

An aerial photograph of an industrial port area at sunset. The sky is filled with warm, golden light and scattered clouds. In the foreground, a body of water reflects the light. The middle ground shows various industrial buildings, cranes, and structures along the waterfront. The background features a range of low mountains under the bright sky.

PPC-GIBS WHITE PAPER SERIES:

INDUSTRIAL TRANSITION AND SUSTAINABILITY INSIGHTS

**Gordon
Institute
of Business
Science**

Centre for African
Management
and Markets

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PPC-GIBS WHITE PAPER SERIES: INDUSTRIAL TRANSITION AND SUSTAINABILITY INSIGHTS

INTRODUCTION

In an era where the clarion call is for sustainable and responsible business practices, the white paper series presented here is both timely and crucial. This series is an inaugural effort, marking the beginning of an annual scholarly contribution to the fields of industrial transition and sustainability. It stems from a pioneering three-year partnership between PPC Limited (PPC) and the Centre for African Management and Markets (CAMM) at the Gordon Institute of Business Science (GIBS).

ABOUT THE COLLABORATORS:

PPC Limited is a supplier of cement, lime (material) and related products in southern Africa. The 126-year-old business has 11 cement factories and a lime manufacturing facility in six African countries including South Africa, Botswana, the Democratic Republic of the Congo, Ethiopia, Rwanda, and Zimbabwe. The company is headquartered in Sandton (Johannesburg).

Rooted in the “Build. Connect. Do.” mission, CAMM is one of three centres based at GIBS, the African continent’s premier business school. This strategic positioning provides CAMM with an esteemed base and a vast network, encompassing researchers, practitioners, academics, and policy experts spanning the continent.

The alliance between PPC Limited and GIBS harnesses their collective expertise and resources. This partnership is poised to drive impact in the public domain by doing so. The overarching aim of this series is twofold, namely, to extract practical insights from the broad fields of industrial transition and sustainability, leveraging the intellectual resource capacity of the academic community- faculty and students to further enrich our comprehension of these vital domains; and to augment the prevailing body of knowledge with fresh perspectives and pragmatic strategies developed through our partnership and research collaboration.



ABOUT THE WHITE PAPERS:

This first edition of the series is made up of three white papers.

In *Supply Chain Collaboration in the Transition to a Circular Economy*, Nokhwezi Nhasengo and Jill Bogie show that the transformative journey towards a circular economy mandates a radical re-evaluation of supply chain paradigms. This treatise emphasises the integral role of collaboration in the genesis of a circular economy, harmonising economic development, environmental stewardship, and societal necessities. Pertaining to the South African canvas, the study delineates how sustainability outcomes, especially social ones, are deeply intertwined with the nation's unique socio-economic fabric.

In *Perceptions of the Mining Industry's Contribution to South Africa's Energy Transition Agenda*, Sfiso Nxumalo and Alet Erasmus evidence that South Africa's mining sector stands at a pivotal juncture, confronted with its substantial carbon emissions and the global impetus towards greener energy. This document amasses insights from industry veterans, elucidating potential trajectories for the sector's energy metamorphosis. The discourse propounds the urgency for a cohesive strategy, with an emphasis on energy security and sustainable methodologies.

In the third paper in the series, *Transformation Towards Circularity Through Capabilities and Digitalisation: The Case of Max Burgers*, Sheena Indhul narrates the odyssey of Max Burgers, the first Hamburger fast food company to outcompete McDonalds in Sweden. This paper offers an intricate exploration into the challenges and prospects of pivoting from a linear to a circular business archetype. The exposition accentuates the pivotal role of digitalisation, managerial prowess, and pioneering practices, presenting a roadmap for African enterprises aspiring towards circularity.

In synthesis, these papers illuminate the complexities and opportunities inherent in the shift towards sustainable practices. By intertwining and melding theory with practice, they serve as beacons, guiding businesses and policymakers in their sustainability endeavours.

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CHAPTER 1

WHITEPAPER

THE ROLE OF SUPPLY CHAIN COLLABORATION IN DRIVING THE TRANSITION TO A CIRCULAR ECONOMY AND ITS CONTRIBUTION TO SUSTAINABLE DEVELOPMENT OUTCOMES

White paper by:

Nokhwezi Nhassengo and Dr Jill Bogie



DR JILL BOGIE

Dr Jill Bogie is the Director of GIBS Sustainability Initiatives for Africa and she also holds a responsibility for championing the PRME activities at GIBS. PRME is an initiative of the United Nations Global Compact that focuses on the Principles for Responsible Management Education and integrating the UN Sustainable Development Goals (SDGs) into the activities of business schools and universities.

Her teaching portfolio has a focus on strategy, strategic foresight and sustainability and she teaches on the core courses of the MBA and the MPhil (Corporate Strategy) programmes. The topics include the environment of business; business purpose; business models; creating shared value; tackling complex global challenges; complexity and systemic thinking; futures thinking; multi-stakeholder collaboration and partnerships. Dr Bogie also teaches research methodology.

By combining her business experience and research, Dr Bogie's current focus is on developing innovative approaches to building the sustainability agenda into core business strategy to address the complex global challenges of the 21st century.

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Ms Khwezi Nhassego is an investment professional with a BSc Chemical Engineering degree from the University of Cape Town and an MPhil in Corporate Strategy from the University of Pretoria. She is currently the Chief Investment Officer at the KZN Growth Fund, a developmental finance institution and impact investor based in KwaZulu-Natal. She has over 15 years of experience in the finance and investments industry, gained as part of RMB Ventures, the private equity division of First Rand Limited as well as with her current employer. This experience has exposed her to various sectors of the economy and honed her curiosity and expertise in identifying avenues for collaboration across industry value chains.

Ms Nhassego has a good appreciation of the role of governance in achieving sustainability and balancing competing priorities towards achieving the triple bottom line having served as a nominee director on various portfolio companies during her investment career. Her technical training and business experience has enriched her interest in playing a greater role in the sustainability agenda as well as resolving the challenges facing the South African economy.





SUMMARY

This paper discusses key insights into the role of supply chain collaboration in the transition to a circular economy. The circular economy is an economic system that tackles major global risks resulting from the extensive resource usage of the current economic system by balancing economic progress with long-term preservation of the environment and social needs. A critical element of the circular economy business models is collaboration along the supply chains. Therefore, it is imperative for business leaders to gain deeper knowledge of supply chain collaboration to enable them to transition their organisations' business models to be sustainable in a circular economy. The research found that sustainability outcomes, particularly social outcomes, were country- and sector-specific. In the South African context, outcomes related to the socio-economic conditions and the juxtaposition of high levels of inequality and significant opportunities for development potential. In supply chain collaboration relationships, the supplier development incentives and financial capabilities in the South African context were key contributors to the success and progress towards transitioning to a circular business model. Some of the barriers identified included the increased costs and lack of industry coordination. This paper makes recommendations for business leaders to develop a sustainability-focused organisational culture and to coordinate efforts within their value chains to leverage the opportunities to create employment, education, and training, while also implementing responsible sourcing practices to capture value creation opportunities.

INTRODUCTION

The circular economy presents opportunities for businesses to be competitive, whilst being responsible corporate citizens (Ellen MacArthur Foundation, n.d.). The study focused on the industries that are indicative of the rise in resource consumption driven by population growth and urbanisation, such as the fast-moving consumer goods (FMCG), packaging, mining, and heavy-duty industries (Nhassengo, 2022). A transition to a circular economy in these sectors could have the biggest impact on the global economy, society, and the environment.

Evidence of the negative environmental impacts of the existing linear economic system are being experienced directly through extreme weather events globally, causing disruption to economies and livelihoods (World Economic Forum [WEF], 2022). This presents a compelling case for businesses to transform their business models into a circular economy. Despite the compelling case for businesses to transition to a circular economy, Woolven (2021) acknowledged that in addition to innovation, key challenges include collaboration in the supply chain and purpose alignment managing relationships with partners in the value chain.

The research findings showed that the key elements in supply chain collaboration for a circular economy were supplier development incentives and financial capabilities of supply chain partners. Challenges included a lack of coordination and increased costs, whereas adopting a sustainability culture and mindset, consumer advocacy, and global sustainability frameworks were key enablers.

WHY SUPPLY CHAIN COLLABORATION FOR A CIRCULAR ECONOMY MATTERS

Climate action failure has been identified by WEF (2022) as a top global risk, with human actions as the primary root cause of climate change. The linear economic system demands high resource inputs and generates excess waste and greenhouse gas emissions, which contribute to climate change, which is experienced through extreme weather events. In April 2022, South Africa had its deadliest floods since 1987, when billions of rand in infrastructure were damaged in KwaZulu-Natal (Bester, 2022). In this context, businesses need to innovate and transform their business models into a more circular economic system.

The National Planning Commission Diagnostic Report (South African Government, 2011), which preceded the adoption of the National Development Plan for South Africa in 2012, acknowledged that the principal hurdles for the country in tackling inequality and poverty were:

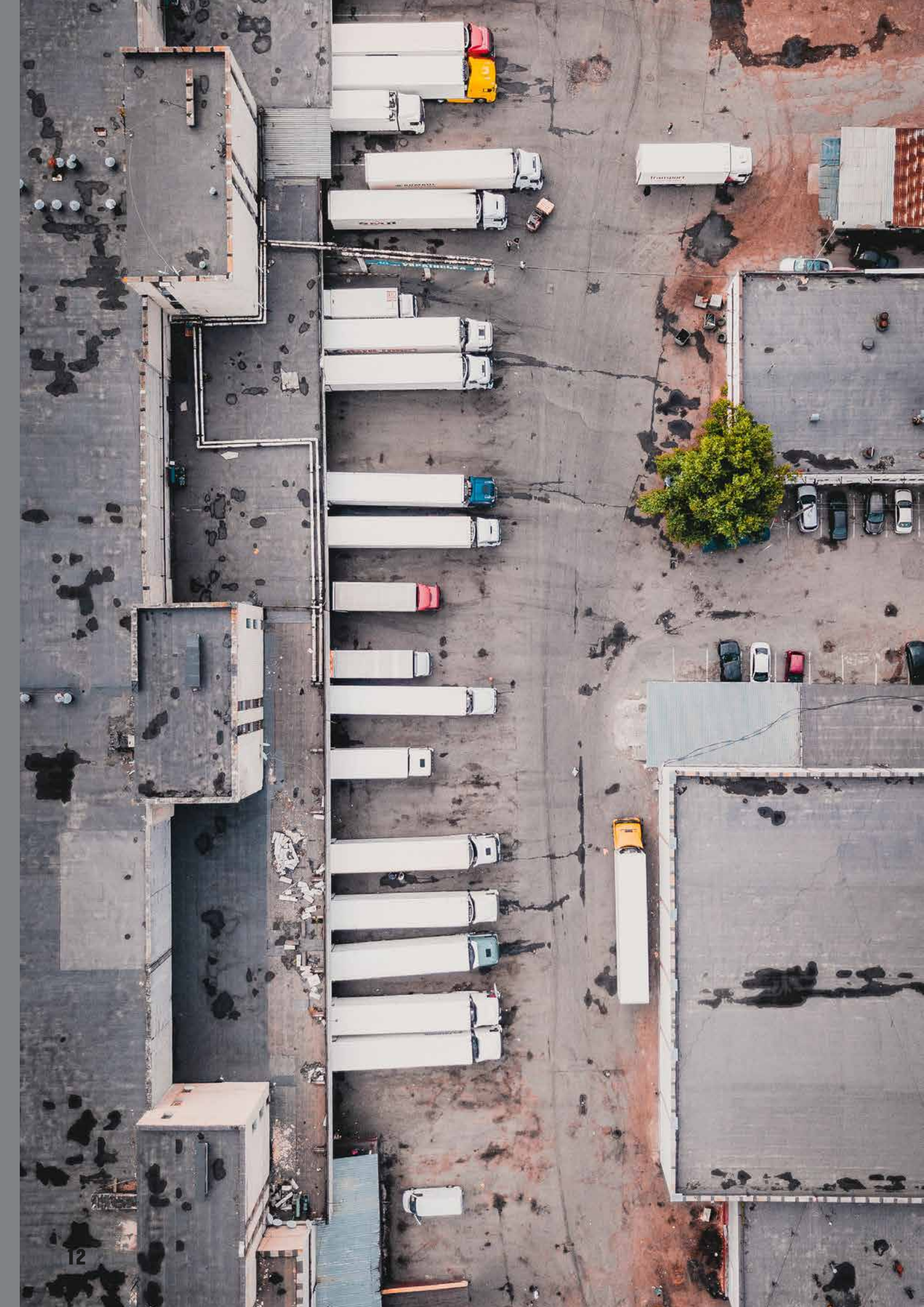
- The escalating high levels of unemployment;
- The poor quality of education available to black South Africans; and
- The environmentally unsustainable (resource-based) growth path of the country.

The 2019 Sustainable Development Goals (SDGs) country report (Statistics South Africa, 2019) identified that some of the key challenges to achieving social goals were the low levels of innovation, entrepreneurship, and misalignment of training programmes with the requirements of the industries driving the economy. Youth unemployment is a significant concern, but also an opportunity to build the circular economy. According to PopulationPyramid.net (2019), of the 58.6 million people residing in South Africa, 34.9% are youths aged 15–34 years. Statistics South Africa (2022) reported that in the first quarter of 2022, at 63.9%, the highest unemployment rates were youths aged 15–24 years, while youths aged 25–34 years recorded an unemployment rate of 42.1%, amounting to an estimated 10 million unemployed youths.

The Circular Economy in Africa Policy (Ellen MacArthur Foundation, 2021) asserts that the circular economy can support economic development, generate employment opportunities, and advance the SDGs objectives. This suggests that the circular economy may be an approach that advances sustainability in multiple ways – from limiting waste to protecting the environment as well as addressing unemployment and youth unemployment, particularly in the South African context.



“The linear economic system demands high resource inputs and generates excess waste and greenhouse gas emissions, which contribute to climate change, which is experienced through extreme weather events.”



METHOD

The research aim was to explore the role that supply chain collaboration plays in the transition towards a circular economy. The setting was organisations operating in South Africa, some of which also have multinational operations in parts of Africa. The data was gathered through interviews with senior managers who work with supply chain collaboration towards a circular economy as well as circular economy consultants. The individuals interviewed were drawn from the FMCG, packaging, mining, and heavy-duty industries.

For consistency and structure, the same interview protocol was used for each person interviewed, and it was designed to gain deep insights from individual experiences. Eighteen interviews were conducted, each lasting an average of 41 minutes. Thereafter, a thorough analysis of the interview transcripts was done to extract the unique codes, which were grouped into categories and then into key themes.

ANALYSIS AND FRAMEWORK

The role of supply chain collaboration in the transition to a circular economy has been identified as an essential driver. While supply chain collaboration may be particular to specific forms of circular business models (CBMs), its role in improving the economic viability of CBMs is widely acknowledged (Jäger & Piscicelli, 2021; Vermunt et al., 2019) and drives the transition towards a circular economy. Figure 1 provides a framework for understanding how cross-sector collaboration drives this transition, the barriers and enablers, and the outcomes for sustainable development.

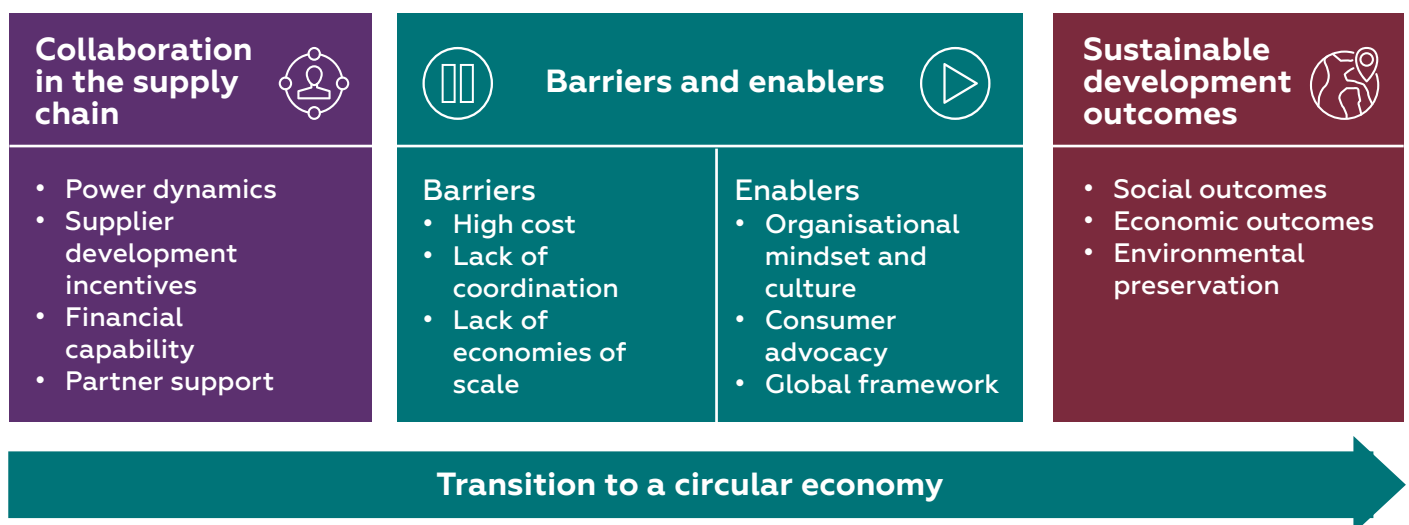


Figure 1: Theoretical framework of supply chain collaboration in the transition to circular economy (Source: Authors' own)

COLLABORATION IN THE SUPPLY CHAIN:

POWER DYNAMICS

The relative size and position of each supply chain partner in the supply chain play a role in the relationship dynamics of supply chain collaboration and affect the effectiveness of the collaboration (Brito & Miguel 2017). On the one hand, the power balance may lead to the longevity of these relationships; whilst on the other hand, these dynamics may create power asymmetries that, if not addressed by governance mechanisms, could have negative consequences. Consequently, power asymmetry is a key consideration in managing collaborative relationships (Berardi & Brito, 2021).

BARRIERS

Numerous barriers exist to supply chain collaboration and the transition to a circular economy. The high investment cost required upfront was identified as a barrier for most organisations (Kirchherr et al., 2018). They also highlighted that circular product solutions can lead to premium prices. A case study of the root cause of cost barriers found that companies had varied understanding of the circular economy and thus different ways of implementing new product strategies (Maione et al., 2022). This meant that firms in the same sector implementing different circular strategies could limit opportunities for supply chain collaboration. This lack of coordination within a sector could create company-specific solutions within the same sector and impede the opportunity to benefit from economies of scale that could be achieved through cooperation at sector level.



ENABLERS

The crucial first step to enable a company to transition towards a circular approach is the organisational mindset shift (Batista et al., 2019; Hussain & Malik, 2020; Korhonen et al., 2018). This is because the nature of a circular economy requires paradigm shifts in how organisations do business and create value. It is the fundamental difference that a transition to circularity has compared to other sustainability frameworks (Korhonen et al., 2018). A circular approach demands changes at the core of an organisation's culture and mindset. This shift creates a willingness to redesign the business model and to commit to the investments required to implement appropriate circular strategies (Korhonen et al., 2018). The key enabler to transition is business model innovation, which requires collaboration in the supply chain and partnering across sectors.

