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# Interplay in Circular Economy Innovation, Business Model Innovation, SDGs, and Government Incentives: A Comparative Analysis of Pakistani, Malaysian, and Chinese SMEs

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**Abstract:** This study aims to examine the effects of circular economy innovation and BMI (business model innovation) on SMEs (Small and Medium Enterprises) economic, environmental, and social performance along with the mediating role of government incentives in Pakistan, Malaysia, and China. Data were collected through a structured questionnaire in online survey from the owners, CEO, and senior managers of SMEs in Pakistan, Malaysia, and China, and analyzed using PLS-SEM. The results revealed that circular economy innovation and BMI have positive significant effects on SMEs economic, environmental, and social performance in Pakistan, Malaysia, and China. The study also found that government incentives have mediating effects on the relationship between circular economy innovation, BMI, and SMEs economic, environmental, and social performance in Pakistan, Malaysia, and China. This study provides interesting insights about SMEs economic, environmental, and social performance by evaluating the impacts of circular economy innovation, BMI, and amid mediation of government incentives. These useful insights will enable policy makers and practitioners to develop more effective strategies to enhance the economic, environmental, and social performance of SMEs. By reviewing the literature on circular economy innovation, BMI, and government incentives, the main contribution of this study is the evaluation and analysis of circular economy innovation, BMI, and government incentives as they affect SMEs economic, environmental, and social performance in Pakistan, Malaysia, and China. The theoretical and practical implications for academics and practitioners are displayed at the end of the study.

**Keywords:** circular economy innovation; business model innovation; government incentives; SMEs performance

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## 1. Introduction

The UN sustainable development agenda 2030 has garnered wide-ranging attention from industries and academia around the world, underscoring the importance of scare resources, avoiding environmental degradation, and preventing hunger and poverty in societies. In this regard, the UN sustainability agenda has launched the concept of Triple Bottom Line (TBL) and emerged as the potential driver for competitive advantage [1]. Due to this reason, many multinational companies have launched practices of sustainable development as per the UN agenda [2]; however, SMEs have widely shown scarce engagement in these practices around the world. For example, the British Chamber of Commerce has noted that only 11 percent of UK SMEs have engagement in sustainability measures, instead of a greater role in and contribution to the world economy [3]. However,

sustainability-oriented business practices have forced companies to transform from the traditional to a more innovative business model to ensure energy conservation, reduce pollution and wastage of resources, and gain economic, environmental, and social efficiencies. In the race towards sustainable development, competitive advantage, and environmental efficiencies, firms are widely focusing on sustainability-oriented innovation and circularity to ensure their survival in an intense competitive environment.

Sustainability-oriented innovation has involved firms in the practices of BMI and circular economy innovation to achieve economic, environmental, and social efficiencies among firms [3,4]. These innovative practices are promoting closed-loop production and eco-efficiency in operations, innovating business structure, enhancing production and consumption efficiency, and implementing circular inventions [3,5]. Particularly, circular economy innovation has emerged as a new trend in the business environment to achieve sustainable development goals [6]. The trend of CE-innovation is perceived as a solution-based approach for gaining economics development within environmental boundaries [7], and can be applied as a technique to reduce the loss of resources, create a vital ecosystem using the tactics of eco-design, and repairing, recycling, and refurbishing to retain environmental values. These environmental approaches and ecosystem ensure sustainable production, clean drinking water, and a healthy living environment in the societies [7–9]. Especially, circular economy innovation is perceived as a key driver and contributing factor in sustainability [10]. Due to these reasons, many companies have shown a responsible attitude towards popularizing the practice of circular economy strategies [11] and moving from linear production to a more advanced ecosystem that leads to gaining core competencies and improving efficiencies [11,12].

Circular economy innovation provides a foundation for sustainability-oriented innovation to enhance the efficiencies of resources, innovative solutions, and BMI [13,14]. In this regard, BMI as a tool for sustainability and circularity has been acknowledged as an important part of the gray literature by companies and government agencies [15]. BMI, for sustainability and circularity, is perceived as a fundamental capability of businesses to gain a competitive advantage [15], and has led to the concept of circular/sustainable BMI. Further, firms are forced by various factors to consider environmental behavior, and to integrate sustainability and CE principles in their BMs [15,16]. Recently, there are calls for businesses to address these critical societal issues, specifically the ecosystem in business model research [17], and there is still a lack of understanding of the association between BMI and ecosystem, and there is space for a solid framework in this context.

Implementing the practices of circular economy innovation and BMI to transform the setup of SMEs into more sustainable business practices have brought forward the concept of closed-loop activities as a new trend of innovation [18] and, as an outcome, closed-loop innovative business activities lead SMEs to gain economic, environmental, and social efficiencies [3]. However, the literature is scarce in this regard and needs extensive investigation to explore the role of circular economy innovation and BMI in achieving improved economic, environmental, and social performance among SMEs [3,19–21]. In addition, despite a substantial body of research, it is rare to find data on how firms reinvent their business models for circularity [22–27], and how these practices enhance their economic, environmental, and social efficiencies [28–31], especially in Pakistan, Malaysia, and China. It is also difficult to find data on how government policies and support contribute to the transition process towards achieving sustainable development goals. In the existing scenario, previous studies have widely focused on the larger firms [32,33] but paid less attention to SMEs, especially in a comparative context in Pakistan, Malaysia, and China to understand the approaches towards SDGs. Therefore, this study has observed a gap in research in the relevant literature to evaluate the role of circular economy innovation and BMI in achieving economic, environmental, and social performance among SMEs along with aimed mediation of government incentives in Pakistan, Malaysia, and China. Therefore, this study aims to uncover the following raised research questions:

1. To what degree do circular economy innovation, BMI, and government incentives impact economic, environmental, and social performance among SMEs in Pakistan, Malaysia, and China?
2. What is the relationship between circular economy innovation, BMI, and government incentives among SMEs in Pakistan, Malaysia, and China?
3. Do government incentives mediate the relationship between circular economy innovation, BMI, and economic, environmental, and social performance among SMEs in Pakistan, Malaysia, and China?

To uncover the above research questions, we observed a need to study conduction in the defined context. Therefore, this study contributes to the relevant literature by evaluating the impacts of circular economy innovation, BMI, and government incentives on the economic, environmental, and social performance among SMEs in Pakistan, Malaysia, and China based on the resource-based view theory of Barney 1991 [34]. This study also contributes by assessing the mediating role of government incentives between circular economy innovation, BMI, and the economic, environmental, and social performance among SMEs in Pakistan, Malaysia, and China. As well, this study merged the literature of circular economy innovation, BMI, government incentives, and SDGs based on the findings from Pakistan, Malaysia, and China. The application of PLS-SEM in the defined context is also a novel methodological contribution. However, the remainder of this study is as follows; after the introduction, this study thoroughly reviews the theoretical background of the defined variables and explains the theoretical framework of the study. Methodology is presented in the third section, and results are presented in the fourth section of this study. Discussion, implications, and conclusions are included in the last part of this study.

## 2. Theoretical Background and Hypothesis Development

### *2.1. The Resource-Based View Theory*

The concept of resource-based view was introduced by Barney in 1991 as a method of viewing of environmental circumstances to gain competitive advantages by using the organizational resources [34]. Barney focused on establishing a connection among heterogeneous resources and the mobility of these resources with the firm's strategic objectives to gain a competitive advantage in the target market. Barney also argued for the use of valuable resources such as physical capital resource, human capital resources, and organization capital resources to enable firms' practices to gain overall efficiency and improvement in performance. It is important for an organization to realize the uniqueness of the available resources (particularly, valuable, rare, imperfect able, and non-substitutable) and utilize them in a way to improve the efficiencies and effectiveness of organization [35]. Valuable, rare, imperfect able, and non-substitutable resources can lead to gaining a competitive advantage in the marketplace and creates barriers for competitors in follow-up imitation. The valuable, rare, imperfect able and non-substitutable resources of SMEs can help to improve the brand image and profitability of firms. It can also lead to create a monopoly in the target market and prevent the entrance of new ventures. In the view of resource-based theory, resources and capabilities can improve production efficiencies among firms, which leads to the enhancement of short-term and long-term profitability of firms [34]. Production efficiencies can also support the elimination of adverse impacts on the environment and gain social efficiencies among communities. Therefore, in the view of resource-based theory, innovating business model, and implementing the practices of circular economy innovation, firms can gain a competitive advantage and economic, environmental, and social efficiencies in the market.

### *2.2. Circular Economy Innovation and Sustainable Development Goals*

In light of the UN sustainability agenda 2030 to transform the world through sustainable development for gaining economic, environmental, and social efficiencies among

communities, the notion of circular economy has widely emerged into the academic literature and practices. The agenda of sustainable development was published with the aim of revising economic, environmental, and social policies to ensure prosperity, eliminating poverty and hunger among communities, and to ensure the sustainability of this planet [36]. In this regard, many international organizations and agencies, and the European Union, are trying to boost sustainability through accelerating the transition from linear economy to circular economy innovation [37,38], and launched a roadmap to a "resource efficient Europe" in 2011 to increase sustainability. In 2015, the EU initiated a program called "Close the Circle: An Action Plan of the European Union for the Circular Economy" and enforced its implementation in the member states to achieve the economic, environmental, and social efficiencies.

Kirchherr, Reike, and Hekkert [39] have defined circular economy as "a an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level such as products, companies, consumers, eco-industrial parks, and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers." In this regard, the circular economy approach should be treated as an economic model and as a tool to achieve sustainable development goals among communities [40].

Specifically, the strategy of circular economy is useful to achieve sustainable development goals including economic growth, sustainable production and consumption, climate change and environmental efficiencies, and quality of life and social efficiencies [40]. In this regard, many countries consider circular economy as the prime indicator to achieve the objectives of sustainable development goals and sustainable wellbeing, noted as "This action plan will be instrumental in reaching the Sustainable Development Goals (SDGs) by 2030" [40]. Similarly, many other organizations have noted that circular economy innovation has positive significant effects on sustainable development goals, especially in economic, environmental, and social efficiencies [40].

Predominantly, the transition from the traditional to circular economy model has positive significant impacts on sustainable development goals in direct and indirect ways [41], especially economic, environmental, and social efficiencies, as well as international competitiveness. In this regard, circular economy innovation is a prudent strategy to meet the economic, environmental, and social needs among societies and to serve sustainability goals [42]. Furthermore, Khajuria et al. [43] have outlined five main pillars of the sustainable development goals, which are: people, planet, prosperity, peace, and partnership. Precisely, the concept of circular economy is the main gateway to the future, a key component of sustainability, and a helpful mechanism to transition from the traditional production system to the more advanced circular economy system [40,44]. However, as per the UN 2030 agenda, economics, environmental, and social efficiencies are the top priorities among the sustainable development goals but are still in infancy and require wide-ranging investigation in the context of circular economy innovation to develop a more solid theoretical framework [36,45]. Therefore, we can hypothesize that:

**H1a**: Circular Economy Innovation has positive effects on economic performance among SMEs in Pakistan, Malaysia, and China

**H1b:** Circular Economy Innovation has positive effects on environmental performance among SMEs in Pakistan, Malaysia, and China

**H1c:** Circular Economy Innovation has positive effects on social performance among SMEs in Pakistan, Malaysia, and China

### *2.3. Business Model Innovation and Sustainable Development Goals*

BMI is perceived as a main indicator of sustainable development, product and service innovation, technological innovation to achieve the goal of competitive advantage, and

income generation [46]. Principally, BMI is the higher-level modification and perfection of the foundation of a business model, production process, services structure, and product features to enhance the sustainable development capabilities among firms. In this regard, prior studies have evaluated the role of BMI in achieving the sustainable development goals among enterprises and observed that BMI has positive association with SDGs [46], and lead firms to achieve economic, environmental, and social efficiencies, as well as a competitive advantage. BMI involves the unique structural and foundational elements of enterprises that work as a mean to achieve core competencies in industrial settings and set them apart from competitors. BMI is an effective strategy to obtain resources, enhance efficiencies, explore new markets to create values, and adopt new methods and logics to acquire values that lead firms to achieve the sustainable development goals [46]. However, the literature has highlighted four categories of BMI, which are: full innovation, partial innovation, expansion innovation, and realization innovation.

