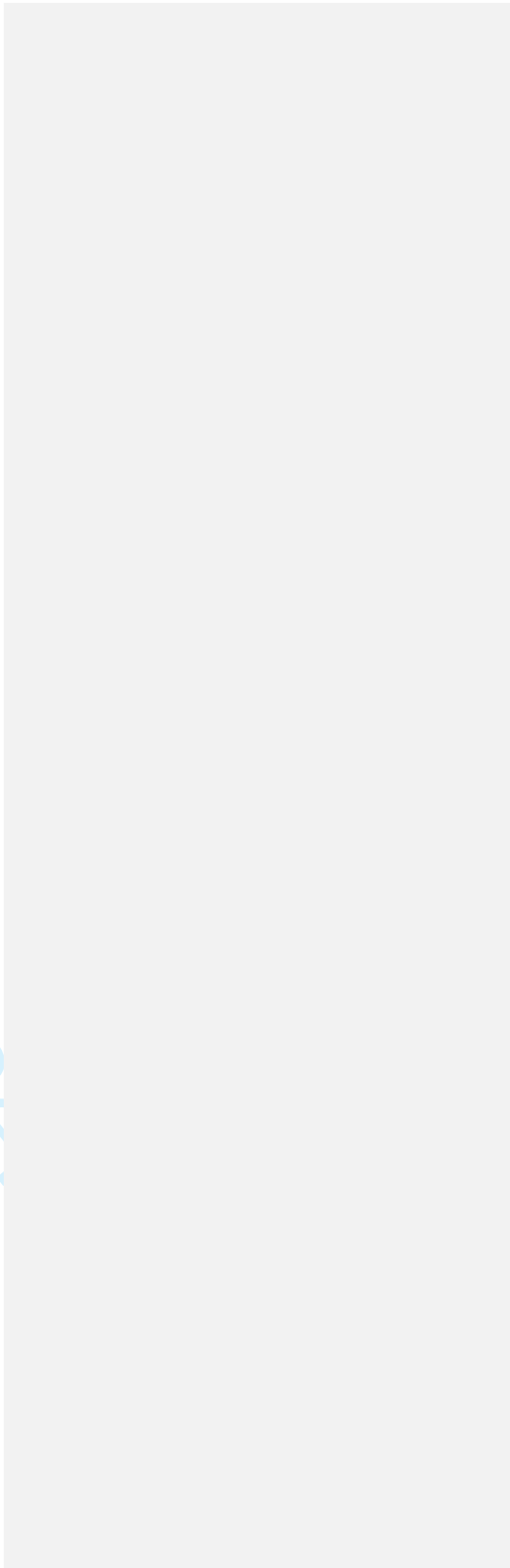
Singh, M.P., Chakraborty, A. and Roy, M. (2018), "Developing an extended theory of planned behavior model to explore circular economy readiness in manufacturing MSMEs, India", *Resources, Conservation and Recycling*, Vol. 135 No. January 2017, pp. 313–322.

- Singh, N., Jain, S. and Sharma, P. (2014), "Determinants of proactive environmental management practices in Indian firms: An empirical study", *Journal of Cleaner Production*, Vol. 66, pp. 469–478.
- Stone, L.J. (2006), "Limitations of cleaner production programmes as organisational change agents. II. Leadership, support, communication, involvement and programme design", *Journal of Cleaner Production*, Vol. 14 No. 1, pp. 15–30.
- Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H. and Idris, M. (2021), "Economic growth, increasing productivity of smes, and open innovation", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 7 No. 1, pp. 1–37.
- Suryantini, N.P.S., Wayan Edi Arsawan, I., Darmayanti, N.P.A., Moskalenko, S. and Gorokhova, T. (2021), "Circular economy: Barrier and opportunities for SMEs", *E3S Web of Conferences*, Vol. 255, available at: <https://doi.org/10.1051/e3sconf/202125501017>.
- Susanty, A., Tjahjono, B. and Sulistyani, R.E. (2020), "An investigation into circular economy practices in the traditional wooden furniture industry", *Production Planning & Control*, Taylor & Francis, Vol. 31 No. 16, pp. 1336–1348.
- Temminck, E., Mearns, K. and Fruhen, L. (2015), "Motivating Employees towards Sustainable Behaviour", *Business Strategy and the Environment*, Vol. 24 No. 6, pp. 402–412.
- Tsimoshynska, O., Koval, M., Kryshchal, H., Filipishyna, L. and Koval, V. (2021), "INVESTING IN ROAD CONSTRUCTION INFRASTRUCTURE PROJECTS UNDER PUBLIC-PRIVATE PARTNERSHIP IN THE FORM OF CONCESSION.", *Scientific Bulletin of National Mining University*, No. 2.
- Yadav, G., Luthra, S., Huisingh, D., Mangla, S.K., Narkhede, B.E. and Liu, Y. (2020), "Development of a lean manufacturing framework to enhance its adoption within manufacturing companies in developing economies", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 245, p. 118726.
- York, J.G. (2009), "Pragmatic sustainability: Translating environmental ethics into competitive advantage", *Journal of Business Ethics*, Vol. 85 No. SUPPL. 1, pp. 97–109.
- Zhang, B., Yang, S. and Bi, J. (2013), "Enterprises' willingness to adopt/develop cleaner production technologies: An empirical study in Changshu, China", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 40, pp. 62–70.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Zhang, Q. and Ma, Y. (2021), “The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership”, *Journal of Cleaner Production*, Elsevier, Vol. 292, p. 126057.