A circular approach demands changes at the core of an organisation's culture and mindset. This shift creates a willingness to redesign the business model and to commit to the investments required to implement appropriate circular strategies.

OUTCOMES

A circular approach can facilitate social outcomes, such as creating employment, education, and training opportunities; unlocking opportunities for previously disadvantaged communities; and promoting social equity (Sudusinghe & Seuring, 2022; Veleva & Bodkin, 2018). International studies on circular economy and supply chain collaboration appear to identify outcomes related to environmental preservation and economic performance, with limited attention paid to the social aspects (Sudusinghe & Seuring, 2022; Veleva & Bodkin, 2018). This study concluded that in the context of South Africa and Africa, social outcomes were a key focus. Embedding social compliance meant extending social outcomes into the supply chain by adopting responsible sourcing practices, such as protecting human rights. An example from this study illustrated how the restoration process for a mine closure facilitated social outcomes. This involved reskilling and training local communities and previous supply chain partners to develop alternative skills. The aim was to ensure continued livelihoods beyond the mine's existence. What was unique in this situation was that the social outcomes were dissociated from the core economic activities of the lead firm.

This research aimed to gain a deeper understanding of the role of supply chain collaboration in the transition towards CBMs. The mechanisms used to manage power asymmetry in supply chain relationships were explored. This research also sought to gain new insights into the barriers and enablers of a transition to a circular economy and the sustainable development outcomes that may be achieved in pursuing the transition.

FINDINGS

The research had valuable insights that improved the understanding of the role of supply chain collaboration in the transition towards a circular economy, with some specific insights revealing the unique opportunity to advance sustainable development in the South African context.

TRANSITION TO CIRCULAR ECONOMY

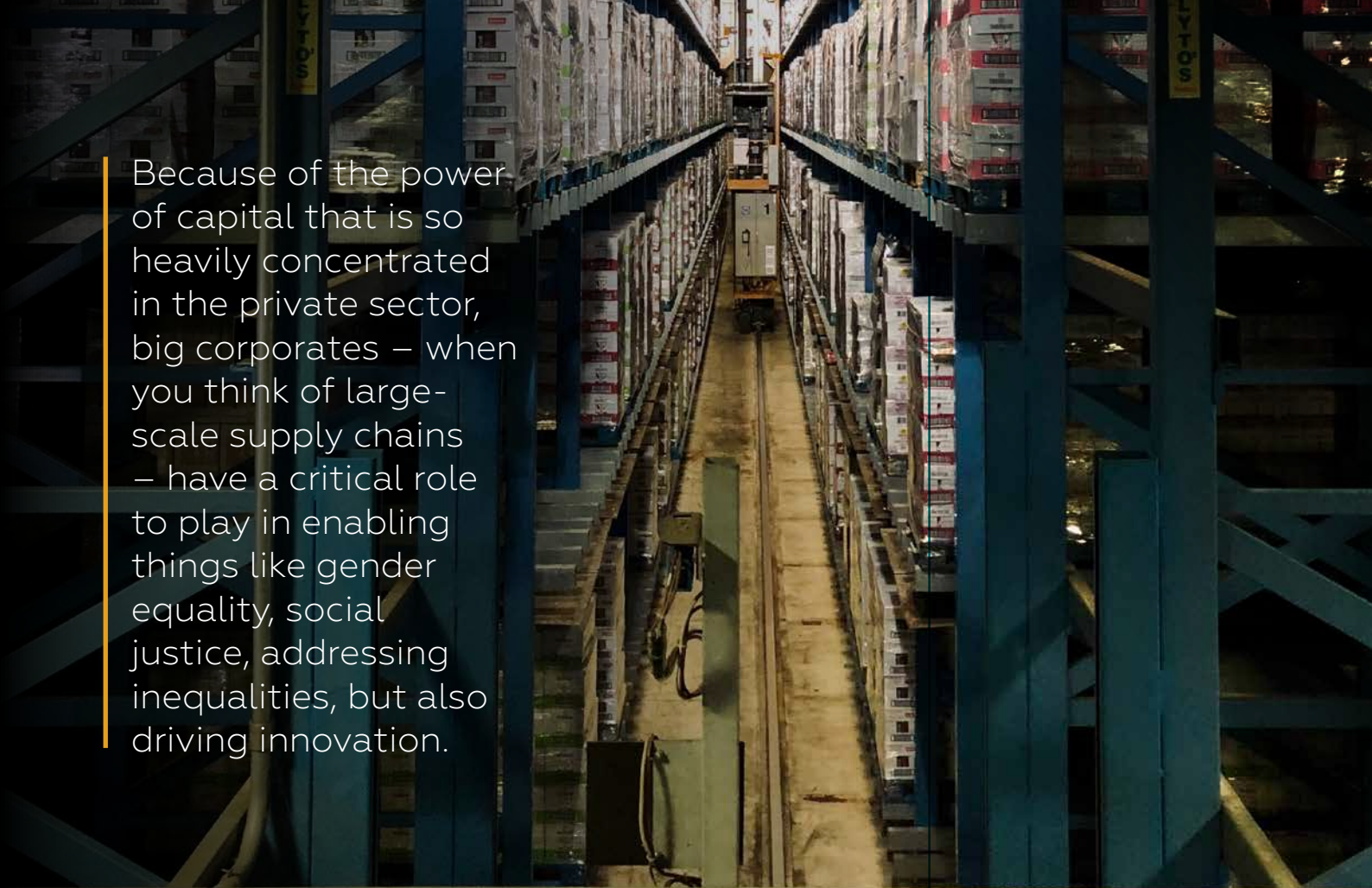
Senior managers from various sectors expressed their experience that the transition towards a circular economy was a journey and required partnerships. One manager shared, "I think my experience so far has been ... I think it's a journey, it doesn't happen overnight. I think we're all holding each other's hands because it's all new."

The role of supply chain collaboration as a key driver of the transition was confirmed by one of the circular economy consultants, who stated:

It is the role of the supply chain, particularly in a corporate environment, to actually effect some of the sustainable development goals that we're looking for. Because of the power of capital that is so heavily concentrated in the private sector, big corporates – when you think of large-scale supply chains – have a critical role to play in enabling things like gender equality, social justice, addressing inequalities, but also driving innovation.

One of the executives working with circular economy initiatives advocated for the business case and opportunity presented by the transition, highlighting the need to understand value chain analysis and hidden costs:

So how much that raw material costs that's not sitting in a skip, how much labour time did you use to put that material in the skip, how much electricity or energy went into it that you are now putting into a skip, and you put a cost to that and including water, time, productivity, all that kind of stuff. You basically see that your waste cost isn't just the waste service provider fee, it's quadruple that because now you've taken all of those ... costs into account and that's when people start realising, "Okay, I see that it's actually not just that gate fee any more or that cost to move it off my site". There is a much bigger cost and potential opportunity.



Because of the power of capital that is so heavily concentrated in the private sector, big corporates – when you think of large-scale supply chains – have a critical role to play in enabling things like gender equality, social justice, addressing inequalities, but also driving innovation.

COLLABORATION IN THE SUPPLY CHAIN

Many of the managers interviewed agreed that the supplier and enterprise development incentives in a South African specific context facilitated the balancing of power dynamics in supply chain collaborations:

I think there are examples, and particularly the examples that I've seen that have worked best are the ones where supply chain businesses or businesses in the supply chain are brought into specific initiatives or specific programmes, often linked to SED [Small Enterprise Development] and ED [enterprise development] targets and expenditure, where there is more likely to be collaboration.

A senior executive in the FMCG sector referred to partnership support being key in transitioning their suppliers towards sustainable business models:

And we do know that most of our BEE [black economic empowerment] partners might not have reached where we want them to be, and hence, we need to assist them to reach so that we are able to proudly report on that, or make sure that they are also sustainable as well – whether it is packaging material, whether it is plastic, whether it is diesel usage, et cetera, those type of things.

BARRIERS AND ENABLERS

Senior managers and the circular economy consultants concurred that the high investment cost was one of the key barriers in adopting initiatives for circular economy transition:

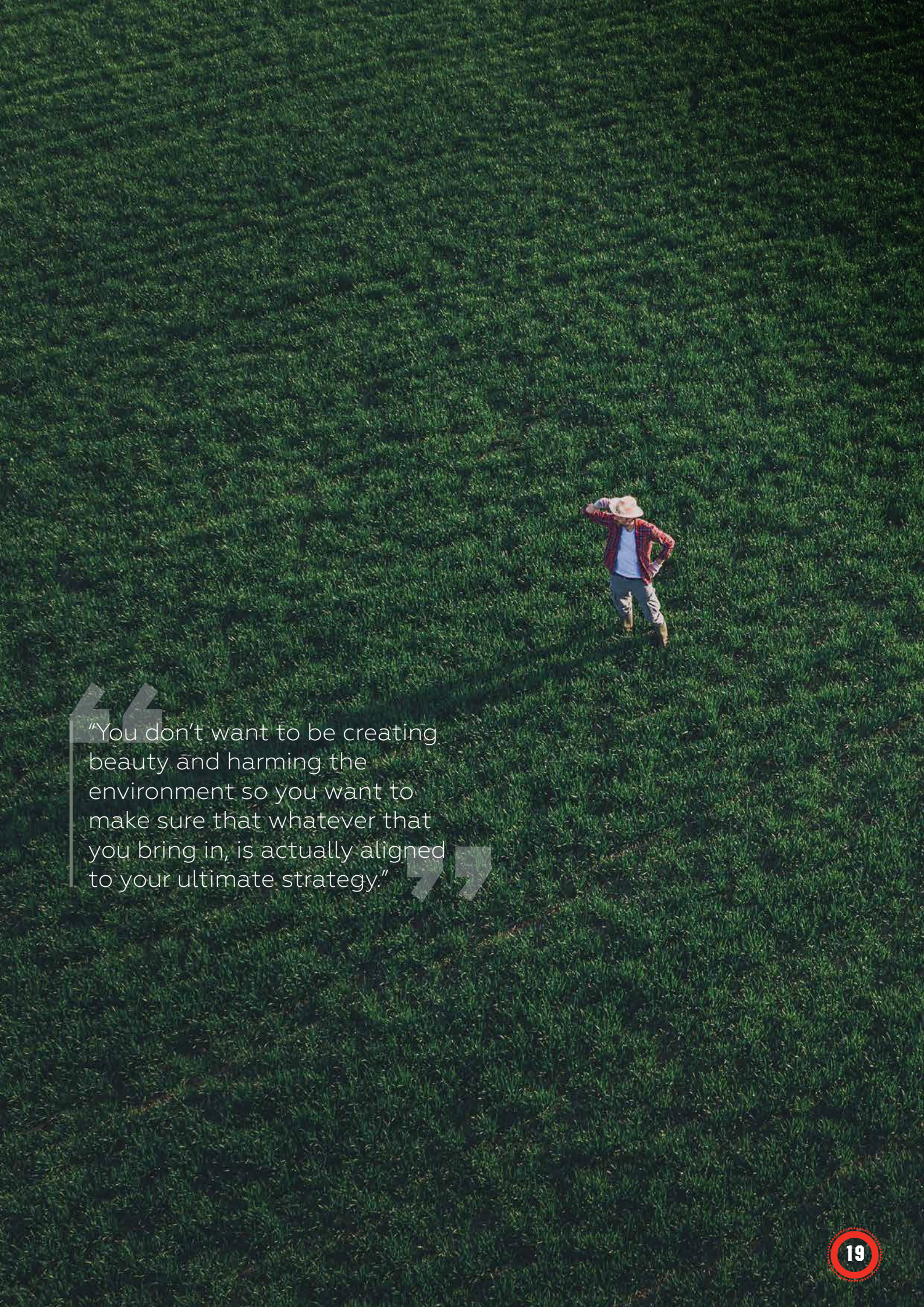
Whether it is the capex [capital expenditure] requirement from new renewable energy, or biomass installed in a factory, or whether it's the, I'd say, access to arable land for your smallholder farmer, whether it's market access platforms that need to exist within small to medium enterprises to be able to showcase their unique value proposition, these are different little aspects that can and do present challenges to sustainability initiatives.

Most of the executives dealing with circular economy transition, particularly in the mining and heavy-duty industries, emphasised the role of the organisational mindset and culture as a key enabler of the transition. One executive commented: "You don't want to be creating beauty and harming the environment so you want to make sure that whatever that you bring in, is actually aligned to your ultimate strategy." Another executive working in the FMCG sector illuminated how this mindset facilitates integrating sustainability thinking into every decision the company makes:

We've put in place measures with our teams. If you want to launch a new product, you've got to have a circular principle for both the product and the packaging. Don't put palm oil that you bought without oversight. We want responsible palm oil in there. We know where it comes from. We know who's farming it, we know that nobody was affected by the fact that this is the palm oil, we know there's no slavery. So, everything we do, whether it's product, packaging, transport, warehousing, purchasing, it's all got that overriding, guiding principle that is good business.

One of the heads of sustainability highlighted how adopting global sustainability frameworks can enable the transition journey through best practices:

I made sure that we were signatories and participants to the UN Global Compact, right? Because once you become a partner, slash participants, slash signatory and they have different levels of what that means, you then immediately have access to best practice.

An aerial photograph of a vast, lush green field. A person wearing a wide-brimmed hat, a red and white plaid shirt, and light-colored pants stands in the lower right quadrant of the frame, looking towards the camera. The field is densely packed with grass, and the lighting creates soft shadows across the terrain.

“You don’t want to be creating beauty and harming the environment so you want to make sure that whatever that you bring in, is actually aligned to your ultimate strategy.”



“So, I think what that does, is that offers business opportunities and entrepreneurial opportunities for the recyclers and that certainly huge opportunity for job creation in this country.”

OUTCOMES

In a unique example where the lead firm sought to achieve social outcomes unrelated to its economic activities, a senior project manager in the mining sector shared the experience of a mine closure project that sought to achieve not just the environmental restoration, but to consider the livelihoods of the supply chain partners and the community beyond the end of life of the mine:

Because we've understood that beyond our existence we need to make sure that the communities are able to stand without us. We are training people in the community to have driver's licences. That has nothing to do with us, but we are saying, "How do we upskill the community?" So, I think the learnings from the closure of one mine helps us pre-empt the closure of another, but saying, "In the process of getting there, how are we still investing back so that we just don't wait for closure, and we find other ways of upskilling these individuals or the community beyond our mine life?"

There was evidence of the circular economy transition having a focus on social outcomes in the South African context due to the inequalities that exist. Many executives gave examples of how social and economic inclusiveness was a key focus area in executing their circular economy strategies. One executive from the FMCG sector expressed:

In Africa, is the double benefit of, you know, you're not just doing something for the environment, there's also the livelihoods elements and improving livelihoods and one of the things I personally am passionate about is ensuring that we look at these different models for social and economic inclusion.

Another executive in the packaging manufacturing sector opined: "So, I think what that does, is that offers business opportunities and entrepreneurial opportunities for the recyclers and that certainly huge opportunity for job creation in this country." The research found evidence of the critical role played by supply chain collaboration in the transition towards a circular economy. Some unique insights were gained regarding how supplier and enterprise development programmes have a balancing effect in collaborations that have power asymmetry. The larger firms were incentivised to empower smaller firms. The importance of entrenching a sustainability culture was expressed as an enabler, regardless of the sector. A unique insight was that the South African context of inequalities and high levels of unemployment drives the focus on achieving social outcomes. Furthermore, a unique sector context was illustrated through the mine closure example, demonstrating how reskilling was used to achieve social outcomes. These findings informed the research conclusions that were utilised to develop recommendations for businesses.

RECOMMENDATIONS FOR BUSINESS

The research conclusions provide some recommended actions for businesses with ambitions to innovate their business models or that are already transitioning to CBMs.

COLLABORATION IN THE SUPPLY CHAIN

FINANCIAL INSTRUMENTS FOR TRANSITION

Participation of financial institutions is recommended in designing and offering customised financing instruments for the circular economy transition. Access to finance could unlock the financing gaps experienced by small firms that have viable innovative ideas to implement a circular economy but lack funding. Financing instruments could also be designed for large firms that require large capital investments to transition their business models to CBMs. Business leaders of large corporates could consider including financiers as critical stakeholders in supply chain collaboration.

SUPPORT FOR SUPPLY CHAIN PARTNERS

Lead firms in the supply chain could utilise their resources to build capacity for innovation by providing training and other support to their supply chain partners. This would enhance the viability and long-term sustainability of the supply chain collaborations in the transition to a circular economy.

ADDRESSING BARRIERS

ORGANISATIONAL CULTURE AND SUSTAINABILITY MINDSET

Business leaders could actively facilitate a shift of the organisational culture to a sustainability mindset over time. This is essential, as compliance-driven change is seldom sufficient. Once the vision and values become aligned to a sustainability mindset, they play a more effective role in facilitating the transition, than any legislation-, regulation- or compliance-driven measures.

GREATER UNDERSTANDING OF ECONOMIC BENEFITS

Business leaders need to invest in gaining a deeper understanding of the long-term economic benefits of a circular economy and develop an ability to perform value chain analysis. This would enable business leaders to unpack hidden costs of remaining with a linear business model and build a business case for transitioning to a circular model.

GLOBAL SUSTAINABILITY FRAMEWORKS

Businesses could become affiliated with signatories to credible global sustainability institutions. These organisations can assist with providing industry-specific frameworks, best practices, and guidelines for the transition. At a company level, the initial assessments could include prioritising actions that transform the business models towards circularity.




SUSTAINABLE DEVELOPMENT OUTCOMES

South Africa has a large youth population that is mostly unemployed or lacks the skills and experience required to access available job opportunities. This resource could be leveraged through education that is targeted at the circular economy innovations by partnering with government and educational institutions to provide training programmes for youth on technology as well as entrepreneurial skills.

South Africa would not only take advantage of the economic growth opportunities presented by the circular economy, but at the same time could achieve social outcomes, such as job creation, improvement of livelihoods, and reducing inequalities. A similar strategy could be adopted in other African countries that share the level of high unemployment and inequalities.

