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SUSTAINABILITY INDICATOR SCORES OF REMANUFACTURING AND FACTORS INFLUENCING FASHION SMES IN ADOPTING CIRCULAR ECONOMY

**Abstract**

Fashion business is increasingly concerned on the circular economy implementation. This leads Micro, Small and Medium Enterprises (MSMEs) to reflect on the economy, environmental and social aspects that affect such implementation. This study aims to determine the implementation of circular economy principles in the fashion MSMEs located in Bandung City. Specifically, three objectives were investigated, i.e., identifying the categories of fashion SMEs that adopt circular economy principles, estimating the Remanufacturing Sustainability Indicator (RSI) value for fashion SMEs that apply circular economy principles, and analyzing the factors that influence fashion MSMEs in applying circular economy principles. This study employed structural surveys to fashion SMEs in Bandung City. The data were analyzed by using descriptive analysis, Remanufacturing Sustainability Indicator (RSI), and logistic regression. The results show that that all types of MSMEs based on their products, and based on PERMEN 11/Per/M.KUKM/XII/2015 have implemented circular economy principles. The RSI values range from 0.045 to 486,050,181 with an average of 48,605,102.81, indicating that the economic, social, and environmental remanufacturing indicators for fashion MSMEs exceed the national average. The influence factor of Fashion MSMEs to implement circular economy principles only include revenue variable.

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Vol. 22, No. 3 (Edisi November-2023)

**Penulis: \***  
Hiendra Kurniawan, Faroby Falatehan, Pini Wijayanti

**Judul: \***  
Remanufacturing Sustainability Indicator Scores and Determining Factors of Fashion MSMEs in Adopting Circular Economy

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Kajian ini telah diulas dan disorot dengan baik. Nilai orisinalitas terletak pada premis tentang implementasi dari ekonomi sirkular terhadap keberlanjutan UMKM. Selain konsep ekonomi sirkular, kebaruan terkonsen dalam menyoroti bidang fesyen di Kota Bandung.

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Yth. Editor Jurnal Sosio Teknologi: **Dr. Sansan Ziaul Haq**

Terima kasih atas undangan Bpk beserta kolega. Saya mengapresiasi yang setinggi-tingginya kepada pihak Editor yang masih menaruh kepercayaan untuk kembali mengulas artikel yang disubmit di Jurnal Sostek. Adapun 2 manuskrip ilmiah yang dimaksud telah ditinjau sesuai profesionalitas, wawasan, kapabilitas, dan area disiplin pengulas. Baru saja, Saya kirimkan koreksi final dari karya berjudul: "*Remanufacturing sustainability indicator scores and determining factors of fashion MSMEs in adopting circular economy*" (nomor makalah: 73879-1) dan "Pengaruh kemacetan di Jalan Raya Kopo terhadap perilaku *aggressive driving* pengendara motor" (nomor makalah: 73925-1) ke OJS (terlampir). Selain itu, saya memohon kebijaksanaan kepada Bpk untuk memberi penghargaan sebagai pengulas dari kedua artikel diatas sebagai bukti kinerja. Ini penting mengingat setiap aktivitas akademik, baik eksternal ataupun internal memerlukan pelaporan setiap semester. Kami menerima dukungan semisal SK dan sertifikat pengulas. Menunggu konfirmasi dari Bpk di masa depan. Harap maklum dan semoga sukses.

Salam hormat,

**Dio Caisar Darma**

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## Remanufacturing Sustainability Indicator Scores and Determining Factors of Fashion MSMEs in Adopting Circular Economy

### *Nilai Keberlanjutan Remanufaktur dan Faktor-faktor yang Memengaruhi UMKM Fesyen dalam Menerapkan Ekonomi Sirkular*

Hiendra Kurniawan<sup>1</sup>, Faroby Falatehan<sup>2</sup>, Pini Wijayanti<sup>3</sup>

Prodi S2 Ekonomi Sumberdayadaya Alam dan Lingkungan<sup>1</sup>

Prodi S2 Ekonomi Sumberdayadaya Alam dan Lingkungan<sup>2</sup>

Prodi S2 Ekonomi Sumberdayadaya Alam dan Lingkungan<sup>3</sup>

Email: [hiendrak@gmail.com](mailto:hiendrak@gmail.com)