BMI reintegrates the internal and external capabilities and resources of firms that can improve the operations, efficiencies, market performance, and core competencies of firms, which can lead them to achieve the sustainable development goals. Therefore, BMI is emerging as a new trend of sustainability in industrial setup and enabling the reconfiguration of business capabilities and resources to achieve economic, environmental, and social efficiencies [47]. Due to its high robustness, researchers are widely attempting BMI for sustainability in various settings to understand its role in achieving economic, environmental, and social efficiencies; however, further investigation is needed to highlight its role in creativity, innovation, and ecosystem efficiencies [48]. Particularly, in prior studies, the research on BMI has widely focused on the value creation, value delivery, and value capturing [48]. Therefore, this study has observed a gap in the literature and identified a need to examine the role of BMI in achieving economic, environmental, and social efficiencies and proposed that:

**H2a:** BMI has positive effects on the economic performance of SMEs in Pakistan, Malaysia, and China

**H2b:** BMI has positive effects on the environmental performance of SMEs in Pakistan, Malaysia, and China

**H2c:** BMI has positive effects on the social performance of SMEs in Pakistan, Malaysia, and China

### *2.4. Government Incentives and Sustainable Development Goals*

As per the UN sustainability agenda 2030, economic, environmental, and social efficiencies are the prime motives of many organizations, agencies, and countries around the world to ensure energy conservation, the elimination of poverty and hunger, clean drinking water, employment, economy growth, health and protection, peace, and the reduction of pollution, and to improve the quality of life in societies to produce a sustainable world for all people. In this regard, government agencies can play a vital role in achieving the sustainable development goals, especially among SMEs, which most often face a lack of resources and guidance from the UN sustainability agenda [49]. State level initiatives and schemes, especially financial incentives, can play a significant role in monitoring pollution, providing direction, gaining growth, and achieving the sustainable development goals among firms [50]. However, this study focuses on the economic, environmental, and social efficiencies of SMEs in relation to government incentives.

In the view of the UN sustainability agenda, it is almost the key responsibility of every government to formulate a solid structure of SDG strategies for SMEs to ensure smooth operating functions [51], and to achieve economic, environmental, and social efficiencies, as well as the creation of values among societies. In the context of resource-based view theory, the firms with sufficient resources can efficiently transform their setup from the traditional production system to more the effective sustainable production system to achieve desirable performance [52]. Particularly, government incentives and technical assistance can play a major role in SMEs to launch more sustainable initiatives to ensure

economic, environmental, and social efficiencies. Government financial schemes can lend support to control firms' crisis situations and help in survival, growth, achieving sustainable development, and overcoming imbalance of resources [53]. In this regard, the Chinese government has launched financial schemes to promote sustainability initiatives among firms and transition them from the traditional mode of business to a more sustainable and energy efficient production system [52].

Without financial incentives, it is often difficult to launch sustainability initiatives, environmental practices, and corporate social responsibilities among communities [54], while an efficient financial position can support the adoption of more desirable businesses practices among communities. In the same way, non-financial support is also essential for smooth functioning and performance to ensure firms' survival in a competitive environment [52]. In emerging economies, government incentives and favorable policies (such as low taxes, lower regulatory charges etc.) lead firms toward sustainability initiatives and green practices to achieve economic, environmental, and social efficiencies, especially among small firms. Therefore, we can hypothesize that:

**H3a:** Government incentives have positive effects on the economic performance of SMEs in Pakistan, Malaysia, and China

**H3b:** Government incentives have positive effects on the environmental performance of SMEs in Pakistan, Malaysia, and China

**H3c:** Government incentives have positive effects on the social performance of SMEs in Pakistan, Malaysia, and China

### *2.5. Circular Economy Innovation and Government Incentives*

Circular economy innovation is the higher-level rethinking of manufacturing, industrial processes, services, product innovation, production process, consumption, and usage of raw material to achieve sustainable development goals [55], and is the "*transition from linear economic models based on take, make, use and waste towards circular models that minimize, recover, recycle, and reuse materials, water, and energy*." The transition process includes several steps and requires essential resources to implement a more efficient and sustainable business model. Circular economy innovation is the key driver for the elimination of environmental impacts to ensure sustainable economic growth in a competitive environment. In this regard, incentive schemes are the basic requirement among firms to bring a spirit of sustainable innovation, circular economy innovation, and business model innovation to achieve long lasting economic, environmental, and social efficiencies among communities. Accelerating the transition towards circular economy requires essential incentives to overcome the barriers to implementing circular economy innovation among firms [56]. Particularly, financial incentives play an instrumental role in empowering firms as well as consumers to adopt the habit of more sustainable choices. Incentives enable firms to initiate sustainability practices, create value for societies, and launch more desirable business activities [56]. Concisely, circular economy innovation attracts investor's interest in a competitive business environment and leads toward better financial outcomes [56]. Therefore, we can propose a hypothesis that:

**H4:** There is a positive relationship between circular economy innovation and government incentives among SMEs in Pakistan, Malaysia, and China

### *2.6. Business Model Innovation and Government Incentives*

Firms, institutions, and government agencies are widely enforcing their workers to focus on discoveries, innovation, and R&D practices. In this regard, they offer a bundle of incentives to launch new projects, hire consultants, and train their workers for greater creativity and innovation purposes. Creation and discoveries are mysterious processes and require incentives for better innovation [57], and, without incentives, especially government funding, it is difficult for SMEs to create a higher level of innovation and show sustainable performance. Innovation and creativity increase the confidence of firms, lead to a competitive advantage, and grab investors' attention. Zhang and Guan [58] have

observed that innovation performance affects government financial incentives in the Chinese context. Furthermore, the innovation of business models can improve the economic, environmental, and social efficiencies among SMEs, growth, and value in societies, and gain government attention towards greater innovation and industrial development. Usually, the product, process, services, and model innovation among firms provide the direction and define the future for communities and government agencies to formulate more innovative policies and spare a good number of incentives for developmental and R&D purposes. Therefore, we propose in this study that:

**H5:** There is a positive relationship between BMI and the government incentives among SMEs in Pakistan, Malaysia, and China

### *2.7. Mediating Role of Government Incentives*

In the interpretation of the UN sustainability outline, many organizations, agencies, and the EU have launched various developmental programs and schemes to achieve economic, environmental, and social efficiencies among communities and ensure the smooth survival of firms. Specifically, the EU and Chinese government have offered various schemes to transform from the linear production system to more efficient and sustainable business practices. Particularly, financial support can provide fresh motivation to SMEs which most often face a lack of financial resources, developmental fundings, and scarce knowledge of sustainable development goals. Financial support can play a significant role in achieving the economic, environmental, and social efficiencies among small enterprises [59]. In this regard, many countries have aggressively focused on boosting sustainability practices and accelerating the transition from linear to more energy efficient production systems and circular economy innovation [37,38]. Likewise, under the pressure of environmental degradation, many firms are trying to renovate their business models and adopting the practices of circular economy innovation to ensure the achievement of sustainable development goals.

Usually, government incentives and technical assistance put pressure on a firm's administration to implement sustainability practices by innovating their business model and adopting the activities of circular economy innovation. Government subsidies can support the controlling of environmental pollution, promote ecological innovation, green initiative, BMI, and circular economy innovation, and gain economic, environmental, and social efficiencies [60–62]. With a view towards a transition towards more sustainable business practices, many countries have initiated a program of circular economy and enforced firms to ensure its implementation to achieve economic, environmental, and social efficiencies. Especially, the EU has assumed the practices of circular economy as a tool to achieve the sustainable development goals [37]. In this regard, government incentives can play a significant role in achieving the sustainable development goals to transform the prominent business model from a high-pollution and energy-consumption process to more environment friendly business practices [63]. Environment-oriented policies can play a significant role in circular economy innovation, business model innovation [64,65], and achieving the sustainable development goals. Consequently, with the support of government incentives, SMEs can effectively prevent wastage and pollution by transforming the existing business model into a more innovative business model, promoting ecological practices and circular economy innovation to achieve the sustainable development goals [66]. Therefore, we can hypothesize that:

**H6a:** Government incentives mediate the relationship between circular economy innovation and economic performance among SMEs in Pakistan, Malaysia, and China

**H6b:** Government incentives mediate the relationship between circular economy innovation and environmental performance among SMEs in Pakistan, Malaysia, and China

**H6c:** Government incentives mediate the relationship between circular economy innovation and social performance among SMEs in Pakistan, Malaysia, and China

**H7a:** Government incentives mediate the relationship between BMI and economic performance among SMEs in Pakistan, Malaysia, and China

**H7b:** Government incentives mediate the relationship between BMI and environmental performance among SMEs in Pakistan, Malaysia, and China

**H7c:** Government incentives mediate the relationship between BMI and social performance among SMEs in Pakistan, Malaysia, and China

Based on the inclusive literature review and theoretical circumstantial, this study has developed a conceptual research framework that involves circular economy innovation, BMI, government incentives, and sustainable development goals as shown in (Figure 1).

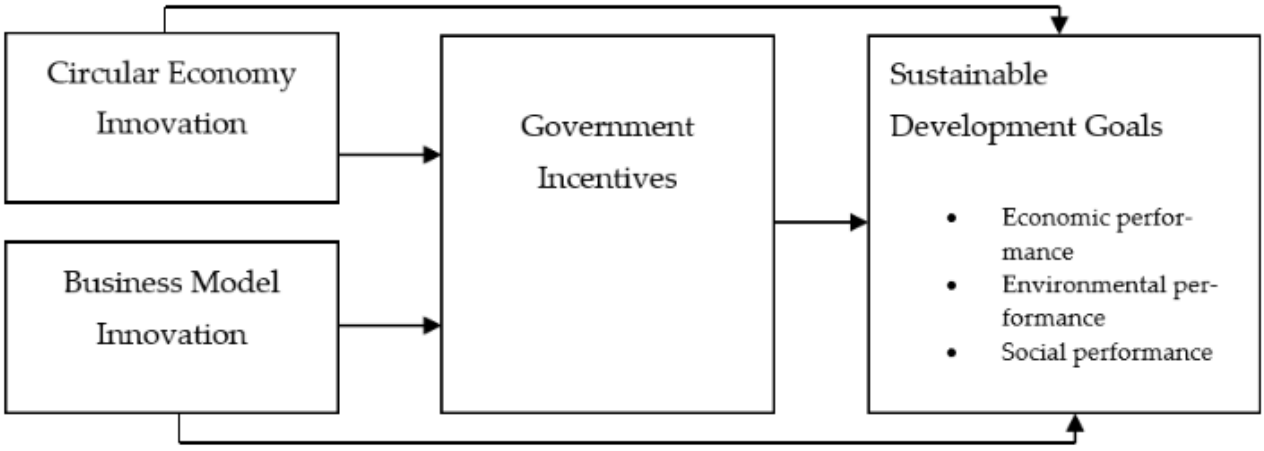


**Figure 1.** Conceptual model.

## 3. Methodology

### *3.1. Sample and Data Collection*

The current study collected data through online questionnaires from the owners, CEO, and operational managers of registered SMEs in Pakistan, Malaysia, and China to analyze the practices of sustainable development goals in relation to circular economy innovation and BMI. The study derived the sample size with the support of G-Power which is perceived as an authentic procedure in PLS-SEM [67]. The outcome of the G-Power has shown that 129 is the minimum set of data to establish a relationship among the defined constructs for a single unit. However, we circulated 384 questionnaires among each country (Pakistan, Malaysia, and China) using the random sampling technique to achieve the minimum level of dataset from July 2021 to August 2022 among manufacturing and services firms. The profiles of firms are presented with their complete information in Table 1. Meanwhile, only 300 questionnaires were considered for each unit due to the minimum acceptable ratio of the respondent's participation. We clarified to the respondents that the data will be used only for research and publication purposes, and they happily cooperated in this regard.

