Research Article

The Impact of TQM Practices on Sustainability Performance: Exploring the Mediating Role of Circular Economy

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Abstract: Companies can be more sustainable by embracing Circular Economy (CE) practices. Nevertheless, the relationship of CE implementation on sustainability performance of companies are obscure to even a greater extent when determinants like Industry 4.0 and stakeholder demands influence both CE implementation and sustainability performance. The present literature provides understand of the association between CE implementation, sustainability performance and the factors that influence them. This conceptual paper investigates the impact of TQM practices on CE and its role in sustainability performance. This research seeks to advance theoretical understanding, providing insights into how Total Quality Management (TQM) impacts environmental (ENP), economic (ECO), social performance (SOP) with CE serving as an intermediary.

Keywords: Circular economy, Total quality Management practices, Environmental performance, Economic performance, Social Performance

1. Introduction

The idea of CE has gained the attention of researchers, practitioners, policy-makers, and business interests to control the take-make-waste model as it has become vital to achieve green development [1][2][37]. The current environmental issues which include energy, soil, air, water pollution, dependence on fossil fuels, scarcity of sources, environmental degradation, and biodiversity loss pose a serious threat to Earth's well-being [3][4]. Moreover, there's an increase in global issues e.g. population growth, the average consumption per person, poverty, high rates of inequality and, increase in corruption [5][6]. In order to tackle such problems CE is implemented. CE objective is to impede the exhaustion of resources and regenerative energy and material loops.

It has become essential for companies to transition to CE implementation and adopt sustainable practices. As proof of this, various researches have been conducted to study CE and sustainable performances, practices associated with CE are value proposition, capture, creation, and delivery in sustainable business models [7][3]. Other studies have dealt with the frameworks to monitor the impact CE transition has on the use of natural resources, impact on environment and social and economic growth [8]; and the evaluation of sustainability performance [9]; the study of analysis of the variation of environmental-oriented supply cooperation (ESCC) practices in the implementation of CE strategies in order to enhance ecological and economic performance, [10]; theoretical frameworks using different tactics improve the practices of CE [11][12] ; how different drivers affect CE implementation and their repercussions on sustainability performance [13][14]. Recent studies showed the effect CE implementation have on sustainability prac-

tices and vice versa [15]. Even though recent studies emphasize on the implementation of CE and its link with sustainability performance, there exists a gap: how a companies' sustainability outcome is impacted by CE, regardless of its importance in the domain [15] [16]. According to this, sustainability performance can be best explained as the measurement of an organization's whole performance using diverse indicators. These indicators can be its policies, decisions, and actions creating economic, social and environmental results [9].

The existing literature on whether adopting CE leads to improving companies' sustainability performance or not is insufficient [17][18], this gap calls for attention. E.g., most of the existing literature looks more into individual impacts of CE implementation on environmental and economic outcome of the companies. But some researchers stress the need to study how different practices of CE impacts the SOP, ENP, ECO, and organizational performance (ORM) [19]. Furthermore, due to contradictory results of some other studies a new gap emerges, i.e. Researcher [13] [25] found that there was no statistical impact of eco design on ECO, SOP and ENP in the manufacturing companies in the United Kingdom. But other studies show significant impact of sustainable design on ECO and ENP in the production sector in China [20], Pakistan [21][22], and Indonesia [23]. So, understanding how the field of CE has been studied is important.

2. Literature Review

2.1 CE and TQM Practices

The concept of CE is intrinsically associated with TQM. TQM practices improve sustainable practices by enhancing operational effectiveness [38][28]. It is suggested by author [39] that adopting CE strategies improves TQM practices, e.g., streamlining and progressive enhancement. The outcome of the author's [40][29] research pinpoints that CE strategies i.e. recycling, refurbishing, reusing correlate with TQM's principles and further support the above findings. Incorporating both CE practices and TQM can help achieve product development, thereby enhancing environmental impact. [41][30] The integration is not limited to environmental impact only, but it stretches out to economic benefits as well [42][43].

Proposition 1: Total quality management practices has positive effect on circular economy.

2.2 CE and Social, Environmental and Economic Performance

Today's world is more environmentally conscious, which has led the government to formulate new and stricter laws to eradicate environmental degradation [31][32]. Consequently, the companies assessed their strategic approaches to categorizing social, environmental, and economic performance. A new perspective of sustainability, CE aims to improve business performance by enhancing operations to contribute to ecological equilibrium [44] [36]. CE aims to create a closed-loop system of creation and consumption in defiance of the take-make-waste model [35]. It is an approach that reconsiders firms' manufacturing and consumption processes by applying the 9Rs, i.e., reduce, reuse, rethink, repair, recycle, repurpose, refurbish, remanufacture, and recover [45][33]. Figure 1 indicate the conceptual model of this study.

Proposition 2a: CE has a positive impact on social performance.

Proposition 2b: CE has a positive impact on environmental performance.

Proposition 2c: CE has a positive impact on economic performance.