#### ARTICLE INFO

##### Keywords:

circular economy, fashion MSMEs, logistic regression, remanufacturing sustainability indicators, MSME sustainability strategy

#### ABSTRACT

Fashion business is increasingly concerned on the circular economy implementation. This leads Micro, Small and Medium Enterprises (MSMEs) to reflect on the economy, environmental and social aspects that affect such implementation. This study aims to determine the implementation of circular economy principles in the fashion MSMEs located in Bandung City. Specifically, three objectives were investigated, i.e., identifying the categories of fashion SMEs that adopt circular economy principles, estimating the Remanufacturing Sustainability Indicator (RSI) value for fashion SMEs that apply circular economy principles, and analyzing the factors that influence fashion MSMEs in applying circular economy principles. This study employed structural surveys to fashion SMEs in Bandung City. The data were analyzed by using descriptive analysis, Remanufacturing Sustainability Indicator (RSI), and logistic regression. The results show that all types of MSMEs based on their products, and based on PERMEN 11/Per/M.KUKM/XII/2015 have implemented circular economy principles. The RSI values range from 0.045 to 486,050,181 with an average of 48,605,102.81, indicating that the economic, social, and environmental remanufacturing indicators for fashion MSMEs exceed the national average. The influence factor of Fashion MSMEs to implement circular economy principles only include revenue variable.

#### INFO ARTIKEL

**Kata kunci:**  
ekonomi sirkular, UMKM fashion, regresi logistik, indikator keberlanjutan remanufaktur, strategi keberlanjutan UMKM

#### ABSTRAK

Isu lingkungan global saat ini semakin mengukuhkan urgensi penerapan ekonomi sirkular. Hal ini mendorong Usaha Mikro, Kecil, dan Menengah (UMKM) untuk merenungkan aspek ekonomi, lingkungan, dan sosial yang memengaruhi implementasi tersebut. Penelitian ini bertujuan untuk menentukan penerapan prinsip ekonomi sirkular pada UMKM fesyen yang berlokasi di Kota Bandung. Secara khusus, tiga tujuan diteliti, yaitu mengidentifikasi kategori UMKM fesyen yang mengadopsi prinsip ekonomi sirkular, memperkirakan nilai Indikator Keberlanjutan Remanufaktur (RSI) bagi UMKM fesyen yang menerapkan prinsip ekonomi sirkular, dan menganalisis faktor-faktor yang memengaruhi UMKM fesyen dalam menerapkan prinsip ekonomi sirkular. Penelitian ini menggunakan survei struktural terhadap UMKM fesyen di Kota Bandung. Data dianalisis dengan menggunakan analisis deskriptif, Indikator



*Keberlanjutan Remanufaktur (RSI), dan regresi logistik. Hasil penelitian menunjukkan bahwa semua jenis UMKM berdasarkan produk mereka, dan berdasarkan*

*PERMEN 11/Per/M.KUKM/XII/2015, telah menerapkan prinsip ekonomi sirkular. Nilai-nilai RSI berkisar antara 0,045 hingga 486.050.181 dengan rata-rata 48.605.102,81, menunjukkan bahwa indikator-indikator remanufaktur ekonomi, sosial, dan lingkungan untuk UMKM fesyen melebihi rata-rata nasional. Faktor yang memengaruhi UMKM Fesyen dalam menerapkan prinsip ekonomi sirkular hanya meliputi variabel pendapatan.*

**Comment [i-1]:** Mohon untuk menambah implikasi untuk keberlangsungan metodologi praktis, dan teoritis di masa depan.

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<https://doi.org/10.5614/sostek.itbj.2022.21.1.x>

## INTRODUCTION

The current global environmental issues are increasingly emphasizing the urgency of implementing a circular economy. A circular economy is an economic system with a product lifecycle approach that primarily focuses on reducing, reusing, and repairing materials in the production, distribution, and consumption processes. This concept can be applied at micro-level (companies and consumers), meso-level (eco-industrial areas), and macro-level (cities, regions, and countries) with the aim of achieving sustainable economics, fostering environmental quality, economic well-being, and social justice (Kirchherr et al., 2017). Currently, only nine percent of global economic activities embrace circular economy principles, while the linear growth-oriented economic system is closely associated with environmental issues such as deforestation, biodiversity loss, climate change, floods, and pollution (water, soil, and air) due to overexploitation and exceeding environmental carrying capacity in both input and output supply chain (WEF, 2019). The circular economy offers a solution and an antithesis to the problems posed by the linear economy (Korhonen et al., 2018).