REFERENCES

- Batista, L., Gong, Y., Pereira, S., Jia, F., & Bittar, A. (2019). Circular supply chains in emerging economies – a comparative study of packaging recovery ecosystems in China and Brazil. *International Journal of Production Research*, 57(23), 7248–7268. <https://doi.org/10.1080/00207543.2018.1558295>
- Berardi, P. C., & Brito, R. P. d. (2021). Supply chain collaboration for a circular economy – from transition to continuous improvement. *Journal of Cleaner Production*, 328, Article 129511. <https://doi.org/10.1016/j.jclepro.2021.129511>
- Bester, L. (2022, May 3). *How South Africa's recent floods compel climate action*. World Economic Forum. <https://www.weforum.org/agenda/2022/05/how-south-africa-s-recent-floods-compel-climate-action/>
- Brito, R. P., & Miguel, P. L. S. (2017). Power, governance, and value in collaboration: Differences between buyer and supplier perspectives. *Journal of Supply Chain Management*, 53(2), 61–87. <https://doi.org/10.1111/jscm.12134>
- Ellen MacArthur Foundation. (2021). *Circular economy in Africa: Policy*. <https://ellenmacarthurfoundation.org/circular-economy-in-africa-policy>
- Ellen MacArthur Foundation. (n.d.). *What is a circular economy?* <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>
- Hussain, M., & Malik, M. (2020). Organizational enablers for circular economy in the context of sustainable supply chain management. *Journal of Cleaner Production*, 256, Article 120375. <https://doi.org/10.1016/j.jclepro.2020.120375>
- Jäger, J. K., & Piscicelli, L. (2021). Collaborations for circular food packaging: The set-up and partner selection process. *Sustainable Production and Consumption*, 26, 733–740. <https://doi.org/10.1016/j.spc.2020.12.025>
- Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the circular economy: Evidence from the European Union (EU). *Ecological Economics*, 150, 264–272. <https://doi.org/10.1016/j.ecolecon.2018.04.028>
- Korhonen, J., Nuur, C., Feldmann, A., & Birkie, S. E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, 175, 544–552. <https://doi.org/10.1016/j.jclepro.2017.12.111>
- Maione, C., Lapko, Y., & Trucco, P. (2022). Towards a circular economy for the plastic packaging sector: Insights from the Italian case. *Sustainable Production and Consumption*, 34, 78–89. <https://doi.org/10.1016/j.spc.2022.09.002>
- Nhassengo, N. (2022). *The role of supply chain collaboration in driving the transition to a circular economy and its contribution to sustainable development outcomes* [Unpublished master's dissertation]. Gordon Institute of Business Science.
- PopulationPyramid.net. (2019). *South Africa 2019*. <https://www.populationpyramid.net/south-%20africa/2019/>
- South African Government. (2011). *National Planning Commission: Diagnostic overview*. https://www.gov.za/sites/default/files/gcis_document/201409/npcdiagnosticoverview1.pdf

A close-up photograph of a jeweler in a workshop. The jeweler, wearing a dark blue apron, is using a blowtorch to heat a small, shallow metal bowl. The bowl is held in a metal stand on a wooden workbench. The blowtorch's flame is bright orange and yellow, with a blue inner core. The background is slightly blurred, showing various tools and equipment in the workshop. The overall scene is well-lit, highlighting the intricate work being performed.

South Africa would not only take advantage of the economic growth opportunities presented by the circular economy, but at the same time could achieve social outcomes, such as job creation, improvement of livelihoods, and reducing inequalities.

REFERENCES

Statistics South Africa. (2019). *Sustainable Development Goals (SDGs) country report 2019 – South Africa*.
http://www.statssa.gov.za/MDG/SDGs/Country_Report_2019_South_Africa.pdf

Statistics South Africa. (2022). *Quarterly Labour Force Survey (QLFS) Q1: 2022*.
<https://www.statssa.gov.za/publications/P0211/Presentation%20QLFS%20Q1%202022.pdf>

Sudusinghe, J. I., & Seuring, S. (2022). Supply chain collaboration and sustainability performance in circular economy: A systematic literature review. *International Journal of Production Economics*, 245, Article 108402.
<https://doi.org/10.1016/j.ijpe.2021.108402>

Veleva, V., & Bodkin, G. (2018). Corporate-entrepreneur collaborations to advance a circular economy. *Journal of Cleaner Production*, 188, 20–37.
<https://doi.org/10.1016/j.jclepro.2018.03.196>

Vermunt, D. A., Negro, S. O., Verweij, P. A., Kuppens, D. V., & Hekkert, M. P. (2019). Exploring barriers to implementing different circular business models. *Journal of Cleaner Production*, 222, 891–902.
<https://doi.org/10.1016/j.jclepro.2019.03.052>

Woolven J. (2021, August 15). *Overcoming design challenges to make your business circular*. Ellen MacArthur Foundation.
<https://ellenmacarthurfoundation.org/articles/overcoming-design-challenges-to-make-your-business-circular>

World Economic Forum. (2022). *The global risks report 2022: Insight report* (17th ed.).
https://www3.weforum.org/docs/WEF_Global_Risks_Report_2022.pdf

Financing instruments could also be designed for large firms that require large capital investments to transition their business models to CBMs. Business leaders of large corporates could consider including financiers as critical stakeholders in supply chain collaboration.



CHAPTER 2

WHITEPAPER

PERCEPTIONS OF THE MINING INDUSTRY'S CONTRIBUTION TO SOUTH AFRICA'S ENERGY TRANSITION AGENDA

White paper by:

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CHRISTIAN SFISO NXUMALO PR.ENG.

Engineering Manager – ARM Ferrous

Sfiso Nxumalo is a qualified mechanical engineer with over 20 years of experience in the mining industry, most of which have been in substantive positions including that of an Engineering Manager. He holds a Bachelor of Science Engineering degree in Mechanical Engineering from the University of Cape Town obtained in 1999. He has a Government Certificate of Competency (mines & works) obtained in 2003, a Master of Philosophy in Business Management specialising in Corporate Strategy from GIBS (2023), and is registered as a Professional Engineer with the Engineering Council of South Africa since November 2006. He is also a member of the South African Institution of Mechanical Engineering. Sfiso is actively involved in the energy transition initiatives within the mining industry, also looking at technology deployment strategies for the ARM Ferrous division. He is also involved with risk mitigation strategies relating to water issues in the Northern Cape within the Vaal Gamagara region. Sfiso remains committed to the development of Africa through the pursuit of sustainable development and wishes to explore a meaningful way to contribute, through research, to ways that can benefit her (Africa) sons and daughters.

PROF ALET C ERASMUS

Alet obtained her PhD at the University of Pretoria, specialising in consumer behaviour, particularly consumer uncertainty and complex decision-making, as well as household technologies. After retiring as head of the Department of Consumer Science, where she was involved as academic for more than 40 years, she was appointed as a research associate at the Gordon Institute of Business Science. She is an NRF rated researcher, and is currently supervising MBA, MPhil, and doctoral students. She has supervised 10 PhD studies and more than 70 Masters' studies to date, producing more than 60 international publications, including text books for tertiary institutions.



ABSTRACT

Alarming, South Africa is among the top 12 transmitters of greenhouse gas emissions in the world, with the mining industry contributing to this predicament significantly. A pertinent challenge faced by this industry is the absence of a globally coordinated policy on how the momentous task of transitioning to alternative energy sources should be done. This qualitative investigation acquired the contributions of experienced role players in South Africa's mining industry, noting their perceptions of possible drivers of a workable energy transition process for the local mining industry, whilst admitting challenges and constraints. The aim was to produce a viable solution that could be implemented by leaders and decision-makers in the mining industry concerning energy-related decisions for the future. The consensus reached, was that energy security is a primary concern that trumps carbon neutrality. During vibrant discussions, challenges associated with a coal phase out were highlighted and pleas were made for a more empathetic understanding of South Africa's unique socio-economic context. A multi-level perspective is envisaged, where energy transition can be accomplished through a skilful integration of existing and novel technologies to deal with exogenous pressures from the global energy landscape, without negating prevailing socio-economic realities.

Keywords: Energy security; energy transition; mining industry; national energy agenda; renewable energy

INTRODUCTION AND BACKGROUND

To date, economic growth in the world has been driven primarily by fossil-based energy that is blamed for enhancing global warming, environmental degradation (Wang et al., 2022), and causing natural disasters (Busby, 2018). The 2015 Paris Agreement that South Africa is part of is an attempt to ameliorate the predicament that the world has fallen prey to (Adebayo et al., 2021). Accordingly, governments and policymakers are urged to revise policies and define energy transition pathways, notwithstanding energy security, energy justice, renewable technologies, and related socio-economic consequences (Pingkuo & Huan, 2022). However, no globally coordinated policy and clear path exists yet on how change could be achieved (Svobodova et al., 2020). Inevitably, there is no one-size-fits-all solution to solve the unique challenges faced within countries and across industries in the same country. Fortunately, visible acceptance of renewable energy uptake is evident from improvements in technology and investments in renewable energy technology (RET) (Gui & MacGill, 2018), especially in developed economies.



WHY IS THIS IMPORTANT TO THE SOUTH AFRICAN MINING INDUSTRY?

The Minerals Council South Africa (2022) 2021 report indicates that the mining sector produced R841.6 billion in minerals export and R153.8 billion in employee earnings, generating R27 billion of tax revenue, which amounts to a significant R480.9 billion (8.7%) of the country's gross domestic product. Major international role players, such as Anglo American and Australian mining group BHP, are part of the South African mining industry (Robinson, 2016) and belong to the International Council on Mining and Metals (ICMM), which is dedicated to a safe, fair, and sustainable mining and metals industry (ICMM, 2021). Members have collectively committed to net-zero emissions of Scope 1 and 2 greenhouse gases (GHGs) by 2050. This involves all direct emissions from an organisation's activities, including fossil fuel combustion in gas turbines, diesel generators, and fossil-powered vehicles, as well as indirect emissions related to the purchase of electricity. The mining industry contributes significantly to GHG emissions. Its contribution to global GHG emissions amounts to 4%–7%, as it generates up to 5.1 gigatons of CO₂ GHG emissions annually, constituting 3%–6% of the total emissions. As per the Council for Scientific and Industrial Research 2018 report, South Africa's mining sector contributes 6% of the country's GHG (Motaung, 2023). These emissions largely originate from fugitive coal-bed methane released during underground operations as well as from energy generation and transportation of materials. A significant 28% share of GHG emissions are indirect emissions, including the combustion of coal (Delevingne et al., 2020).

Members have collectively committed to net-zero emissions of Scope 1 and 2 greenhouse gases (GHGs) by 2050.

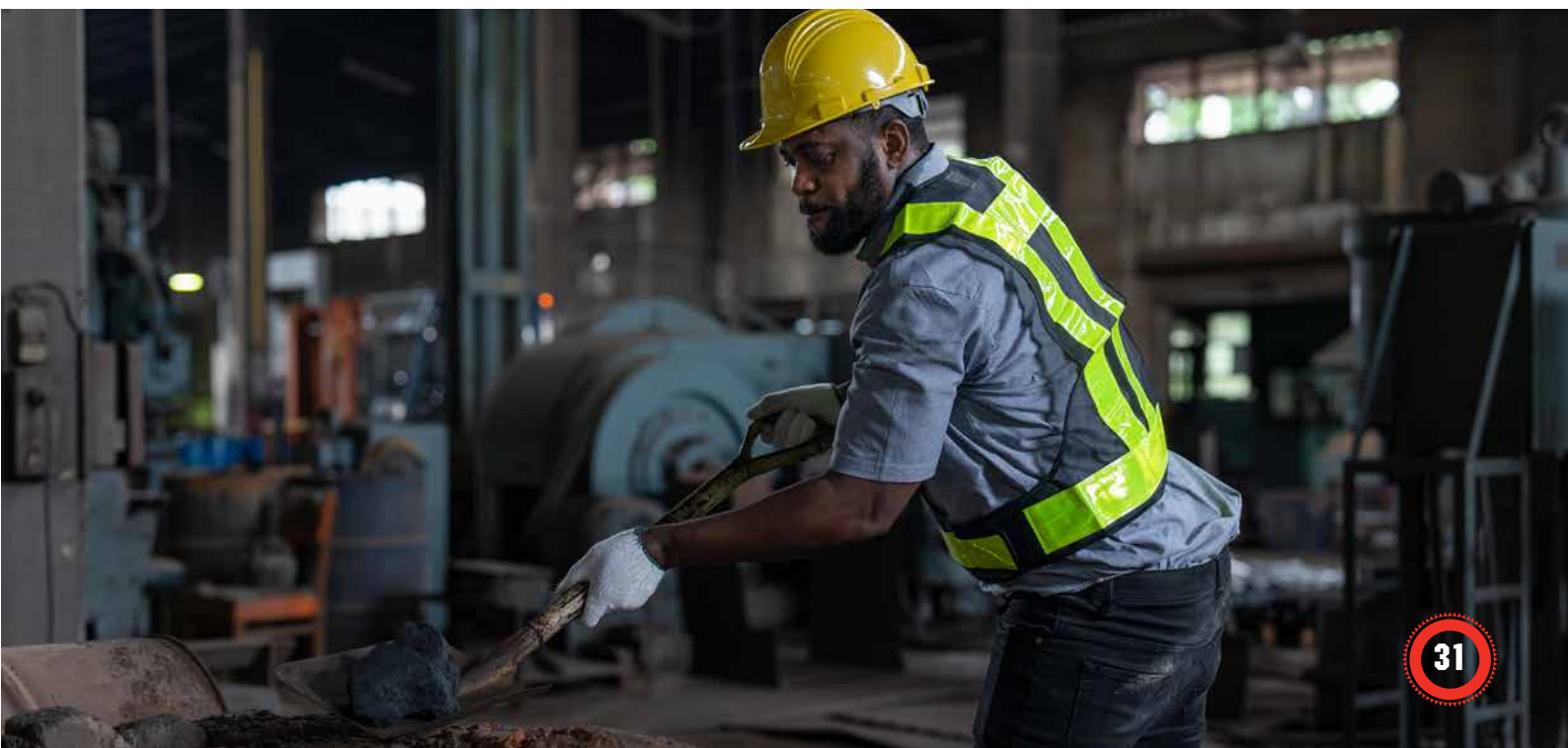
THE MINING SECTOR'S ENERGY DEMANDS

The South African mining sector's energy consumption is petroleum-based and electrical energy-dependent, using mostly imported fossil fuels for its mining, cooling, and ventilation requirements, and transport sector (Pollet et al., 2015). Foreign dependence on crude oil is concerning amid the current war in Ukraine and the subsequent unstable crude oil prices. Further challenges include the long-term power generation capacity, the country's energy demands amid attempts to extend electrification to previously disadvantaged communities, the devastating effects of prolonged load-shedding in the country in dealing with the energy supply crisis, and the soaring electricity costs (Adebayo et al., 2021). The South African Reserve Bank estimates that load-shedding is costing South Africa as much as R899 million per day, with indications that had load-shedding not occurred, the country's economy could have been 17% larger than present (Naidoo, 2023).

ENERGY TRANSITION

Transitions are complex and take time to implement, involving multiple actors (Geels et al., 2016) who have to adhere to new and existing rules. A multi-level perspective (MLP) has become a popular avenue for industries (Damman et al., 2021; Gui & MacGill, 2018; Kanger, 2021; Marín & Goya, 2021) to accomplish energy transition where complex socio-economic conditions prevail. MLP is based on a socio-technical theory that accommodates an existing regime, while attempting to understand the locked-in path-dependent systems responsible for the stability of existing systems. For example, the use of petroleum-based energy in the form of diesel by the mining industry and electrical energy derived from burning thermal coal used to generate power in the mining industry are well-established systems that are supported by large organisations with established assets, infrastructure, economies of scale, supply chains, and technology (Geels, 2011). In South Africa, the electricity utility is a parastatal, Eskom, which is under pressure to transform to respond to the challenges of climate change. Hence, exogenous pressures from the global energy landscape create an opportunity for niche innovations (Borasio & Moret, 2022), such as replacing fossil-based energy systems with sustainable energy systems, including solar photovoltaic, wind, hydropower, or nuclear. On the transport side of mining, niche innovations include the development of electric vehicles, electric-diesel hybrids, battery-electric hybrids, and hydrogen-battery hybrids.

Energy transition in South Africa is a complex issue (Todd & McCauley, 2021) involving major challenges concerning energy security emanating from ageing utility infrastructures, corruption, and foreign dependence on petroleum energy, as well as the unavoidable socio-economic impact that a shift to alternative energy sources would have on communities that depend on coal mining businesses to survive (Heras & Martín, 2020). South Africa's large coal reserves complicate matters for policymakers. On the one hand, it is difficult to ignore a resource that sits on your doorstep. On the other hand, uncertainties about RET as a possible solution for the energy crisis elevate the need for the country to identify and adopt a viable energy transition pathway that signifies an understanding of the pressing need to prevent the continued destruction of the natural environment, while accommodating people's and industries' energy needs. In the South African mining context, the phase out of coal-fired power stations will likely attract power struggles due to concerns about energy security and the further deterioration of socio-economic conditions due to job losses when the coal business is no longer active. Although the development of niche innovations to replace coal as a source of energy will require the development of new rules and institutions that might benefit communities, it is difficult for them to comprehend an outcome amid so many uncertainties. Consequently, the unavoidable socio-economic impact that a shift to alternative energy sources may have on communities that depend on coal mining businesses to survive is a pressing concern.



THE RESEARCH PROBLEM

Globally, South Africa is the only African country among the top 12 emitters of GHGs. This is largely attributed to the use of fossil-fuel energy systems, consumption by Eskom, and the mining industry (Todd & McCauley, 2021). Although various mining companies in South Africa have already implemented measures to drastically reduce GHG emissions by 2050, it is unclear whether their pathways align with the country's energy transition agenda, considering local energy security, energy justice, and prevailing socio-economic conditions. Due to the lack of a clear policy direction, role players have created different, ambitious pathways that are not necessarily aligned, are vulnerable to failure, and lack social acceptance (Todd & McCauley, 2021). Furthermore, it is unclear how role players in the mining industry who are dealing with the reality daily perceive the impact of proposed energy transition pathways amid the global expansion of renewable energy systems that are still very expensive to implement (Damman et al., 2021).

Although various mining companies in South Africa have already implemented measures to drastically reduce GHG emissions by 2050, it is unclear whether their pathways align with the country's energy transition agenda, considering local energy security, energy justice, and prevailing socio-economic conditions.

RESEARCH QUESTION

THE RESEARCH WAS DIRECTED BY THE FOLLOWING RESEARCH QUESTION:

What are the drivers, enablers, and constraints concerning the energy transition agenda and discourse in the mining industry in South Africa, and what is the way forward?

AIM OF THE RESEARCH

Involving experienced role players in the local mining industry who spontaneously shared their expertise, this qualitative investigation explored the drivers, enablers, and constraints in the agenda, dialogue, and execution of the mining industry's plans to transition from fossil-based fuels to alternative energy sources in the foreseeable future.

BUSINESS CONTRIBUTION

Understanding that each country will have to craft its unique energy transition pathways and commitments (Pingkuo & Huan, 2022), this research sheds light on the realities encountered by South Africa's mining industry from the perspective of experienced role players in the industry. Contributions could guide the design of an implementable energy transition pathway for the mining industry that acknowledges the unique characteristics of the context that integrates the realities of the industry as well as that of the communities that depend on the industry for their livelihoods.

METHODOLOGY

A qualitative, phenomenological approach, using personal interviews, directed data collection. Fourteen participants were recruited based on their experience and vested interest in the energy transition of the mining industry. These participants were either in the sustainability space or responsible for the energy transition and decarbonisation strategies of their companies.

A semi-structured, open-ended questionnaire directed the virtual interviews that were preceded by an explanation of the purpose of the research and completion of consent forms. To honour participants' privacy, unique codes – ranging from P1 to P14 – replaced their identities. Atlas.ti software and thematic analysis served to analyse the transcribed interviews (Gioia et al., 2013). Figure 1 illustrates the data saturation analysis, confirming an adequate sample size to infer valid conclusions. Strict protocols were adhered to, as per the ethical guidelines of the academic institution, GIBS.

Furthermore, it is unclear how role players in the mining industry who are dealing with the reality daily perceive the impact of proposed energy transition pathways amid the global expansion of renewable energy systems that are still very expensive to implement

(Damman et al., 2021).

