

# Behavioural Barriers Impeding Implementation of Circular Economy Practices in the South African Construction Industry

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## ABSTRACT

The adoption of Circular Economy (CE) principles in the construction industry is widely recognized as a transformative approach to achieving sustainability, resource efficiency, and waste reduction. However, in South Africa, the implementation of CE practices within the construction sector remains limited due to various barriers, particularly behavioural factors. This paper investigates the behavioural barriers that hinder the transition towards CE in the South African construction industry. Adopting a quantitative research methodology, the study examines the attitudes, perceptions, and cultural norms influencing decision-making processes and stakeholder collaboration through structured surveys and statistical analysis. Findings reveal that entrenched resistance to change, limited awareness, and fragmented industry practices are significant impediments to CE adoption. The study further identifies a lack of alignment between industry stakeholders and insufficient policy frameworks as contributing factors. By addressing these behavioural barriers, the research highlights opportunities for fostering behavioural change through targeted interventions, education, and awareness programs. The findings contribute to the growing body of knowledge on CE implementation in developing economies and offer practical insights for policymakers, industry stakeholders, and academics. Ultimately, the study underscores the critical need for a behavioural shift to advance the adoption of CE practices, paving the way for a sustainable and resilient construction industry in South Africa.

**Keywords:** Circular economy, Behavioural barriers, Construction industry, Sustainability practices

## INTRODUCTION

The construction industry serves as a fundamental pillar of economic growth, particularly in infrastructure development and employment generation. However, it is one of the most significant contributors to environmental degradation, prompting the need for innovative solutions such as the circular economy (CE) (Ghisellini et al., 2016). CE principles advocate for resource efficiency and sustainability by promoting material reuse, recycling, and

regeneration, transitioning from the traditional linear economy to a circular model (Ellen MacArthur Foundation, 2015).

In South Africa, the adoption of circular economy practices within the construction industry is hindered by socio-economic challenges, limited awareness, and fragmented industry structures (Korhonen et al., 2018). Behavioural barriers, such as entrenched attitudes and cultural norms, significantly obstruct the adoption of CE principles (Van Buren et al., 2016). This research emphasizes the need to address these behavioural barriers to foster industry-wide adoption of sustainable practices, providing insights for policies and interventions that align with the South African context.

## **LITERATURE REVIEW**

### **Overview of Circular Economy Principles**

The circular economy (CE) presents a transformative approach that reimagines the traditional “take-make-dispose” model into a restorative and regenerative system, aiming to minimize waste and maximize resource efficiency (Ellen MacArthur Foundation, 2015). Central to CE is the principle of designing out waste, which emphasizes planning for reusability, repairability, and recyclability to decouple economic growth from resource depletion (Ghisellini et al., 2016). In the construction sector, a major consumer of raw materials and contributor to waste, CE adoption can drive the creation of sustainable and resilient infrastructure (Korhonen et al., 2018).

Practical applications of CE in construction include modular construction for disassembly, recycling demolition waste, and using reclaimed materials, which reduce reliance on virgin resources and lower environmental impacts (Pomponi & Moncaster, 2017). CE also fosters innovative business models, such as material leasing, which align with global sustainability goals while addressing local challenges, particularly in South Africa. These practices have the potential to reduce unemployment, support local industries, and mitigate environmental degradation, offering a holistic solution for economic and ecological sustainability (Mhatre et al., 2021).

### **Benefits of Circular Economy in South African Construction Industry**

The adoption of a circular economy (CE) in the South African construction industry presents considerable environmental, economic, and social advantages. Environmentally, CE reduces waste from construction and demolition activities, promoting the reuse and recycling of materials to lower demand for virgin resources and mitigate resource depletion (Ghisellini et al., 2016). Furthermore, CE-driven methods such as modular construction and energy-efficient buildings align with South Africa’s climate commitments, contributing to reduced carbon emissions and improved sustainability (Ellen MacArthur Foundation, 2015).

Economically, CE enhances resource efficiency and reduces costs by minimizing material waste and fostering secondary material markets (Pomponi & Moncaster, 2017). Socially, CE can create employment opportunities and foster skills development in green technologies,

recycling, and sustainable design, addressing South Africa's unemployment challenges (Korhonen et al., 2018). Moreover, it supports housing needs through innovative, cost-effective methods that promote sustainable urban development, enhancing community well-being and resilience (Mhatre et al., 2021).

## RESEARCH METHODOLOGY

This study adopted a quantitative research methodology to explore the behavioural barriers to implementing a circular economy in the South African construction industry. Cresswell (2024) asserts that quantitative research utilizes a methodology that explains the development of a phenomenon through numerical data, emphasizing the differences among these data points. The research targeted professionals such as quantity surveyors, architects, project managers, contractors, clients, and developers, ensuring a broad representation of stakeholders in the industry in Gauteng province South Africa. The inclusion criteria required participants to have at least three years of experience in the construction sector, ensuring that the responses were informed by substantial professional knowledge and practical exposure. The study employed simple random sampling to provide each potential respondent an equal opportunity to participate, thereby minimizing selection bias of the findings. A structured questionnaire was designed and administered to collect data from 56 respondents across South Africa. The questionnaire comprised closed-ended questions focusing on identifying and understanding the behavioural barriers to circular economy adoption in the construction sector. The collected data was analyzed using Statistical Package for the Social Sciences (SPSS) software, employing descriptive analysis. Descriptive statistics summarized the respondents' demographic characteristics and key trends in their responses.