**Table 1.** Profile of the firms.

| Pakistan | | | Malaysia | | | China | | |
|---|---|---|---|---|---|---|---|---|
| **Description** | **Frequency** | **Percentage** | **Description** | **Frequency** | **Percentage** | **Description** | **Frequency** | **Percentage** |
| **Owners/Managers** | | | **Owners/Managers** | | | **Owners/Managers** | | |
| Owner | 53 | 17.66% | Owner | 61 | 20.33% | Owner | 76 | 25.33% |
| CEO | 64 | 21.33% | CEO | 69 | 23.00% | CEO | 57 | 19.00% |
| Managers | 183 | 61.00% | Managers | 170 | 56.66% | Managers | 167 | 55.66% |
| **Industries** | | | **Industries** | | | **Industries** | | |
| Chemicals | 41 | 13.66% | Chemicals | 45 | 15.00% | Chemicals | 39 | 13.00% |
| Software | 57 | 19.00% | Software | 64 | 21.33% | Software | 63 | 21.00% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pharmacy | 47 | 15.66% | Pharmacy | 43 | 14.33% | Pharmacy | 52 | 17.33% |
| Cosmetics | 62 | 20.66% | Cosmetics | 54 | 18.00% | Cosmetics | 59 | 19.66% |
| Engineering | 37 | 12.33% | Engineering | 42 | 14.00% | Engineering | 50 | 16.66% |
| Electronics | 56 | 18.66% | Electronics | 52 | 17.33% | Electronics | 37 | 12.33% |
| **Size of the Firm** | | | **Size of the Firm** | | | **Size of the Firm** | | |
| 20–50 Employees | 44 | 14.66% | 20–50 Employees | 51 | 17.00% | 20–50 Employees | 31 | 10.33% |
| 51–100 Employees | 72 | 24.00% | 51–100 Employees | 68 | 22.66% | 51–100 Employees | 57 | 19.00% |
| 101–150 Employees | 82 | 27.33% | 101–150 Employees | 74 | 24.66% | 101–150 Employees | 72 | 24.00% |
| 151–200 Employees | 56 | 18.66% | 151–200 Employees | 79 | 26.33% | 151–200 Employees | 81 | 27.00% |
| 201–250 Employees | 46 | 15.33% | 201–250 Employees | 28 | 9.33% | 201–250 Employees | 59 | 19.66% |
| **Age of the Firm** | | | **Age of the Firm** | | | **Age of the Firm** | | |
| 10 Years or less | 145 | 48.33% | 10 Years or less | 87 | 29.00% | 10 Years or less | 85 | 28.33% |
| 11–20 Years | 94 | 31.33% | 11–20 Years | 173 | 57.66% | 11–20 Years | 181 | 60.33% |
| 21 and above Years | 61 | 20.33% | 21 and above Years | 40 | 13.33% | 21 and above Years | 34 | 11.33% |

### *3.2. Instruments*

The instrument of the study was adopted and adapted for all the constructs as presented in Table 2. The questionnaire mentions the demographic information along with the important descriptions of defined constructs. The questionnaire was refined as per the study requirements. The study used structured questionnaires as most of the firms have no formal data for circular economy innovation, BMI, and SDGs. All the questions were closed-ended; however, the choice given to mark the most suitable option. The scale was defined in the range of strongly agree to strongly disagree on the five-point Likert scale. Highly expert researchers evaluated the accuracy of the scale to confirm the face validity. Some weak items were deleted as per the expert's advice. The scale was also evaluated with the strategy of pilot study to finalize the more reliable scale in this study (Appendix A).

**Table 2.** Instruments of the study.

| Constructs | | Number of Items | Authors |
|---|---|---|---|
| Circular Economy Innovation | | 8 | Rodríguez-Espíndola et al., 2022 [3] |
| BMI | | 6 | Anwar, 2018 [68] |
| Government Incentives | Financial Support | 6 | Anwar et al., 2020 [52] |
| | Non-Financial Support | 6 | Anwar et al., 2020 [52] |
| Sustainable Development Goals | Social Development | 8 | Rizwanullah et al., 2021; Anwar et al., 2020 [52,63] |
| | Environmental Development | 12 | Rizwanullah et al., 2021; Anwar et al., 2020 [52,63] |
| | Economics Development | 6 | Rehman& Anwar,2019;Anwar, Khan& Shah, 2018 [69,70] |

*3.3. Technique*

The current study evaluated the acquired data through Smart Partial Least Square Structural Equation Modeling (PLS-SEM) to test the developed hypothesis. PLS-SEM has the advantage of validating each step a in systematic way, displaying results only in one click, and having a better performance in predictive studies [71–73]. Therefore, we finalized the application of PLS-SEM in the proposed research model to obtain results due to its suitability in the defined theoretical framework.

## 4. Results

The current study has evaluated the collected information via PLS-SEM to display a layout of the results. In PLS-SEM analysis, measurement and structural models are the main steps to assess the validity of the model and test the developed hypothesis [74]. In the measurement model, factors loading, composite reliability, and average variance extracted (AVE) are the main factors of interest to ensure the convergent validity in the proposed conceptual model. The acceptable values of factors loading are 0.7 or higher, for composite reliability 0.7 or greater, for Cronbach's Alpha 0.7 or greater, and for AVE 0.5 or greater as indicated below (Table 3) for all three cases. The results revealed that all the concerned values are in the acceptable range. Further, the study applied the Fornell and Larcker [75] criteria to evaluate the accuracy of discriminant validity. The outcomes of the discriminant validity can be seen in Table 4 where the diagonal values are higher in the concerned rows and columns for each unit. The approach of HTMT was applied to verify the accuracy of discriminant validity in the assessment of the measurement model. The results of HTMT are presented in Table 4. In addition, the current study evaluated the issues of multicollinearity through variance inflation factor (VIF) among the available constructs and observed that there are no issues of multicollinearity in this study.

In the second step of PLS-SEM, in the assessment of the structural model, a bootstrapping procedure was applied for testing the developed hypothesis. The results indicated that the circular economy innovation, BMI, and government incentives have positive significant effects on economic, environmental, and social performance among SMEs in Pakistan and China. In the same way, circular economy innovation and BMI have positive significant effects on economic, environmental, and social performance among SMEs in Malaysia. Surprisingly, government incentives a have positive significant relationship with economic and social performance, but a non-significant relationship with environmental performance among SMEs in Malaysia, as shown in Table 5. In addition, the findings revealed that the government incentives mediate the relationship between circular economy innovation and the economic, environmental, and social performance among SMEs in Pakistan, Malaysia, and China, as shown in Table 6. In the same manner, the study observed that government incentives mediate the relationship between BMI and the economic, environmental, and social performance among SMEs in Pakistan, Malaysia, and China. Moreover, the findings revealed that the values of Q-squares are higher than zero which means that predictive relevance exists in this study.

**Table 3.** Factor Loading, Cronbach's Alpha, Composite Reliability, and AVE.

| Variable | Items | Pakistan | | | | Malaysia | | | | China | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F.L | C.A | C.R | AVE | F.L | C.A | C.R | AVE | F.L | C.A | C.R | AVE |
| **Circular Economy Innovation** | CEIN1 | 0.832 | 0.861 | 0.924 | 0.671 | 0.775 | 0.88 | 0.909 | 0.626 | 0.879 | 0.880 | 0.909 | 0.626 |
| | CEIN 2 | 0.799 | | | | 0.715 | | | | 0.772 | | | |
| | CEIN 3 | 0.749 | | | | 0.786 | | | | 0.719 | | | |
| | CEIN 4 | 0.764 | | | | 0.880 | | | | 0.785 | | | |
| | CEIN 5 | 0.682 | | | | 0.801 | | | | 0.803 | | | |
| | CEIN 6 | 0.780 | | | | 0.782 | | | | 0.782 | | | |
| **BMI** | BMI1 | 0.898 | 0.901 | 0.896 | 0.591 | 0.828 | 0.851 | 0.889 | 0.573 | 0.653 | 0.886 | 0.914 | 0.643 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BMI2 | 0.783 | | | | 0.701 | | | | 0.899 | | | |
| | BMI3 | 0.903 | | | | 0.755 | | | | 0.787 | | | |
| | BMI4 | 0.777 | | | | 0.700 | | | | 0.900 | | | |
| | BMI5 | 0.756 | | | | 0.758 | | | | 0.778 | | | |
| | BMI6 | 0.783 | | | | 0.790 | | | | 0.768 | | | |
| | GIN1 | 0.860 | | | | 0.860 | | | | 0.611 | | | |
| | GIN2 | 0.802 | | | | 0.800 | | | | 0.747 | | | |
| **Government Incentives** | GIN3 | 0.889 | 0.887 | 0.924 | 0.634 | 0.890 | 0.887 | 0.917 | 0.689 | 0.750 | 0.814 | 0.868 | 0.571 |
| | GIN4 | 0.784 | | | | 0.785 | | | | 0.826 | | | |
| | GIN5 | 0.812 | | | | 0.812 | | | | 0.822 | | | |
| | EF1 | 0.816 | | | | 0.816 | | | | 0.855 | | | |
| | EF2 | 0.812 | | | | 0.844 | | | | 0.806 | | | |
| | EF3 | 0.721 | | | | 0.822 | | | | 0.748 | | | |
| **Economics Performance** | EF4 | 0.788 | 0.903 | 0.928 | 0.636 | 0.731 | 0.904 | 0.924 | 0.636 | 0.743 | 0.907 | 0.926 | 0.642 |
| | EF5 | 0.796 | | | | 0.739 | | | | 0.794 | | | |
| | EF6 | 0.817 | | | | 0.799 | | | | 0.847 | | | |
| | EF7 | 0.820 | | | | 0.823 | | | | 0.810 | | | |
| | ENF1 | 0.819 | | | | 0.660 | | | | 0.798 | | | |
| | ENF2 | 0.840 | | | | 0.893 | | | | 0.815 | | | |
| | ENF3 | 0.825 | | | | 0.779 | | | | 0.798 | | | |
| **Environmental Performance** | ENF4 | 0.731 | 0.904 | 0.917 | 0.689 | 0.894 | 0.897 | 0.92 | 0.624 | 0.817 | 0.903 | 0.923 | 0.632 |
| | ENF5 | 0.738 | | | | 0.765 | | | | 0.745 | | | |
| | ENF6 | 0.802 | | | | 0.747 | | | | 0.792 | | | |
| | ENF7 | 0.818 | | | | 0.767 | | | | 0.797 | | | |
| | SF1 | 0.710 | | | | 0.815 | | | | 0.708 | | | |
| | SF2 | 0.785 | | | | 0.814 | | | | 0.774 | | | |
| | SF3 | 0.702 | | | | 0.721 | | | | 0.691 | | | |
| **Social Performance** | SF4 | 0.790 | 0.888 | 0.913 | 0.601 | 0.791 | 0.903 | 0.924 | 0.634 | 0.771 | 0.868 | 0.899 | 0.561 |
| | SF5 | 0.888 | | | | 0.791 | | | | 0.878 | | | |
| | SF6 | 0.743 | | | | 0.816 | | | | 0.743 | | | |
| | SF7 | 0.792 | | | | 0.821 | | | | 0.656 | | | |

