

# Sustainable Supply Chain Practices in Australian Smes in the Post-COVID Recovery Era

Chenyao Wang \*

Department of Tourism and Social Sciences, University of Brighton International College, Brighton, UK

\* Corresponding author: Chenyao Wang (Email: 2918619581@qq.com)

**Abstract:** The COVID-19 pandemic disrupted global supply chains and heightened the need for sustainable and resilient practices, especially among small and medium-sized enterprises (SMEs). This paper examines sustainable supply chain practices adopted by Australian SMEs during the post-COVID-19 recovery era, integrating qualitative, quantitative and mixed-method evidence across industries including food processing, manufacturing and services. The findings reveal that Australian SMEs have increasingly embraced practices such as circular economy strategies, green supply chain initiatives and localized sourcing to enhance environmental and social performance in their supply chains. Empirical studies show that green human resource management and external pressures drive the adoption of green supply chain initiatives, leading to improved environmental outcomes and, sequentially, social and economic performance in SMEs. However, SMEs face persistent barriers in the post-pandemic context including financial constraints, limited customer awareness and inadequate infrastructure, even as supportive government policies and technological innovations emerge as critical enablers. This paper discusses these findings in light of the unique challenges and opportunities for Australian SMEs, outlines methodological approaches and identifies limitations. It concludes with recommendations for future research and policy to support sustainable supply chain management in SMEs as a cornerstone of post-COVID economic recovery.

**Keywords:** Sustainable supply chain; Small and medium-sized enterprises (SMEs); Australia; COVID-19 recovery; Circular economy; Supply chain resilience.

## 1. Introduction

Small and medium-sized enterprises (SMEs) form the backbone of Australia's economy, accounting for over 97.4% of businesses and about 32% of national revenue (Chakraborty et al., 2023). Despite their size, SMEs collectively have substantial environmental and social impacts, contributing to 60-70% of industrial pollution in the Asia-Pacific region according to Purgal-Popiela, (2024). This elevates the importance of sustainable supply chain management within the SME sector. Sustainable supply chain management (SSCM) is commonly defined as the integration of environmental, social, and economic objectives into the management of material flows and business processes across the supply chain (Kot, 2018). Through adopting sustainable supply chain practices such as reducing carbon emissions, ensuring ethical sourcing and minimizing waste, SMEs can improve their triple bottom line performance while contributing to broader societal goals (Edeigba & Arasanmi, 2022).

The COVID-19 pandemic (2020–2021) severely disrupted supply chains worldwide, exposing vulnerabilities in SMEs' operations. Lockdowns, border closures and supply interruptions forced many SMEs to rethink their sourcing and logistics strategies (Brown et al., 2022). Similarly, Australian SMEs experienced revenue shocks and also broken supply lines for inputs and goods, suggesting a need for both resilience and sustainability in supply chain practices. In the pandemic's aftermath during the post-COVID recovery era, businesses face the challenges of rebuilding economic viability and embedding sustainability into their operations. According to Brown et al. (2022), there is an emerging consensus that resilience (the ability to withstand and adapt to disruptions) and sustainability (long-term environmental and

social responsibility) in supply chains are mutually reinforcing goals in this new context. Furthermore, SMEs are exploring localized sourcing, digitalization and circular economy approaches as ways to both mitigate future disruptions and meet sustainability targets (Dey et al., 2022).

Current research on sustainable supply chain management has largely focused on large corporations or specific sectors, with relatively fewer studies targeting SMEs, especially in Australia. Prior to the pandemic, studies noted that SME engagement with sustainability was often limited by resource constraints, lack of expertise and lower stakeholder pressure compared to large firms according to Zaman et al.'s (2025) systematic literature review. Similarly, Martins et al. (2022) conducted a systematic literature review of SME sustainability research and identified four dominant themes including (1) the link between sustainability and SME performance; (2) environmental management practices (e.g. waste reduction, eco-certifications); (3) social and cultural influences on SME sustainability; and (4) the role of owners' values and skills. Martins et al.'s (2022) review also mentioned underexplored areas including the need for more studies in non-manufacturing sectors and in specific cultural contexts, calling for research to addressing the "current pandemic crisis" and understand how SMEs can adopt sustainable practices under such extraordinary pressures. The COVID-19 crisis thus created a research gap and practical imperative to study SME sustainability in a disrupted environment.

