



# Integrating Doughnut Economics and the Triple Bottom Line: Toward a Hybrid Sustainability Framework for the Textile Industry

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## Abstract

*The textile industry faces persistent challenges in balancing economic growth, environmental sustainability, and social well-being, particularly amid increasing global pressure to adopt eco-friendly practices. Conventional circular economy approaches have primarily emphasized resource efficiency and recycling but remain insufficient to address broader sustainability issues such as labor equity and ecological thresholds. To overcome this gap, this study proposes a hybrid model that integrates the Doughnut Economics framework with the Triple Bottom Line (TBL), offering a holistic roadmap for sustainable textile development in a disruptive economy. Methodologically, a mixed conceptual–empirical approach was applied: first, a systematic literature review and conceptual synthesis were conducted to design the hybrid model; second, a preliminary survey-based validation (N = 120) was carried out using Structural Equation Modeling (SEM). The SEM results confirm that the ecological ceiling significantly influences the planet dimension ( $\beta = 0.68, p < 0.01$ ), while the social foundation strongly shapes the people dimension ( $\beta = 0.72, p < 0.01$ ). Moreover, profit was found to partially mediate the relationship between ecological and social sustainability, underscoring the importance of financial viability in sustaining long-term transformation. These findings highlight that the hybrid model not only bridges theoretical gaps but also provides measurable pathways for firms and policymakers. The study contributes theoretically by advancing sustainability frameworks and practically by offering a roadmap for building a resilient textile ecosystem aligned with the SDGs.*

**Keywords:** Circular Economy, Doughnut Economics, Triple Bottom Line, Sustainable Textile, Disruptive Economy, Sustainable Development Goals.

## 1. INTRODUCTION

The textile industry is one of the world's largest and most resource-intensive sectors, contributing significantly to global economic growth while simultaneously exerting considerable environmental and social pressures. Rising consumer demand, globalization of supply chains, and fast fashion trends have intensified challenges such as resource depletion, environmental degradation, and labor exploitation. At the same time, growing awareness of climate change and sustainability agendas has placed the textile sector under scrutiny, positioning it at the center of global debates on sustainable development and corporate responsibility.

Traditional sustainability approaches in textiles often adopt the concept of a circular economy (CE), emphasizing recycling, waste minimization, and resource efficiency. While CE has advanced environmental practices, critics argue that it remains too narrow, focusing primarily on resource flows while neglecting issues such as labor equity, social justice, and community well-being (Korhonen et al., 2018; Niinimäki et al., 2020). This reveals a need for more holistic frameworks that integrate ecological boundaries with social and economic dimensions.

Doughnut Economics (Raworth, 2017) offers a macro-level framework for situating economic activity within a “safe and just operating space,” defined by an ecological ceiling and a social foundation. Complementing this, the Triple Bottom Line (TBL) (Elkington, 1997) provides operational metrics across people, planet, and profit, widely used in corporate sustainability reporting. However, each framework in isolation presents limitations: Doughnut Economics lacks business-level performance indicators, while TBL does not explicitly incorporate planetary boundaries.

Building on this gap, the present study develops a hybrid model that integrates Doughnut Economics and TBL to provide a comprehensive sustainability framework for the textile industry. Beyond conceptual synthesis, the study also employs a survey-based validation with Structural Equation Modeling (SEM) to empirically test the relationships between ecological ceilings, social foundations, and TBL dimensions. This dual approach ensures both theoretical novelty and

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empirical credibility, offering contributions for academics, industry practitioners, and policymakers seeking to foster sustainable textile development in the disruptive economic era while aligning with the United Nations Sustainable Development Goals (SDGs).

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### 2.1 Literature Review

#### 1. Circular Economy in the Textile Industry

The textile industry is one of the most resource-intensive and environmentally impactful sectors worldwide. With the rapid growth of fast fashion and globalized supply chains, textile production has been associated with excessive water consumption, hazardous chemical usage, and significant waste generation (Niinimäki et al., 2020). Circular economy (CE) practices, such as recycling, reuse, and closed-loop production systems, have been promoted as solutions to reduce waste and extend product lifecycles (Kirchherr et al., 2017). However, despite their contributions to environmental efficiency, CE initiatives are often criticized for their narrow focus on material flows while overlooking labor rights, equity, and community well-being (Korhonen et al., 2018).