**Table 4.** Discriminant Validity and HTMT.

| | | **Discriminant Validity** | | | | | | | **HTMT** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **CEIN** | **BMI** | **GIN** | **ED** | **END** | **SD** | | **CEIN** | **BMI** | **GIN** | **ED** | **END** | **SD** |
| | **CEIN** | **0.919** | | | | | | **CEIN** | | | | | | |
| | **BMI** | 0.507 | **0.869** | | | | | **BMI** | 0.407 | | | | | |
| **Pakistan** | **GIN** | 0.651 | 0.494 | **0.846** | | | | **GIN** | 0.535 | 0.497 | | | | |
| | **ED** | 0.563 | 0.607 | 0.653 | **0.897** | | | **ED** | 0.549 | 0.513 | 0.440 | | | |
| | **END** | 0.393 | 0.429 | 0.423 | 0.414 | **0.830** | | **END** | 0.335 | 0.401 | 0.357 | 0.463 | | |
| | **SD** | 0.578 | 0.515 | 0.615 | 0.620 | 0.421 | **0.775** | **SD** | 0.438 | 0.582 | 0.282 | 0.388 | 0.464 | |
| | **CEIN** | **0.757** | | | | | | **CEIN** | | | | | | |
| | **BMI** | 0.536 | **0.891** | | | | | **BMI** | 0.502 | | | | | |
| **Malaysia** | **GIN** | 0.643 | 0.505 | **0.897** | | | | **GIN** | 0.423 | 0.498 | | | | |
| | **ED** | 0.622 | 0.428 | 0.568 | **0.790** | | | **ED** | 0.301 | 0.319 | 0.261 | | | |
| | **END** | 0.480 | 0.414 | 0.414 | 0.408 | **0.830** | | **END** | 0.242 | 0.364 | 0.363 | 0.254 | | |
| | **SD** | 0.641 | 0.286 | 0.353 | 0.456 | 0.423 | **0.796** | **SD** | 0.223 | 0.274 | 0.054 | 0.347 | 0.470 | |
| | **CEIN** | **0.802** | | | | | | **CEIN** | | | | | | |
| | **BMI** | 0.509 | **0.791** | | | | | **BMI** | 0.453 | | | | | |
| **China** | **GIN** | 0.424 | 0.492 | **0.801** | | | | **GIN** | 0.318 | 0.482 | | | | |
| | **ED** | 0.324 | 0.394 | 0.464 | **0.795** | | | **ED** | 0.219 | 0.304 | 0.066 | | | |
| | **END** | 0.516 | 0.446 | 0.496 | 0.348 | **0.755** | | **END** | 0.386 | 0.411 | 0.354 | 0.530 | | |
| | **SD** | 0.525 | 0.574 | 0.398 | 0.493 | 0.349 | **0.749** | **SD** | 0.492 | 0.428 | 0.261 | 0.303 | 0.418 | |

**Table 5.** Direct Relationship (Hypothesis Testing).

| Country | Relationship | Estimate | SM | SD | T-Value | Decision | R-Square | F-Square | VIF | Q-Square |
|---|---|---|---|---|---|---|---|---|---|---|
| Pakistan | CEIN→EP | 0.287 | 0.289 | 0.048 | 5.945 | Supported | 0.761 | 0.115 | 2.994 | 0.473 |
| | BMI→EP | 0.593 | 0.592 | 0.045 | 13.151 | Supported | | 0.510 | 2.889 | |
| | GIN→EP | 0.067 | 0.066 | 0.031 | 2.193 | Supported | | 0.015 | 1.235 | |
| | CEIN→ENP | 0.302 | 0.303 | 0.046 | 6.497 | Supported | 0.782 | 0.139 | 2.994 | 0.49 |
| | BMI→ENP | 0.600 | 0.599 | 0.04 | 15.191 | Supported | | 0.571 | 2.889 | |
| | GIN→ENP | 0.049 | 0.048 | 0.029 | 2.665 | Supported | | 0.009 | 1.235 | |
| | CEIN→SP | 0.068 | 0.068 | 0.081 | 2.839 | Supported | 0.38 | 0.003 | 2.987 | 0.22 |
| | BMI→SP | 0.436 | 0.436 | 0.076 | 5.760 | Supported | | 0.106 | 2.853 | |
| | GIN→SP | 0.220 | 0.222 | 0.055 | 3.986 | Supported | | 0.064 | 1.262 | |
| | CEIN→GIN | 0.321 | 0.326 | 0.096 | 3.340 | Supported | 0.19 | 0.044 | 2.867 | 0.128 |
| | BMI→GIN | 0.134 | 0.134 | 0.097 | 2.382 | Supported | | 0.008 | 2.867 | |
| Malaysia | CEIN→EP | 0.645 | 0.643 | 0.035 | 18.367 | Supported | 0.711 | 0.978 | 1.470 | 0.446 |
| | BMI→EP | 0.295 | 0.297 | 0.04 | 7.335 | Supported | | 0.190 | 1.582 | |
| | GIN→EP | 0.006 | 0.004 | 0.036 | 2.153 | Supported | | 0.000 | 1.361 | |
| | CEIN→ENP | 0.693 | 0.693 | 0.03 | 23.069 | Supported | 0.729 | 1.208 | 1.470 | 0.445 |
| | BMI→ENP | 0.249 | 0.251 | 0.037 | 6.656 | Supported | | 0.145 | 1.582 | |
| | GIN→ENP | 0.001 | 0.000 | 0.039 | 0.038 | Not Supported | | 0.000 | 1.361 | |
| | CEIN→SP | 0.615 | 0.613 | 0.035 | 17.38 | Supported | 0.686 | 0.818 | 1.470 | 0.427 |
| | BMI→SP | 0.300 | 0.302 | 0.04 | 7.468 | Supported | | 0.181 | 1.582 | |
| | GIN→SP | 0.025 | 0.023 | 0.04 | 2.012 | Supported | | 0.001 | 1.361 | |
| | CEIN→GIN | 0.220 | 0.221 | 0.061 | 3.631 | Supported | 0.265 | 0.047 | 1.404 | 0.179 |
| | BMI→GIN | 0.362 | 0.361 | 0.06 | 5.990 | Supported | | 0.127 | 1.404 | |
| China | CEIN→EP | 0.356 | 0.359 | 0.046 | 7.658 | Supported | 0.729 | 0.161 | 2.910 | 0.462 |
| | BMI→EP | 0.493 | 0.488 | 0.048 | 10.267 | Supported | | 0.282 | 3.178 | |
| | GIN→EP | 0.083 | 0.088 | 0.04 | 2.068 | Supported | | 0.019 | 1.367 | |
| | CEIN→ENP | 0.364 | 0.366 | 0.044 | 8.277 | Supported | 0.728 | 0.167 | 2.910 | 0.453 |
| | BMI→ENP | 0.498 | 0.493 | 0.047 | 10.671 | Supported | | 0.287 | 3.178 | |
| | GIN→ENP | 0.061 | 0.066 | 0.04 | 2.534 | Supported | | 0.010 | 1.367 | |
| | CEIN→SP | 0.172 | 0.169 | 0.07 | 2.460 | Supported | 0.47 | 0.019 | 2.750 | 0.243 |
| | BMI→SP | 0.330 | 0.33 | 0.063 | 5.223 | Supported | | 0.065 | 3.168 | |
| | GIN→SP | 0.302 | 0.305 | 0.049 | 6.109 | Supported | | 0.126 | 1.332 | |
| | CEIN→GIN | 0.081 | 0.086 | 0.086 | 1.988 | Supported | 0.269 | 0.003 | 2.900 | 0.142 |
| | BMI→GIN | 0.45 | 0.453 | 0.085 | 5.293 | Supported | | 0.096 | 3.094 | |

**Table 6.** Indirect Effects (Hypothesis Testing).

| Country | Relationship | Estimate | SM | SD | T-Value | CILL | CIUL | Decision |
|---|---|---|---|---|---|---|---|---|
| Pakistan | CEIN→GIN→EP | 0.122 | 0.222 | 0.213 | 1.982 | 0.021 | 0.169 | Supported |
| | CEIN→GIN→ENP | 0.148 | 0.416 | 0.312 | 2.318 | 0.035 | 0.256 | Supported |
| | CEIN→GIN→SP | 0.061 | 0.173 | 0.203 | 2.341 | 0.071 | 0.289 | Supported |
| | BMI→GIN→EP | 0.239 | 0.309 | 0.108 | 2.105 | 0.043 | 0.160 | Supported |
| | BMI→GIN→ENP | 0.347 | 0.206 | 0.206 | 3.043 | 0.034 | 0.278 | Supported |
| | BMI→GIN→SP | 0.030 | 0.330 | 0.223 | 2.276 | 0.050 | 0.172 | Supported |
| Malaysia | CEIN→GIN→EP | 0.261 | 0.101 | 0.308 | 2.146 | 0.021 | 0.173 | Supported |
| | CEIN→GIN→ENP | 0.373 | 0.300 | 0.209 | 3.036 | 0.039 | 0.249 | Supported |
| | CEIN→GIN→SP | 0.145 | 0.405 | 0.209 | 2.575 | 0.045 | 0.266 | Supported |
| | BMI→GIN→EP | 0.182 | 0.202 | 0.114 | 2.147 | 0.039 | 0.161 | Supported |
| | BMI→GIN→ENP | 0.191 | 0.200 | 0.214 | 3.037 | 0.056 | 0.239 | Supported |
| | BMI→GIN→SP | 0.169 | 0.409 | 0.115 | 4.588 | 0.048 | 0.184 | Supported |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| China | CEIN→GIN→EP | 0.117 | 0.207 | 0.209 | 2.793 | 0.009 | 0.222 | Supported |
| | CEIN→GIN→ENP | 0.205 | 0.305 | 0.207 | 3.705 | 0.020 | 0.159 | Supported |
| | CEIN→GIN→SP | 0.125 | 0.226 | 0.126 | 2.944 | 0.017 | 0.222 | Supported |
| | BMI→GIN→EP | 0.238 | 0.204 | 0.121 | 3.813 | 0.003 | 0.132 | Supported |
| | BMI→GIN→ENP | 0.227 | 0.203 | 0.202 | 2.389 | 0.008 | 0.071 | Supported |
| | BMI→GIN→SP | 0.236 | 0.338 | 0.035 | 3.836 | 0.007 | 0.089 | Supported |

Notably, the results of PLS-SEM revealed that BMI has much greater effects on the economic performance of SMEs in Pakistan (Figure 2) as compared with circular economy innovation and government incentives. Likewise, the outcomes of PLS-SEM indicated that BMI has greater impacts on environmental performance among SMEs in Pakistan as compared to circular economy and government incentives. In the same way, the results have shown that BMI has much higher effects on social performance among SMEs in Pakistan as compared to circular economy innovation and government incentives. In addition, we noted that circular economy innovation has a stronger relationship with government incentives as compared to BMI among SMEs in Pakistan. Further, the study observed that government incentives mediate the relationship between circular economy innovation and economic performance among SMEs in Pakistan. The study also noted that government incentives mediate the relationship between circular economy innovation and environmental performance among SMEs in Pakistan. Likewise, we also observed that government incentives mediate the relationship between circular economy innovation and social performance among SMEs in Pakistan.

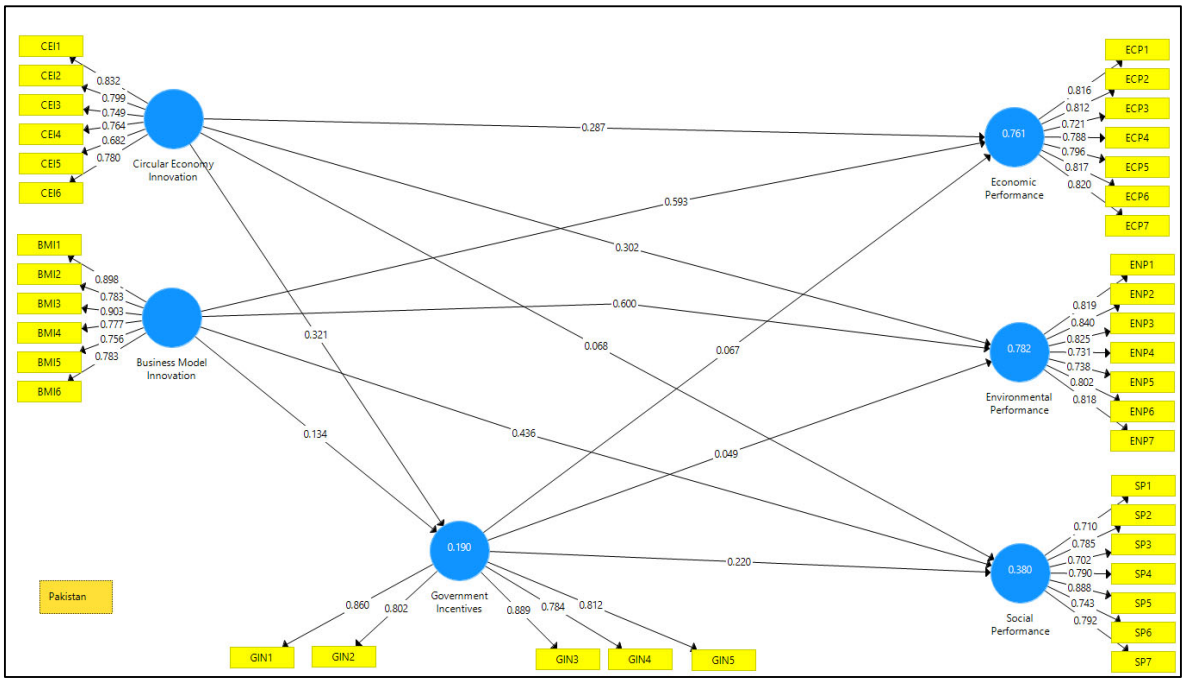


**Figure 2.** Measurement Model (Pakistan).

Additionally, the results of PLS-SEM have indicated that government incentives mediate the relationship between BMI and the economic performance among SMEs in Pakistan. Similarly, we noted that government incentives mediate the relationship between BMI and environmental performance among SMEs in Pakistan. Further, we also observed that government incentives mediate the relationship between BMI and social performance among SMEs in Pakistan. Therefore, based on these results, it has been noted that BMI has

a much stronger role than the other factors in achieving economic, environmental, and social performance among SMEs in Pakistan (Figure 3).