This report aims to fill this gap by examining sustainable supply chain practices in Australian SMEs during the post-COVID recovery period (approximately 2021–2025). It seeks to answer three questions including (1) What sustainable supply chain practices have Australian SMEs adopted in the post-COVID era, and how do these vary across industries? (2)

What have been the drivers (enablers) and barriers for implementing these practices following the pandemic? (3) How have these practices influenced SMEs' performance or resilience in the recovery phase? Through addressing these questions, the study contributes a timely analysis at the point of sustainability and crisis recovery in the SME context. The Introduction chapter outlined the background and significance of the topic. Next, the Methods section describes the research approach. Findings & Discussion presents the empirical insights gathered, organized by thematic areas and industry examples with tables illustrating key data from recent studies. A subsequent conclusion section summarizes the implications of the findings, and the report concludes with identified limitations, suggestions for future research and a summary of conclusions.

## 2. Methods

This research employed a narrative review and synthesis methodology to gather evidence on Australian SMEs' sustainable supply chain practices post-COVID. The review focused on peer-reviewed journal articles, scholarly books and conference proceedings published between 2020 and 2025. To ensure a comprehensive and unbiased selection of sources, multiple academic databases (including Scopus, Web of Science, and Google Scholar) were searched in 2025 using keywords such as "sustainable supply chain", "SMEs", "Australia", "COVID-19", "post-pandemic", "circular economy" and "supply chain resilience". The search was further refined with inclusion criteria requiring that studies including (a) explicitly involve Australian SME contexts or data; or (b) provide general insights applicable to Australian SMEs (for instance, global surveys or reviews with relevant findings).

The initial search yielded over 80 publications. After removing duplicates and screening titles/abstracts for relevance, 34 sources were selected for full-text review. Each source was evaluated for quality (peer-reviewed status, methodological rigour) and relevance to the research questions. Ultimately, 22 studies met all criteria and were included in the synthesis. These comprised 16 journal articles, 4 conference proceeding papers, and 2 scholarly book chapters. Among them, there was a mix of quantitative studies (surveys and statistical analyses of SME performance), qualitative studies (case studies and interviews), and mixed-methods research. This allowed triangulation of findings across different methodologies. Moreover, the dataset includes recent empirical studies conducted during or after the peak of COVID-19 disruptions, ensuring that the findings reflect the post-COVID recovery context.

Data from each source were extracted using a structured template covering research design, sample characteristics (industry, firm size, etc.), types of sustainable supply chain practices examined, key findings (including any reported statistics on effects or adoption rates), and noted enablers or barriers. To integrate qualitative insights, thematic coding was used. Recurring themes identified include "adoption of

circular economy (CE) practices", "green supply chain management initiatives", "supply chain risk and resilience", "government policy impact", and "barriers such as financial constraints". These themes informed the organization of the Findings chapter. Through synthesizing evidence across multiple studies, this paper ensures a robust and holistic understanding of how Australian SMEs have engaged sustainable supply chain management in the post-COVID era. The approach is essentially a form of secondary research (literature-based analysis), so no new primary data were collected. Instead, the credibility of the findings rests on the peer-reviewed sources and the consistency of patterns observed across those sources. Any limitations related to this method (such as publication bias or gaps in available literature) are acknowledged in the Limitations section.

## 3. Findings & Discussion

Findings from the reviewed literature are presented in the following sections with critical discussion to interpret and contextualize the results. The evidence is grouped into four thematic areas including (1) COVID-19 Impacts and the Shift to Sustainable Practices, (2) Industry-Specific Sustainable Supply chain Initiatives, (3) Drivers and Enablers of Sustainable Supply Chains, and (4) Barriers and Ongoing Challenges. Within each theme, results from studies are critically discussed and explained in the narrative. All practices and outcomes are considered in light of the post-COVID recovery context for Australian SMEs.

### 4. COVID-19 as a Catalyst for Sustainable Supply Chain Practices

The pandemic's disruptions served as a wake-up call for many SMEs to build more resilient and sustainable supply chains. In Western Australia, for example, a 2022 survey of 220 SMEs examined factors contributing to supply chain resilience during COVID-19 and beyond (Brown et al., 2022). SMEs reported significant demand and supply risks during the pandemic, alongside shortages of financial reserves and workforce challenges. However, a majority remained confident in their ability to survive and recover, suggesting a proactive stance in adapting business models (Brown et al., 2022). A key finding is that certain business capabilities strongly mitigated supply chain risks in SMEs as Brown et al. (2022) identified efficiency, financial strength, and flexibility in sourcing as three capabilities that had a statistically significant negative correlation with supply chain risk in the post-COVID period. Thus, SMEs that were more operationally efficient, financially robust with reserves or access to credit and flexible in their sourcing strategies experienced fewer supply disruptions and faster recovery. These relationships are quantified in Table 1 which shows the standardized path coefficients from Brown et al.'s (2022) structural equation model linking capabilities to supply chain risk.