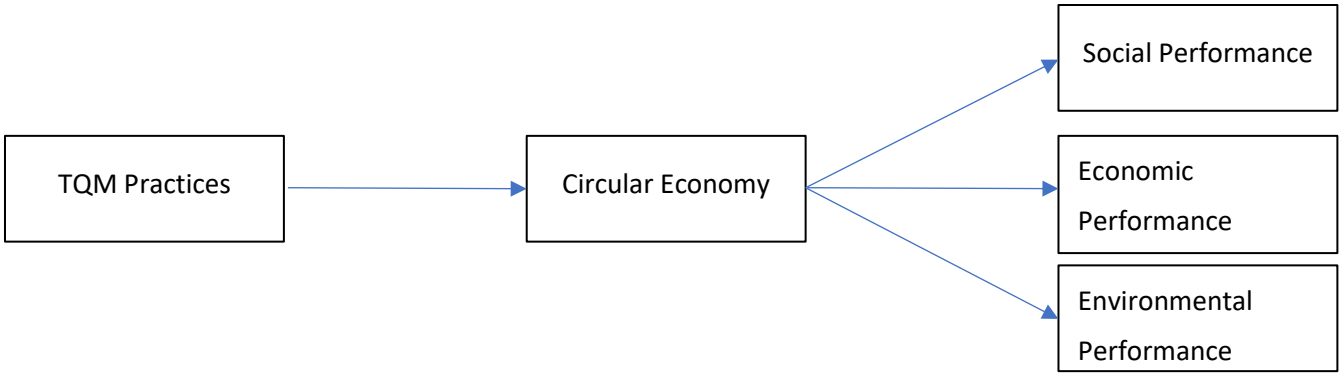

Figure 1. Conceptual Framework

4. Conclusion

This conceptual paper sheds light on the impact TQM practices on sustainability practices (specifically SOP, ENP, and ECO), with CE acting as an intermediary. It can be stated that by incorporating CE into TQM, can aid in improving productivity, sustainability outcome, and consumer contentment. TQM provides a continuous improvement framework as well as a consumer centric approach while CE provides an integrated approach. By incorporating CE practices companies can identify problems that can be turned into opportunities e.g. carbon footprint, waste reduction, and meeting the customer demands that can prove to be their competitive advantage. Through incorporating CE into TQM practices firms can achieve sustainability. This study discloses that by adopting CE practices and strategies, it is possible to attain higher ENP, but SOP and ECO cannot be fully guaranteed.

5.1 Theoretical implications

This conceptual paper yields considerable contribution to theory by enhancing and clarifying the interrelations between TQM, CE, and sustainability outcomes. This paper also broadens the knowledge map of CE implementation and sustainable outcome, by analyzing the CE drivers. Moreover, it stresses on the lack of representation of the social factor in sustainability literature emphasizing the need for a more thorough and balances analysis of all three dimensions. The review also recognizes gaps in the current body of knowledge and demands further evidence- based research on the dynamics and results of these practices. In accordance with earlier models, this studies links supply chain theories, collaborative practices, and uncertainties, offering a comprehensive knowledge of the impacts of CE implementation on sustainable outcomes

5.2 Practical Implications

This conceptual paper examines the conceptual connection between CE implementation and sustainable outcomes. These insights provide robust foundation for organizations guiding managers to select and implement CE strategies to enhance their performance. Managers can explore the impacts of CE implementation, implement them and enhance the sustainable outcomes. The research framework is specifically significant for countries with low CE implementation, encouraging practices such as the incorporation of Industry 4.0, promoting tactical and learning change, and confronting stakeholder pressure. To enhance the company's performance and to facilitate the transition to CE implementation, managers must leverage knowledge and technological innovations, encourage behavioral shifts in employees and respond to the stakeholder's demands. The findings also offer feasible understanding for the policymakers.

The effect of CE implementation on sustainable outcomes assists policymakers in captivating the companies of its possible gains to improve their sustainable outcomes. Furthermore, results of this conceptual paper can assist in the formulation of policies for the embracement of CE practices. Improved sustainability outcomes can be achieved by

adopting Industry 4.0 and CE in firms. Along with this, the consequences of the formulated strategies and rules can expedite firm originality, consequently enhancing sustainability outcomes.

5.3 Future Research Directions

It is suggested that the scholars should carry out more researches that incorporate Industry 4.0 as it is crucial for the research to assess the merged influences of CE implementation on sustainability outcomes, as these are the domains that are unexplored in the present literature. The incorporation of Corporate Social Responsibility Performance (CSRP) components is fundamental within sustainability performance metrics on CE research when analyzing outcomes. To gain a deeper insight upon impact of CE strategies on sustainable outcomes additional investigation is needed on companies of various countries, sectors, and sizes. There is scarcity of evidence, notably in the developed, developing, and emerging economies. Understudied regions like Latin America, Oceania, and Africa should be prioritized, where there is minimal research held on these practices. Studies must include large corporations that impact the supply chain significantly as well as SMEs that are often restricted due to lack of awareness and resources although their role is critical in economies.. It is recommended to perform comparative analysis of CE practice adoption.

Data Availability:

The datasets used in this study are available from the corresponding authors upon reasonable request.

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