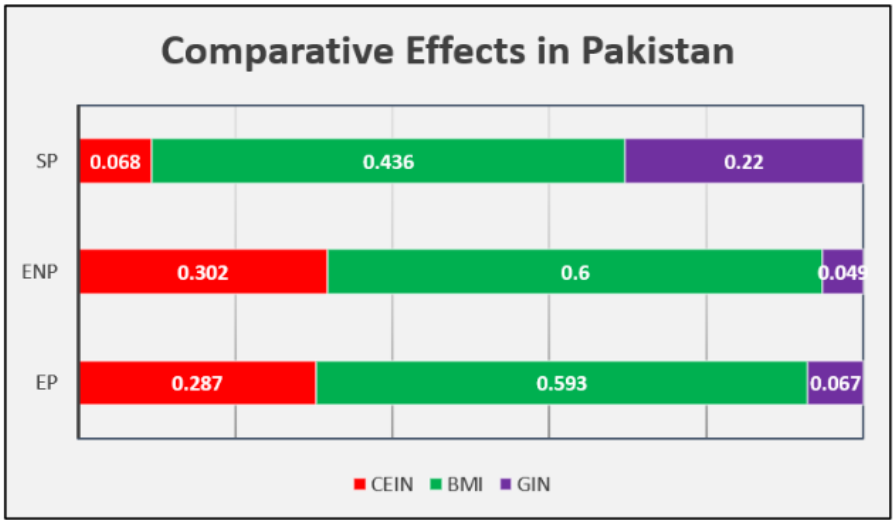


**Figure 3.** Comparative Effects in Pakistan.

Based on the results, it has been noted that BMI has a much stronger role in achieving economic and environmental performance among SMEs as compared to social performance. The study also observed that circular economy innovation has a stronger role in achieving environmental performance among SMEs in Pakistan as compared to economic and social performance. Therefore, on the basis of these results, it can be inferred that SMEs in Pakistan have a greater focus on BMI to achieve a higher level of economic and environmental performance. It can also be said that the government agencies may not be adequately supporting the achievement of social performance among SMEs due to their limited budget. It is also possible that the firms in Pakistan may not have enough internal sources to focus on social performance and, thus, prefer to focus widely on economic and environmental performance to ensure their firm's survival and environmental protection. It is also possible that the consumers in Pakistan are not strongly oriented to social activities and may not prefer to invest social wellbeing. It can also be said that the consumers in Pakistan are not strongly aware of the social circumstances, and, therefore, the SMEs are not widely focusing on the social issues. It is also possible that the Pakistani government is not adequately enforcing SMEs to improve social efficiencies as compared to economic and environmental efficiencies.

Moreover, the results of PLS-SEM clarified that circular economy innovation has a greater role in achieving economic performance among SMEs in Malaysia as compared to BMI and government incentives. In the same way, the results have shown that circular economy innovation has a greater role in achieving environmental performance among SMEs in Malaysia as compared to BMI and government incentives. Likewise, the results have displayed that circular economy innovation has a greater role in achieving social performance among SMEs in Malaysia as compared to BMI and government incentives (Figure 4). Further, the study observed that government incentives mediate the relationship between circular economy innovation and economic performance among SMEs in Malaysia. The study also noted that government incentives mediate the relationship between circular economy innovation and environmental performance among SMEs in Malaysia. Likewise, we also observed that government incentives mediate the relationship between circular economy innovation and the social performance among SMEs in Malaysia.

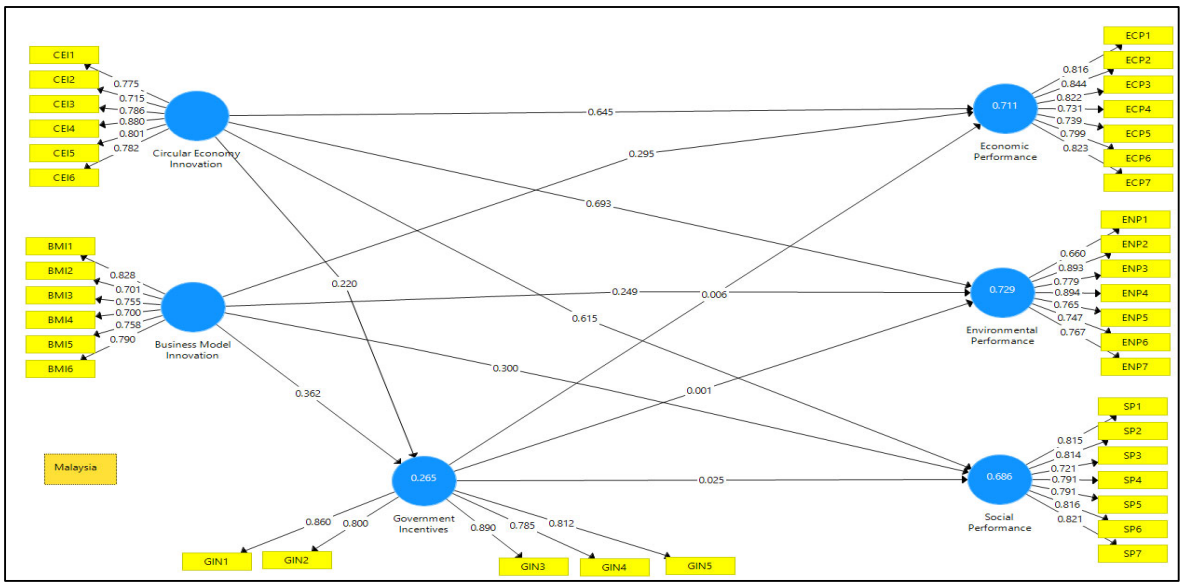


**Figure 4.** Measurement Model (Malaysia).

Additionally, the results of PLS-SEM have indicated that government incentives mediate the relationship between BMI and economic performance among SMEs in Malaysia. Similarly, we also noted that government incentives mediate the relationship between BMI and environmental performance among SMEs in Malaysia. Further, we also observed that government incentives mediate the relationship between BMI and social performance among SMEs in Malaysia. Surprisingly, we noted that government incentives have weak positive and insignificant effects on environmental performance among SMEs in Malaysia. Perhaps the Malaysian government is not widely focusing on building science parks and SDG incubators in poor communities. It may be that the Malaysian government is not giving significant attention to the evaluation of suppliers who are not adequately involved in environmental practices. Therefore, based on these results, it can be noted that circular economy innovation has a much stronger role in achieving economic, environmental, and social performance among SMEs in Malaysia (Figure 5), as compared to BMI and government incentives. Therefore, on the basis of these results, it can be inferred that SMEs in Malaysia have a greater focus on circular economy innovation to achieve a higher level of economic, environmental, and social performance. It can also be said that the government agencies may not supporting too many SMEs in the context of BMI as compared to circular economy innovation.

It is also possible that the firms in Malaysia may not have enough internal sources to focus on BMI and, thus, prefer to focus widely on circular economy innovation to achieve economic, environmental, and social efficiencies. It is also possible that the SMEs in Malaysia have already reinvented their business models and are now focusing widely on circular economy innovation. It is also imaginable that the consumers in Malaysia are more oriented towards circular economy innovation in the view of sustainable developmental goals. It can also be said that the consumers in Malaysia are too oriented towards circular economy innovation; therefore, the SMEs are not widely focusing on BMI. It is also possible that the Malaysian government is widely enforcing SMEs to improve their circular economy innovation practices in society as compared to BMI to achieve economic, environmental, and social efficiencies.

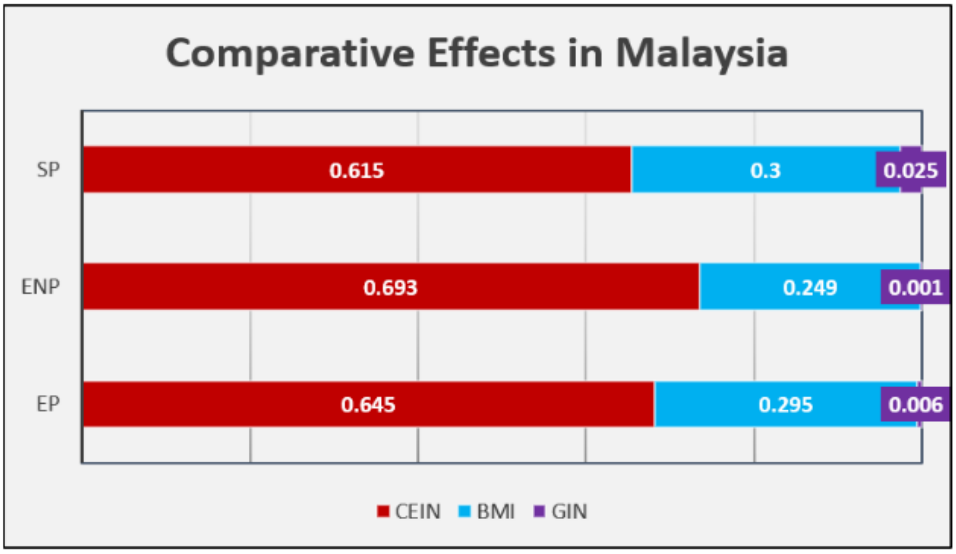


**Figure 5.** Comparative effects in Malaysia.

Likewise, the results of PLS-SEM have indicated that BMI has a greater role in achieving economic performance among SMEs in China as compared to circular economy innovation and government incentives (Figure 6). Likewise, the outcomes of PLS-SEM indicated that BMI has greater impacts on environmental performance among SMEs in China as compared to circular economy and government incentives. In the same way, the results have shown that BMI has much greater effects on the social performance of SMEs in China as compared to circular economy innovation and government incentives. In addition, we noted that circular economy innovation has a stronger relationship with government incentives as compared to BMI among SMEs in China. Further, the study observed that government incentives mediate the relationship between circular economy innovation and economic performance among SMEs in China. The study also found that government incentives mediate the relationship between circular economy innovation and environmental performance among SMEs in China. Likewise, we also observed that government incentives mediate the relationship between circular economy innovation and social performance among SMEs in China.

Additionally, the results of PLS-SEM have indicated that government incentives mediate the relationship between BMI and economic performance among SMEs in China. Similarly, we also noted that government incentives mediate the relationship between BMI and environmental performance among SMEs in China. Further, we also observed that government incentives mediate the relationship between BMI and social performance among SMEs in China. Therefore, based on these results, it can be noted that BMI has a much stronger role in achieving economic, environmental, and social performance among SMEs in China (Figure 7). Based on the results, it was found that BMI has a much stronger role in achieving economic and environmental performance among SMEs in China as compared to social performance. The study also observed that circular economy innovation has a stronger role in achieving environmental performance among SMEs in China as compared to economic and social performance.