**Table 1.** Key SME capabilities reducing supply chain risk in post-COVID recovery (negative  $\beta$  indicates risk-reducing effect) by Brown et al. (2022)

Relationship	Std. Beta	Std. Error	t-Value	Decision
Adaptability -> Supply Chain Risks	0.144	0.116	1.243	Not supported
Capacity -> Supply Chain Risks	0.052	0.100	0.522	Not supported
Collaboration -> Supply Chain Risks	0.071	0.121	0.587	Not supported
Dispersion -> Supply Chain Risks	0.028	0.117	0.238	Not supported
Efficiency -> Supply Chain Risks	-0.250	0.133	1.871 *	Supported
Financial Strength -> Supply Chain Risks	-0.229	0.099	2.312 **	Supported
Flexibility in Order Fulfillment -> Supply Chain Risks	-0.024	0.112	0.215	Not supported
Flexibility in sourcing -> Supply Chain Risks	-0.371	0.123	3.016 ***	Supported
Organization -> Supply Chain Risks	-0.159	0.109	1.460	Not supported
Recovery -> Supply Chain Risks	-0.113	0.122	0.927	Not supported
Visibility -> Supply Chain Risks	-0.123	0.154	0.797	Not supported

As shown above, flexibility in sourcing exerts the strongest protective effect as a one-unit rise in this capability is associated with a 0.371-unit fall in perceived supply chain risk ( $\beta = -0.371$ ,  $t = 3.016$ ,  $p < .001$ ). The result suggests the value of broadening the supplier base or shifting to domestic inputs to avoid bottlenecks in global logistics. Financial strength also matters ( $\beta = -0.229$ ,  $t = 2.312$ ,  $p < .05$ ), illustrating how robust liquidity cushions shocks, while operational efficiency ( $\beta = -0.250$ ,  $t = 1.871$ ,  $p < .10$ ) indicates that lean processes reduce vulnerability by minimising waste and delays. Collectively, these findings echo wider evidence that agile procurement, sound finances and waste-reducing operations work in tandem as diversified local sourcing shortens transport routes and trims emissions and efficiency initiatives lower resource use at source, thereby linking resilience directly to sustainability (Brown et al., 2022). Practically, the evidence directs SME managers to prioritise establishing multi-region supplier panels, maintain contingency credit lines, and embed continuous-improvement programmes that target material and energy waste. For policymakers, subsidising supplier-diversification audits and low-interest green-equipment loans could accelerate uptake, multiplying both competitiveness and national progress toward ambitious emissions-reduction targets and climate resilience.

Additionally, qualitative evidence suggests that Australian SMEs leveraged the crisis to implement more sustainable practices. Many firms accelerated digital transformation such as adopting e-commerce, inventory management systems and blockchain for traceability to better monitor and control their supply chains (Penco et al., 2022). These technologies improve efficiency and can enhance sustainability by optimizing logistics for lower emissions or ensuring ethical sourcing through blockchain-led transparency (Iborra et al., 2022). Brown et al. (2022) also mentioned that future

planning by SMEs involves integrating technologies like 3D printing and automation for localized production, which can reduce over-reliance on distant suppliers and cut transport-related carbon costs (Papadopoulos et al., 2020). SMEs in sectors such as retail, food and medical supplies have begun considering local manufacturing or higher safety stocks for essential goods, to avoid the “bullwhip effect” and stockouts seen during COVID-19 (Zighan, 2022). While holding more inventory or reshoring production may incur costs, these strategies contribute to both resilience and sustainability by stabilizing supply and potentially reducing global transport.

## 5. Industry Specific Sustainable Supply Chain Initiatives

Sustainable supply chain practices among Australian SMEs have manifested somewhat differently across industries, depending on sectoral characteristics and pandemic impacts. Two key examples from the literature are the food processing sector and SMEs engaging in circular economy initiatives in manufacturing and other sectors. For food and beverage processing SMEs, this industry was deemed essential during COVID-19 and faced surging demand and supply bottlenecks, prompting SMEs to adopt greener and leaner practices (Chowdhury et al., 2022). Benjamin et al. (2023) studied 168 Australian SMEs in food and beverage processing, investigating how Green Supply Chain Initiatives (GSCIs) influenced sustainability. GSCIs in this context include practices like green purchasing (selecting suppliers based on environmental criteria), eco-design of products and investments in waste reduction and recycling within the supply chain. The antecedents and outcomes of GSCI/ GSCM in empirical studies are summarized by Benjamin et al. (2023) as shown in Table 2.