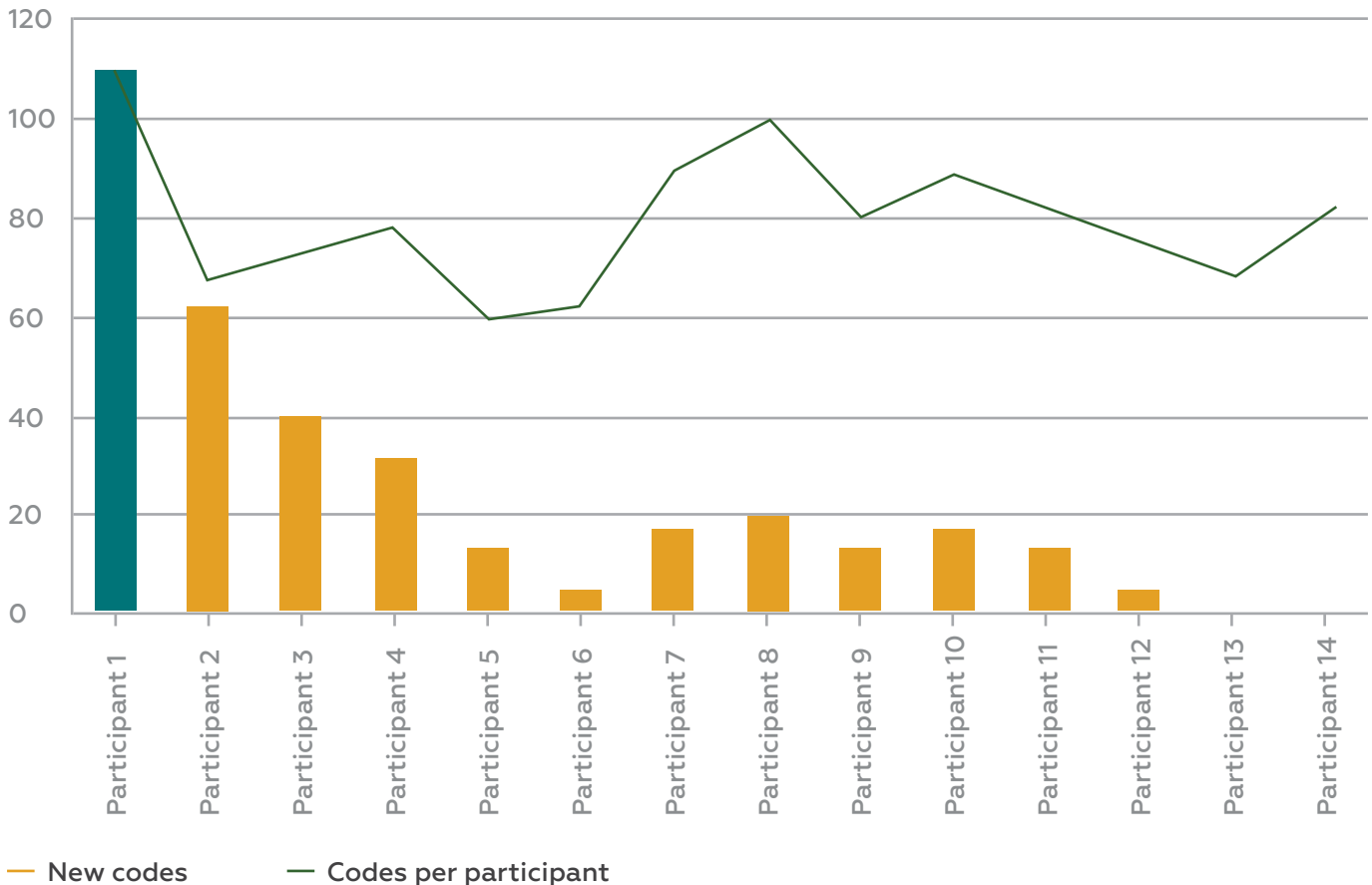


Figure 1: Data saturation analysis (Source: Authors' own)

FINDINGS

Figure 2 presents the predominant discussion themes and related findings. These themes are discussed thereafter, with selected statements included to reveal the sentiments of participants – specifying contributors’ code numbers – to support the findings. The findings are presented in descending order of the importance of an issue during discussions.

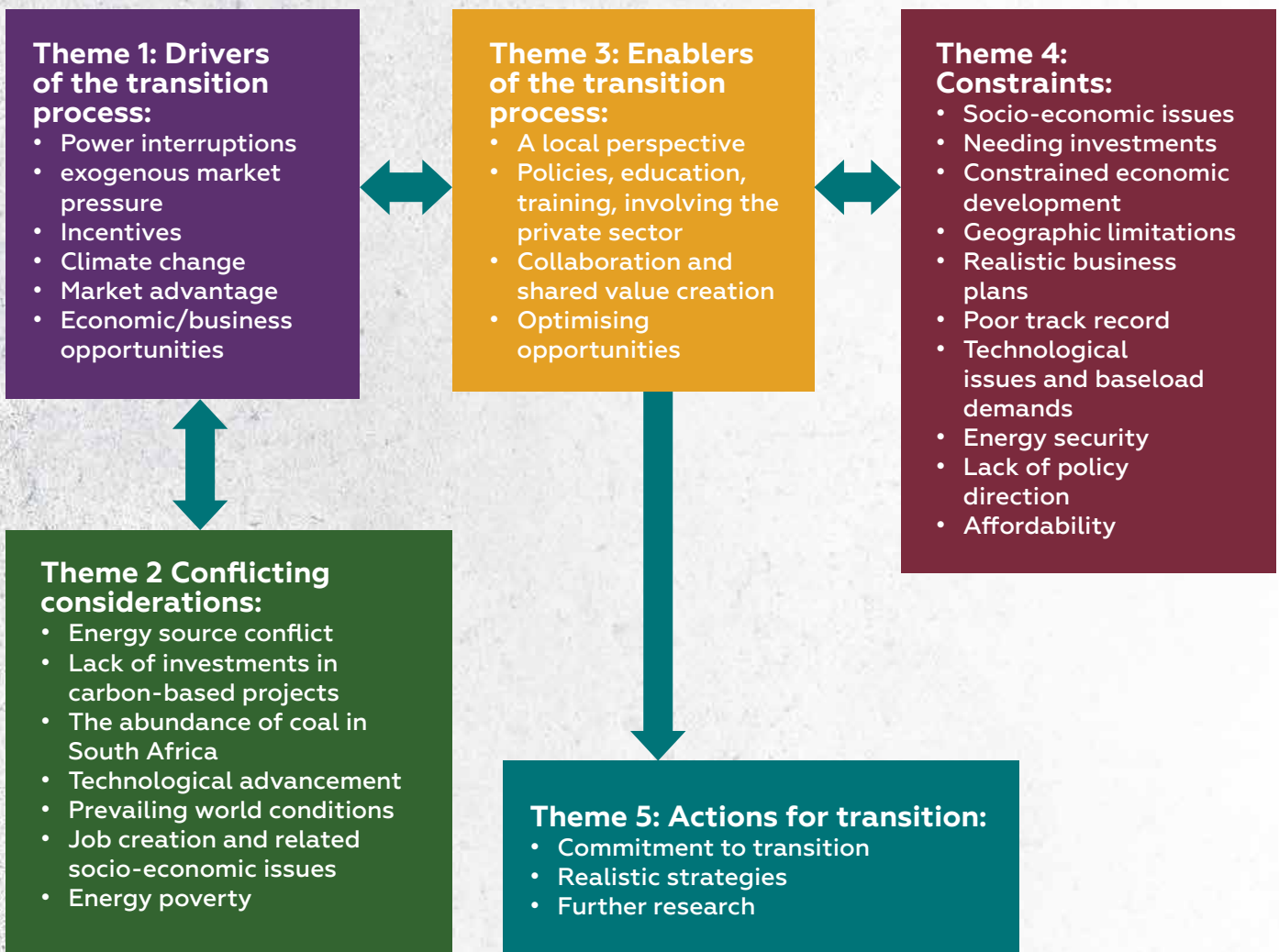


Figure 2: Research themes

THEME 1: DRIVERS OF THE TRANSITION PROCESS

The mining industry understands the need to integrate its primary goal to remain internationally competitive with the pressing global environmental dilemma:

1

Power interruptions accelerate the need for the mining industry to react swiftly, with the study's participants observing:

- "More and more players in the mining sector are trying to get off the grid to decrease our dependence on Eskom" (P8).
- "We had to take extra measures which cost us more to run, increasing our carbon footprint" (P3).

2

Exogenous market pressure is a reality forcing the industry to remain competitive:

- "The EU [European Union] sets the rules of the game. Customers will not buy anything that's produced from liquid fuel or coal" (P1).
- "We need to be renewable, otherwise you can't sell your product" (P6).
- "We are under immense pressure to drop our fossil fuel business" (P8).

3

Incentives, including carbon credit to promote decarbonising (Knudsen et al., 2021) and credit abatement to enforce compliance to transition (Weiss et al., 2021), could accelerate energy transition.

- "South Africa should put a price on emissions to push people... It should make sense to pull up your solar plan" (P10).
- "Carbon tax should reflect our realities" (P8).

4

Climate change is a global challenge requiring tangible actions, and coal is perceived as the culprit in South Africa:

- "The implications of climate change are global" (P1).
- "South Africa has to take bold steps around tackling climate change" (P4).
- "Coal mining has a large environmental impact with emissions at power stations" (P9).
- "The real issue is emissions" (P10).

5

Market advantage remains a primary goal amid all the challenges:

- "When aggressive about your reduction in carbon intensity, you can gain market share" (P1).
- "We want to remain competitive internationally" (P4).
- "So, we don't fall off the competitive chart" (P7).

6

Economic/business opportunities created through alternative energy sources can benefit all:

- "It should make sense economically; solar installations across the mining industry is because it is cheaper than Eskom" (P6).
- "It's not because everybody wants to be green" (P10).

THEME 2:

CONFLICTING CONSIDERATIONS

A complex interplay of considerations concerning the energy transition discourse includes encouraging and opposing views that may jeopardise the momentum of the energy transition:

1

Energy source conflict is the most prevalent issue revealing conflicting views on the best way forward:

- "We are targeting the introduction of green hydrogen" (P4).
- "The hydrogen economy still has a way to go before being financially feasible" (P9).
- "SA needs to optimise gas deposits off the coast" (P3).
- "SA is blessed, we have got significant solar and wind potential" (P8).
- "Moving to nuclear might be part of the solution" (P1).

2

Lack of investments in carbon-based projects and related financial pressure will exert pressure on the mining industry concerning their energy transition strategies. One participant (P4) stated, "There is a lack of investment in new coal mines across the world", adding "We had quite a lot of negative sentiments around funding capital projects for coal".

3

The abundance of coal in South Africa understandably creates conflict concerning the mining industry's transition to cleaner fuel:

- "It is not a matter of coal just going to disappear like that ... we have got an abundance of coal.... The whole conversation around the demise of coal is completely premature" (P14).
- "All the European countries got wherever they are now because of coal" (P8).

4

Technological advancement has financial implications for South African mining that are difficult to accommodate in a highly competitive market:

- "Technologies will make it possible that the transition to carbon-neutral energy transmission, based on coal, becomes an acceptable option" (P1).
- "The capital investment and sustained operational costs for carbon capture technology make that plan unviable" (P13).

5

Prevailing world conditions create a conflicting reality, reinforcing the position of coal in the global energy mix, supporting South Africa's coal mining industry:

- "Some countries, much more developed than us, are emitting a lot more carbon than us into the atmosphere ... have now recommissioned their coal power stations when they didn't get gas from Russia" (P14).
- "The EU is ramping up coal supplies because of the Russia-Ukraine tensions" (P5).
- "I foresee a sharp curve in the minds of investors who were anti-coal" (P4).

"It is not a matter of coal just going to disappear like that ... we have got an abundance of coal... The whole conversation around the demise of coal is completely premature"



6

Job creation and related socio-economic issues associated with the coal mining industry in South Africa are a major threat in our move away from coal, evoking the outcry, “It should not be about protecting the industry, it should be about advancing the interest of the economy” (P10).

Other participants shared the following:

- “Direct employment from coal mining and Eskom ... you’re looking at 150 000” (P6).
- “How many jobs does renewable industry offer versus what the coal industry is offering” (P7).
- “The trucking businesses that transport coal from mines ... there’s around 10 000 additional jobs there” (P5).
- “We will see social and political unrest, and not have a stable society going forward” (P14).

7

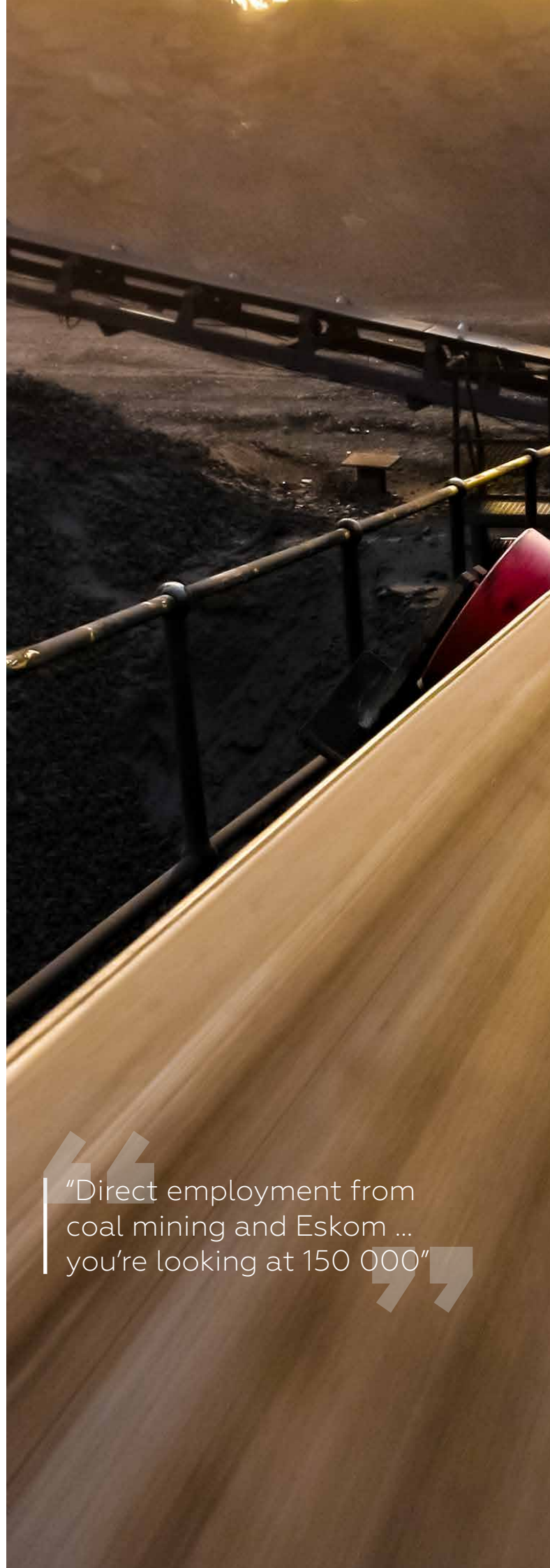
Economic considerations require a balancing act between implementing climate change mitigations and chasing sustainable economic growth amid a complicated question:

- “Do people go hungry or do we save the planet?” (P12).
- “The option that will make the most sense is the one that is developed by an individual country itself, considering what can they afford, their situation ... what makes sense economically” (P10).
- “We have to balance our decarbonisation agenda with creating jobs and growing economic value for all” (P8).

8

Energy poverty due to limited access to reliable, affordable energy is a dark reality in large parts of South Africa that is a priority:

- “Since the new dispensation, they [South Africa] have tried to electrify most of the country, but many isolated areas still don’t have [electricity]” (P12).
- “Much of its citizenry does not have access to equitable power” (P8).



“Direct employment from coal mining and Eskom ... you’re looking at 150 000”



THEME 3:

ENABLERS OF THE TRANSITION PROCESS

Unique local conditions, policies, optimisation of opportunities, and the value of collaboration with the private sector and international investors dominated discussions, suggesting a cautious approach.

1

A local perspective will accommodate South Africa's reality, and importantly: "The international noise regarding climate change needs African leaders to be bold in addressing it from an African challenge perspective" (P7). Others revealed:

- "Transition in a way that we are not rushing to move at the same strategy as the first world, compromising the livelihood of our people" (P2).
- "History will judge us harshly if we allow the transition agenda to overtake our immediate needs" (P14).

2

Policies, education, and training that involve the private sector are required to ensure local needs form part of the drives and technical initiatives of the transition:

- "Not many policy proposals focus on incentivising what SA [South Africa] needs to transition to as far as mainstreaming renewable energy technology" (P4).
- "An enabling environment is necessary for the private sector to take the country through the transition process" (P2).
- "Communities should benefit ... that is much, much more important" (P6).
- "[Communities] can put up solar at a very low cost" (P3).

3

Collaboration with developed countries is a crucial enabler to unlocking growth potential in South Africa:

- "Repurposing the energy that was used to operate the mine can create a development hub of excellence that includes healthcare; primary, secondary, and tertiary education; and housing options that can lead to ownership and the associated commercial infrastructure that leans itself to the formation of a sustainable society" (P13).
- "The biggest growth opportunities are in the rural communities" (P4).
- "The only way an investor is going to unlock this wealth is by contacting, on an equitable basis, the local communities... It is the responsibility of developed countries to help developing countries" (P8).

4

Optimising opportunities to decarbonise and achieve net-zero targets by 2050:

- "Explore opportunities where we can turn green" (P12).
- "We should be much more proactive" (P1).
- "[We must] show commitment to decarbonise" (P7).
- "Exploit coal in a cleaner or environmentally responsible manner" (P4).



“Not many policy proposals focus on incentivising what SA [South Africa] needs to transition to as far as mainstreaming renewable energy technology”

THEME 4: CONSTRAINTS

The constraints raised are a testament to the overwhelming conflict on various levels that the mining industry can only partly control:

1

Socio-economic issues create concern about unrealistic transition pathways, reminding us that:

- “There is not a country in the world that will allow its citizens to go hungry just because they want to be green.... Transition will be big ... we ought to change the wings of this plane that we are flying” (P12).
- “The impact on our communities would be devastating” (P8).
- “Despite good intentions, the transition won’t be easy” (P7).
- “Right now, it is just too expensive to go green” (P14).

2

Investments coupled with international support is a matter of fact to support the mining industry’s good intentions:

- “SA will need hundreds of billions to fully transition out of coal” (P8).
- “Greater investment is crucial” (P1).
- “How will we afford that?” (P14).

3

Constrained economic development is South Africa’s unfortunate reality:

- “Without infrastructure, we are prevented from that opportunity” (P8).
- “We are not going to get rid of these emissions with our resources ... climate change will continue despite what we do” (P10).
- “You need to have the infrastructure.... How will we afford that?” (P14).

4

Geographic limitations imply that not all parts of South Africa are affected equally:

- “Challenges with the typography make it difficult” (P1).
- “Depending on your area, such as coastal areas where it is windier, you can do the necessary installations” (P2).