The textile industry plays a significant role in implementing the circular economy worldwide. Unfortunately, it's also one of the largest contributors to pollution after the oil industry (Carrico & Kim, 2014). Global data indicates that the fashion sector contributes 20% to global water waste (water pollution) and 20% of total global carbon emissions (air pollution) (UN, 2021). Even fashion products that end up as solid waste contribute a staggering 92 million tons to landfills, accounting for 87% of total production, eventually being buried or incinerated (UNEP, 2018). Given these substantial negative impacts, implementing a circular economy is an urgent necessity in the textile industry.

According to BPS (2021), Micro, Small, and Medium Enterprises (MSMEs) make up 99.90 percent of all businesses operating in Indonesia (totaling 63 million units), with the majority being in the trade sector. MSMEs are the largest type of business (contributing 60% of Indonesia's GDP) and serve as the foundation of Indonesia's economy (Christiana et al., 2014). The Coordinating Ministry for Maritime Affairs (2016) set a target for Indonesia to have entrepreneurs that constitute 14% of the total population. BPS (2021) states that the open unemployment rate in Indonesia is 5.86%.

According to Asriningtyas et al. (2019), flooding in Bandung City is not solely caused by natural factors such as high rainfall but also by human factors like land use changes and improper development. This indicates the need for serious attention and concrete actions from all parties to maintain and preserve the environment for sustainability. Based on the BPBD West Java report (2020), 142 neighborhoods from 30 districts experienced floods in the past three years, highlighting the need for other governmental bodies like DLHK to take action.

Entrepreneurship plays a vital role in economic growth. According to Pranowo and Sihombing (2021), entrepreneurship can stimulate economic growth by generating new jobs, increasing income, and improving the well-being of society. According to GIS DUKCAPIL (2022), out of the total population of 2,452.9 thousand in Bandung City, 178,075 are employed in the private sector. This underscores the crucial role of MSMEs in entrepreneurship, serving as the backbone of a region's economy by contributing to economic growth and job opportunities.

Based on the stated problem, the general objective of this research is to analyze the feasibility of a circular economy in fashion MSMEs in Bandung City. This can be achieved by addressing three specific objectives as follows:

1. Identify categories of Fashion MSMEs that have adopted circular economy principles.
2. Estimate the Remanufacturing Sustainability Indicators for Fashion MSMEs implementing circular economy principles.

**Comment [i-2]:** Lanskap literatur belum terlihat optimal. Untuk itu, diperlukan penguatan pondasi teoritis. Sehubungan dengan relevansi objektivitas dan studi kasus yang disorot, para pengarang dapat menambahkan beberapa referensi. Pengulas menyarankan 3 kutipan seputar prinsip dan konsep dalam pembangunan UMKM sebagaimana berikut:

Rosyadi, R., Mire, M. S., Jiuhardi, J., & Purwadi, P. (2023). Memperluas wawasan seputar polemik bisnis - Relevansi pada unit usaha mikro di Bontang Kuala. *Jurnal Pengabdian Pada Masyarakat*, 8(3), 683-699. <https://doi.org/10.30653/jppm.v8i3.431>

Wijaya, A., Jiuhardi, J., ZA, S. Z., Nurjanana, N., & Kurniawan, E. (2023). Determinants of small scale business: An empirical evidence from Indonesia. *International Journal of Sustainable Development and Planning*, 18(3), 305-314. <https://doi.org/10.18280/ijstdp.180305>

Rosyadi, R., & Fitriadi, F. (2023). Rethinking and design facilitating pillars SME performance: An illustration for Indonesia. *International Journal of Social and Economic Studies within the Framework of Emerging Global Development*, Volume 3, pp. 169-180. Berlin, Germany: Penerbit Lang Verlag. Retrieved from <https://doi.org/10.3726/b20968>

**Comment [i-3]:** Motif atau orientasi studi sudah dikembangkan. Akan tetapi, motivasi penelitian untuk arah keberlanjutan akademis dan manajerial belum diulas secara konstruktif.

- Analyze the factors influencing Fashion MSMEs in Bandung City to adopt circular economy principles.