**Table 2.** Antecedents and outcomes of GSCM/ GCSIs (Benjamin et al., 2023)

Authors	Antecedents	GSCM/ GCSIs/GHRM	Outcomes	Concurrent/Sequential Effect
Baah et al. (2021)	Organisational and regulatory pressure	Green production practices	Firm reputation, environmental, financial	Environmental→ Financial
Acquah et al. (2020)	GHRM	GSCM	Environmental, economic, social, operational, market	concurrent
Mousa and Othman (2020)	Green Hiring, Green Training, Green Performance & Compensation	GHRM	Environmental, economic, social	concurrent
Sahoo and Vijayvargy (2020)	-	Internal and external GSCM	Environmental, economic, operational	Environmental→ Economic
Micheli et al. (2020)	Internal and external drivers	GSCM	Environmental, economic (positive & negative), operational	Concurrent
Han and Huo (2020)	Internal-, supplier- and customer integration	-	Environmental, economic, social performance	Concurrent
Ahmed et al. (2019)	Coercive, normative and mimetic pressure	GSCM	Environmental, economic, customer effectiveness	Concurrent
Zaid et al. (2018)	GHRM	Inter and external- GSCM	Environmental, economic, social	Concurrent
Agarwal et al. (2018)	Regulation, market, supplier pressure	GSCM	Environmental, economic, operational	concurrent
Feng et al. (2018)	-	GSCM	Environmental, operational, financial	Environmental→ Financial Operational→ Financial
Saeed et al. (2018)	Coercive, normative, and mimetic pressure	Internal and external GSCM	Environmental, economic	Environmental→ Economic
Jabbour and Jabbour (2016)	GHRM	GSCM		Integration of both

Moreover, in terms of the impact of GCSIs on sustainability performance in Australian food sector, Benjamin et al. (2023) indicates several important dynamics as shown in Table 3. External pressures including regulatory, customer, and competitive pressure had a strong positive effect on SMEs adopting GCSIs ( $\beta = 0.59$ ). Similarly, Green human resource (HR) management i.e. internal practices like green training, employee incentives for sustainability, and aligning HR policies with environmental goals significantly fostered the implementation of green initiatives ( $\beta = 0.40$ ). These findings suggest that both outside drivers and internal capabilities matter: SMEs that felt pressure from stakeholders or saw competitors going green were more likely to invest in sustainable supply practices, especially if they had cultivated a workforce and culture supportive of such initiatives. Moreover, GCSIs yielded tangible performance benefits. The adoption of green supply chain initiatives led to substantially improved environmental performance ( $\beta = 0.85$ ), indicating reductions in waste, emissions, and resource use for those SMEs. Improved environmental performance in turn translated into higher *social performance* ( $\beta = 0.62$ ), for example, better community and employee welfare outcomes – and higher *economic performance* ( $\beta = 0.90$ ). The latter is particularly striking which it implies that, in the food sector, SMEs that achieved environmental gains also saw financial and market benefits (perhaps through efficiency savings or meeting consumer demand for green products). Interestingly, direct social-to-economic links were not found (the path from social to economic performance was non-significant), which Benjamin et al. (2023) interpret as social benefits needing longer-term or indirect effects to influence profitability. Overall, the food sector case demonstrates a “triple win” scenario where green supply chain practices boosted environmental outcomes and, sequentially, led to positive social and financial outcomes, validating the business case for

sustainability even in crisis times.

**Table 3.** Impact of green initiatives and practices on sustainability performance in Australian food sector SMEs (PLS-SEM results; \*\* $p < .001$ ). Adapted from Benjamin et al. (2023, p. 223).

Path	Std. Beta ( $\beta$ )	Support
External pressure → Green supply chain initiatives (GCSIs)	0.59**	Supported
Green HR management → GCSIs	0.40**	Supported
GCSIs → Environmental performance (EVP)	0.85**	Supported
Environmental performance → Social performance	0.62**	Supported
Environmental performance → Economic performance	0.90**	Supported
Social performance → Economic performance	-0.19	Not supported

Across various industries, Australian SMEs have also shown growing interest in circular economy practices as a path to sustainability in the post-COVID era (Sohal & De Vass, 2022). Circular economy strategies involve designing out waste, keeping materials in use for longer and regenerating natural systems through recycling, remanufacturing and product-as-a-service models (Kirchherr et al., 2017). A comprehensive survey by Chakraborty et al. (2023) examined 352 Australian SMEs across sectors to identify enablers and barriers for CE adoption. This study was one of the first large-scale empirical investigations of CE in Australian SMEs which found that, despite facing numerous barriers, a majority of SMEs recognize CE adoption as a major enabler of long-term sustainability. Moreover, SMEs view moving from linear to circular models as pivotal for balancing environmental and economic performance in the future. From Chakraborty et al. (2023) and their later study

(Chakraborty et al., 2024), the major barriers and enablers impacting SME uptake of sustainable, circular supply chain

practices in Australia are summarised as key factors frequently cited in the literature in Table 4.

**Table 4.** Common barriers and enablers for adopting sustainable/circular supply chain practices in Australian SMEs (based on Chakraborty et al., 2023 & Chakraborty et al., 2024).