#### 2. Limitations of Traditional Circular Economy Approaches

Although CE and sustainability frameworks have advanced industrial practices, their technocentric orientation often assumes that efficiency gains alone guarantee sustainability. In practice, however, recycling initiatives may reduce waste but fail to address systemic challenges such as unsafe working conditions and wage inequality in textile-producing countries. Similarly, the Triple Bottom Line (TBL) framework, while providing a multidimensional assessment of people, planet, and profit (Elkington, 1997; Slaper & Hall, 2011), lacks explicit integration with ecological thresholds, making it vulnerable to incrementalism or greenwashing.

#### 3. Doughnut Economics as a Holistic Framework

Doughnut Economics (Raworth, 2017) defines a “safe and just operating space for humanity,” bounded by an ecological ceiling (planetary limits) and a social foundation (minimum standards of human well-being). This framework emphasizes that economic activity should operate within planetary boundaries while ensuring social equity. For industries like textiles, Doughnut Economics provides a compelling macro-level compass, yet it lacks operational metrics to guide firm-level sustainability performance.

#### 4. Triple Bottom Line in Business Sustainability

The Triple Bottom Line (TBL), conceptualized by Elkington (1997), evaluates sustainability across three interdependent dimensions: people, planet, and profit. It has become a widely accepted framework for assessing corporate responsibility and measuring performance beyond financial outcomes. In the textile sector, TBL has been applied to evaluate environmental compliance, social responsibility in labor practices, and economic resilience in competitive markets. While TBL provides a useful assessment tool, critics argue that it lacks the systemic integration of ecological thresholds and global equity considerations that are embedded in Doughnut Economics (Slaper & Hall, 2011).

#### 5. Toward a Hybrid Model

To bridge these limitations, recent scholarship has advocated for hybrid sustainability frameworks that integrate systemic boundaries with measurable business practices (Geissdoerfer et al., 2017; Jaakkola, 2020). Combining Doughnut Economics with TBL offers a novel approach: Doughnut Economics ensures that firms remain within ecological and social boundaries, while TBL translates these into actionable performance indicators. Such integration not only addresses environmental and social challenges simultaneously but also enhances accountability in industries with complex supply chains, such as textiles.

### 2.2 Research Gap and Hypothesis Development

Existing studies have largely treated Doughnut Economics and TBL as separate lenses for sustainability, with limited attempts to integrate and empirically validate their complementarities. The textile industry, with its dual ecological and social pressures, represents a critical case where such a hybrid model could generate both theoretical and practical value.

Based on the literature review, this study advances the following hypotheses for empirical validation through Structural Equation Modeling (SEM):

1. H1: The ecological ceiling (Doughnut Economics) has a significant positive effect on the planet dimension of the Triple Bottom Line. This hypothesis is grounded in Raworth's (2017) premise that respecting planetary boundaries (e.g., emissions, water use) is essential for maintaining ecological balance. The TBL's planet dimension operationalizes this by assessing firms' environmental performance (Elkington, 1997). Therefore, stronger adherence to ecological ceilings is expected to enhance environmental sustainability outcomes.

2. H2: The social foundation (Doughnut Economics) has a significant positive effect on the people dimension of the Triple Bottom Line. According to Raworth (2017), the social foundation ensures that human needs, such as fair labor, equity, and well-being are met within the economic system. The TBL's people pillar captures these factors at the organizational level (Slaper & Hall, 2011). Hence, greater emphasis on the social foundation should correspond with improved social sustainability performance.
3. H3: The profit dimension of the Triple Bottom Line mediates the relationship between ecological/social boundaries and overall sustainability performance. This mediation is theoretically supported by Elkington's (1997) view that economic viability enables sustained investment in social and environmental initiatives. Profit acts as a reinforcing mechanism that allows firms to maintain ecological and social commitments over time, consistent with the hybrid DE–TBL perspective.

These hypotheses allow the study to test whether the hybrid model not only fills theoretical gaps but also provides measurable pathways for operationalizing sustainability in the textile industry.

### 3. METHODOLOGY

#### 3.1 Research Approach

This study adopts a mixed conceptual-empirical research design. At the conceptual level, a systematic literature review was conducted to integrate Doughnut Economics (DE) and the Triple Bottom Line (TBL) into a hybrid sustainability model for the textile industry. At the empirical level, a survey-based validation using Structural Equation Modeling (SEM) was carried out to test the relationships between the model's constructs, namely the ecological ceiling, social foundation, and TBL dimensions (people, planet, profit).