## FINDINGS AND DISCUSSION

### Behaviour-Based Barriers to CE Implementation

The table presents a ranked analysis of behavioral barriers to implementing the circular economy (CE) in the South African construction industry, based on mean scores and standard deviations. The highest-ranking barrier, Resistance to Change (mean = 4.02, SD = 1.114), indicates that stakeholders in the industry are notably hesitant to move away from conventional linear economic practices. This aligns with the findings by Homrich et al. (2018), who noted that resistance often stems from a lack of confidence in new systems and reluctance to disrupt established workflows. Kirchherr et al. (2018) further argue that resistance is exacerbated by limited leadership commitment and insufficient organizational readiness for change.

The Lack of Understanding of CE Benefits (mean = 3.98, SD = 1.209) highlights the knowledge gap among construction professionals regarding the advantages of CE practices. According to Geissdoerfer et al. (2017), this barrier is common in industries where the long-term value of sustainability

initiatives is not immediately apparent. Stahel (2016) adds that insufficient understanding often leads to misconceptions about the financial viability and operational feasibility of CE, creating a significant barrier to its adoption. Similarly, the Lack of Incentives or Rewards (mean = 3.93, SD = 1.052) ranked third, pointing to an absence of tangible motivators for stakeholders to transition to CE. Studies by Ghisellini et al. (2016) and Winans et al. (2017) suggest that without clear economic or reputational benefits, organizations may be unwilling to invest in CE practices.

Lower-ranked barriers, such as Perception of Second-Hand Materials (mean = 3.84, SD = 1.085), reflect the stigma associated with recycled materials, as noted by Velenturf and Purnell (2017), who identified concerns about quality, durability, and safety as common deterrents. Perceived Complexity of CE Implementation (mean = 3.82, SD = 1.172) further indicates that stakeholders find CE processes difficult to operationalize, a challenge highlighted by Kirchherr et al. (2018), who identified complex regulatory frameworks and technical requirements as significant impediments. Cultural and Organizational Norms (mean = 3.78, SD = 1.287) and Short-Term Thinking (mean = 3.75, SD = 1.250) underscore systemic issues where entrenched practices and immediate financial considerations take precedence over long-term sustainability, as discussed by Murray et al. (2017). Finally, Concerns About Increased Workload (mean = 3.69, SD = 1.069) indicate that the perceived additional effort required for CE implementation discourages stakeholders, a finding supported by Smol et al. (2017), who argue that such perceptions often deter organizations from engaging in circular practices.

**Table 1:** Behavior-based barriers to CE implementation.

Behaviour Barriers to CE	Mean	Std. Deviation	Rank
Resistance to change	4,02	1,114	1
Lack of understanding of CE benefits	3,98	1,209	2
Lack of incentives or rewards	3,93	1,052	3
Perception of Second-Hand Materials	3,84	1,085	4
Perceived complexity of CE implementation	3,82	1,172	5
Economical and Financial Concerns	3,80	1,026	6
Cultural and Organizational norms	3,78	1,287	7
Short term thinking	3,75	1,250	8
Concerns about increased workload	3,69	1,069	9

### Strategies to Deal With Behavior-Based Barriers

The findings in the table reveal that workshops and seminars are perceived as the most effective strategy, with a mean score of 4.04 (SD = 1.154), ranking first among the strategies evaluated. This aligns with existing literature emphasizing the importance of hands-on training and information dissemination in promoting understanding and adoption of best practices in various fields (Reich & Weber, 2021). Clear messaging and feedback mechanisms, both with mean scores of 4.02, were jointly ranked second, highlighting the critical role of clear communication and iterative feedback

in implementing effective strategies (Smith et al., 2020). Lower-ranked strategies, such as financial incentives (mean = 3.82, SD = 1.249) and pilot projects (mean = 3.80, SD = 1.078), point to less enthusiasm or perceived effectiveness among respondents, possibly due to their long-term nature or implementation complexities (Johnson & Lee, 2022). Notably, “short-term thinking” received the lowest mean score (3.15, SD = 1.297), indicating it is perceived as a hindrance rather than a strategy for success.

**Table 2:** Strategies to deal with behaviour-based barriers.

Strategies	Mean	Std. Deviation	Rank
Workshops and seminars	4,04	1,154	1
Clear messaging	4,02	1,163	2
Feedback mechanisms	4,02	1,114	2
Industry partnerships	3,93	1,103	3
Certification programs	3,93	1,103	3
Change management	3,91	1,059	4
Lifecycle cost analysis	3,91	1,093	4
Behavioural nudges	3,89	1,117	5
Standards and guidelines	3,89	1,133	5
Third-party verification	3,89	1,227	5
Collaborative platforms	3,87	1,277	6
Sustainability goals	3,87	1,123	6
Regulatory support	3,84	1,118	7
Financial incentives	3,82	1,249	8
Pilot project	3,80	1,078	9
Case studies	3,65	1,022	10
Short term thinking	3,15	1,297	11

## CONCLUSION AND FURTHER RESEARCH

This study has identified and analyzed the behavioral barriers impeding the adoption of the circular economy (CE) within the South African construction industry. The findings reveal that despite growing awareness of sustainability and circular economy principles, deeply entrenched behavioral factors such as resistance to change, lack of stakeholder collaboration, and insufficient awareness of CE benefits significantly hinder its implementation. Additionally, cultural norms, a low-risk appetite among industry players, and a preference for traditional linear economic models further compound these challenges.

The study underscores the necessity of addressing these behavioral barriers to facilitate the transition toward a more sustainable construction paradigm. It emphasizes the importance of fostering a culture of innovation, collaboration, and proactive engagement among all stakeholders. Moreover, targeted interventions such as capacity-building programs, robust policy frameworks, and industry-led awareness campaigns are essential for overcoming these barriers and driving the adoption of CE practices in the construction sector. Future research on the implementation of circular economy principles in the South African construction industry could focus on

assessing how emerging technologies, such as Building Information Modeling (BIM), can aid in addressing behavioral barriers and facilitating CE adoption in construction projects.

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