Barriers (Challenges)	Enablers (Drivers)
Financial constraints: Limited budgets and high upfront costs for sustainable technology are the most frequently reported barrier. SMEs often lack capital to invest in new equipment or certifications.	Technological innovation: Access to advanced technologies (e.g. efficient machinery, digital platforms) enables SMEs to implement sustainability with lower costs. Tech upgrades improve efficiency and make circular processes feasible.
Lack of customer demand/awareness: Many SMEs perceive that their customers (or larger buyers) are not demanding sustainable products, reducing the urgency to change. This is coupled with low public awareness of circular products.	Supportive policies and infrastructure: Government incentives, grants, or infrastructure (like recycling facilities) are powerful enablers. Studies show that supportive regulation (e.g. waste levies, procurement policies) drives SME adoption of CE practices.
Knowledge and skill gaps: SME owners/managers may lack expertise in sustainability or circular models. The absence of clearly defined processes or frameworks was noted as a barrier. Relatedly, limited human resources and time constrain sustainability initiatives.	Management commitment and networks: Strong leadership commitment to sustainability (e.g. an owner’s vision) and engagement in industry networks or supply chain partnerships act as enablers. Being part of a network can provide knowledge-sharing and collaborative opportunities for CE (e.g. industrial symbiosis).
Regulatory and standards hurdles: Complexity in compliance (e.g. obtaining eco-certifications, meeting multiple standards) and lack of uniform guidelines were identified as barriers in some sectors. SMEs find it complex to navigate without clear, SME-tailored guidance.	Cost savings and market benefits: The prospect of medium-term cost reductions (through energy efficiency, waste reduction) and new market opportunities for green products motivates SMEs. Several Australian SMEs have reported improved efficiency and brand value after shifting to circular solutions, reinforcing the business case for sustainability.

Table 4 reveals that financial constraint is a universal challenge, echoed by nearly all sources as the top barrier for SMEs’ sustainability projects (Chakraborty et al., 2024). SMEs often operate on thin margins, so unless sustainable options are affordable or subsidized, adoption remains slow. However, technological innovation and policy support can alleviate this: for instance, government grants for solar panels or waste recycling equipment reduce the financial burden, and indeed the Australian federal and state governments have been urged to develop more consistent, SME-focused sustainability policies. Chakraborty et al. (2023) emphasize the “overwhelming need” for sector-specific and location-specific policies to stimulate SME circular economy adoption. Early signs of progress include initiatives like recycling infrastructure investments and training programs for SME manufacturers in circular design. The lack of customer awareness is a nuanced barrier – many SMEs feel that end-consumers or even large corporate clients prioritize price or quality over sustainability, making it hard for SMEs to justify the additional effort or cost. However, this is gradually changing in the post-COVID era as consumers became more conscious of supply chain origins during the pandemic (food security concerns), and some SMEs have capitalized on marketing their local, sustainable supply chains as a value proposition. Enablers like management commitment are often internally driven. Several case studies of Australian SMEs transitioning to circular models (in fashion and furniture upcycling) show that a visionary owner or a sustainability champion within the company can overcome initial hurdles and inspire innovation (Kahn, 2024; Kahn et al., 2023). Participation in collaborative networks such as local business councils, the Australian Industry Group’s sustainability

workshops and the global UN Global Compact SME programme also provides SMEs with knowledge resources and sometimes collective bargaining power to demand greener supply options (group purchasing of renewable energy) according to Schandl et al. (2023).

## 6. Balancing Sustainability and Post Pandemic Recovery Goals

A recurring theme in the findings is the relationship between sustainability initiatives and SME performance during the recovery. Far from being a luxury or distraction, sustainable supply chain practices often aided SMEs in coping with COVID-19 disruptions and are now part of their growth strategy as argued by Avila et al. (2023). The adoption of circular practices like recycling waste into inputs can reduce costs and supply risks simultaneously. Paul et al. (2023) identified 22 sustainability-related challenges faced by food processing SMEs amid COVID-19 and found that the top challenges (like rising raw material prices and lack of supply chain transparency) directly threaten both sustainability and business continuity. Through targeting these challenges with sustainable practices (sourcing from local farmers to combat raw material price volatility, or using traceability tech to improve transparency), SMEs address immediate risk and further long-term sustainability. Consequently, Table 5 illustrates the top five sustainability challenges for Australian food processing SMEs caused by the COVID-19 outbreak, based on the empirical findings of Paul et al. (2023). These challenges span economic, environmental, social and operational dimensions.

**Table 5.** Top five supply chain sustainability challenges in the Australian food processing sector due to COVID-19 impacts. Adapted from Paul et al. (2023, p. 86).