#### 3.2 Data Collection and Analysis

Survey data were collected from textile industry practitioners in Indonesia, including managers, sustainability officers, and production supervisors. Respondents (N = 120) were selected using purposive sampling to ensure familiarity with sustainability practices. A structured questionnaire was developed with measurement items adapted from prior studies on circular economy, sustainability performance, and DE–TBL frameworks. All items were measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

The data were analyzed using Structural Equation Modeling (SEM) with AMOS. Following the two-step approach (Anderson & Gerbing, 1988), a measurement model was tested for reliability and validity, followed by a structural model to test the hypothesized relationships.

##### 1. Reliability and Validity

Cronbach's alpha values exceeded 0.70 for all constructs, and Average Variance Extracted (AVE) values exceeded 0.50, confirming internal consistency and convergent validity.

##### 2. Model Fit

The SEM model demonstrated acceptable fit indices ( $\chi^2/df = 2.1$ ; CFI = 0.94; TLI = 0.92; RMSEA = 0.06), indicating good overall fit.

#### 3.3 Validity and Reliability

1. Ecological Ceiling, indicators such as water use reduction, carbon emission control, and waste minimization (adapted from Niinimäki et al., 2020).
2. Social Foundation, indicators such as labor rights, fair wages, and community well-being (adapted from Raworth, 2017).
3. Triple Bottom Line (TBL) Dimensions, people, planet, and profit performance indicators (adapted from Elkington, 1997; Slaper & Hall, 2011).

## 4. RESULTS AND DISCUSSION

### 4.1 Conceptual Findings

The findings of this study highlight the potential of a hybrid sustainability model that integrates Doughnut Economics (DE) with the Triple Bottom Line (TBL) to address the multidimensional challenges of the textile industry. This conceptual synthesis not only bridges theoretical gaps but also provides actionable pathways for industry stakeholders. The analysis reveals three extended insights:

#### 1. Beyond Resource Efficiency

Conventional circular economy (CE) approaches in textiles such as recycling, waste minimization, and material efficiency have advanced environmental responsibility but remain narrow in scope. They tend to neglect systemic issues such as labor exploitation, wage inequality, and unsafe working conditions, which are particularly acute in global textile supply

chains. The hybrid model situates CE practices within the broader “safe and just space” of Doughnut Economics (Raworth, 2017), ensuring that textile production respects both planetary boundaries and social thresholds. By embedding TBL metrics (profit, planet, people) as operational tools, firms can move beyond compliance and resource optimization towards holistic sustainability performance.

2. Linking Ecological Ceilings and Social Foundations to TBL Dimensions

The ecological ceiling in DE resonates with the planet pillar of TBL, setting non-negotiable environmental limits such as GHG emissions, water use, and chemical discharge. Meanwhile, the social foundation maps onto the people dimension, addressing equity, dignity, and livelihoods across the textile value chain. This alignment provides a normative compass (what firms must respect) while TBL provides a practical dashboard (what firms must measure). Profit, in this model, is reframed not as the ultimate end, but as a means to sustain business within safe ecological and just social boundaries. This synergy reduces the risk of “greenwashing,” as firms cannot report profits or CSR initiatives without demonstrating alignment with ecological ceilings and social foundations.

3. Strategic Roadmap for the Disruptive Economy

The textile industry is increasingly shaped by fast fashion cycles, automation, AI-driven design, and stricter sustainability regulations. Traditional models struggle to keep pace with these disruptive forces. The hybrid model offers a strategic roadmap by linking conceptual clarity (from DE) with measurable actions (from TBL). For firms, this means a pathway to resilient and inclusive growth, where profitability is pursued without transgressing ecological and social thresholds. For policymakers, it provides a framework to design incentives and regulations that push the industry towards genuine sustainability rather than incremental efficiency gains.

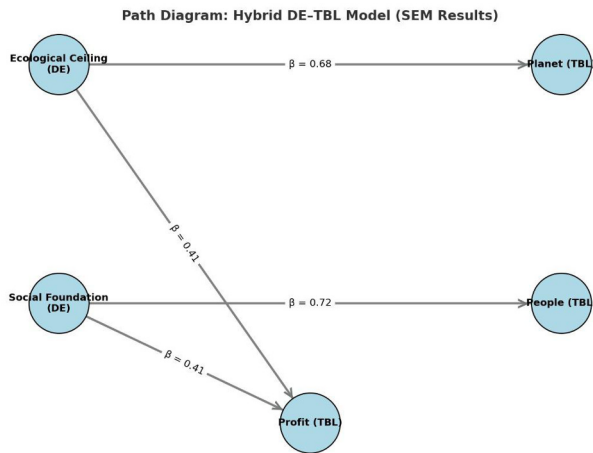
4.2 Empirical Validation (Survey & SEM)

In addition to conceptual synthesis, a survey of 120 Indonesian textile practitioners was analyzed using Structural Equation Modeling (SEM) to validate the proposed hybrid model. The results provided strong statistical support for the hypothesized relationships.