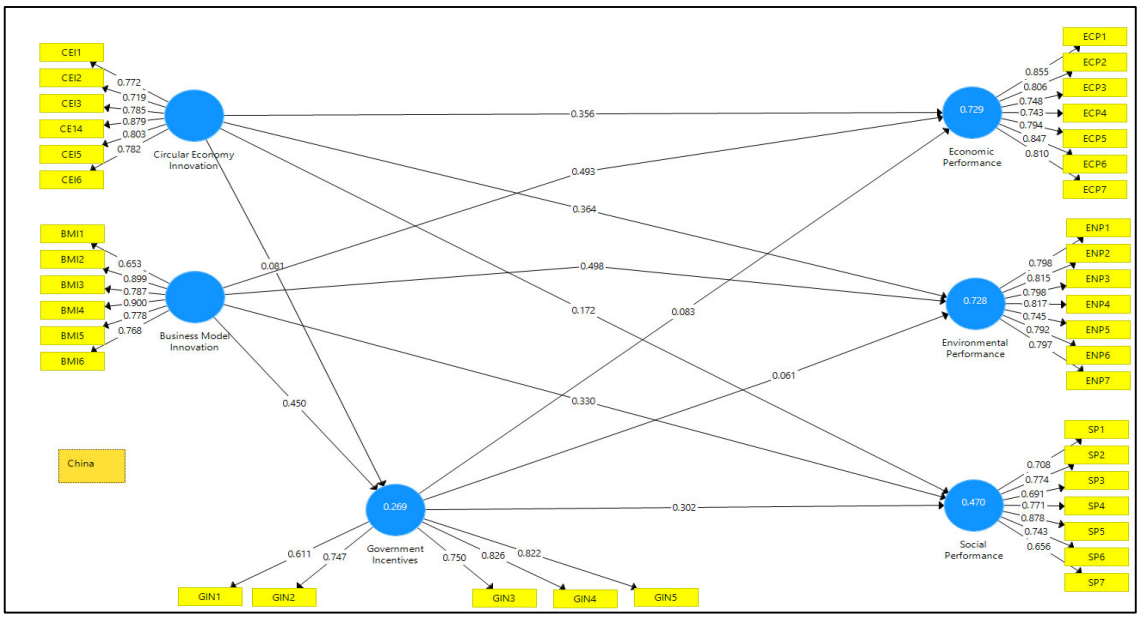


**Figure 6.** Measurement Model (China).

Therefore, on the basis of these results, it can be inferred that SMEs in China have a greater focus on BMI to achieve a higher level of economic and environmental performance. It can also be said that the government agencies may not be adequately supporting the achievement of social performance among SMEs due to higher competition. It is also conceivable that the firms in China may not have enough internal sources to focus on social performance and thus prefer to focus widely on economic and environmental performance to ensure their firm's survival and environmental protection. It is also imaginable that the consumers in China are not strongly oriented towards social activities and may not prefer to invest too much in their social wellbeing. It can also be said that the consumers in China are not very interested in their social circumstances; therefore, the SMEs are not widely focusing on social issues. It is also possible that the Chinese government is not adequately enforcing the improvement of social efficiencies by SMEs as compared to economic and environmental efficiencies.

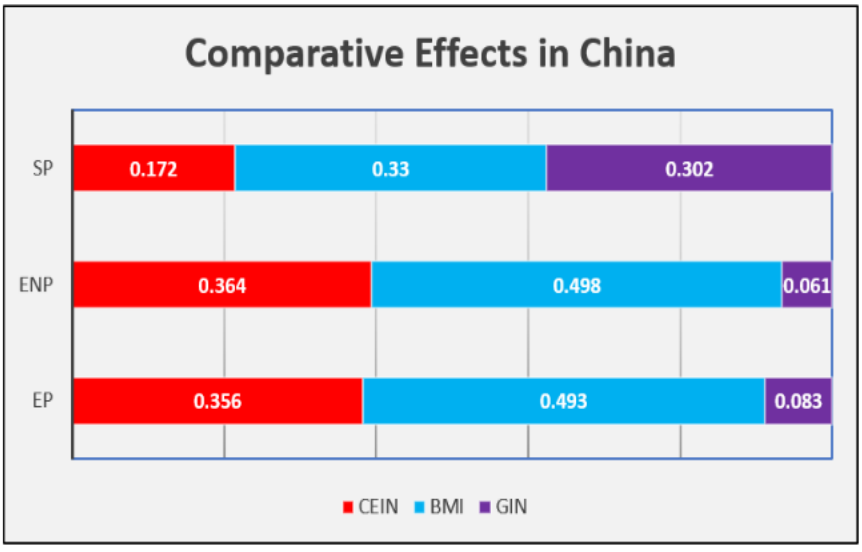


**Figure 7.** Comparative effects in China.

Based on the outcomes of this study, it can be said that SMEs have access to governmental financial schemes and invest a good amount of money in circular economy innovation practices, as well as BMI, to achieve the sustainable development goals in Pakistan, Malaysia, and China. It can also be inferred, based on the results, that there is a structure of stable policies for SMEs in Pakistan, Malaysia, and China, to follow the practices of circular economy innovation and reinvent their business models to achieve economic, environmental, and social efficiencies. Perhaps SMEs have defined some policies of circular economy innovation and strictly follow them while merging in new agreements. It can also be said, on the basis of the results, that SMEs engage their employees and other stakeholders in circular economy innovation strategies and practices to highlight the significance of sustainable development goals in all aspects of their organizations in Pakistan, China, and Malaysia. Similarly, based on the findings in this study, it can be inferred that SMEs are widely focusing on the innovation of their core products and services, as well as their production processes, on a continuing basis to increase their revenue using innovative business strategies. It can also be said that SMEs are aggressively involved in traditional sales practices as well as digital media sales landscapes to sustain their survival and economic, environmental, and social growth.

It can be said, based on the results, that the SMEs in Pakistan, China, and Malaysia are widely exchanging innovative information with their partners, such as pricing structures for raw material, products, and services, on a regular basis to improve their economic, environmental, and social performance in a competitive business environment. It is also possible that the firms are continuously evaluating their value propositions for their products and services by comparing with previous performance to validate their innovative strategies and strive for improvement. Likewise, it can be said, on the basis of the results, that the SMEs in Pakistan, Malaysia, and China have access to government funding opportunities for social, economic, and environmental initiatives and sufficient government financial subsidies are available to them for development purposes. It can also be imagined that the SMEs have access to interest-free government loans schemes, both for the short term and long term, that can improve their social, economic, and environmental performance in communities. It can also be said that there are an adequate number of public programs for social, economic, and environmental development where SMEs can reach out to government sources.

## 5. Discussion

The purpose of this study was to examine the effects of circular economy innovation and BMI on sustainable development goals (economic, environmental, and social development) along with the mediating role of government incentives in Pakistan, Malaysia, and China. The results indicated that circular economy innovation and BMI have positive significant effects on economic, environmental, and social performance in Pakistan, Malaysia, and China. Likewise, government incentives have positive significant effects on economic, environmental, and social performance among SMEs in Pakistan and China. Surprisingly, government incentives have positive significant effects on economic and social performance among SMEs in Malaysia, but insignificant effects on environmental performance. Therefore, the strategies of circular economy innovation, BMI, and the availability of government incentives have an advantage in achieving economic, environmental, and social performance objectives among SMEs, especially in Pakistan, Malaysia, and China. The application of circular economy innovation and innovating the business model as per the community requirements have the advantage of offering more fit services in economic, environmental, and social performance that can lead to achieving, for firms, long lasting objectives and the building of an image in the relevant communities. Specifically, government incentives play a major role in motivating firms to initiate circular economy innovation strategies and transform the firms from the traditional mode of production to a more energy efficient and pollution free production system to establish a more sustainable business environment.

The intent of this study was to examine the relationships between defined variables and provide answers to the raised research questions. The results of the study have clarified the relationships between defined constructs and provided answers to the raised research questions. Further, the results of this study are in line with Anwar [68] who examined the effects of business models on SMEs performance, along with the mediating role of competitive advantage; this study is in line in the sense of BMI and firm performance. This study is also in line with Rizwanullah et al. [63] who assessed the role of green innovation in achieving sustainable development goals along with the moderating role of government incentives; this study is in line in the sense of sustainable development goals and government incentives in Pakistani context. This study is also in line with Khan et al. [76] who investigated the role of sustainable development goals in firms' financial performance along with the moderating role of green innovation; this study is in line in the context of sustainable development goals. This study is also in line with Korsakiene and Raisiene [77], who highlighted the sustainability drivers in the context of SMEs. The study is also in line with Udeh and Akporien [78] in the context of evaluating the triple bottom line in the industrial aspects. This study is also in line with [79] in the context of circular economy and data collection online. However, the findings of this current study are unique as compared to in-line studies due to the analysis of circular economy innovation, BMI, and government incentives in achieving economic, environmental, and social efficiencies in a comparative context among SMEs in Pakistan, Malaysia, and China.

### *5.1. Implications of the Study*

#### 5.1.1. Practical Implications

These findings imply that firms can focus their efforts on circular economy innovation, BMI, and the combination of these variables. which would be an interesting strategy to achieve economic, environmental, and social performance among SMEs. The tactics of circular economy innovation and revising the business model as per the community requirement can inspire firms to initiate more efficient business practices that can result in better performance and gain a competitive advantage. Regular engagement in circular economy innovation activities and BMI practices can improve skills and confidence among employees and facilitate better economic, environmental, and social performance in a competitive business environment. By adopting the circular economy innovation strategies and innovating the business model as per the community requirement, firms can gain some unique production and business practices and skills which may lead them to be perceived as a market leader and difficult for competitors to beat in a competitive business environment. It can also lead firms to be perceived as a top brand among communities and help to capture market shares. The expertise of workers and skills can lead towards better innovation capabilities. The wise tactics of circular economy innovation and business model efficiencies can provide the opportunity for trust among communities and building a brand image which can lead to achieving economic, environmental, and social objectives. Market trust and confidence can lead firms to obtaining an advantage over competitors, enhancing commitment to innovation, and result in better business practices. Further, government assistance in terms of circular economy innovation and BMI could lead SMEs to achieve economic, environmental, and social efficiencies. In this scenario, private- and public-sector partnerships would be a wise strategy to boost the trend of circular innovation among SMEs.

Moreover, this study contributes to the prior literature by analyzing the relative importance of circular economy innovation, government incentives, and BMI in achieving economic, environmental, and social efficiencies, especially in Pakistan, Malaysia, and China. Therefore, managers can launch more effective business practices in developing business strategies in a competitive environment to ensure firm survival and gain sustainable objectives. The results of this study are also helpful for practitioners and policy makers to develop a more efficient business model per community requirements that can

ensure more effective business services for those communities. The initiatives of circular economy innovation practices, BMI, and availability of government incentives allow practitioners to employ more accurate business techniques that can enhance the market attachment and customers' engagement with firms, as well as increasing economic, environmental, and social efficiencies. However, the study has noted that firms are widely focusing on BMI and circular economy innovation while developing strategies for sustainable development goals. Therefore, policy makers and practitioners need to widely focus on BMI and circular economy innovation while formulating strategies for economic, environmental and social efficiencies.

#### 5.1.2. Theoretical Implications

This study merged the literature of circular economy innovation, BMI, government incentives, and sustainable development goals based on the findings from Pakistan, Malaysia, and China, and validated the proposed research model in a comparative context. The application of PLS-SEM in the defined comparative context is also a novel contribution in the emerging literature. This study has extended the resource-based view theory by developing a theoretical framework and validating that framework in a comparative way with data collection and analysis. The validated model adds to the relevant literature and can enhance practitioners' understanding of the strategies of circular economy innovation, BMI, government incentives, and the contribution of these factors to achieving economic, environmental, and social performance objectives. This study extends the theory of resource-based views in context to accommodate internal resources, capabilities, and efficiencies with the external market requirement to achieve long-lasting sustainable development goals. This study also extends the resource-based view theory in the defined context based on the findings from Pakistan, Malaysia, and China.