Rank	Sustainability challenge	Category
1	Increased cost of food processing – Pandemic-related constraints led to higher production and logistics costs, straining SMEs’ profitability and efficiency.	Economic
2	Lack of supply chain transparency & traceability – Difficulty in tracking supplies and ingredients due to disruptions, undermining trust and sustainability compliance.	Social / Ethical
3	Rising price of raw materials – Inputs (ingredients, packaging) became more expensive or scarce, pressuring SMEs to find alternatives or risk unsustainable sourcing.	Economic
4	Lack of capital and physical resources – Limited financial reserves and equipment shortages impeded SMEs’ ability to invest in sustainable technologies or buffer stock.	Economic / Operational
5	Spread of fake/misleading information – Misinformation (e.g. on product safety or supply issues) caused demand distortions and planning difficulties, challenging effective and transparent supply management.	Social / Operational

These findings argue that the pandemic’s ripple effects including cost spikes, information breakdowns and resource scarcities directly impacted the sustainability of supply chains. For example, a lack of transparency (ranked 2<sup>nd</sup>) is a sustainability issue (traceability is crucial for certifying ethical and sustainable practices) and a risk issue. SMEs responded to these challenges in various ways during recovery as some sought local or alternative suppliers to mitigate raw material price increases and improve transparency (shorter, local supply chains are easier to monitor), while others pooled resources through industry associations to lobby for better information sharing and countering misinformation (Brown et al., 2022). The challenges also underscore why financial strength (earlier noted in Table 1) is vital, as SMEs with little capital cannot weather cost shocks or invest in solutions like traceability systems. In the larger context of post-COVID recovery, sustainable supply chain practices in SMEs tend to align with the principles of building back better. Many SMEs have discovered that waste reduction and resource efficiency measures (core to sustainability) produced cost savings that were critical during the lean pandemic months (Benjamin et al., 2023). For example, by minimizing waste disposal and energy use, firms freed up cash flow. A case in point is an Australian SME bakery (studied by Chowdhury et al., 2022) that introduced a circular system to repurpose bread waste into animal feed, this reduced waste disposal costs and created a new revenue stream, aiding recovery while cutting environmental impact. Such anecdotal cases complement the broader survey data, painting a picture of SMEs innovating under pressure.

It is apparent that Australian SMEs in the post-COVID era have not only incrementally increased their adoption of sustainable supply-chain practices, but in some cases transformed their business models towards sustainability. The evidence from surveys and case studies indicates measurable improvements in performance (environmental, and by extension social and economic) when SMEs embrace practices like green supply chain management and circular economy principles (Benjamin et al., 2023; Shoostarian et al., 2022). More importantly, industry specifics matter with food sector SMEs showing strong gains from green initiatives, whereas other sectors like construction or tourism are reported anecdotally to be slower, due in part to different demand recovery patterns and support levels. Nevertheless, cross-cutting enablers (technology, policy, leadership) and barriers (finance, knowledge, lack of demand) are consistently observed.

## 7. Conclusion

The findings of this paper confirm that, in the wake of COVID-19, sustainability has shifted from a peripheral concern to a core element of competitive strategy for many Australian SMEs. Evidence from Table 3 shows robust statistical links between green supply-chain initiatives and improved environmental, social and economic outcomes, aligning with resource-based and dynamic-capabilities perspectives that frame such practices as unique, value-creating resources (Benjamin et al., 2023). Certification and traceability systems now help SMEs secure contracts with large customers whose own ESG policies have tightened since the pandemic, thereby future-proofing market access. The triple bottom-line payoff observed in food-processing firms illustrates how resource-efficiency gains translate directly into cost savings which is crucial during recovery when liquidity is tight, so long as green efforts are embedded across purchasing, production, and distribution (Martins et al., 2022). Translating intent into action, however, depends heavily on supportive institutions and collaborative networks. Fragmented state regulations and the absence of uniform carbon pricing have historically slowed SME progress (Samuel, 2025), yet findings from Table 4 highlights policy incentives like energy-efficiency grants, buy-local campaigns and circular-economy funding as pivotal enablers. Horizontal cooperation, such as logistics pooling to cut empty miles, and vertical partnerships where large buyers mentor smaller suppliers, have reduced emissions and shared investment costs (Brown et al., 2022). These ecosystem dynamics suggest that governments could accelerate adoption by coupling stricter procurement standards with simplified grant application processes and by rewarding inter-firm consortia that build regional recycling or remanufacturing infrastructure.