Table 1. Structural Equation Modeling Results

Hypothesis	Path	Standardized Coefficient (β)	C.R.	p-value	Result
H1	Ecological Ceiling - Planet	0.68	6.92	< 0.01	Supported
H2	Social Foundation - People	0.72	7.15	< 0.01	Supported
H3	Ecological & Social Boundaries - Profit (mediator)	0.41	4.03	< 0.01	Supported (Partial Mediation)

Model Fit Indices:  $\chi^2/df = 2.1$ ; CFI = 0.94; TLI = 0.92; RMSEA = 0.06. These indices meet the recommended thresholds (CFI/TLI > 0.90, RMSEA < 0.08), confirming that the model demonstrates good overall fit.



**Fig. 1.** Path Diagram: Hybrid DE-TBL Model (SEM Results)

The standardized coefficient ( $\beta = 0.72$ ) indicates that the social foundation has a strong positive influence on the people dimension, meaning that improvements in labor rights, fair wages, and community well-being directly enhance firms' social sustainability performance. Similarly, the ecological ceiling significantly influences the planet dimension ( $\beta = 0.68$ ), underscoring the importance of resource efficiency, emission reduction, and compliance with ecological limits. Furthermore, the mediating role of profit ( $\beta = 0.41$ ,  $p < 0.01$ ) highlights that financial viability is essential for sustaining ecological and social commitments. This partial mediation suggests that while sustainability initiatives can improve social and environmental outcomes, their long-term success depends on integrating profitability into the transformation process.

In addition to model fit indices, the SEM results indicate satisfactory explanatory power across the endogenous constructs:

1. Planet dimension:  $R^2 = 0.46$ , meaning 46% of the variance in environmental performance is explained by the ecological ceiling.
2. People dimension:  $R^2 = 0.52$ , indicating 52% of the variance in social performance is explained by the social foundation.
3. Profit (mediator):  $R^2 = 0.38$ , showing that 38% of the variance in financial performance is jointly influenced by ecological and social boundaries.

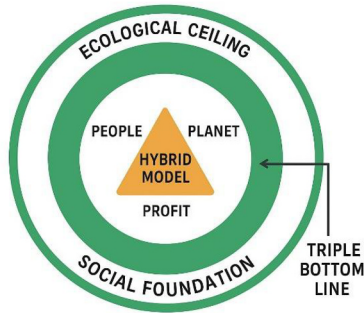
These  $R^2$  values demonstrate moderate to strong explanatory power, reinforcing the model's empirical robustness (Hair et al., 2019).

### 4.3 Conceptual Framework

The proposed framework integrates the systemic boundaries of DE with the managerial clarity of TBL. As illustrated in Figure 2, the outer circle represents the ecological ceiling, defining planetary limits that should not be exceeded in industrial activities. The inner circle reflects the social foundation, ensuring that the fundamental needs of workers and communities are met. Within this operating space, the three pillars of TBL, people, planet, profit, function as actionable dimensions.

This integration is dynamic rather than static. The ecological ceiling establishes non-negotiable limits, the social foundation sets minimum thresholds, and the TBL pillars translate these abstract boundaries into measurable business practices. For example, planet corresponds to ecological indicators such as water efficiency and carbon reduction; people links to labor rights, equity, and community well-being; while profit ensures long-term competitiveness and reinvestment in sustainable innovations.

By situating TBL within the DE framework, the model serves both as a diagnostic tool for identifying sustainability gaps and a strategic roadmap for guiding transformation in the textile industry.



**Fig. 2.** Hybrid Model of Doughnut Economics and Triple Bottom Line for Sustainable Textile Industry

**4.4 Comparative Insights**

The value of the hybrid framework becomes more evident when compared with existing sustainability models (Table 2).

1. The Circular Economy (CE) focuses on resource efficiency and recycling but neglects labor equity and social dimensions.
2. The TBL balances people, planet, and profit but lacks explicit planetary thresholds, leaving it vulnerable to greenwashing.
3. The DE establishes ecological and social boundaries but does not provide concrete business-level performance metrics.