Zhu, Q., Geng, Y. and Lai, K. hung. (2011), “Environmental supply chain cooperation and its effect on the circular economy practice-performance relationship among Chinese manufacturers”, *Journal of Industrial Ecology*, Vol. 15 No. 3, pp. 405–419.



Dear Editor and Reviewer (s)

**International Journal of Productivity and Performance Management (IJPPM)**

We are thankful to the anonymous reviewers, and the editors **International Journal of Productivity and Performance Management**, for their encouraging remarks and constructive and insightful comments. The insightful comments led us to think deeper, and we believe we have now come up with an improved version of the paper. As follows, we provide a response to the individual comments of the editor and two reviewers in the following Table. The changes made in the manuscript while responding to reviewers' comments are highlighted in yellow. We have also made some additional changes to align the existing text with the revised one, made a few necessary textual changes, and incorporated suggested edits after copy editing. All such changes in the manuscript are highlighted in yellow and red.

We hope this improvement can meet the expectations of reviewers. Thank you

No	Comments and Question from Reviewer 1	Revision
1	Good paper. It could be considered for publication, upon Editor's agreement, if the suggestion made above is accepted by the authors.	We thank reviewer(s) that our manuscript meets the IJPPM qualifications
2	Originality: Does the paper contain new and significant information adequate to justify publication?: Yes. The study aimed to examine the relationship between green economic incentives and environmental commitment as drivers of the circular economy practices in Small and Medium Enterprises. This covers a gap identified in the extant literature by the authors, which makes the paper interesting for publication.	We are very grateful for the appreciation of the reviewers regarding our paper on circular economy practices in SMEs
3	Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: Yes. The paper adequately covers the recent literature on the subject, considering a wide array of other studies that support its content.	We are grateful for the reviewer's comments.
4	Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: Yes. The method employed (Smart PLS) is adequate for	We are grateful for the reviewer's comments.

	the hypotheses testing. Research design was described in detail, allowing full understanding of what was done.	
5	Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: Yes. Results enabled to fulfill the identified gaps, adding relevant knowledge to the existing literature.	We are grateful for the reviewer's comments.
6	<p>Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: The authors detailed how the paper can contribute to the literature and managerial practice. Limitations and suggestions for future research are also presented.</p> <p>The only suggestion this reviewer would like to make is to create a "Discussion" section. In fact, the discussion is currently part of the conclusions but separating them as a new item would benefit the paper structure.</p>	<p>We are very grateful for the constructive comments from the reviewers.</p> <p>For the discussion section, we have made significant additions to the paper by adding Discussion and Theoretical Contribution (Page 8, paragraph 1-6), which is then followed by the Managerial Contribution, and Conclusions, Limitations, and Further Study sections (Page 10, paragraph 1-4) (please see in yellow highlight).</p>
7.	Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: Ye. The paper is well written and developed.	We are grateful for the reviewer's comments.



No	Comments and Question from Reviewer 2	Revision
1	<p>Recommendation: Major Revision</p> <p>Comments: All comments were made above. The paper is interesting but it needs improvements.</p>	<p>We are very grateful for the constructive comments from the reviewers.</p> <p>The author (s) has made improvements in accordance with the reviewer comments. We hope that the revisions made meet the expectations, suggestions and quality so that they deserve to be published in IJPPM</p>
2	<p>Originality: Does the paper contain new and significant information adequate to justify publication?: the paper is original.</p>	<p>We are grateful for the reviewer's comments.</p>
3	<p>Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The paper misses the method used to raise the literature review. Authors should perform a systematic literature review, where they could clearly state how the references were raised.</p> <p>Besides, concerning the hypothesis, some of them lack relationship to theory.....authors use Natural resource-based theory but it not clear the relationship between this lens and all the hypothesis....</p>	<p>In the literature review, we used the research of Suryantini et al. (2021) regarding the circular economy in SMEs which needs to involve the role of the government, SMEs and other stakeholders. This study uses a systematic literature review (SLR) to reveal the research agenda that we are trying to uncover in our study. So, for this reason, the literature has been built based on a systematic literature review (SLR) so that a clear state of how the references were raised.</p> <p>Furthermore, on the advice of a very valuable reviewer, we have linked the natural resource based view (NRBV) to all hypotheses in this study (can be seen in the yellow section).</p>
4	<p>Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: research methods appears to be OK.</p>	<p>We are grateful for the reviewer's comments.</p>
5	<p>Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: Results are clear, but the paper misses a section with the discussion of the results.</p>	<p>We are grateful for the reviewer's comments.</p> <p>The author (s) has created a discussion section</p>