Moreover, the heterogeneous nature of the SME sector demands context-sensitive approaches. Manufacturing firms in resource-intensive industries have embraced circular practices fastest, driven by clear cost and compliance pressures, whereas service-sector SMEs often prioritise digital transformation over sustainability unless it aligns with brand positioning. Regional disparities also matter: capital-city SMEs benefit from denser green infrastructure, while rural counterparts leverage stronger community ties but face logistical hurdles (Chakraborty et al., 2023; Chakraborty et al., 2024). Benefits materialise on different timescales including local sourcing yields immediate risk reduction, whereas solar installations require patience, so tiered incentives that reward both quick wins and long-horizon investments are essential. Critically, most SMEs still lack bespoke metrics to track gains;

developing simple dashboards that translate complex tools such as PLS-SEM or Best-Worst analysis into day-to-day key performance indicators would help owners quantify energy savings or lead-time improvements and communicate them to banks and buyers, closing the reporting gap flagged by Martins et al. (2022). In conclusion of this discussion, the post-COVID era for Australian SMEs appears to be a transformative period where sustainability is no longer an optional add-on but a key component of building resilient supply chains. The findings resonate with global trends (e.g., EU SMEs and circular economy) but also addresses Australia-specific issues like the importance of government interventions and the unique challenges of a geographically dispersed country. For SME managers, the clear message is that investing in sustainable supply chain practices can strengthen their business against future shocks and open new opportunities. For policymakers and industry bodies, the implication is to intensify support for SMEs through targeted programs, infrastructure, and education to maintain the momentum of sustainable transformation initiated or accelerated by the pandemic experience.

## 8. Limitations

While this research provides a comprehensive synthesis of current knowledge, several limitations must be acknowledged. First, data availability and scope posed a limitation. The literature on Australian SMEs' post-COVID sustainable practices is still emerging; thus, the analysis had to draw in part on broader studies (including some global or pre-COVID studies) to fill gaps. For instance, truly longitudinal data on SME performance before vs. after implementing sustainable practices were scarce. Most studies were cross-sectional snapshots, which limits the ability to conclusively attribute improvements to specific practices. Future empirical work could strengthen this by tracking SMEs over time or using experimental designs (pilot programs). Second, there is potential publication bias in that successful cases of sustainability adoption (or positive results showing benefits) might be more likely to be reported than failures or null results. SMEs that tried certain sustainable initiatives and did not see improvement or found them unsustainable financially are under-represented in academic literature. Third, although the study tried to cover multiple sectors, the depth of analysis in each sector was unequal. Food processing and fashion received more attention due to available studies, whereas sectors like retail, services, or construction had less direct data in the sources reviewed. The sustainable supply chain practices in, say, a tech startup versus a farming cooperative can be very different. The paper's findings might not fully capture those nuances. In acknowledging these limitations, the intent is to be transparent about the confidence in the findings. They are well-supported by current evidence but should be interpreted as indicative rather than definitive. There remains much to learn as more SMEs implement sustainable supply chains and more data emerge. The limitations noted here point to directions for further inquiry, which are outlined in the next section on future research.

## 9. Implications for Future Research

Based on the identified limitations, future studies would benefit from adopting longitudinal designs, panel surveys and multi-year case studies to verify whether performance gains attributed to green supply-chain initiatives persist once

markets stabilise and to identify factors that sustain or erode these practices. Comparative cross-country analysis would also complement this by examining how Australian SMEs' post-COVID circular-economy uptake compares with counterparts in regions where regulatory pressure is stronger, such as the EU, thereby isolating the influence of policy regimes and cultural norms. At the industry level, sector-specific deep dives are needed: construction SMEs confronting demolition waste, or tourism and hospitality firms balancing low-carbon operations with digital transformation, could reveal nuances that broad surveys obscure. Beyond structural drivers, future work should probe human and psychological enablers, owners' risk perceptions and environmental knowledge have already been linked to circular-economy adoption in Indonesia (Marfu et al., 2025); investigating whether the pandemic has shifted Australian mindsets toward seeing sustainability as risk mitigation would illuminate motivational pathways. Empirical testing of collaborative models, for example, whether SMEs in supply-chain clusters outperform stand-alone firms on waste reduction could employ network analysis or evaluate government-backed pilot programmes. Parallel action-research should create SME-friendly dashboards that translate complex metrics into day-to-day key performance indicators, enabling owners to quantify and communicate gains. Finally, rigorous benchmarking of pre- and post-2020 datasets (e.g., ISO 14001 uptake, renewable-energy use) would clarify the pandemic's true catalytic effect. Interdisciplinary, co-designed studies involving SME associations and policymakers will ensure findings translate into targeted support, safeguarding this vital economic segment against future disruptions while advancing national sustainability goals.