5

Realistic business plans need to direct the way forward:

- “The economics should not be driven by me putting up a solar plan because the investors would like to see me decarbonising” (P10).
- “Without a business case, the likelihood of the transition going fast is unlikely” (P12).

6

South Africa’s poor track record on large capital project execution complicates our future:

- “SA’s history of timeline and budget over-runs on big capital projects is a concern” (P1).
- “In the past, there’s been a failure to implement” (P11).

7

Technological issues and baseload demands are inescapable hurdles, cautioning:

- “You will never get that with renewables. Never” (P7).
- “There’s no technology that is forthcoming within the next decade, to do smelting differently for aluminium” (P7).
- “Baseload is key for industrialisation” (P5).
- “The country still needs baseload power, we can’t ignore that ... certain times of the year, the renewable energy plants can’t keep up with demand” (P3).

“There is not a country in the world that will allow its citizens to go hungry just because they want to be green.... Transition will be big ... we ought to change the wings of this plane that we are flying”

8

Energy security is fundamental, although respondents warned that:

- “Energy security trumps the need to get to carbon neutrality” (P7).
- “Energy drives industrialisation creates jobs, etc., that is fundamental”. (P14).
- “Our responsibility as the leadership today is to solve our energy crisis” (P12).

9

The lack of policy direction fuels the view that the 2019 Integrated Resource Plan (IRP) of the Department of Minerals and Energy (DMRE) is redundant:

- “IRP is always behind the curve” (P4).
- “The world is transitioning faster than they [DMRE] are applying their minds, they get overtaken by events” (P7).
- “DMRE ... it’s lack of capacity or it’s just lethargy” (P5).

10

Affordability is blamed on the pricing of independent power producers (IPP), which is perceived as being unfair:

- “The IPPs who have built the first renewable plants ... their electricity costs 10 times more than current Eskom tariffs” (P6).
- “We are effectively asking poor people to subsidise IPP companies to stay in business” (P14).





“The world is transitioning faster than they [DMRE] are applying their minds, they get overtaken by events”

THEME 5: ACTIONS FOR TRANSITION

The way forward for the mining industry came down to three important actions:

1

Commitment to transition to achieve net zero by 2050 is non-debatable:

- “The mines are serious to reduce the carbon to net zero by 2050” (P4).
- “I can’t think of any customer that doesn’t have an emission reduction target” (P9).
- “We support the bold and welcoming statement at the COP 26 last year to reduce from 10% by 2030 to 30%” (P8).

2

Realistic strategies are a minefield to navigate, but point to long-term strategies rather than quick fixes:

- “A 10- to 20-year period is needed for the transition to playing itself out” (P1).
- “Transition might not – in a developing nation like South Africa – happen at the pace that it’s envisaged to happen ... there are too many risks and issues we need to manage carefully” (P4).

3

Further research is proposed to make informed choices, confirming the industry’s mature approach to a very complex situation:

- “There are opportunities ... explore them and do further research on this” (P4).
- “Do your research, you could probably lower the price of technologies” (P6).
- “Studies can be done to do these things responsibly and safely” (P12).



CONCLUSION

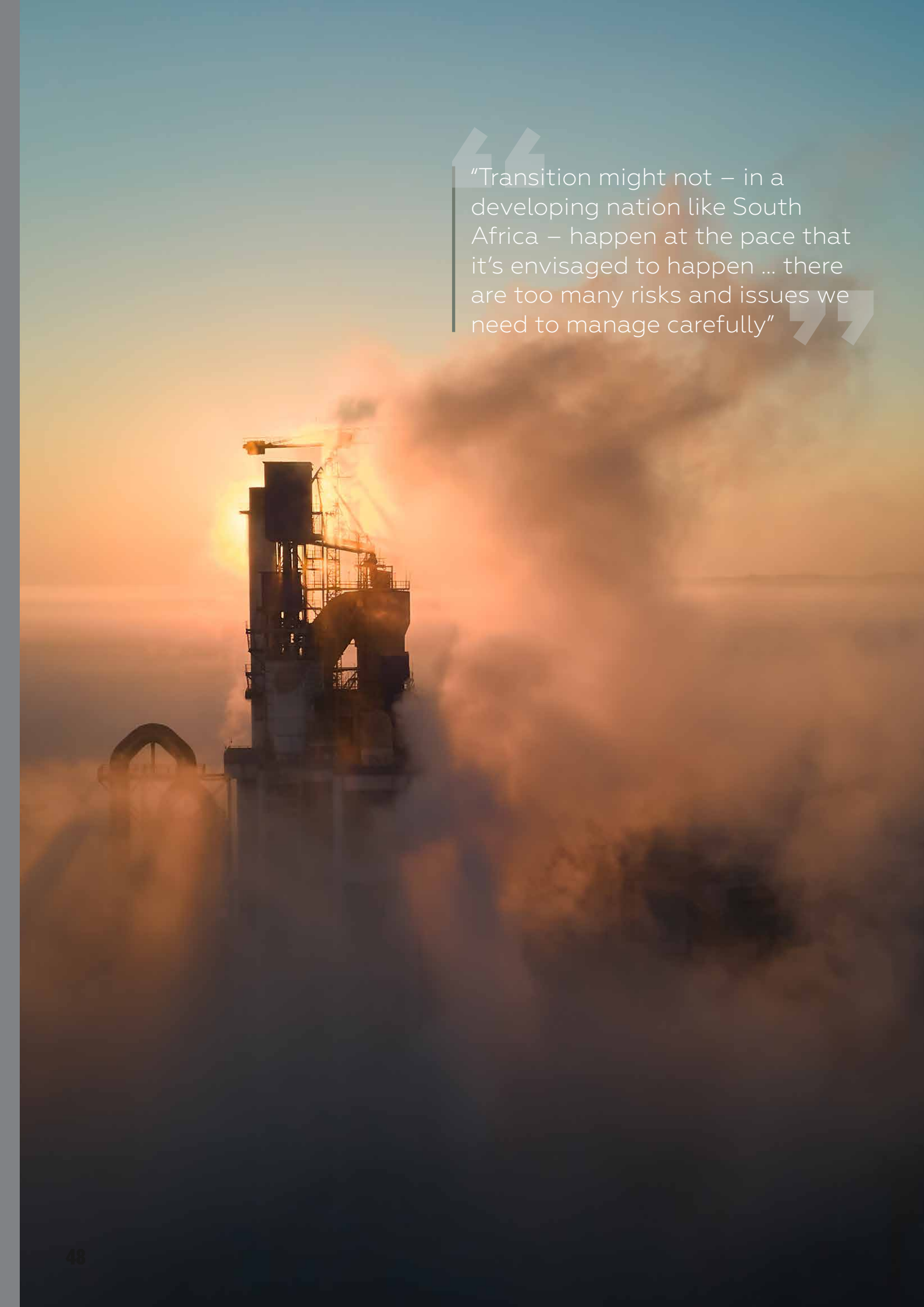
Undoubtedly, the South African mining industry is cognisant of the need to urgently implement energy transition pathways to ensure global relevance of the industry and competitiveness. The consequences for the environment, if not abiding, are equally clear. However, South Africa faces the predicament that it is expected to implement a first-world perspective, while prevailing, poor socio-economic conditions of millions of citizens in the country living with energy poverty and job insecurity require a more empathetic approach. Worth investigating is the MLP that has become a popular avenue for industries (Damman et al., 2021; Gui & MacGill, 2018; Kanger, 2021; Marín & Goya, 2021) to accomplish energy transition amid complex socio-economic conditions. Hereby, an existing regime, such as the use of coal, is acknowledged and partly retained to show an understanding of existing systems that contribute to the socio-economic stability, which communities desperately long for. Consequently, exogenous pressures from the global energy landscape should be viewed as an opportunity to develop and introduce novel innovations (Borasio & Moret, 2022) that could replace fossil-based energy systems with sustainable energy alternatives – even for parts of the industry. For example, hybrid technology could be introduced, rather than to initiate a drastic move away from fossil-based fuel. This could even be done in parts of the mining sector, such as with vehicle departments.

PARTICIPANTS WERE CLEAR THAT

A local, African perspective is the only viable route going forward to prevent socio-political turmoil:

- “The international noise regarding climate change needs African leaders to be bold in addressing it from an African challenge perspective” (P7).
- The involvement of the private sector and international role players are needed to contribute financially and provide empirically sound guidelines to direct action.
- Changes should be humane: “There is not a country in the world that will allow its citizens to go hungry just because they want to be green” (P12).
- The question remains: “Do people go hungry or do we save the planet?” (P12).
- While the issue of global warming is a pressing concern and the need to change is well understood, “it should not be about protecting the industry, it should be about advancing the interest of the economy” (P10).

Due to an abundance of coal in South Africa (Todd & McCauley, 2021), the current utility incumbent has no other option but to use it as the baseload for the country. To reduce the country’s overall coal consumption, major industries like the mining industry are obliged to actively pursue viable avenues to transition to more sustainable energy sources – however complicated – and set an example for other industries in the country.



“Transition might not – in a developing nation like South Africa – happen at the pace that it’s envisaged to happen ... there are too many risks and issues we need to manage carefully”

REFERENCES

- Adebayo, T. S., Awosusi, A. A., Bekun, F. V., & Altuntaş, M. (2021). Coal energy consumption beat renewable energy consumption in South Africa: Developing policy framework for sustainable development. *Renewable Energy*, 175, 1012–1024. <https://doi.org/10.1016/j.renene.2021.05.032>
- Borasio, M., & Moret, S. (2022). Deep decarbonisation of regional energy systems: A novel modelling approach and its application to the Italian energy transition. *Renewable and Sustainable Energy Reviews*, 153(December 2020).
- Busby, J. (2018). Warming world: Why climate change matters more than anything else. *Foreign Affairs*, 97(4), 49–55.
- Damman, S., Sandberg, E., Rosenberg, E., Pisciella, P., & Graabak, I. (2021). A hybrid perspective on energy transition pathways: Is hydrogen the key for Norway? *Energy Research & Social Science*, 78, Article 102116. <https://doi.org/10.1016/j.erss.2021.102116>
- Delevingne, L., Glazener, W., Grégoir, L., & Henderson, K. (2020, January 28). *Climate risk and decarbonization: What every mining CEO needs to know*. McKinsey. <https://www.mckinsey.com/capabilities/sustainability/our-insights/climate-risk-and-decarbonization-what-every-mining-ceo-needs-to-know#/>
- Geels, F. W., Kern, F., Fuchs, G., Hinderer, N., Kungl, G., Mylan, J., Neukirch, M., & Wassermann, S. (2016). The enactment of socio-technical transition pathways: A reformulated typology and a comparative multi-level analysis of the German and UK low-carbon electricity transitions (1990–2014). *Research Policy*, 45(4), 896–913. <https://doi.org/10.1016/j.respol.2016.01.015>
- Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1(1), 24–40. <https://doi.org/10.1016/j.eist.2011.02.002>
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15–31. <https://doi.org/10.1177/1094428112452151>
- Gui, E. M., & MacGill, I. (2018). Typology of future clean energy communities: An exploratory structure, opportunities, and challenges. *Energy Research & Social Science*, 35, 94–107. <https://doi.org/10.1016/j.erss.2017.10.019>
- Heras, J., & Martín, M. (2020). Social issues in the energy transition: Effect on the design of the new power system. *Applied Energy*, 278, Article 115654. <https://doi.org/10.1016/j.apenergy.2020.115654>
- ICMM. (2021, October 5). *Climate change: Position statement*. <https://www.icmm.com/en-gb/our-principles/position-statements/climate-change>
- Kanger, L. (2021). Rethinking the multi-level perspective for energy transitions: From regime life-cycle to explanatory typology of transition pathways. *Energy Research & Social Science*, 71, Article 101829. <https://doi.org/10.1016/j.erss.2020.101829>
- Knudsen, E. S., Lien, L. B., Timmermans, B., Belik, I., & Pandey, S. (2021). Stability in turbulent times? The effect of digitalization on the sustainability of competitive advantage. *Journal of Business Research*, 128, 360–369. <https://doi.org/10.1016/j.jbusres.2021.02.008>
- Marín, A., & Goya, D. (2021). Mining – the dark side of the energy transition. *Environmental Innovation and Societal Transitions*, 41, 86–88. <https://doi.org/10.1016/j.eist.2021.09.011>
- Minerals Council South Africa. (2022). *Integrated annual review 2021: Changing mines, changing lives*. <https://www.mineralscouncil.org.za/industry-news/publications/annual-reports>

REFERENCES

- Motaung, H (2023, April 12). Digging for change: South African industry addresses climate change. *Mining Review Africa*. <https://www.miningreview.com/battery-metals/digging-for-change-south-african-industry-climate-change/#:~:text=The%20South%20African%20mining%20industry,climate%20change%20greenhouse%20gas%20emissions>
- Naidoo, P. (2023, February 6). Load shedding may cost SA R899m a day, Sarb says. Moneyweb. <https://www.moneyweb.co.za/news/south-africa/load-shedding-may-cost-sa-r899m-a-day-sarb-says/#:~:text=Eskom%20has%20repeatedly%20said%20an,needed%20to%20end%20load%20shedding.&text=South%20Africa's%20electricity%20crisis%20is,according%20to%20central%20bank%20estimates>
- Pingkuo, L., & Huan, P. (2022). What drives the green and low-carbon energy transition in China?: An empirical analysis based on a novel framework. *Energy*, 239, Article 122450. <https://doi.org/10.1016/j.energy.2021.122450>
- Pollet, B. G., Staffell, I., & Adamson, K.-A. (2015). Current energy landscape in the Republic of South Africa. *International Journal of Hydrogen Energy*, 40(46), 16685–16701. <https://doi.org/10.1016/j.ijhydene.2015.09.141>
- Robinson, I. (2016). The globalization of the Southern African mining industry. *Journal of the Southern African Institute of Mining and Metallurgy*, 116, 769–775.
- Svobodova, K., Owen, J. R., Harris, J., & Worden, S. (2020). Complexities and contradictions in the global energy transition: A re-evaluation of country-level factors and dependencies. *Applied Energy*, 265, Article 114778. <https://doi.org/10.1016/j.apenergy.2020.114778>
- Todd, I., & McCauley, D. (2021). Assessing policy barriers to the energy transition in South Africa. *Energy Policy*, 158, Article 112529. <https://doi.org/10.1016/j.enpol.2021.112529>
- Wang, S., Wang, X., & Lu, B. (2022). Is resource abundance a curse for green economic growth? Evidence from developing countries. *Resources Policy*, 75(December 2021), 102533. <https://doi.org/10.1016/j.resourpol.2021.102533>
- Weiss, O., Pareschi, G., Georges, G., & Boulouchos, K. (2021). The Swiss energy transition: Policies to address the Energy Trilemma. *Energy Policy*, 148, Article 111926. <https://doi.org/10.1016/j.enpol.2020.111926>



**TRANSFORMATION
TOWARDS
CIRCULARITY
THROUGH
CAPABILITIES AND
DIGITALISATION:
THE INTERNATIONAL
BUSINESS CASE STUDY
OF SWEDISH FAST-FOOD
FRANCHISE MAX BURGERS**

White paper by:
Sheena Indhul



SHEENA INDHUL

Sheena Indhul is a versatile professional with a multifaceted career spanning engineering, marketing, education, and sustainability advocacy. She has garnered invaluable insights across various industries. Recognised for her dedication to sustainability, Sheena serves as the Deputy Chairperson of the GIBS Graduate Sustainability Committee.

Sheena Indhul is a seasoned Marketing and Brand Executive at Crowe Southern Africa, and a Head Lecturer at the Institute of Marketing Management. With qualifications in Audio Engineering, Marketing Management, and a Master's in Philosophy Business Administration specialising in International Business, she combines her passion for sustainability and over 15 years of marketing experience to promote and educate businesses towards adopting sustainable practices. Beyond traditional marketing approaches, she excels in integrating people, science, technology, and business.

Her endeavour is to inspire and empower businesses to embrace sustainable practices. By combining her marketing acumen with her fervent dedication to sustainability, she aims to catalyse positive change within the business landscape. With an unwavering focus on research and education, her vision is to see businesses worldwide shifting towards sustainable practices, creating a greener and more responsible future.

ABSTRACT

The journey of the first climate positive fast-food company transformation towards circularity through capabilities and digitalisation presents an intriguing case that warrants careful examination. Unravelling the complexities of this transformation is essential to grasp the challenges inherent in shifting from a linear "farm-to-table" model to a closed-loop system. In this evolving landscape, the potential for a competitive advantage becomes apparent, positioning the company ahead of industry rivals, such as McDonald's and Burger King. However, the successful adoption of circular business models necessitates the cultivation of new management talents, the integration of advanced technologies, and the implementation of innovative practices.

This study elucidates the transition process undertaken by a multinational Swedish business, shifting from a linear model to a closed-loop system. The author examines the trajectory towards strategic renewal and presents a generic framework that holds relevance for other organisations within the same industry. The research highlights the systematic steps involved in the transformation, providing valuable insights and practical guidance for organisations seeking to embark on a similar path of sustainable change and circularity.

This research delves into a comprehensive 53-year transformational journey towards circularity, accompanied by an examination of practical examples. Employing a qualitative research methodology, specifically a narrative approach, the study focuses on Max Burgers, an industry-leading sustainable fast-food company that places paramount importance on global environmental stewardship. The analysis draws upon publicly available sources and synthesises the information into a coherent narrative, presenting an analysis of the company's challenges, solutions, and initiatives. To enhance clarity and conciseness, certain sections of the content are condensed and organised in a tabulated format.

The primary objective of this white paper is to furnish discerning managers with novel perspectives on the adoption of circular transformation through capabilities and digitalisation. Businesses aspiring to minimise their ecological footprint and maximise operational value face three distinct barriers that require careful navigation:

- Organisational maturity, influenced by factors, such as business expansion, portfolio downsizing, and workforce dissatisfaction;
- The transitional barrier encompassing considerations of capabilities, business models, practices, processes, and consumer education; and
- The transformation barrier, which entails integrating digitalisation, forging partnerships, and responding to evolving customer and market dynamics.

To surmount these obstacles, the author proposes a framework that elucidates guiding principles and approaches for embracing circularity within operations, thereby fostering sustainability, efficiency, and innovation. Businesses that successfully navigate these barriers and enhance coordination among their functional units can reap several advantages. First, they have the potential to achieve long-term profitability and resilience, while proactively addressing environmental concerns. By doing so, they not only contribute to sustainability, but also safeguard their financial prosperity over the extended term. Second, through genuine improvements in their protocols, processes, and procedures, businesses can establish credibility and mitigate any accusations of greenwashing. These foster trust among stakeholders, solidifying their reputation as responsible environmental stewards. Lastly, organisations that prioritise sustainability and make significant strides in this realm enhance their standing with key stakeholders, including investors, customers, employees, and the broader community. By demonstrating a sincere commitment to environmental responsibility, businesses can cultivate trust and enduring relationships, as well as increase their profitability.

Unravelling the complexities of this transformation is essential to grasp the challenges inherent in shifting from a linear “farm-to-table” model to a closed-loop system.

INTRODUCTION

The activities and operational practices of contemporary organisations have been identified as significant contributors to the environmental challenges we currently encounter. When companies aim to transition towards sustainability, they often encounter a substantial degree of uncertainty. Driving sustainability and efficiency within business operations requires a strategic renewal approach that embraces circularity and leverages digitalisation technologies. The transformation towards circularity begins with recognising the need for change. Such change attracts environmentally conscious consumers, reduces operational costs, and fosters innovation.