## 6. Conclusions and Future Directions

This study intends to examine the effects of circular economy innovation and BMI, in achieving economic, environmental, and social objectives along with the mediation of government incentives in the defined context. The results of the study have provided empirical evidence that the initiatives of circular economy innovation in relation with BMI and government incentives play a greater role in achieving economic, environmental, and social performance goals. The results of the study have also contributed to the relevant literature by testing the developed hypotheses. Eventually, it is believed that the findings of this study will contribute to the relevant theoretical literature and deliver significant information to policy-makers in formulating more effective economic, environmental, and social performance strategies. It will guide business practitioners to design more significant development strategies to achieve sustainable objectives. However, while interpreting results, the reader should know about the scope of the collected data and the analysis procedure. This study is limited to the resource-based view theory while the application of other theories (such as contingency theory and stakeholder theories) can interpret the results differently. To bring further perfection in results, future studies can examine the mediating role of the resources of management in the defined context and the application of stakeholder and contingency theories. Moreover, the study has only evaluated the defined theoretical framework by collecting data from firms in Pakistan, Malaysia, and China; conducting the study in other settings may show different results.

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## Appendix A

### Circular Economy Innovation

1. In our company we have replaced new recyclable system for raw materials with renewable, recyclable, or biodegradable inputs
2. In our company we have launched new processes to decrease the usage of non-recyclable raw materials in our processes
3. In our company we have launched new environmentally friendly packaging system
4. In our company we have launched new system to use the leftover raw material again in our processes
5. In our company we are using recycled materials as an input in our new processes
6. In our company we have launched new initiatives to collect leftover products from customers to recycle them
7. In our company we have introduced new alternative ways to use our products once they have served their initial purpose
8. In our company we have found new revenue streams for products/services after they have served their initial purpose

### Business Model Innovation

1. How much of revenue from noncore products are generated through traditional revenue sources such as circulation, display advertising, and classified operations?

   Almost all 1 2 3 4 5 Almost none
2. How do you sell your noncore products?
   Existing salesforce sells both core and noncore products.

   1 2 3 4 5
   Noncore products are exclusively sold through digital media salesforce.
3. How many new formal or informal arrangements for information exchange with your partners have been created in the past 3 years?

   No new arrangements 1 2 3 4 5 Very many new arrangements
4. In the last 3 years, have you changed your pricing structure for raw material, product, and services?

   We have made no changes to our pricing structure.
   1 2 3 4 5
   We have completely changed our pricing structure.
5. Please compare the value propositions offered by your products/services now with those offered 3 years ago.

   They are pretty much the same 1 2 3 4 5 They are dramatically different
6. Please compare the cost structure of means employed to produce the noncore products with that employed to produce the core products.

   Cost structure for noncore product is much higher
   1 2 3 4 5
   Cost structure for noncore products is much lower

**Government Incentives**

**Government Financial Support**

1. We can easily access sufficient equity fundings provided by the government for SDGs
2. In our country, there are sufficient government financial subsidies available for SMEs, and we have easy access to it
3. We can easily access interest-free, and a low level of interest charged debt/loan fundings
4. We can easily access government short term and long-term financial services

**Government Nonfinancial Support**

5. Our government supports SMEs in building science parks and SDGs incubators in poor communities
6. We access a wide range of assistance provided by the government for SDGs activities and SDGs projects
7. Our government encourages SMEs to help in sustainable development by improving the corporate social responsibilities

**Sustainable Development**

**Economics Performance**

1. We have achieved return on asset
2. We have achieved return on equity
3. We have achieved return on investment
4. We have improved our profitability
5. We have improved the production cost
6. We have improved the sales growth
7. We have improved in work productivity

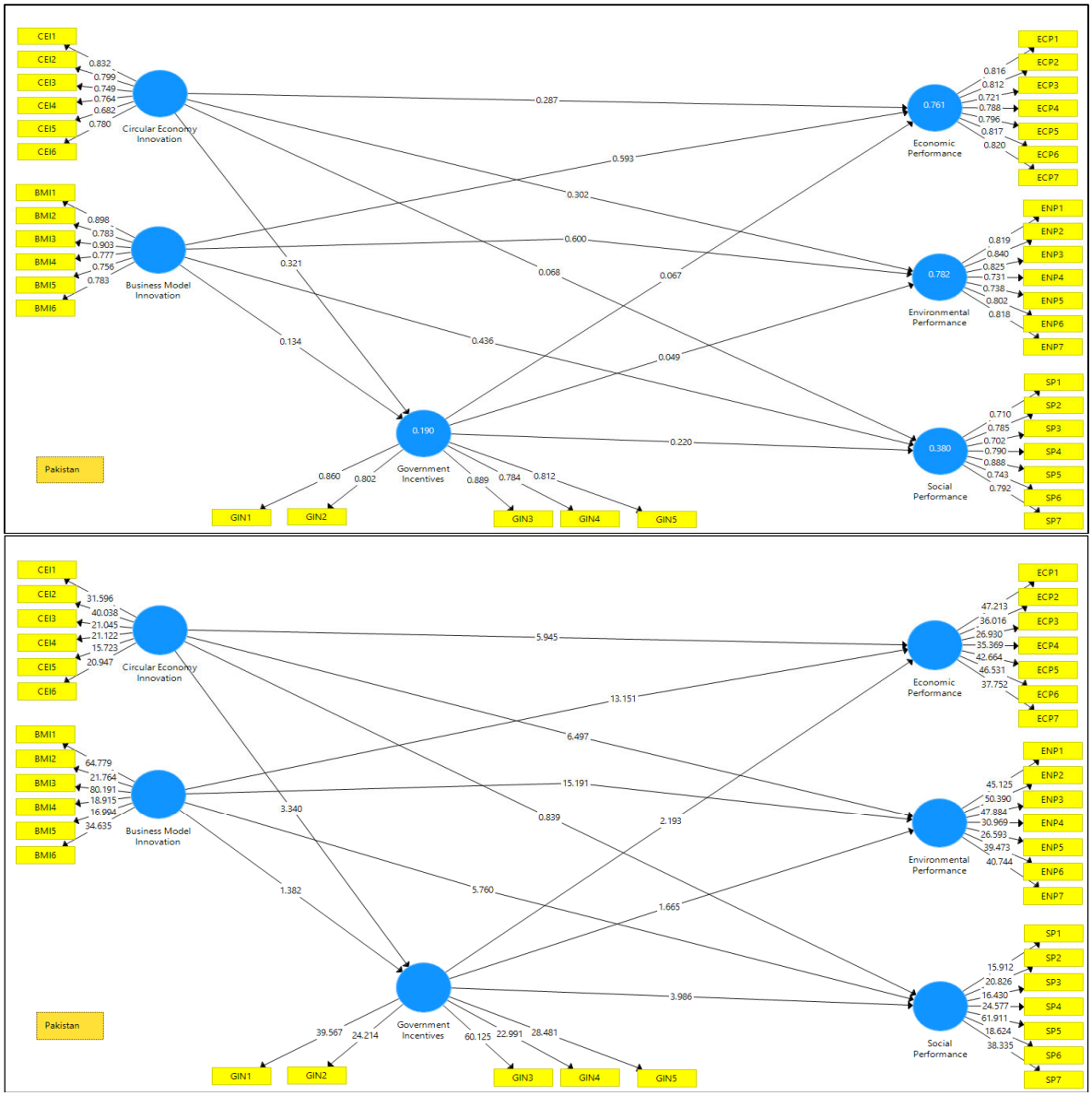
**Environmental Performance**

1. We raise awareness and/or train of the employees in water and/or energy conservation
2. We give priority to reusable, used or recycled materials.
3. We have established metrics that monitor (e.g., regarding risks, levels of pollution, of energy consumption, waste, etc.) the environmental initiatives
4. We consult stakeholders (e.g., employees, suppliers, clients, creditors, etc.) for environment-related decisions
5. We integrate environmental considerations in the conception and development of products and services in all phases of their life cycle (eco-conception and the analysis of the life cycle)
6. We integrate environmental considerations in purchase decisions and the evaluation of suppliers
7. We give priority to more water and energy-efficient equipment
8. We separate garbage and waste (recycling of materials: paper, plastic, glass and metal)
9. We encourage and support employees to use alternatives means of transportation to commute instead of single-occupancy cars (e.g., rideshare, public transport, bicycle, etc.)
10. We give priority to less polluting vehicles and modes of transportation and/or optimize distribution network
11. We communicate actions to internal stakeholders (e.g., meetings with staff, intranet, reports, etc.)
12. We communicate actions to external stakeholders (e.g., website, reports, etc.)

**Social Performance**

1. We have established metrics that monitor (e.g., amounts spent, allocated time, types of beneficiaries, etc.) to benefit the communities
2. We favor local suppliers in the regions
3. We favor job creation in the regions
4. We offer internships and contribute to student training in different communities
5. We contribute to community cultural, sporting or teaching activities (public organizations or associations with social, cultural, sporting or teaching activities)
6. We consult other stakeholders (employees, suppliers, clients, creditors, associations, firms, etc.) for decisions concerning local development
7. We communicate actions among internal stakeholders (e.g., meetings with staff, intranet, reports, etc.)
8. We communicate actions to external stakeholders (e.g., website, reports, etc.)

**Pakistan Sample**



**Outer Weight (Pakistan Sample)**

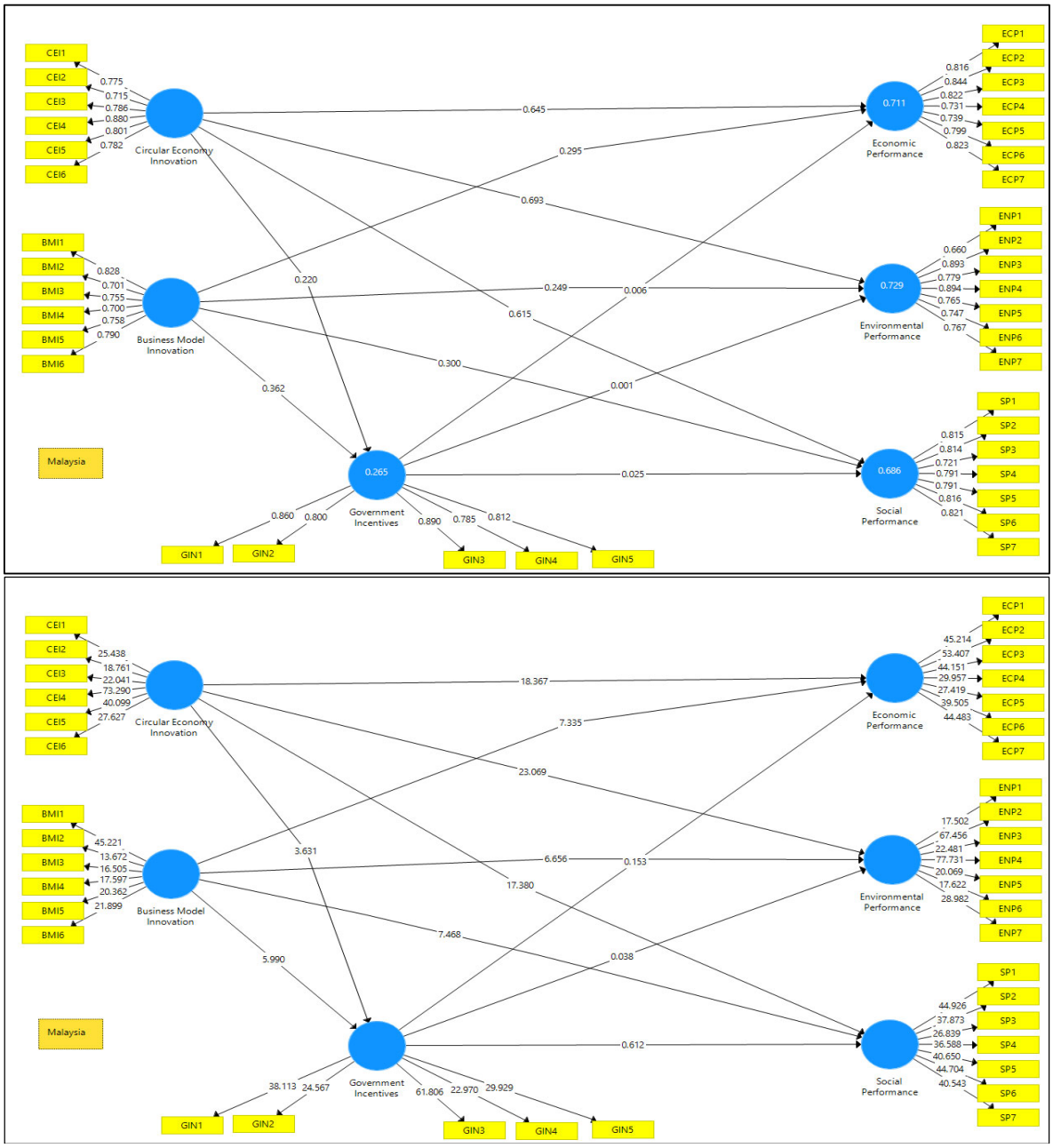
| | Business Model Innovation | Circular Economy Innovation | Economic Performance | Environmental Performance | Government Incentives | Social Performance |
|---|---|---|---|---|---|---|
| BMI1 | 0.219 | | | | | |
| BMI2 | 0.19 | | | | | |
| BMI3 | 0.219 | | | | | |
| BMI4 | 0.183 | | | | | |
| BMI5 | 0.177 | | | | | |
| BMI6 | 0.232 | | | | | |
| CEI1 | | 0.243 | | | | |
| CEI2 | | 0.227 | | | | |
| CEI3 | | 0.196 | | | | |
| CEI4 | | 0.223 | | | | |
| CEI5 | | 0.185 | | | | |
| CEI6 | | 0.221 | | | | |
| ECP1 | | | 0.178 | | | |
| ECP2 | | | 0.174 | | | |
| ECP3 | | | 0.179 | | | |
| ECP4 | | | 0.187 | | | |
| ECP5 | | | 0.193 | | | |
| ECP6 | | | 0.177 | | | |
| ECP7 | | | 0.169 | | | |
| ENP1 | | | | 0.178 | | |
| ENP2 | | | | 0.182 | | |
| ENP3 | | | | 0.196 | | |
| ENP4 | | | | 0.173 | | |
| ENP5 | | | | 0.169 | | |
| ENP6 | | | | 0.178 | | |
| ENP7 | | | | 0.177 | | |
| GIN1 | | | | | 0.262 | |
| GIN2 | | | | | 0.235 | |
| GIN3 | | | | | 0.265 | |
| GIN4 | | | | | 0.211 | |
| GIN5 | | | | | 0.229 | |
| SP1 | | | | | | 0.177 |
| SP2 | | | | | | 0.177 |
| SP3 | | | | | | 0.149 |
| SP4 | | | | | | 0.19 |
| SP5 | | | | | | 0.199 |
| SP6 | | | | | | 0.168 |
| SP7 | | | | | | 0.225 |