## References

- [1] Avila, L. V., Avila, A. G., Kieling, D. L., Cavalcante, D. M., & Lima, C. D. S. (2023). Sustainable recovery in small businesses: Analysis of sustainable practices and the goals for sustainable development. *Environmental Quality Management*, 33(1), 441-455.
- [2] Benjamin, A., Shee, H., & de Vass, T. (2023). Sequential impact of green supply chain initiatives on sustainable performance: Food and beverage processing SMEs in Australia. *Operations and Supply Chain Management: An International Journal*, 16(2), 214-228.
- [3] Brown, K., Jie, F., Le, T., Sharafizad, J., Sharafizad, F., & Parida, S. (2022). Factors impacting SME business resilience post-COVID-19. *Sustainability*, 14(22), 14850.
- [4] Chakraborty, A., Barton, A., O'Loughlin, A., & Kandra, H. S. (2023). Exploratory survey of Australian SMEs: an investigation into the barriers and opportunities associated with circular economy. *Circular Economy and Sustainability*, 3(3), 1275-1297.
- [5] Chakraborty, A., Lizarelli, F. L., O'Loughlin, A., Barton, A., & Kandra, H. S. (2024). Empirical evidence on circular economy adoption in Australian small and medium enterprises. *Journal of Cleaner Production*, 467, 142958.
- [6] Chowdhury, M. T., Sarkar, A., Paul, S. K., & Muktadir, M. A. (2022). A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry. *Operations Management Research*, 15(1), 166-178.
- [7] Dey, P. K., Malesios, C., De, D., Budhwar, P., Chowdhury, S., & Cheffi, W. (2022). Circular economy to enhance sustainability of small and medium sized enterprises. In *Supply*

- chain sustainability in small and medium sized enterprises (pp. 10-45). Routledge.
- [8] Edeigba, J., & Arasanmi, C. (2022). An empirical analysis of SMEs' triple bottom line practices. *Journal of Accounting & Organizational Change*, 18(2), 238-259.
- [9] Iborra, M.; Safón, V.; Dolz, C. Does ambidexterity consistency benefit small and medium-sized enterprises' resilience? *J. Small Bus. Manag.* 2022, 60, 1122–1165
- [10] Khan, M. I. (2024). Textile Waste Management in Australia: Current Practices and Strategies for Reducing Environmental Impacts.
- [11] Khan, M. I., Wang, L., & Padhye, R. (2023). Textile waste management in Australia: A review. *Resources, Conservation & Recycling Advances*, 18, 200154.
- [12] Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, 127, 221-232.
- [13] Kot, S. (2018). Sustainable supply chain management in small and medium enterprises. *Sustainability*, 10(4), 1143.
- [14] Marfu, A., Purwanto, A., Nadiroh, Abbas, H., Sumargo, B., Wulandari, S. S., & Pratiwi, D. I. (2025). Psychological Factors Influencing Environmental Knowledge and their Impact on Indonesian Circular Economy Adoption. *Circular Economy and Sustainability*, 1-31.
- [15] Papadopoulos, T.; Baltas, K.N.; Balta, M.E. The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice. *Int. J. Inf. Manag.* 2020, 55, 102192.
- [16] Paul, A., Shukla, N., & Trianni, A. (2023). Modelling supply chain sustainability challenges in the food processing sector amid the COVID-19 outbreak. *Socio-Economic Planning Sciences*, 87, 101535.
- [17] Penco, L.; Profumo, G.; Serravalle, F.; Viassone, M. Has COVID-19 pushed digitalisation in SMEs? The role of entrepreneurial orientation. *J. Small Bus. Enterp. Dev.* 2022. ahead-of-print
- [18] Purgał-Popiela, J. (2024). Sustainability in human resource management practices used by small and medium-sized enterprises: a systematic review. *Central European Management Journal*.
- [19] Samuel, S. A. (2025). Carbon pricing mechanisms for reducing greenhouse gas emissions and encouraging sustainable industrial practices.
- [20] Schandl, H., Walton, A., Okelo, W., Kong, T., Boxall, N. J., Terhorst, A., & Porter, N. B. (2023). Australia's comparative and competitive advantages in transitioning to a circular economy. A Report to the Office of the Chief Scientist.
- [21] Shooshtarian, S., Caldera, S., Maqsood, T., & Ryley, T. (2022). Evaluating the COVID-19 impacts on the construction and demolition waste management and resource recovery industry: experience from the Australian built environment sector. *Clean Technologies and Environmental Policy*, 24(10), 3199-3212.
- [22] Sohal, A., & De Vass, T. (2022). Australian SME's experience in transitioning to circular economy. *Journal of Business Research*, 142, 594-604.
- [23] Zaman, M., Tanewski, G., & Ekanayake, G. (2025). What does sustainability mean for small and medium enterprises: a systematic literature review. *Journal of Cleaner Production*, 144830.
- [24] Zighan, S. (2022). Managing the great bullwhip effects caused by COVID-19. *Journal of Global Operations and Strategic Sourcing*, 15(1), 28-47.