1. CASE STUDY EXTRACT

Max Burgers is the first climate-positive retailer/service company in the world to provide a menu that is climate positive. It is also well known for its commitment to environmentally responsible business practices and for being the first environmental franchise in terms of global scope. Max Burgers was presented with the United Nations' Global Climate Action Award at the COP25 conference (Max Burgers, 2019; United Nations Framework Convention on Climate Change, 2019). Moreover, the business has been named among the top 10 globally for quality innovation, which includes the creation of a burger made entirely of plant-based ingredients (Cision, 2021; Max Burgers, n.d., 2021; McCracken, 2023).

Over time, the company expanded its scope and conducted a comprehensive analysis of greenhouse gas emissions, encompassing not only its own waste materials, but also customer and employee travel.

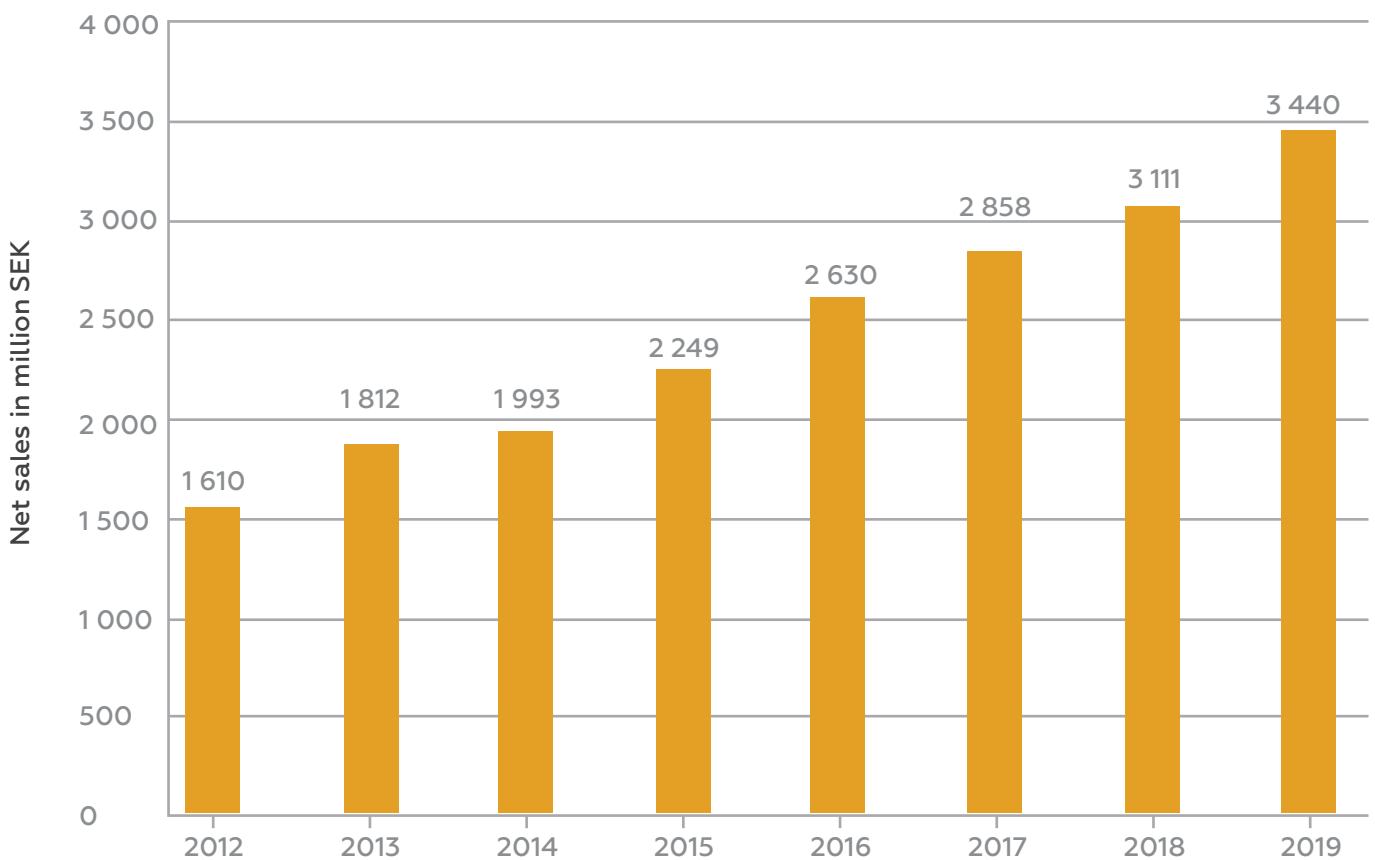


Figure 1: Net sales of Max Burgers AB from 2012 to 2019 (in million SEK)
(Source: Statista, 2021)

Max Burgers' bottom line has never looked better. In 2019, the Swedish fast-food chain's net sales were at an all-time high of around 3.4 billion Swedish kronor, surpassing any previous year's total and generated a profit of 428 million Swedish kronor in 2019. From 1969 to 2019, Max Burgers experienced a steady and continuous expansion, with each passing year marking noticeable growth. Since its establishment, the company has embarked on a journey to achieve climate positivity. The values of sustainability, quality, and proactive contribution to global improvement have emerged as the fundamental guiding principles of Max Burgers.

In 1968, Britta Andersson and the late Curt Bergfors founded a humble family business in Gällivare, Sweden (Esensjö & Esensjö, 2010). Fast-forward to present day and the franchise is still proudly owned and operated by the Andersson family. What began as a local venture has blossomed into a global enterprise, boasting 177 restaurants and 7 400 employees (Max Burgers, 2022).

In its early years, Max Burgers focused on its home base in Sweden, gradually expanding its operations across the country between 1970 and 1999. The company strategically established its presence in various venues, including hotels, restaurants, fuel stations, and gyms (Esensjö & Esensjö, 2010). In 2000, Max Burgers embarked on a transformative path, implementing a series of measures to optimise its business operations, streamline its portfolio, and refocus on its core activities (Esensjö & Esensjö, 2010).

Even from its inception, Max Burgers demonstrated a commitment to environmental consciousness. In 1969, the company took its first step towards sustainability by installing a recycling facility for corrugated cardboard. The following year, it began repurposing oil waste to create soap (Max Burgers, 2022, 2022). As the years progressed, Max Burgers intensified its efforts to reduce its carbon footprint. It ventured into producing biodiesel from used frying oil and biochar from waste, while also implementing measures to minimise food waste, improve energy efficiency, and power its restaurant with 100% wind energy (Max Burgers, 2022; Pyreg, 2021). The company pioneered an internal carbon-pricing system and went above and beyond industry norms to address its climate impact.

Max Burgers has not only focused on internal changes, but also embraced a broader vision of environmental stewardship. It has planted over two million trees in Africa, actively participated in reducing greenhouse gas emissions in the fast-food industry, and encouraged customers to consider the environmental impact of their food choices. The company has expanded its menu to include a wide selection of vegan and vegetarian alternatives, emphasising flavour and ingredient quality, with everything prepared to order.

The brothers' takeover of the family business marked a pivotal moment in Max Burgers' commitment to climate change initiatives. Their initial efforts targeted greenhouse gas emissions along the entire supply chain – from farm to customers (Max Burgers, 2018). Over time, the company expanded its scope and conducted a comprehensive analysis of greenhouse gas emissions, encompassing not only its own waste materials, but also customer and employee travel (Watson, 2018). Recognising the significant contribution of industrial livestock agriculture to greenhouse gas emissions, Max Burgers decarbonises its menu and offset the remaining emissions by planting trees, achieving a remarkable 110% offset (The Natural Step, 2015; Watson, 2018).

In conclusion, Max Burgers' transformation towards sustainability and environmental responsibility has been a story of continuous growth, strategic choices, and pioneering initiatives. From its humble beginnings, the company has emerged as a leader in the fast-food industry, showcasing the power of embracing sustainability and innovation for the betterment of our planet.

In 2000, Max Burgers embarked on a transformative path, implementing a series of measures to optimise its business operations, streamline its portfolio, and refocus on its core activities.

2. WHY IT MATTERS

The Anthropocene era has rendered the environment 10 times worse than it was originally, causing irreparable damage to the natural ecosystem that formerly existed on earth, since the beginning of the social and economic system (Elf et al., 2022; Ghobakhloo & Fathi, 2021; Steffen et al., 2015). In the interest of reducing the detrimental effect on succeeding generations, the involvement of public discourse promotes a behavioural shift towards sustainability and enhanced knowledge of climate change (Elf et al., 2022; Steffen et al., 2015). The Organisation for Economic Co-operation and Development predicted that, by 2060, the quantity of naturally occurring materials used will have increased by double, if further regulations regarding the production of global material resources are not implemented (Dellink et al., 2018; OECD, 2019). The severity of the harm done to the environment will have a detrimental effect on the human population's health. Consequently, rising material consumption will inevitably result in an increase in greenhouse gas emissions, which will exacerbate the climate catastrophe.

Various industries have failed to implement the best sustainable business practices (Lo, 2020), whereas some organisations struggle with the integration of circularity in their business models (Gandolfo & Lupi, 2021). To this point, exploring the capabilities needed for a business to transform towards a circular economy (Fernandez de Arroyabe et al., 2021) is essential, and leveraging technology could accelerate and make the process agile. Briefly put, in the long term, the implementation of circular transformation could positively impact a business's bottom line, in addition to the global economic, environmental, and social effects.

The transition towards a circular economy and the integration of sustainable practices are imperative due to several compelling reasons.

1

First, the environmental implications cannot be ignored. The current linear economic model diminishes natural resources, engenders excessive waste, and contributes to climate change. Adopting a circular economy approach helps minimise resource extraction, reduce waste generation, and alleviate the impact of greenhouse gas emissions. This shift is vital for preserving ecosystems, fighting climate change, and ensuring the availability of resources for future generations (Ekins et al., 2019; Mbow et al., 2019).

2

Second, there are economic benefits associated with circularity. Businesses that embrace circular practices can improve their operational efficiency, reduce costs, and create new revenue streams. By adopting innovative business models, companies can unlock opportunities for growth and enhance their competitive advantage. Additionally, circular economy practices promote job creation, stimulate local economies, and foster sustainable economic development (Barros et al., 2021; Jensen, 2022).

3

Third, the social dimension of the circular economy is significant. It addresses social inequality and promotes inclusive growth by creating employment opportunities, particularly in the areas of remanufacturing and recycling. Moreover, the circular economy can enhance product quality and ensure consumer satisfaction. By prioritising social sustainability, businesses can build trust and forge stronger relationships with customers, employees, and local communities (Dey, 2022; Indhul, 2022; Padilla-Rivera et al., 2020).

4

Lastly, the global context demands action. The urgent need to address pressing environmental challenges, such as resource scarcity, pollution, and climate change, requires a collective effort from political authorities, businesses, and individuals. The circular economy provides a framework for sustainable development that aligns economic prosperity with environmental stewardship and social well-being. It offers a pragmatic pathway to achieve the United Nations Sustainable Development Goals and build a more resilient and sustainable future for all.

In summary, the transition to a circular economy matters because it addresses environmental concerns, drives economic benefits, promotes social well-being, and contributes to global sustainability efforts. Adopting circularity is not only necessary to alleviate environmental degradation, but is also indispensable for creating a more prosperous, inclusive, and resilient society.

3. RESEARCH DESIGN AND METHODOLOGY

The study employed qualitative research methodology. It depicted a 53-year business journey from 1969 to 2022 in the form of a chronological narrative, bringing to light the challenges, opportunities, and initiatives that arose during the course of the company's existence as the events naturally occurred. The information was obtained from various public domain sources that were compiled into a single database.

In total, 1 500 searches were conducted from a content analysis perspective. Each article was analysed to assess structural variables and 150 sources were identified for suitable use. Articles unrelated to the research study were excluded. The author collectively sampled 150 videos, TED Talks, conference papers, news articles, blog posts, podcasts, reports, peer-reviewed literature, and websites. A guideline was created to determine whether the content should be used or rejected to ensure all areas within the set parameter were covered and that no other research at the time in the industry matched the criteria for the fast-food industry. Discrepancies were identified before the main set of articles was selected and a final set of 26 sources was used (refer to Appendix A). The strategy centred on reliable and valid content pertaining to the core research dimensions. Microsoft Excel was used to synthesise, analyse, and draw a text timeline analysis from 1969 to 2022.

Each article was analysed to assess structural variables and 150 sources were identified for suitable use.

To streamline the information presented in this white paper, parts of the content are condensed and organised in tabulated form. This structure helps to provide a clear and coherent understanding of the sequence of challenges, opportunities, and initiatives in a logical manner.

The overall purpose of the research design (see Figure 1) was to give the study a suitable structure to operate inside. The author's cognitive progression is exemplified through a sequential process, commencing with the research focus (phase 1) and advancing into the theoretical domain (phase 2). These two phases were implemented in parallel with the secondary data analysis (part A) and theoretical exclusion (part B). The alignment of all four components (phase 1, phase 2, part A, and part B) was essential to establish the narrative analysis (phase 3), leading to the culmination in the empirical realm (phase 4). The empirical realm provides a conceptual integrated framework for embracing transformation towards circularity.

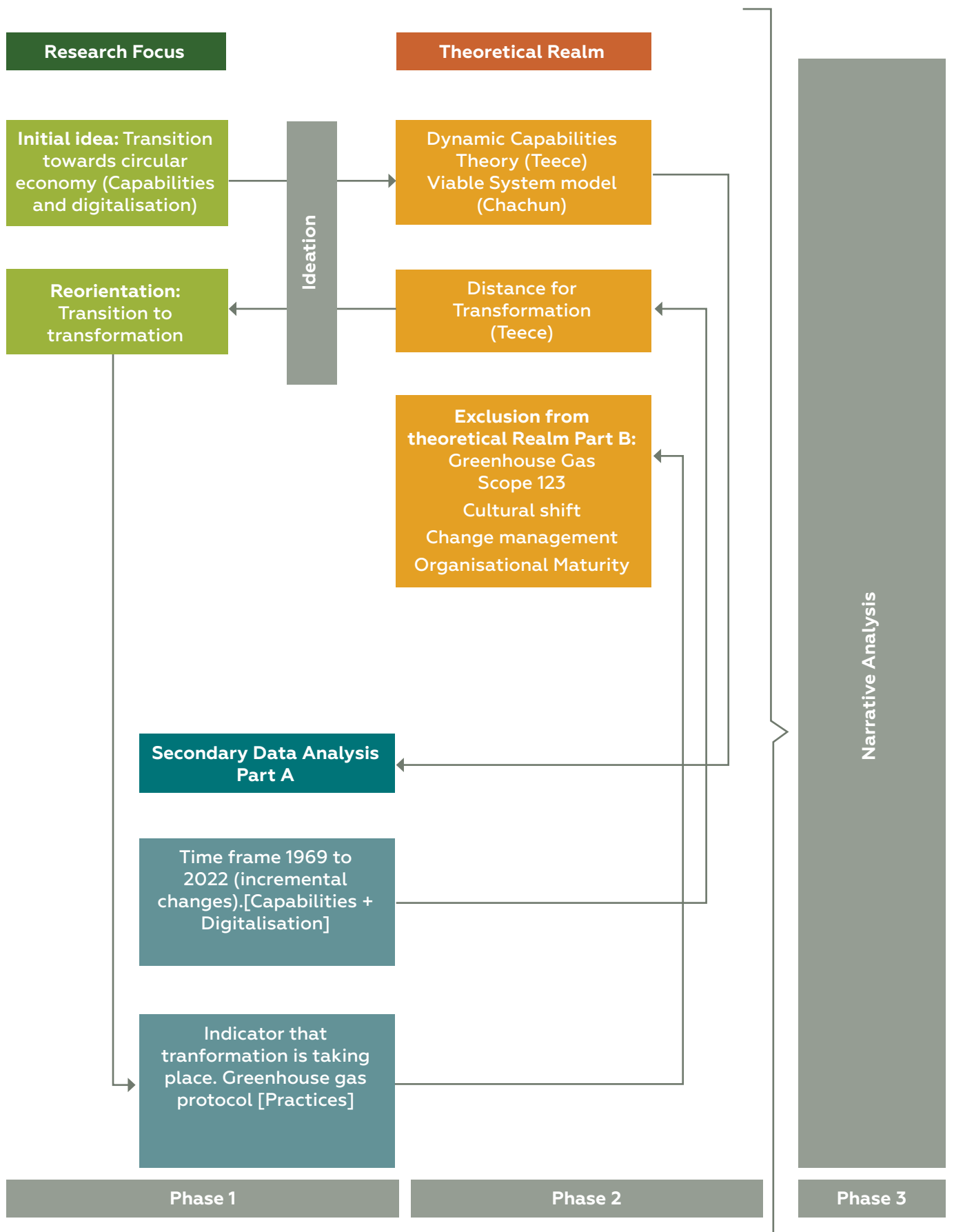
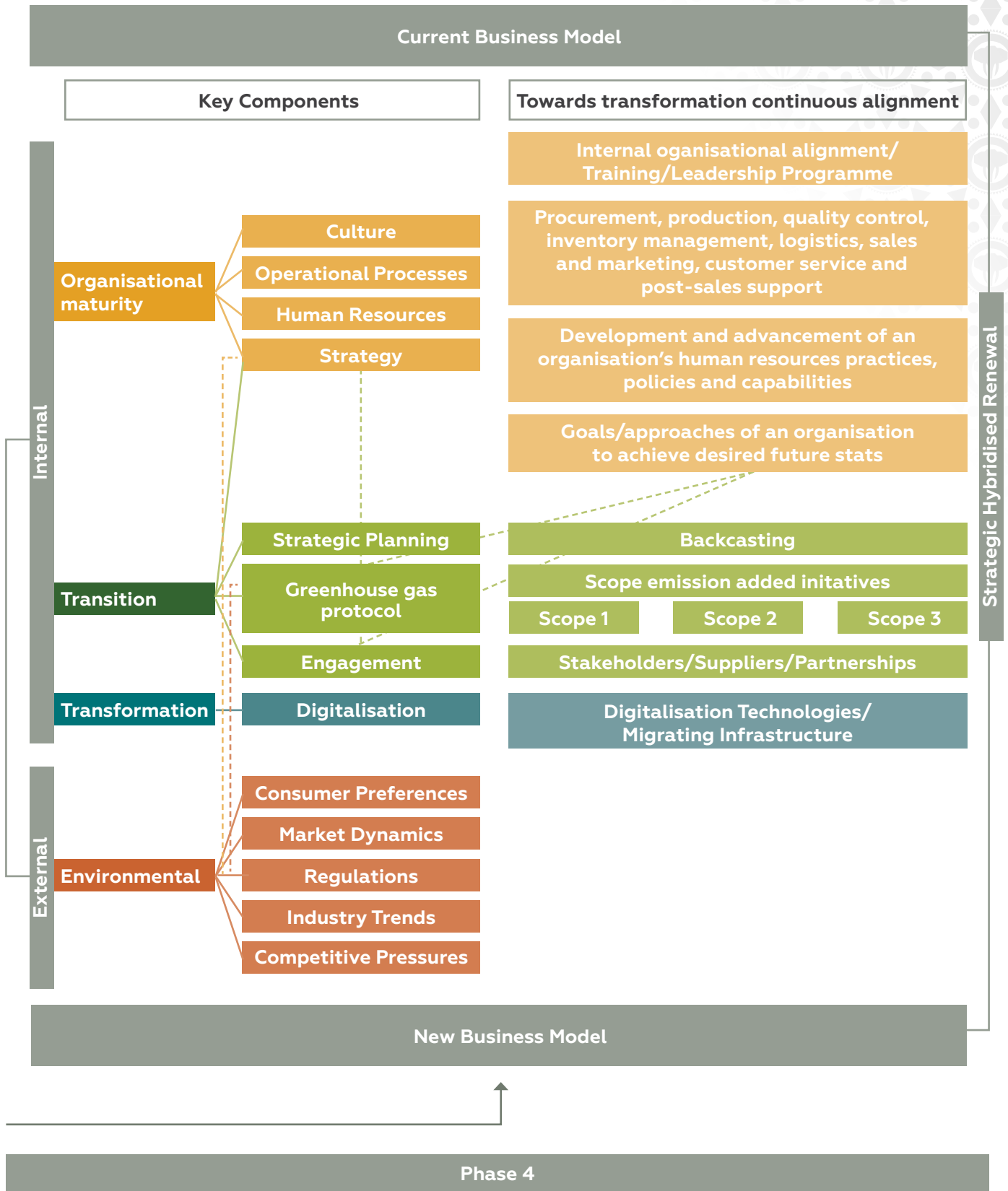


Figure 2: Author's cognitive progression of the research process
 (Source: Author's illustration)

Empirical Realm



4.1 ANALYSIS

PROBLEM CONTEXT

Max Burgers acknowledged the importance of understanding its climate implications. The human resource director at the time, Pär Larshans, was entrusted with probing what rivals were doing about climate change despite having no expertise and competency in industrial market research and sustainability.