## METHOD

This research was conducted in the administrative area of Bandung City and focused on MSMEs registered with the Bandung City Cooperative and SME Agency (DISKOPUMKM). The research spanned approximately three months, including three months for data collection (February-May 2023) and two months for data analysis (May-June 2023), which included thesis presentation and guidance processes.

Table 1: Matrix of Objectives, Data Types, and Data Sources

| No | Objectives  | Data types  | Data Sources                |
|----|---|---|-----------------------------|
| 1  | Identify categories of Fashion MSMEs that have adopted circular economy principles                                | Descriptive analysis  | Literature and primary data |
| 2  | Estimate the Remanufacturing Sustainability Indicators for Fashion MSMEs implementing circular economy principles | Quantitative data and comparative analysis using Remanufacturing Sustainability Indicator (RSI) | Primary data                |
| 3  | Analyze the factors influencing Fashion MSMEs in Bandung City to adopt circular economy principles                | Quantitative data and correlation analysis using logistic regression                            | Primary data                |

The research methodology involved collecting primary data through surveys conducted among fashion MSMEs in Bandung City. The collected data were analyzed using descriptive analysis, Remanufacturing Sustainability Indicator (RSI), and logistic regression. The parameter for MSMEs implementing a circular economy is defined as businesses engaging in at least one of the 5Rs (Reduce, Reuse, Recycle, Replace, and Replant) activities (EMF, 2015).

In Objective number 2, the study used the RSI tool, which is an advancement of sustainability typologies by Pearce and Turner (1990) and Pezzoli (1997) on the "Triple Bottom Line." The RSI elements were derived from the work of Fatimah and Aman (2018), focused on Indonesian industries and referencing international journals and literature on sustainability metrics in various developing countries. These RSI elements were compared to national averages to gauge the achievements of Fashion MSMEs.

Table 2: Calculation Matrix of RSI Values

| Indicator          | Element                 | Measurement Unit | Equation   |
|--------------------|-------------------------|------------------|--|
| Economic Indicator | Job creation            | % (Percentage)   | $JC = \frac{\text{total remanufacturing jobs}}{\text{total formal jobs}}$            |
|                    | Salary Increase         | IDR              | $SI = \frac{\text{incremental salary}}{\text{total employee salary}}$                |
|                    | Net Income              | IDR              | $NI = \text{Pendapatan} - \text{total biaya}$  |
|                    | Production Costs        | % (Percentage)   | $PC = \frac{\text{total costs}}{\text{total revenue}}$                               |
|                    | Productivity            | % (Percentage)   | $P = \frac{\text{total remanufacturing input}}{\text{total remanufacturing output}}$ |
| Social Indicator   | Skilled workforce       | % (Percentage)   | $SW = \frac{\text{total Skilled workforce}}{\text{total employees}}$                 |
|                    | Workplace Accident Rate | % (Percentage)   | $WAR = \frac{\text{total accidents}}{\text{total work hours}}$                       |

|                       |                      |                |  |
|-----------------------|----------------------|----------------|--|
|                       | Labor productivity   | % (Percentage) | $LP = \frac{\text{total revenue}}{\text{total labor costs}}$                     |
|                       | Community complaints | % (Percentage) | $CC = \frac{\text{total customer complaints}}{\text{total customers}}$           |
| Environment Indicator | Material Acquisition | Kg             | $MA = \frac{\text{Reused Material}}{\text{Total kg of remanufactured products}}$ |

The determination of independent variables in this research is based on previous studies: X1 Owner's age according to Dabija et al. (2019), X2 Business age according to Sabestova (2013), X3 Certified workers according to Pramadini et al. (2019), X4 Annual revenue according to Niu and Zhou (2022), and X5 Profit in implementing CE according to EMC (2016).