6	Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: Discussion is poor in the paper. i suggest authors create a new section: discussion right after the results.	<p>We are very grateful for the constructive comments from the reviewers.</p> <p>For the discussion section, we have made significant additions to the paper by adding Discussion and Theoretical Contribution (Page 8, paragraph 1-6), which is then followed by the Managerial Contribution, and Conclusions, Limitations, and Further Study sections (Page 10, paragraph 1-4) (please see in yellow highlight).</p>
7.	Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: English language needs polishing.	<p>Our paper has been sent to native for polishing. All changes have been communicated to the word in red. In addition, we also attach our proofread paper that includes track changes.</p> <p>Overall, the quality of communication has been improved.</p>

# Copyright Transfer Agreement

This agreement provides for the transfer of the copyright in the Work to

**Emerald Publishing Limited (Emerald) to enable the maximum dissemination of the Work**

**Title** (hereafter known as the "Work")

Circular Economy Practices in SMEs: Aligning Model of Green Economic Incentives and Environmental Commitment

**Author(s)** (provide name, organisation and email address)

I Wayan Edi Arsawan, Viktor Koval, dwi suhartanto, Ni Kadek Dessy Hariyanti, Natal?ia Polishchuk, Viktoriia Bondar

(If multiple, please list in order with corresponding party listed first)

## 1. ASSIGNMENT TO EMERALD

- 1.1 In consideration of Emerald agreeing to consider the above-named Work for publication (both parties agree that such consideration shall be deemed sufficient), you hereby assign with full title guarantee worldwide copyright of the Work and all rights therein including, but not limited to, the right to publish, reproduce, republish, transmit, sell, distribute, disseminate, create derivative works from the Work (in whole or in part) and otherwise exploit the Work and all revisions or iterations of it, in all languages and in all forms and media (whether now known, or hereafter developed), for the full term of copyright and all extensions and renewals thereof.
- 1.2 If for any reason Emerald decides not to publish the Work (notwithstanding that the Work may otherwise have been accepted by Emerald) it shall give written notice of this decision to the corresponding party who shall have the right to require Emerald to assign back the rights hereby assigned.
- 1.3 You grant to Emerald the right to use your name, likeness and biographical data on or in connection with the Work or any derivative works based on the Work, including in promotional and marketing materials.

## 2. LICENCE TO AUTHOR(S)

Emerald grants to the Author(s) a non-exclusive licence to use and reproduce all or part of the Work (after first publication by Emerald) for the Author(s) use for classroom teaching and in any literary work written or edited by the Author(s). This licence is granted subject to the Author(s) providing full attribution and applying the appropriate copyright line. For further information about additional Author rights, including guidance on depositing works, please see Emerald's Author Rights page: <https://www.emeraldgrouppublishing.com/publish-with-us/author-policies/author-rights> as updated from time to time.

## 3. AUTHOR(S) WARRANTIES

- 3.1 You warrant to Emerald as follows:
- 3.1.1 you have the full power and authority to enter into and execute this Agreement for and on behalf of yourself and any other owner(s) of copyright in the Work;
- 3.1.2 the Work is an original work which you have created independently. You have read, acknowledge and agree to Emerald's Originality Guidelines at <http://www.emeraldgrouppublishing.com/authors/writing/originality.htm> as updated from time to time;
- 3.1.3 the Work is not currently being considered for publication by any other journal or publication and will not be submitted for such review while under review by Emerald;
- 3.1.4 subject to the use of any third party rights where consents have been obtained in accordance with the paragraph below, you own all intellectual property rights vesting in the Work;
- 3.1.5 if third party material has been used in the Work, you have obtained the necessary permission from the copyright holder(s) to use any such material in the Work and copies of these permissions will be provided to Emerald on the date of this Agreement;
- 3.1.6 where applicable, that necessary consents have been obtained for studies of named organisations and/or people and will be provided to Emerald on the date of this Agreement;
- 3.1.7 the Work does not contain any unlawful statements, does not infringe any existing copyright or violate any proprietary rights, rights of privacy or publicity, or any other rights of any third party;
- 3.1.8 anyone who has made a significant contribution to the research and the Work has been listed as an author. Minor contributors have been noted in the acknowledgements section; and
- 3.1.9 you have declared any potential conflict of interest in the research. Any support from a third party has been noted in the acknowledgements.

## 4. INDEMNITY

You indemnify and shall keep Emerald indemnified against any loss, expense, injury or damage (including any legal costs and disbursements in relation to any claim) howsoever caused incurred by Emerald directly or indirectly as a result of a breach of the above warranties.

## 5. RIGHTS

Nothing in this Agreement affects any moral rights of the Author(s), including any moral rights to be identified as the author(s) of the Work, in accordance with sections 77 and 78 of the Copyright, Designs and Patents Act 1988.

## AUTHOR(S) AUTHORISATION

Print Name of Author

Date