The business leveraged Larshan’s expert knowledge and started its journey by focusing on social sustainability and the development of its employees.

The company lacked sustainability capabilities at the time. To achieve its long-term goal of developing a sustainable supply chain that would provide a competitive advantage, Max Burgers needed a method that was non-linear and adaptable. Larshans formed a partnership between Max Burgers and consulting company The Natural Step.

Max Burgers’ transformation from a linear model to circularity began. The business cultivated a relationship of trust and confidence with its suppliers over time and, in the same vein, established an internal procedure between collaborators for gathering data over time. Max Burgers was the first company in the fast-food industry to establish a climate impact analysis. Max Burgers realised that greenhouse gases in scopes one and two accounted for 1% of the carbon footprint, while scope three accounted for 99% of total carbon emissions. Rejuvenation in the direction of sustainability and climate positive has been a continuing effort. The business utilised the greenhouse gas protocol as a platform to make judgements regarding optimising policies, activities, and operations. In addition, the company utilised practices in accordance with the standards of ISO 14021.

Challenges	Solutions
Larshans’ findings led Max Burgers to opportunity	Fast-food chains were consistent in receiving bad press for unhealthy eating Poor working conditions Consistency in expansion models that run local alternatives out of business
Social sustainability – workforce inclusivity	Max Burgers started a social sustainable programme and hired people who were differently abled and those who had difficulties entering the labour market The company also incorporated sustainability lessons into its leadership training programme for restaurant managers and cashiers The employee changes started in 2008, which resulted in increased employee retention and pride in work
Towards a sustainable supply chain	Both Max Burgers and The Natural Step started to collaborate on a way forward. Tasked with a fundamental question: “Is a sustainable hamburger chain possible?” A backcasting approach, the ABCD process, was used by The Natural Step
Cultivating confidence – engaging partnerships	The business employed a specific person to manage data collection surrounding the carbon footprint process The business conducted an analysis of its climate impact across the whole supply chain from farm to table
Taking steps to become climate positive	Climate-positive menu solution by measuring 100% of emissions Reducing emissions through initiatives in the value chain Removing 110% of emissions; once the business reached a climate-neutral phase across the value chain, it added an additional 10% by planting carbon-absorbing trees Carbon-labelling the menus Educating customers and providing them with a choice to consume in a more environmentally friendly manner Greenhouse gas scope and ISO 14021

Table 1: The Journey towards circularity



“Max Burgers was powered entirely by wind energy in Sweden in 2008, Norway in 2016, and Denmark in 2021.”

4.2 ABCD PROCESS QUANTIFIED

Since 2008, Max Burgers has funded forestry initiatives in Africa in an effort to reduce carbon emissions across its supply chain. As a direct outcome of the ABCD paradigm, Max Burgers has since planted 3.26 million trees, which equates to planting trees on 9 605 football fields or taking 386 160 automobiles off the road for one year. In addition, Max Burgers was powered entirely by wind energy in Sweden in 2008, Norway in 2016, and Denmark in 2021.

It took Max Burgers 15 years to achieve the following, paving the way for other companies:

- 100% of restaurants powered by wind energy;
- 100% fish produced by well-managed ecosystems;
- 100% used frying oil converted into biodiesel;
- 27% increased customer loyalty; and
- 15% relative increase in sales of low-carbon products.

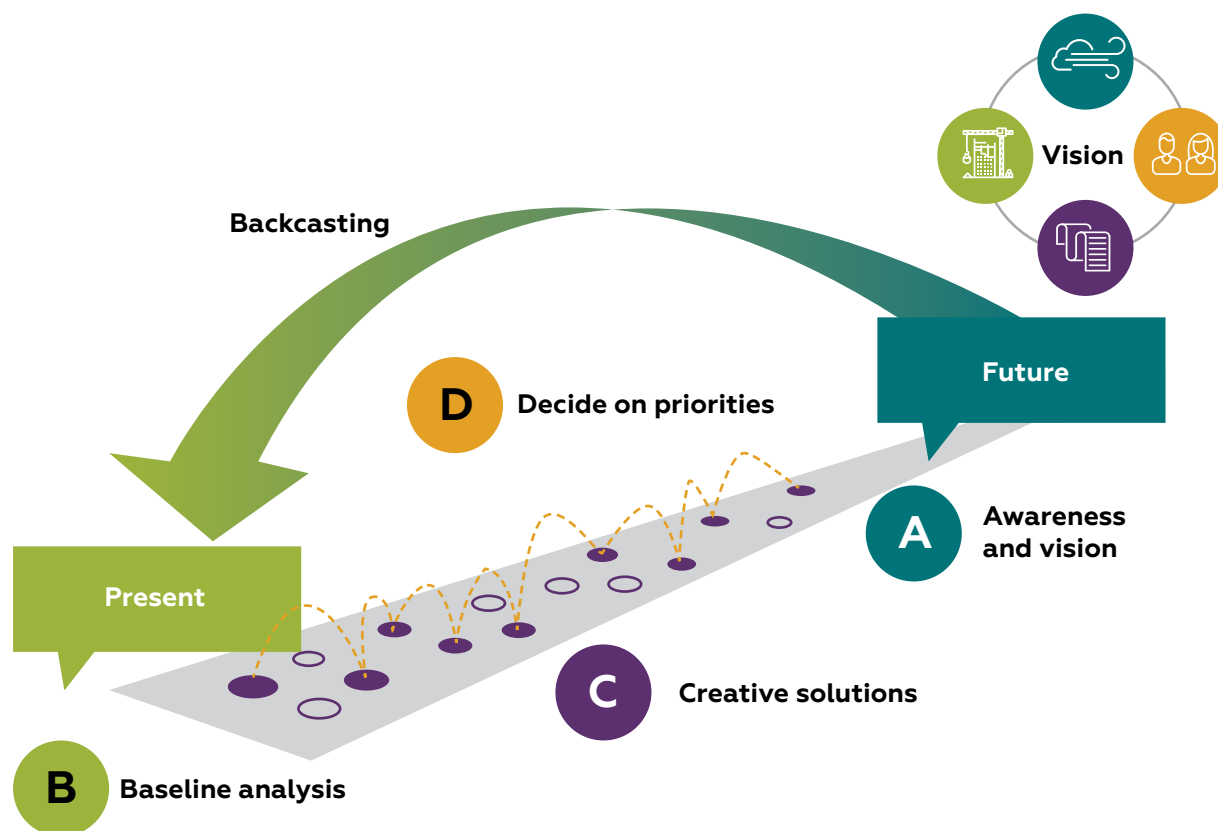


Figure 3: Four elements of backcasting – ABCD Process
(Source: Robert, 2019)

As outlined in Figure 3, backcasting from sustainability principles comprises four key elements:

- A: Awareness and vision;
- B: Baseline analysis;
- C: Creative solutions; and
- D: Decide on priorities.

Backcasting and the ABCD process together offer a socially sustainable future to businesses, which encourages them to make decisions with a long-term focus. Moreover, the stepping-stone technique provides flexibility, creative thought, and new technology. It is a forward-thinking, future-driven approach.

4.3 STEPS TOWARDS BECOMING CLIMATE POSITIVE

STEP 1:

Measure 100% of carbon emissions aligned with ISO 14021 across the value chain from farm to table.

This is inclusive of consumers’:

- Travel emissions to and from a Max Burgers restaurant; and
- Consumer waste consumption.

Other pivotal measures on:

- Beef, plant-based food, packaging, single-use items, transport/Logistics, construction, waste, heat, marketing, and travel.

STEP 2:

Reduce emissions across the value chain, a long-term ongoing process. Max Burgers reduced its footprint by actively initiating the following, to name a few:

- 100% wind power energy in selected countries;
- Palm oil-free food;
- Convert frying oil into biofuel;
- Biochar;
- Electric vehicle stations;
- Renewable packaging;
- 1% food waste; and
- Energy-saving programmes.

Scope	Description	Activities	Carbon Footprint
Scope 1	Direct GHG emissions from company operations	Reporting company activities: Fuel combustion – owned assets, company cars, refrigerants	1%
Scope 2	Indirect GHG emissions upstream associated with purchased energy	Upstream activities: Bought energy – electricity and direct heating, cooling, business energy use	
Scope 3	Indirect GHG emissions 3rd party (emissions not included in Scope 2)	Upstream activities: Everything Ise upstream and downstream activities – food, packaging, consumables, transports. Downstream activities: end of life products, transportation and distribution, investments etc.	99%

Figure 4: Scope Emissions
(Source: Author’s illustration)

STEP 3:

Remove 110% of emissions by eliminating 100% of emissions across the value chain and an additional 10% to become climate positive.

5. KEY FINDINGS

Max Burgers encountered challenges and impediments during its transformative journey towards circularity. These obstacles necessitated conscientious navigation and strategic decision-making. Max Burgers' transformation towards circularity was a journey of continuous improvement and innovation.

5.1 BARRIER 1: ORGANISATIONAL MATURITY

Organisational resistance:

When implementing a transformative approach, businesses often face resistance from within their organisations. Max Burgers grappled with internal resistance to change, which impeded the adoption of new practices and processes. Surmounting resistance required effective change management strategies and the cultivation of a novel internal culture that encompassed openness and innovation across the organisational structure.

This requires rethinking and redesigning of the business model, processes, establishing new partnerships, and ensuring collaboration between stakeholders.

5.2 BARRIER 2: TRANSITIONAL

Growth and circular initiatives:

The distance between business functions and sustainable practices across locations posed challenges in terms of consistency. Developing solutions and effectively transferring knowledge and best practices were essential components in mitigating risks for expansion.

Operational complexity:

Transitioning towards circularity requires shifting traditional operational models and practices. The complexity businesses face pertains to the processes and protocols of integrating circularity throughout their value chain. This requires rethinking and redesigning of the business model, processes, establishing new partnerships, and ensuring collaboration between stakeholders.

Consumer education and perception:

Educating and altering consumers' perceptions of food consumption presented a significant challenge for Max Burgers, requiring dedicated efforts to reshape consumers' understanding and perspectives on healthy consumption and the natural environment. Communicating the value and benefits of Max Burgers' sustainable practices to consumers was crucial for building trust and loyalty. The business had to invest in marketing efforts and effectively communicate its sustainability initiatives to create awareness and influence consumer choices.

5.3 BARRIER 3: TRANSFORMATION – DIGITALISATION

Technological adoption:

Embracing digitalisation technologies is a pertinent component for driving sustainability and efficiency. Seamless integration of digital tools and platforms requires investment, training, and overcoming initial operational disruptions. The business encountered challenges in migrating legacy infrastructure as well as adopting and integrating digital solutions into its operations.

5.4 DRIVERS: CIRCULARITY TRANSFORMATION KEY PILLARS

Cross collaboration:

A key component to drive sustainability is engaging with stakeholders. Actively involve employees, customers, suppliers, and the local community in sustainability initiatives, sharing best practice, seeking feedback, and nurturing collaboration for continuous improvement. Achieving circularity requires collaboration across the entire value chain.

Partnerships with supplier engagement:

Sourcing the correct suppliers and partnerships that are committed to sustainable practices is pivotal to successful transformation towards circularity. Prioritising locally sourced ingredients, organic and responsible farming methods, and responsible supply chain management ensures the environmental integrity of products and support of local communities. This minimises businesses' carbon footprint.

Social sustainability:

Embedding social sustainability through cross collaboration, partnerships, and supplier dimensions, Max Burgers demonstrated a commitment to creating a positive impact on society and contributing to the well-being of people and communities. The primary dimensions encompassed in this context were:

- Responsible sourcing;
- Community engagement;
- Employee well-being;
- Diversity and inclusion; and
- Stakeholder engagement.

Strategies to minimise waste and energy:

The business implemented strategies to minimise waste reduction and maximise resource efficiency across operations. Initiatives included recycling programmes, packaging solutions, and optimising energy consumption. Max Burgers explored the use of renewable energy sources to reduce its reliance on fossil fuels, such as wind energy and photovoltaic modules or solar photovoltaic panels (solar panels).

Circular design thinking approach:

Shifting a mindset towards a circular design thinking approach allowed the business to create products that are optimised for reusing, recycling, or upcycling. Innovative material selection ensures that products align with the principles of a circular economy.

Digitalisation:

Businesses leveraging digital technologies, such as internet of things, data analytics, and artificial intelligence, have the capability to enrich consumer experience, optimise operations, and streamline supply chain management. Data insights aided Max Burgers to make informed decisions and drive continuous improvement towards circularity.

Accountability and disclosure:

Reporting on sustainability performance, disclosing key metrics, and progress towards sustainability goals is indicative of accountable actions. Transparency builds trust and loyalty with stakeholders.



5.5 FRAMEWORK: TRANSFORMATION TOWARDS CIRCULARITY THROUGH CAPABILITIES AND DIGITALISATION

This *heuristic generic framework (HGF)* is a flexible framework that presents a collection of guiding principles and approaches aimed at tackling intricate problems or challenges. A distinguishing characteristic of this framework lies in its empirical foundation, stemming from practical application rather than theoretical abstraction.

In the context of transformation towards circularity, an HGF offers organisations an adaptable approach to guide their initiatives. It outlines steps to facilitate the transformation from a linear model to a circular economy. By considering aspects, such as organisational maturity and transitional and transformational approaches, the HGF provides guidelines derived from empirical experience.

The HGF's heuristic nature allows organisations to customise and modify the framework to suit their unique needs. It encourages a problem-solving mindset, fostering experimentation, learning, and continuous improvement throughout the transformation journey. By employing an HGF, organisations can benefit from a systematic approach to address the complexities associated with circular transformation. The framework serves as a foundation for strategic decision-making that promotes collaboration.

By considering aspects, such as organisational maturity and transitional and transformational approaches, the HGF provides guidelines derived from empirical experience.

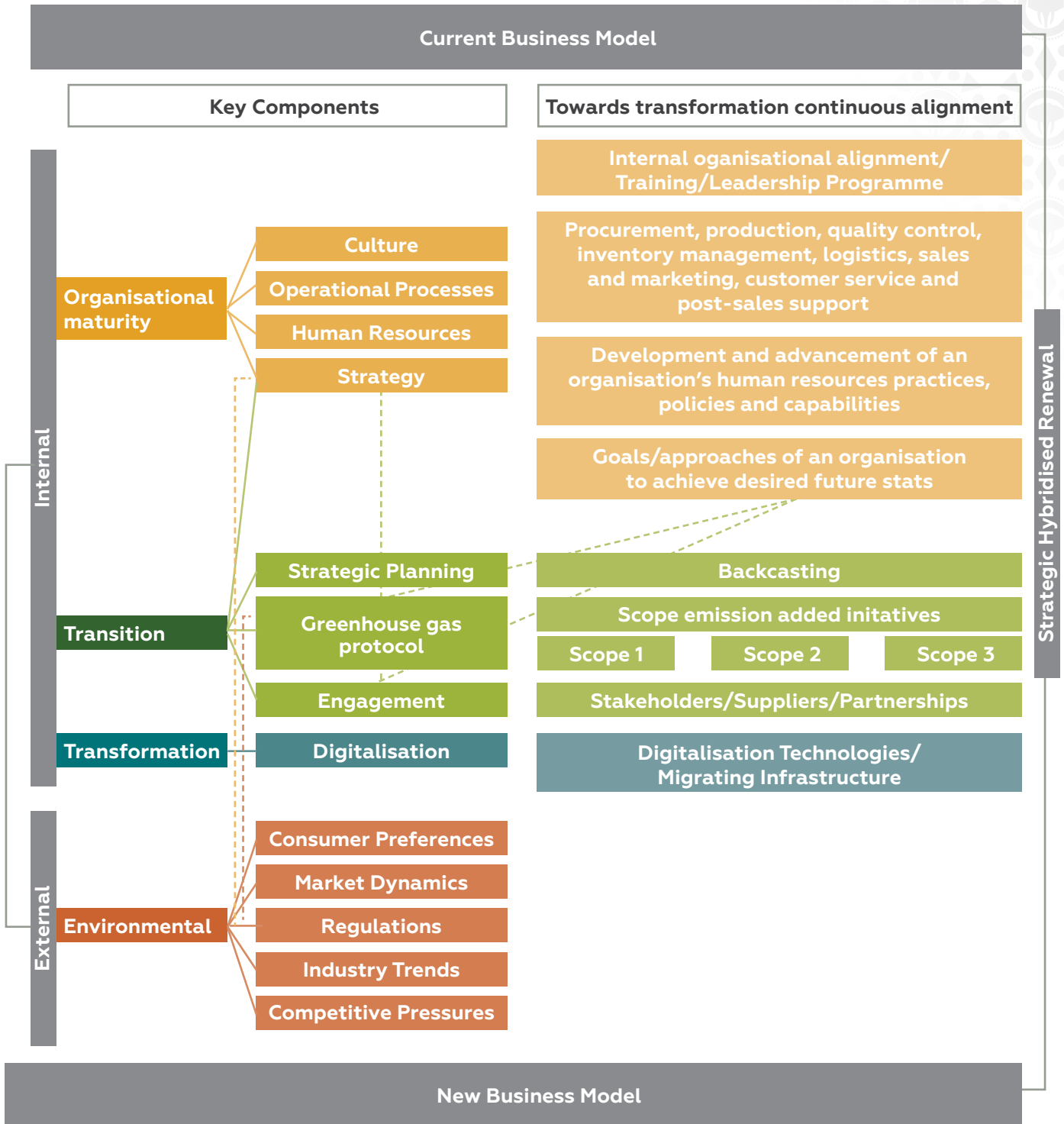


Figure 5: Heuristic generic framework – transformation towards circularity through capabilities and digitalisation
 (Source: Author's illustration)

5.5.1 FRAMEWORK COMPONENTS

An HGF comprises essential internal and external components that may interact in different ways, depending on the business context. The current business model (A) pertains to the established or existing model of an organisation, while the new business model (B) focuses on the envisioned future state encompassing operational, tactical, and strategic dimensions from internal and external perspectives. Strategic hybridised renewal (C) entails the integration of traditional and future approaches, functioning concurrently. The rationale behind this integration is rooted in the fact that international expansion exposes businesses to diverse dynamics, including variations in the external environment across different countries. By retaining certain aspects of the traditional model (A), businesses can maintain adaptability and responsiveness to feedback, market insights, and continuous learning. Consequently, organisations must exhibit proactive behaviour, agility, and a willingness to embrace change to effectively bridge the gap between their business model and their strategic objectives in light of market realities.