Also, for Objective 3, the estimation of the probability of a binary outcome (yes/no) event is done using logistic regression. In this research, logistic regression is employed to observe the relationship between the dependent variable Circular Economy Implementation (Y) and the independent variables: owner's age (X1), business age (X2), total certified workers (X3), annual MSME revenue (X4), and profit (X5). The following equation is used:

$$P(Y = 1) = \frac{1}{1 + \exp(-Z)} \quad (1)$$

Where  $P(Y = 1)$  represents the probability of implementing a circular economy (dependent variable Y) with a value of 1.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \quad (2)$$

Where  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4,$  dan  $\beta_5$  is estimated regression coefficient

## RESULT AND DISCUSSION

### Classification and Characteristics of MSMEs that Have Implemented Circular Economy Principles

The sample in this study encompasses all types of fashion production classifications according to Savitrie (2008), which include various categories of MSMEs producing clothing, pants, bags, shoes, and accessories, all of which apply circular economy principles, as well as based on Regulation of the Ministry of Cooperatives and SMEs (PERMEN KUKM) number 11/Per/M.KUKM/XII/2015. In this research, there are small, micro, and medium-sized MSMEs that apply circular economy principles based on their revenue category. Out of 30 MSME samples, 22 have implemented circular economy principles, among which 20 continue the circular process with other parties, and two MSMEs manage the residual outputs of their production themselves.

Findings regarding the characteristics of MSMEs implementing the circular economy include: their revenue remained unaffected by the pandemic; no sampled MSME received credit related to the circular economy; the locations of these MSMEs are relatively remote and secluded; the initiation of circular practices actually originated from employees seeking other opportunities. Two fashion MSMEs with a higher degree of circularity, specifically engaging in reusing within their own production cycles, share common aspects such as having the lowest revenue among their similar competitors, operating under the same legal entity, being located relatively close to the central government office in Bandung City, being owned by males, and having owners younger than the average respondents.

### Sustainability Remanufacturing Value of Fashion SMEs

**Table 3 The RSI value of MSMEs that apply circular economy principles**

| Element             | Indicator    | Min Value | Max Value | Average | Standard Deviation |
|---------------------|--------------|-----------|-----------|---------|--------------------|
| Economic indicators |              |           |           |         |                    |
| Job Creation        | Job Creation | 0         | 140       | 10      | 34                 |

**Comment [i-4]:** Setiap simbol memiliki makna. Harap diuraikan secara detail setiap simbol yang dicantumkan. Jangan sampai ada yang tertinggal dan tidak diinterpretasikan. Saya rekomendasikan untuk menelaah, meninjau, serta mengadopsi contoh artikel seperti:

Rosyadi, R., Darma, S., & Darma, D. C. (2023). What driving gross domestic product of agriculture? Lessons from Indonesia (2010-2021). *International Journal of Sustainable Development and Planning*, 18(3), 683-692. <https://doi.org/10.18280/ijdp.180304>

**Comment [i-5]:** Serupa dengan komentar 4 diatas, masing-masing simbol statistik mempunyai arti. Mohon untuk diuraikan dengan spesifik. Misalnya; definisi dari Y tidak disebutkan. Juga,  $\beta_0$  berbeda dengan konteks  $\beta_1, \dots, \beta_5$ , dimana  $\beta_0$  seharusnya konstanta dan bukan termasuk parameter dalam regresi seperti yang lainnya. Disamping itu, faktor gangguan/residu ( $\epsilon$ ) tidak dimasukkan dalam fungsi persamaan. Tentu merupakan kesalahan fatal dalam menyusun sebuah formulasi.

|                               |                                   |            |               |             |             |
|-------------------------------|-----------------------------------|------------|---------------|-------------|-------------|
| Employees                     | (%)<br>Salary Increase            | 0          | 50            | 4           | 11          |
| Process                       | (%)<br>Net Income<br>(Rp.)        | 57.600.000 | 1.620.000.000 | 486.050.181 | 479.663.907 |
|                               | Production C<br>osts (%)          | 35         | 80            | 52          | 10          |
|                               | Productivity<br>(%)               | 0          | 50%           | 3%          | 11%         |
| <b>Social Indicators</b>      |                                   |            |               |             |             |
| Employees                     | Workplace<br>Accident Rate<br>(%) | 0          | 0,38          | 0.03        | 0.08        |
|                               | Labor<br>Productivity<br>(%)      | 7          | 3008          | 770         | 661         |
|                               | Skilled<br>Workforce (%)          | 0          | 100           | 8           | 23          |
| Community                     | Community<br>Complaints(%)        | 0          | 0,4           | 0.06        | 0.13        |
| <b>Environment Indicators</b> |                                   |            |               |             |             |
| Material                      | Material<br>Acquisition           | 0 Kg       | 0.909 Kg      | 0.045 Kg    | 0,193 Kg    |

The Sustainability Remanufacturing Value (RSI) of Fashion SMEs Respondents who have implemented circular economy principles exhibit a low standard deviation in many elements. This indicates that the gap or difference in RSI values among the Fashion SMEs Respondents is not too wide, although there is a relatively high standard deviation in certain indicators such as job creation, employee wage increase, and skilled workforce. This suggests that there is variation in RSI values among Fashion SMEs.