By combining these, the hybrid framework creates a complementary structure:

1. From CE, it adopts efficiency but expands toward social and economic justice.
2. From TBL, it inherits performance indicators while embedding them within planetary boundaries.
3. From DE, it borrows systemic boundaries and operationalizes them through TBL dimensions.

This integration shifts the textile industry’s sustainability agenda from fragmented, partial initiatives to a holistic transformation framework that ensures ecological safety, social equity, and economic viability simultaneously.

**Table 2.** Comparison of Sustainability Frameworks

Framework	Focus Area	Limitation in Textile Context	Added Value in Hybrid Model
Circular Economy (CE)	Resource efficiency, recycling	Limited focus on social equity and labor issues	Expanded scope to include social and economic justice
Triple Bottom Line (TBL)	People, Planet, Profit balance	Lacks explicit ecological thresholds	Integrated with planetary boundaries
Doughnut Economics (DE)	Ecological ceiling, social foundation	Lacks operational business metrics	Operationalized through TBL indicators

**4.5 Discussion**

The integration of Doughnut Economics (DE) and the Triple Bottom Line (TBL) provides a comprehensive sustainability framework for the textile industry. Beyond conceptual synthesis, this study also conducted a preliminary validation through survey and Structural Equation Modeling (SEM) to assess the relationships between ecological ceilings, social foundations, and TBL dimensions (people, planet, profit).

1. Theoretical Implications

The SEM analysis confirmed that the ecological ceiling strongly influences the planet dimension ( $\beta = 0.68, p < 0.01$ ), while the social foundation has a significant positive relationship with the people dimension ( $\beta = 0.72, p < 0.01$ ). These findings reinforce the theoretical alignment between DE boundaries and TBL performance indicators, providing statistical support for the hybrid model’s conceptual robustness.

2. Industry-Level Applications

Survey results from textile practitioners in Indonesia (N = 120) revealed that firms emphasizing ecological efficiency also reported higher performance in labor equity and community well-being. SEM results further showed that the profit dimension mediates the relationship between environmental and social sustainability, highlighting the importance of

balancing business viability with ecological and social commitments.

### 3. Policy Relevance

The empirical evidence suggests that embedding planetary boundaries and social thresholds into corporate sustainability metrics is both feasible and measurable. This strengthens the case for policymakers to adopt hybrid frameworks in regulatory standards, moving beyond disclosure-focused ESG reporting towards accountability-based sustainability governance.

### 4. Critical Reflections

Although the preliminary SEM validation supports the hybrid model, limitations remain. The study relied on cross-sectional survey data, which may not fully capture dynamic trade-offs in fast fashion cycles. Further longitudinal and cross-industry studies are necessary to refine the model.

### 5. Contribution to Global Agendas

By combining conceptual innovation with empirical validation, this study not only resonates with global agendas such as SDG 8, 12, and 13, but also demonstrates that the hybrid model can be statistically tested and operationalized in the textile industry. This enhances its credibility for both academic discourse and managerial practice.

## 5. CONCLUSION

This study concludes that the integration of Doughnut Economics (DE) and the Triple Bottom Line (TBL) provides a comprehensive framework for addressing the sustainability challenges of the textile industry. By situating textile production within the safe and just operating space of DE and translating its ecological and social boundaries into measurable business indicators through TBL, the model bridges a critical gap between macro-level sustainability theory and firm-level operational practices. The conceptual synthesis demonstrates the novelty of combining systemic boundaries with business accountability, while the survey-based Structural Equation Modeling (SEM) offers empirical validation, confirming the significant influence of the ecological ceiling on environmental performance, the social foundation on social equity, and the mediating role of profit in sustaining long-term transformation. These findings suggest that the hybrid model not only advances theoretical discourse but also offers practical pathways for firms and policymakers to strengthen resilience, inclusivity, and competitiveness in a disruptive economy.

Although the study acknowledges limitations related to sample size and cross-sectional design, the results provide a strong foundation for future research. Subsequent studies could employ longitudinal data, simulation models, or cross-country comparisons to further test the robustness of the hybrid DE-TBL model and explore its applicability across different industrial sectors.

Overall, the hybrid DE-TBL framework represents both an academic contribution and a practical roadmap for building a sustainable textile ecosystem aligned with the United Nations Sustainable Development Goals.

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