Organisational maturity:

This refers to the level of development, capability, and effectiveness of an organisation in various aspects of its operations and functioning. It represents an organisation's ability to achieve its goals, respond to challenges, and adapt to changes in its internal and external environment. *Organisational maturity encompasses multiple dimensions, including strategic planning, operational processes, leadership and management practices, employee skills and capabilities, technological infrastructure, and overall organisational culture.* Organisational maturity is not a fixed state, but rather an evolving process. It requires ongoing efforts to enhance capabilities, develop talent, foster innovation, and adapt to emerging challenges.

Transition:

In certain instances, there is an interplay between transitional components and strategic elements within the context of organisational maturity. These transitional components encompass critical aspects, such as the adoption of backcasting, implementation of greenhouse gas protocol, and stakeholder engagement. Together, these components are crucial steps towards achieving climate positivity and fostering sustainability-orientated initiatives. They involve engaging stakeholders and forging partnerships that align with ethical values centred around sustainability, thereby establishing a solid foundation for driving sustainable practices within organisations. *Viable solutions or guidelines can be found in sections 4.2, 4.3, and 5.4.*

Transformation:

When digitalisation is integrated into the process of transitioning towards circularity, it provides organisations with the means to optimise their operations, improve the efficient use of resources, and facilitate the shift from a linear economic model to a circular one. By leveraging advanced technologies and harnessing the wealth of data generated by organisations, digitalisation plays a pivotal role in enabling a systematic transition towards circular practices. The adoption of digitalisation technologies empowers organisations by enhancing their capabilities and facilitating the implementation of circularity principles.

6. IMPLICATIONS FOR PRACTITIONERS

In the realm of strategic management, the formulation and execution of strategy entail making choices regarding the actions an organisation will undertake as well as those it will abstain from. Crucially, the decision-makers in an organisation must exhibit unwavering dedication to change for transformative initiatives to materialise. This process revolves around the discernment of internal and external shifts, wherein critical judgements are made regarding the desirability, feasibility, and appropriateness of capitalising on emerging opportunities. The successful execution of strategic transformation necessitates astute sensing capabilities to identify pertinent changes and the subsequent determination of suitable courses of action to harness them effectively.

Numerous industries have encountered deficiencies in the adoption of optimal sustainable business practices, while certain organisations have faced challenges in effectively integrating circularity within their existing business models. Therefore, it is imperative to undertake an exploration of the requisite capabilities that enable businesses to successfully transition towards a circular economy. In this context, leveraging technology holds the potential to expedite and enhance the agility of the transformation process. Succinctly stated, the long-term implementation of circular transformation not only holds promise for bolstering a business's financial performance, but also yields substantial global implications, encompassing economic, environmental, and social dimensions.

The empirical findings of this study provide valuable guidance for practitioners seeking to effectuate organisational transformation towards circularity. By offering a comprehensive overview of critical components operating at internal and external levels, this research explains the effective dismantling of significant barriers through the adoption of solutions pertaining to organisational maturity, transitional processes and practices, and transformation technologies. It is important to acknowledge that the absence of appropriate organisational arrangements can undermine the successful implementation of initiatives. Consequently, firms can derive significant value by embracing the key components outlined in this study, thereby leveraging their resources and capabilities along a designated trajectory for transformative change.

This process revolves around the discernment of internal and external shifts, wherein critical judgements are made regarding the desirability, feasibility, and appropriateness of capitalising on emerging opportunities.

REFERENCES

- Barros, M. V., Salvador, R., Prado, G. F. d., Francisco, A. C. d., & Piekarski, C. M. (2021). Circular economy as a driver to sustainable businesses. *Cleaner Environmental Systems*, 2, Article 100006. <https://doi.org/10.1016/j.cesys.2020.100006>
- Cision. (2021, February 2). *Max Burger's plant-based burger crowned winner in the Quality Innovation Award 2020*. <https://news.cision.com/max-burgers/r/max-burger-s-plant-based-burger-crowned-winner-in-the-quality-innovation-award-2020,c3277817>
- Corbin, T. (2022, March 25). Max Burgers adopts PulPac fibre technology coffee lid. *Packaging News*. <https://www.packagingnews.co.uk/news/environment/max-burgers-adopts-pulpac-fibre-technology-coffee-lid-25-03-2022>
- Dellink, R. et al. (2018) *Global Material Resources Outlook to 2060 - OECD, Global Material Resources Outlook to 2060*. Available at: <https://www.oecd.org/environment/waste/highlights-global-material-resources-outlook-to-2060.pdf>.
- Dey, P. K., Malesios, C., Chowdhury, S., Saha, K., Budhwar, P., & De, D. (2022). Adoption of circular economy practices in small and medium-sized enterprises: Evidence from Europe. *International Journal of Production Economics*, 248, Article 108496. <https://doi.org/10.1016/j.ijpe.2022.108496>
- Ekins, P., Domenech, T., Drummond, P., Bleischwitz, R., Hughes, N., & Lotti, L. (2019). *The circular economy: What, why, how and where* (Background paper for an OECD/EC Workshop on 5 July 2019 within the workshop series: Managing environmental and energy transitions for regions and cities). OECD. <https://www.oecd.org/cfe/regionaldevelopment/Ekins-2019-Circular-Economy-What-Why-How-Where.pdf>
- Elf, P., Werner, A., & Black, S. (2022). Advancing the circular economy through dynamic capabilities and extended customer engagement: Insights from small sustainable fashion enterprises in the UK. *Business Strategy and the Environment*, 31(6), 2682–2699. <https://doi.org/10.1002/bse.2999>
- Esensjö, J., & Esensjö, S. P. (2010). *Maximizing human and organizational potential with the human element* (Case study). The Human Element. https://thehumanelement.com/wp-content/uploads/2020/03/T918US_Max_CaseStudy_2016_03.pdf
- Fernandez de Arroyabe, J. C., Arranz, N., Schumann, M., & Arroyabe, M. F. (2021). The development of CE business models in firms: The role of circular economy capabilities. *Technovation*, 106, Article 102292. <https://doi.org/10.1016/j.technovation.2021.102292>
- Gandolfo, A., & Lupi, L. (2021). Circular economy, the transition of an incumbent focal firm: How to successfully reconcile environmental and economic sustainability? *Business Strategy and the Environment*, 30(7), 3297–3308. <https://doi.org/10.1002/bse.2803>
- Ghobakhloo, M., & Fathi, M. (2021). Industry 4.0 and opportunities for energy sustainability. *Journal of Cleaner Production*, 295, Article 126427. <https://doi.org/10.1016/j.jclepro.2021.126427>
- Indhul, S. (2022). Towards a constructor theory conception for wicked social externalities: Delineating the limits and possibilities of impactful pathways to a better world. In A. Thakhathi (Ed.), *Transcendent development: The ethics of universal dignity*. Vol. 25: *Research in Ethical Issues in Organizations* (pp. 43–52). Emerald Publishing. <https://doi.org/10.1108/s1529-209620220000025004>
- Jensen, H. H. (2022, January 27). *5 circular economy business models that offer a competitive advantage*. World Economic Forum. <https://www.weforum.org/agenda/2022/01/5-circular-economy-business-models-competitive-advantage/>
- Lo, E. (2020, November 5). Adapting business to a circular economy. *Ecovadis*. <https://resources.ecovadis.com/blog/adapting-business-to-a-circular-economy>
- Max Burgers. (n.d.). *Taste test winner*. <https://www.maxburgers.com/products/taste-a-winner/>

- Max Burgers. (2019, November 12). *Award winner Max wants to inspire companies to become climate positive* [Press release]. <https://www.maxburgers.com/about-max/news/news-and-press-releases/max-received-global-climate-action-award-/#:~:text=MAX%20Burgers%20received%20%E2%80%9CGlobal%20Climate,UN%20Global%20Climate%20Action%20Awards>
- Max Burgers. (2021, February 2). *Max Burger's plant-based burger crowned winner in the Quality Innovation Award 2020* [Press release]. <https://www.maxburgers.com/about-max/news/news-and-press-releases/max-burgers-plant-based-burger-crowned-winner-in-the-quality-innovation-award-2020/>
- Max Burgers. (2022). *Sustainability report 2021*. <https://www.maxburgers.com/globalassets/download-files/se/sustainability-report-2022-web.pdf>
- Mbow, C. M., Rosenzweig, C., Barioni, L. G., Benton, T. G., Herrero, M., Krishnapillai, M., Liwenga, E., Pradhan, P., Rivera-Ferre, M. G., Sapkota, T., Tubiello, F. N., & Xu, Y. (2019). Chapter 5: Food security. In V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, E. C. Buendía, P. R. Shukla, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. P. Pereira, P. Vyas, E. Huntley, ... J. Malley (Eds.), *Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* (pp. 437-550). Cambridge University Press. <https://doi.org/10.1017/9781009157988.007>
- McCracken, H. (2023, 21 June). *In praise of moderators, the internet's secret superheroes*. Fast Company. <https://www.fastcompany.com/1738541/10-most-innovative-companies-food>
- OECD (2019), *Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264307452-en>.
- Padilla-Rivera, A., Russo-Garrido, S., & Merveille, N. (2020). Addressing the social aspects of a circular economy: A systematic literature review. *Sustainability*, 12(19), Article 7912. <https://doi.org/10.3390/su12197912>
- Pyreg. (2021, January 24). Sweden: Max Burgers turns waste into biochar and saves the climate. <https://pyreg.com/max-burgers-turns-waste-into-biochar/#:~:text=Turning%20waste%20into%20biochar%20and,with%20a%20PYREG%20Industrial%20Unit.>
- Statista. (2021). *Profit of Max Burgers AB from 2012 to 2019 (in million SEK)*. <https://www.statista.com/statistics/1090001/profit-of-max-burgers/>
- United Nations Framework Convention on Climate Change. (2019). *Max Burgers: Creating the world's first "climate positive" menu | Sweden, Norway, Denmark, Poland*. <https://unfccc.int/climate-action/momentum-for-change/climate-neutral-now/max-burgers#:~:text=Key%20Facts,and%20adopting%2092%25%20renewable%20packaging.>
- Steffen, W., Richardson, K., Rockström J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., de Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers, B., & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), 736–736. <https://doi.org/10.1126/science.1259855>
- Sustainable Brands. (2017, October 31). *SB'17 Copenhagen, Day 1: Redefining the good life through brands, B corps, burgers and ... poetry?* <https://sustainablebrands.com/read/walking-the-talk/sb7-copenhagen-day-redefining-the-good-life-through-brands-b-corps-burgers-and-poetry>
- Watson, A. (2018, June 4). *The world's first climate-positive burgers: Max Burgers now help fight climate change*. Sustainable Brands. <https://sustainablebrands.com/read/walking-the-talk/the-world-s-first-climate-positive-burgers-max-burgers-now-help-fight-climate-change>



APPENDIX A

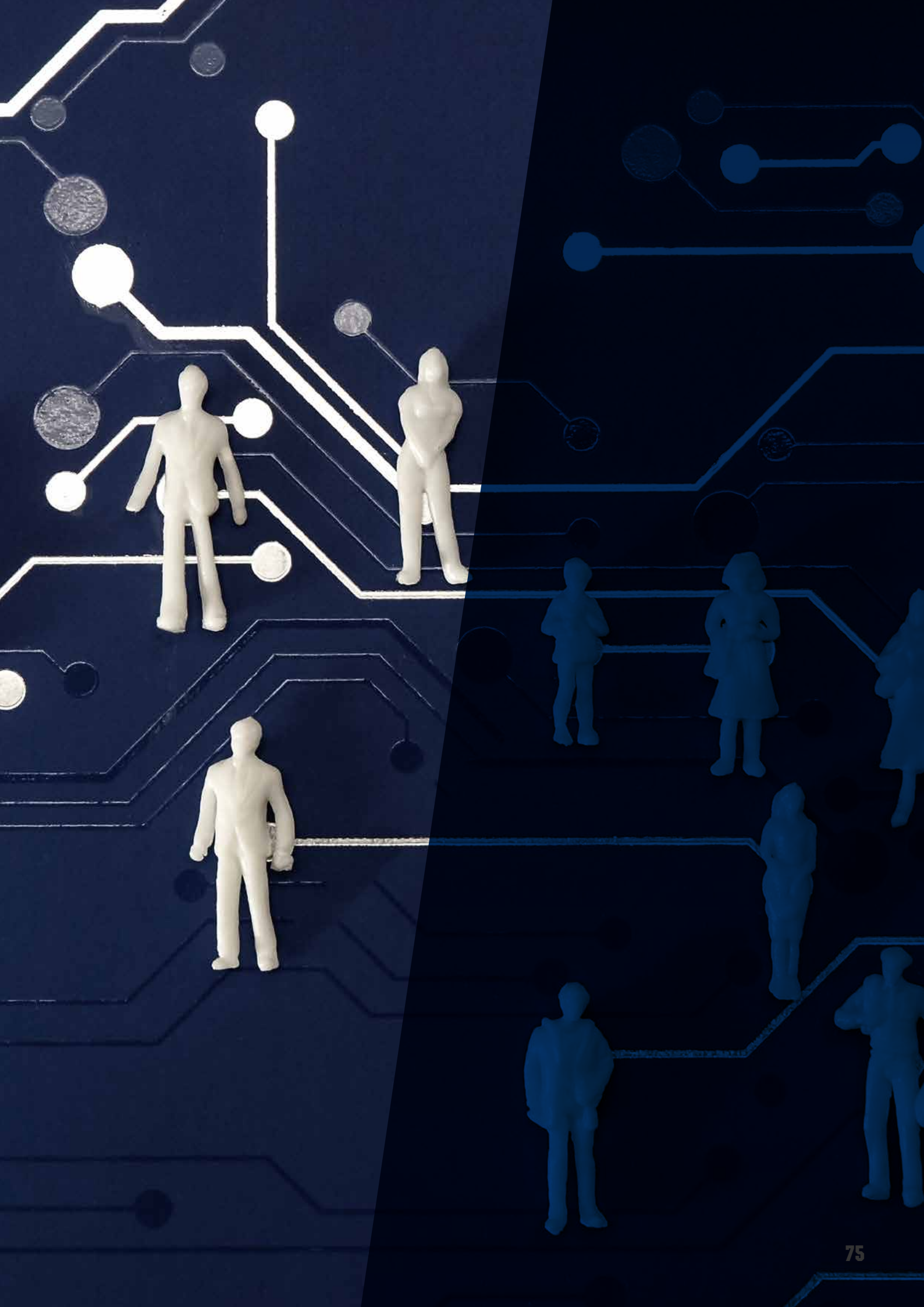
Source description	Day and month	Year	Title
Pyreg	24 January	2021	<i>Sweden: Max Burgers turns waste into biochar and saves the climate</i>
Bipiz, an international database	31 January	2020	<i>Max Burgers, fast food has a positive environmental footprint</i>
The Natural Step	3 June	2015	The Natural Step Max Hamburgers case study
TEDx Talks	21 April	2011	TEDxPresidio – Par Larsens – sustainable hamburgers [Video]
GreenCo ESG Consultants	June	2021	Climate-positive burgers – Max Burgers (Sweden)
United Nations Framework Convention on Climate Change		2019	Max Burgers: Creating the world's first "climate positive" menu Sweden, Norway, Denmark, Poland
Alison Watson via Sustainable Brands	4 June	2018	<i>The world's first climate-positive burgers: Max Burgers now help fight climate change</i>
Sustainable Brands	31 October	2017	<i>SB'17 Copenhagen, Day 1: Redefining the good life through brands, B corps, burgers and ... poetry?</i>
Tony Corbin via <i>Packaging News</i>	25 March	2022	Max Burgers adopts PulPac fibre technology coffee lid
Innovations in Food Technology	30 March	2022	<i>Innovative coffee lid made with PulPac's dry molded fiber technology in Swedish fast food chain Max Burgers</i>
TheSchutzCompany	19 March	2012	<i>De geschiedenis van The Human Element: De ontwikkeling van FIRO® [Video]</i>
Geoff Nudelman via Sustainable Brands	26 January	2022	<i>Is there a secret recipe for successful consumer climate communication?</i>
Sustainable Brands	20 June	2018	<i>Max Burgers' new green burger emojis bite into debate, highlight climate smart food options</i>
Ilona Marx via <i>Ktchn Rebel</i>	Jan	2020	Home of the climate-positive burger

Source description	Day and month	Year	Title
Verdict Food Service	17 September	2021	Max Burgers to improve customer experiences with mParticle
Rob Preston via <i>Forbes</i>	5 May	2016	How Max Burgers is becoming Sweden's latest breakout star
Eeva Haaramo via <i>Computer Weekly</i>	13 June	2016	Nordic CIO interview: Johnny Bröms, Swedish fast-food chain Max Burger
Tim Brown via <i>Oracle Food and Beverage Blog</i>	22 May	2020	Max Burgers keeps business open with omnichannel ordering
Amanda Peters via <i>Global Franchise</i>	18 March	2020	Franchise watch: The world's first climate positive burger franchise
World Forum for Responsible Economy: Press review - The World Forum's Blog - World Forum Reporter			13A – Climate: Managerial Courage to Tackle Environmental Issues - Face to face with Kaj Török
Anna Wolfe via <i>Hospitality Technology</i>	24 July	2022	<i>How one burger chain removed friction from the pickup experience</i>
Eilie Anzilotti via <i>Fast Company</i>	6 June	2018	<i>If you're going to eat meat, try this "climate positive" burger</i>
All ears AI via <i>Medium</i>	7 May	2018	<i>Swedish burger chain Max leads the way in monitoring influencers online</i>
<i>Forbes</i>	5 May	2016	How Max Burgers Is Becoming Sweden's Latest Breakout Star
<i>Computerweekly.com</i>	13 June	2016	Nordic CIO interview: Johnny Bröms, Swedish fast-food chain Max Burger
SOCAP global	11 May	2012	<i>The new era of sustainable business, powered by the human element [Video]</i>

Table A1

Sources Utilised: Circularity and Digitalisation Research at Max Burgers







**Gordon
Institute
of Business
Science**

Centre for African
Management
and Markets