In terms of production processes, Fashion SMEs that apply circular economy principles achieve a net profit with an average amount of Rp. 486,050,181 while maintaining high levels of material acquisition and productivity. This demonstrates efficiency in resource utilization and production cost control.

Overall, the RSI results indicate that Fashion SMEs implementing circular economy principles have a positive impact on various aspects, including job creation, employee well-being, production efficiency, work quality, and environmental management. To support the growth and sustainability of SMEs, it's crucial to continue promoting and developing the implementation of circular economy principles to provide broader benefits both for the SMEs themselves and for the surrounding community and environment.

The achievement of economic-social-environmental indicators in the RSI value of Fashion SMEs Respondents who have implemented circular economy principles is higher compared to those not implementing circular economy principles. For instance, the average value for the job creation indicator is 10%, while the maximum value reaches 140%. This demonstrates that Fashion SMEs have significant potential to increase job opportunities when applying circular economy principles (as only circular SMEs have a weighted value in the job creation indicator). The 10% job creation rate among the Fashion SMEs respondents indicates that job creation in circular economy-oriented Fashion SMEs is five times higher than the average job creation rate among SMEs in Indonesia. Although it is still below the average job creation rate in the manufacturing industry as a whole, an increase in the number of SMEs will undoubtedly contribute significantly to job creation.

**Table 4 Comparison of the average value of the RSI elements in the sample SMEs with standards in Indonesia**

| Indikator                                   | National average standard (per year) | The average value of the MSME elements of respondents at the RSI against national standards |
|---|--------------------------------------|---|
| Job creation in Indonesia                   | 2 %                                  | ✓ Higher  |
| Job creation for the manufacturing industry | 18.63% (1,14 million vacancies)      | ✓ Higher  |
| Increase in salary for MSME employees       | 3 %                                  | X Lower   |
| Provincial Minimum Wage, West Java          | Rp. 23.400.040                       | ✓ Higher  |
| Net profit of micro business                | Rp. 76 juta                          | ✓ Higher  |
| Net profit of small business                | Rp. 1,63 miliar                      | X Higher  |
| Work Accident Rate                          | 0.3 %                                | ✓ Lower (but better)  |
| Small business productivity                 | 50 %                                 | ✓ Higher  |
| Medium business productivity                | 150 %                                | ✓ Higher  |
| Certified workers rate                      | 3,5 %                                | ✓ Higher  |

Sources: BI (2015), BPS (2021), BPS (2020), KEMNAKER (2020), dan KKUKM (2020)

The implications of the table indicate that the average RSI values of the SME respondents are consistently above the national standards across various indicators. First, the higher job creation rate in Indonesia compared to the national average demonstrates the positive impact of SMEs in generating employment opportunities. Additionally, the higher job creation rate in the manufacturing industry exceeding the national average highlights the role of SMEs in contributing to industrial growth and workforce absorption. Moreover, the SME respondents achieve higher wage increases than both the Provincial and National minimum wages. The low incidence of workplace accidents, as indicated by the low accident rate, reflects the prioritization of safety measures by the surveyed SMEs. The higher level of productivity among small and medium-sized businesses surpassing the national average signifies efficient resource utilization and effective business operations. These implications indicate that the surveyed SMEs have demonstrated commendable performance in various aspects, contributing positively to job creation, wage growth, profitability, safety, productivity, and professional development.

Overall, the implications of the comparative results suggest that the SME respondents exhibit strong performance and have exceeded national standards in various aspects. This underscores the potential and contribution of SMEs in supporting economic growth, job creation, employee welfare improvement, as well as increased productivity and workplace safety. Efforts are needed to support and expand the development of SMEs to strengthen the micro, small, and medium-sized business sector in Indonesia.