**Q-Square (Pakistan Sample)**

| | SSO | SSE | $Q^2$ (=1-SSE/SSO) |
|---|---|---|---|
| Business Model Innovation | 1824 | 1824 | |
| Circular Economy Innovation | 1824 | 1824 | |
| Economic Performance | 2128 | 1120.829 | 0.473 |
| Environmental Performance | 2128 | 1084.452 | 0.49 |

| | | | |
|---|---|---|---|
| Government Incentives | 1520 | 1325.282 | 0.128 |
| Social Performance | 2128 | 1660.263 | 0.22 |

**Malaysia Sample**







**Outer Weight (Malaysia Sample)**

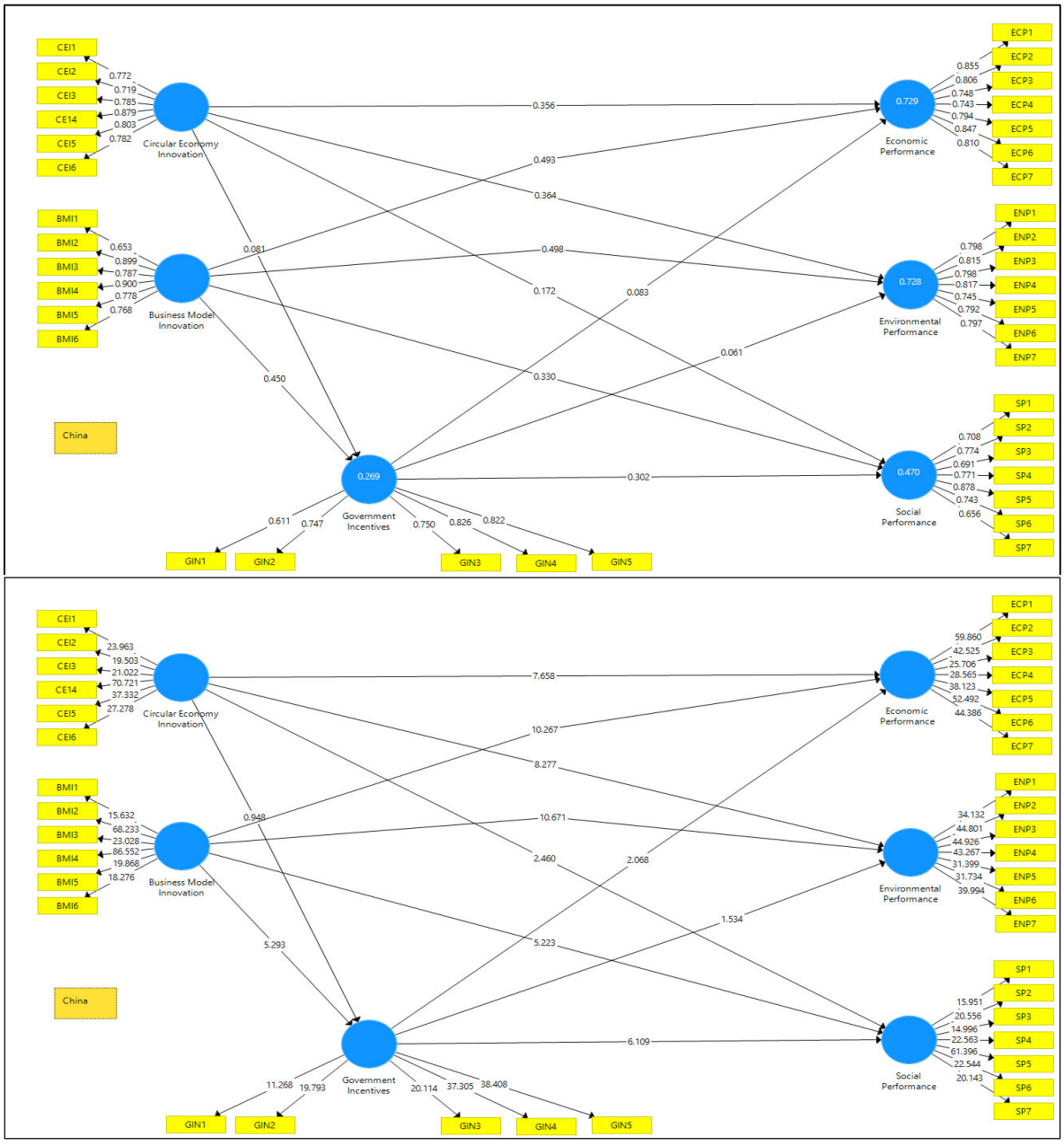
| | Business Model Innovation | Circular Economy Innovation | Economic Performance | Environmental Performance | Government Incentives | Social Performance |
|---|---|---|---|---|---|---|
| BMI1 | 0.258 | | | | | |
| BMI2 | 0.179 | | | | | |
| BMI3 | 0.209 | | | | | |
| BMI4 | 0.25 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BMI5 | 0.208 | | | | | | |
| BMI6 | 0.216 | | | | | | |
| CEI1 | | 0.217 | | | | | |
| CEI2 | | 0.175 | | | | | |
| CEI3 | | 0.211 | | | | | |
| CEI4 | | 0.254 | | | | | |
| CEI5 | | 0.205 | | | | | |
| CEI6 | | 0.196 | | | | | |
| ECP1 | | | 0.175 | | | | |
| ECP2 | | | 0.189 | | | | |
| ECP3 | | | 0.187 | | | | |
| ECP4 | | | 0.171 | | | | |
| ECP5 | | | 0.171 | | | | |
| ECP6 | | | 0.176 | | | | |
| ECP7 | | | 0.184 | | | | |
| ENP1 | | | | 0.179 | | | |
| ENP2 | | | | 0.206 | | | |
| ENP3 | | | | 0.168 | | | |
| ENP4 | | | | 0.202 | | | |
| ENP5 | | | | 0.16 | | | |
| ENP6 | | | | 0.161 | | | |
| ENP7 | | | | 0.188 | | | |
| GIN1 | | | | | 0.262 | | |
| GIN2 | | | | | 0.231 | | |
| GIN3 | | | | | 0.267 | | |
| GIN4 | | | | | 0.211 | | |
| GIN5 | | | | | 0.229 | | |
| SP1 | | | | | | 0.176 | |
| SP2 | | | | | | 0.177 | |
| SP3 | | | | | | 0.18 | |
| SP4 | | | | | | 0.194 | |
| SP5 | | | | | | 0.182 | |
| SP6 | | | | | | 0.177 | |
| SP7 | | | | | | 0.171 | |

**Q-Square (Malaysia Sample)**

| | **SSO** | **SSE** | **$Q^2$ (=1 – SSE/SSO)** |
|---|---|---|---|
| Business Model Innovation | 1824 | 1824 | |
| Circular Economy Innovation | 1824 | 1824 | |
| Economic Performance | 2128 | 1178.145 | 0.446 |
| Environmental Performance | 2128 | 1181.213 | 0.445 |
| Government Incentives | 1520 | 1248.516 | 0.179 |
| Social Performance | 2128 | 1219.677 | 0.427 |

**China Sample**




**Outer Weight (China Sample)**

| | Business Model Innovation | Circular Economy Innovation | Economic Performance | Environmental Performance | Government Incentives | Social Performance |
|---|---|---|---|---|---|---|
| BMI1 | 0.182 | | | | | |
| BMI2 | 0.236 | | | | | |
| BMI3 | 0.202 | | | | | |
| BMI4 | 0.234 | | | | | |
| BMI5 | 0.197 | | | | | |
| BMI6 | 0.191 | | | | | |

| | | | | |
|---|---|---|---|---|
| CE14 | 0.253 | | | |
| CEI1 | 0.21 | | | |
| CEI2 | 0.18 | | | |
| CEI3 | 0.21 | | | |
| CEI5 | 0.209 | | | |
| CEI6 | 0.197 | | | |
| ECP1 | | 0.183 | | |
| ECP2 | | 0.178 | | |
| ECP3 | | 0.17 | | |
| ECP4 | | 0.178 | | |
| ECP5 | | 0.187 | | |
| ECP6 | | 0.177 | | |
| ECP7 | | 0.176 | | |
| ENP1 | | | 0.167 | |
| ENP2 | | | 0.184 | |
| ENP3 | | | 0.19 | |
| ENP4 | | | 0.187 | |
| ENP5 | | | 0.177 | |
| ENP6 | | | 0.171 | |
| ENP7 | | | 0.183 | |
| GIN1 | | | | 0.177 |
| GIN2 | | | | 0.224 |
| GIN3 | | | | 0.251 |
| GIN4 | | | | 0.287 |
| GIN5 | | | | 0.363 |
| SP1 | | | | 0.171 |
| SP2 | | | | 0.184 |
| SP3 | | | | 0.151 |
| SP4 | | | | 0.195 |
| SP5 | | | | 0.214 |
| SP6 | | | | 0.171 |
| SP7 | | | | 0.253 |

**Q-Square (China Sample)**

| | **SSO** | **SSE** | **$Q^2$ (=1 – SSE/SSO)** |
|---|---|---|---|
| Business Model Innovation | 1824 | 1824 | |
| Circular Economy Innovation | 1824 | 1824 | |
| Economic Performance | 2128 | 1145.61 | 0.462 |
| Environmental Performance | 2128 | 1163.374 | 0.453 |
| Government Incentives | 1520 | 1304.65 | 0.142 |
| Social Performance | 2128 | 1610.65 | 0.243 |

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