### Factors Influencing Fashion SMEs in Applying Circular Economy Principles

In the initial testing phase (Block 0), a Model Sig. value of 0.000 was obtained. Since the Sig. value is less than 5% = 0.05, we reject the null hypothesis (H0) at a significance level of 5%. This leads to the conclusion that the independent variables used collectively influence the implementation of circular economy by SME actors. This indicates that the addition of independent variables can significantly impact the model, or in other words, the model is considered to be a good fit

The selection of independent variables in this research is based on previous studies: X1 Age of owner according to Dabija et al. (2019), X2 Age of business according to Sabestova (2013), X3 Certified employees according to Pramadini et al. (2019), X4 Revenue according to Niu and Zhou (2022), and X5 Profit in implementing Sustainable Enterprises (SE) according to EMC (2016), where these variables have been proven to influence owner perceptions for implementing sustainability principles. In this study, estimation of these variables was conducted using partial logistic regression, and through tests such as Log Likelihood, Cox & Snell R Square, Nagelkerke R Square, and the Chi-Square Hosmer and Lemeshow test.

**Tabel 5 Variables in the Equation**

| B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I.for EXP(B) |
|---|------|------|----|------|--------|--------------------|
|---|------|------|----|------|--------|--------------------|

**Comment [i-6]:** Perhatikan dengan hati-hati untuk setiap singkatan. Apakah semuanya terdiuraikan? Anda dapat memonitor satu-persatu dari setiap singkatan yang ada.

| Step           |                       |         |          |       |   |       |       | Lower | Upper |
|----------------|-----------------------|---------|----------|-------|---|-------|-------|-------|-------|
| 1 <sup>a</sup> | UMUR_PEMILIK_UMKM     | ,126    | ,143     | ,777  | 1 | ,378  | 1,134 | ,857  | 1,501 |
|                | UMUR_UMKM             | ,252    | ,231     | 1,196 | 1 | ,274  | 1,287 | ,819  | 2,022 |
|                | PEKERJA_BERSERTIFIKAT | -3,778  | 1578,006 | ,000  | 1 | ,998  | ,023  | ,000  | .     |
|                | OMZET_PERTAHUN        | ,000    | ,000     | 4,626 | 1 | ,031  | 1,000 | 1,000 | 1,000 |
|                | PROFIT                | ,000    | ,003     | ,000  | 1 | 1,000 | 1,000 | ,994  | 1,006 |
|                | Constant              | -12,996 | 8,698    | 2,233 | 1 | ,135  | ,000  |       |       |

a. Variable(s) entered on step 1: UMUR\_PEMILIK\_UMKM, UMUR\_UMKM, PEKERJA\_BERSERTIFIKAT, PENDAPATAN\_PERTAHUN, PROFIT\_ES.

**Comment [i-7]:** Konsistensi dalam penggunaan bahasa Inggris untuk artikel yang berbahasa asing (dalam hal ini *English*) mohon untuk ditelaah. Meskipun ini adalah variabel yang diidentifikasi, tetapi karena pedoman, aturan, dan petunjuk jurnal menerapkan versi Inggris, maka dari itu perlu menyesuaikan.

The "Variables in the Equation" table above is the main table of data analysis using logistic regression. The age of SME owners, the age of SMEs, certified employees, and circular economy profit all have P value Sig Wald > 0.05, which leads to rejecting H1 or meaning that these variables do not provide a significant partial influence on circular economy implementation. On the other hand, the variable "annual revenue" has a Sig Wald value < 0.05, leading to accepting H1 or meaning that the "annual revenue" variable significantly contributes to the partial implementation of circular economy principles.

The probability of an event occurring in the dependent variable can be calculated using the equation  $\pi = 1 / (1 + \exp(-z))$ , where the value of z is based on the independent variables and their parameter coefficients. The odds ratio for the "annual revenue" variable is shown by the EXP (B) value or also known as the ODDS RATIO (OR). For the "annual revenue" variable, the OR is 1.000, which means that if the "annual revenue" value increases by 1, the SMEs are 1.000 times more likely to adopt circular economy principles. This highlights the significance of annual revenue in influencing circular economy adoption in Fashion SMEs. This is in line with the statement by Niu and Zhou (2022) on the importance of revenue for encouraging sustainability adoption among SME owners. If sustainability principles provide tangible transactional benefits to the business, owners are more likely to adopt them.

In conclusion, factors like the age of SME owners, the age of SMEs, the total number of certified training employees, and profits from circular economy implementation partially do not have an influence on the usage of circular economy principles by Fashion SMEs. Only the "annual revenue" factor affects the implementation of circular economy principles in Fashion SMEs. Therefore, further investigation is needed, considering other factors beyond those examined above, to determine further actions to encourage Fashion SMEs to be more active in adopting circular economy principles and maximizing the potential benefits from their implementation.

## CONCLUSION

**Comment [i-8]:** Umumnya, kesimpulan terdiri dari empat bagian pokok: output analisis, implikasi temuan berupa regulasi praktis, kelemahan/keterbatasan studi, dan saran terhadap arah perluasan teoritis maupun studi di agenda mendatang.

1. All classified Fashion SMEs according to Savitrie (2006) and PERMEN KUKM number 11/Per/M.KUKM/XII/2015 have implemented circular economy principles. These include micro, small, and medium-sized businesses involved in clothing, pants, bags, shoes, accessories, which have adopted the practice of reusing their production remnants. Characteristics of Fashion SMEs applying circular economy principles include sharing their remnants with others, maintaining stable revenue despite pandemic effects, lacking circular economy-related credits, operating in less crowded and enclosed locations, and the initiation of circular practices arising from employees seeking additional income.
2. The Remanufacturing Sustainability Indicator (RSI) value for Fashion SMEs applying circular economy principles averages 48,605,102.81. This indicates that Fashion SMEs adhering to the RSI have contributed to economic, social, and environmental indicators. The RSI elements for Fashion SMEs implementing these principles have surpassed the national average, encompassing

aspects like job creation, salary increases, net profits, productivity, and employee certifications. Although there are disparities in certain RSI values, such as job creation, salary increases, and skilled workforce indicators.

3. The variable influencing Fashion SMEs in adopting circular economy principles is the annual revenue (Omzet). Based on the odds ratio results for the "Omzet" variable, if the annual revenue increases by 1 unit, the likelihood of the Fashion SME implementing circular economy practices increases by a factor of 1,000 times compared to before. This reinforces earlier literature/background research, suggesting that sustainability principles' potential to augment revenue encourages a greater propensity for adopting such practices.

Based on the conclusions above, this study formulates four recommendations as follows:

1. The government, through the Department of Environment and Cleanliness and the Department of Cooperatives and Small, Micro, and Medium Enterprises, should focus on and facilitate circular economy mechanisms for Fashion SMEs. This can include collaborations and circular exchanges, training and mentoring programs, as well as providing fashion industry zones to strengthen sustainable ecosystems and encourage the development of SMEs adopting circular economy principles. Further research could create new classifications based on the level of sustainability within different types of SMEs.
2. Fashion SME entrepreneurs should maintain the sustainable remanufacturing practices that have proven to be highly effective in economic, social, and environmental aspects compared to the national average. This will help Fashion SMEs continue setting examples and strengthen their commitment to sustainability, resulting in broader positive impacts on the fashion sector as a whole. For future research, RSI values could serve as a determinant of remanufacturing sustainability levels or other benchmarks beyond the national average.
3. Stakeholders, including the government through the Department of Trade and Industry, as well as providers of funding services, should encourage Fashion SMEs to increase their revenue. This could involve education through certifications and financing options specifically designed to enhance circular practices, aiming to strengthen business sustainability and provide greater social and environmental benefits.
  - a. Further research can delve into the factors influencing revenue in Fashion SMEs, as well as other variables impacting the implementation of circular economy principles in these businesses.

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**Comment [i-9]:** Daftar referensi masih terlampaui minim/sedikit. Setidaknya, perlu menambahkan preferensi acuan yang berhubungan dan seputar kajian yang dibahas. Lalu, penulisan dalam struktur referensi harus konsisten. Untuk mempermudah penyusunan referensi yang baik, disarankan meelaah publikasi tedahulu di jurnal terkait pada periode terbitan yang berdekatan. Ambil contoh seperti:

Showcasing luxury on social media: What are the effects? An anomaly among lecturers (2023).  
<https://doi.org/10.5614/sostek.itbj.2023.22.1>

Dengan begitu, para pengarang dapat memahami dengan bijak dan memperoleh wawasan terkait cara pengutipan yang benar



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