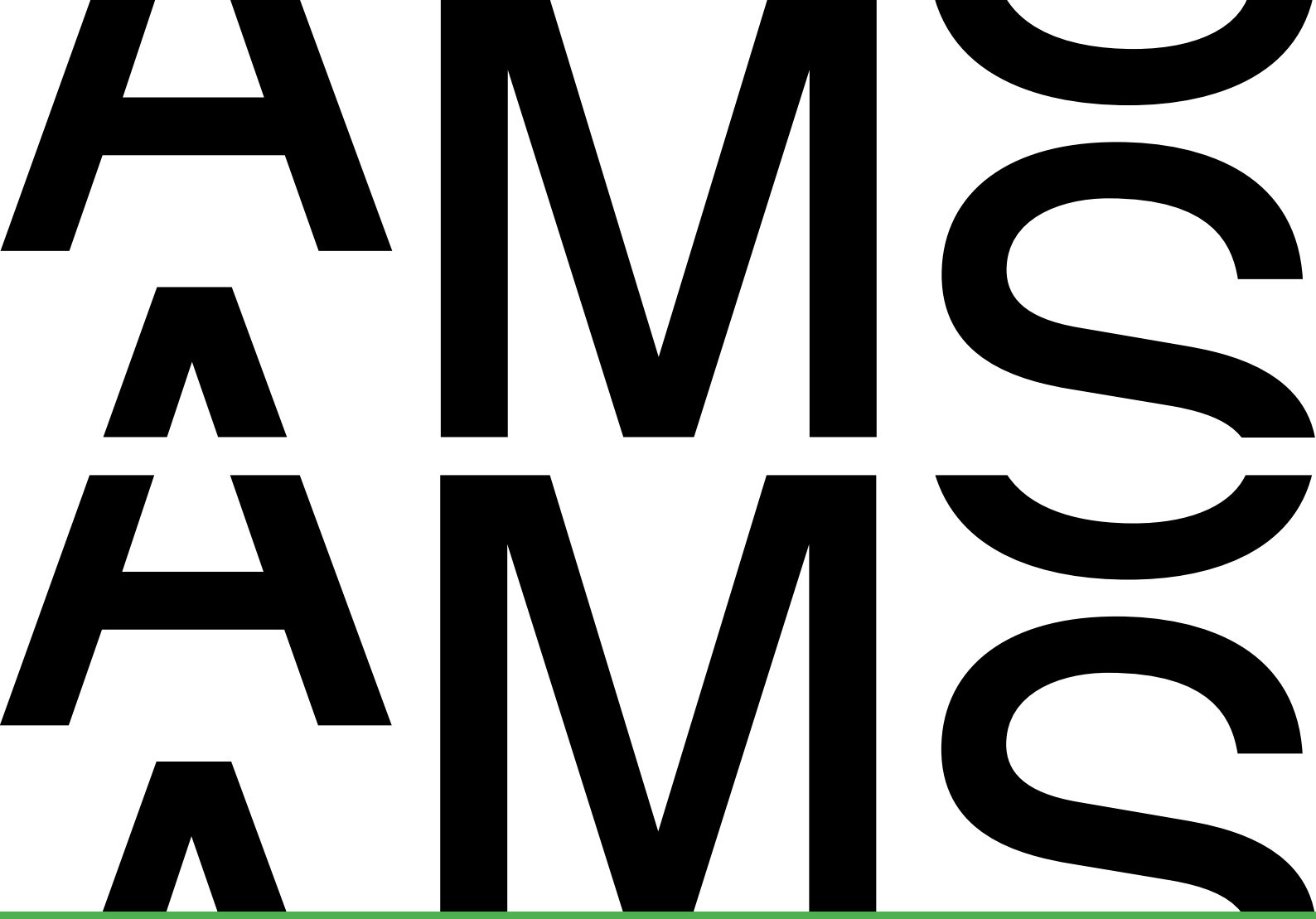

Sustainable Supply Chains

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Executive Summary

In this white paper we take a detailed look at the topic of responsible, circular, and sustainable supply chains. This includes trends in global supply chains, the switch from linear to circular economy, and explore how nature positive and socially responsible supply chains enhance the overall sustainability.

As the global economy becomes more connected and multinational supply chains become more complex, it is key to understand their impact on society and the environment. We need system change on various levels, which will require widely coordinated action. And for these large-scale initiatives we need a whole new vision of value chains that is as comprehensive as the challenges we face.

The global economy's circularity has declined despite the increasing importance of sustainable development, underscoring the need for widespread adoption of circular practices by companies and employees. Progress towards a circular global economy can be driven by factors such as heightened awareness of the planetary crisis, supportive legislation and policies, successful circular showcases by companies, consumer behavioural change, and comprehensive education and training.

Transforming the supply chain to embrace circularity requires procurement professionals to consider environmental and social criteria alongside cost savings, utilize sustainability evaluation tools, and foster innovation awareness. Strategies should prioritize services, adopt a lifetime cost perspective, and establish appropriate key performance indicators (KPIs).

Responsible supply chains necessitate collaboration, transparency, and accountability among stakeholders, with a focus on biodiversity loss, climate change, water footprints, fair labour practices, and community engagement. Transparency is crucial in supply chains, requiring risk assessment, data collection, supplier engagement, and disclosure of practices.

Introduction

The global supply chain is a complex network of producers, manufacturers, distributors, and retailers that spans the globe. The sustainability of this system is critical for ensuring the long-term health and prosperity of both the planet and its inhabitants. Unfortunately, the global supply chain is currently facing several significant sustainability challenges.

One of the biggest of these is the environmental impact of transportation, which is responsible for about 23% of global CO2 emissions (Statista, 2021). To address this challenge, companies are turning to more sustainable transportation options such as electric vehicles, rail, and sea-going vessels powered by alternative fuels.

Another significant challenge facing the global supply chain is the use of disposable packaging. Single-use packaging, such as plastic bags and bottles, contribute to pollution and waste in our oceans and threaten biodiversity. According to the United Nations, an estimated 8-10 million tons of plastic enters the oceans each year (UN, 2022). A such, companies are turning to more sustainable packaging options such as biodegradable plastics and reusable packaging.

Finally, labour practices in the global supply chain are a major concern. According to the International Labour Organization, an estimated 28 million people are victims of forced labour worldwide (ILO, 2022). To address this challenge, companies are implementing more rigorous labour standards and monitoring programs, and are increasingly turning to fair trade and other certification programs to ensure that their products are produced in a sustainable and ethical manner.

A sustainable supply chain is one that incorporates environmental, social, and economic factors into its operations to minimize negative impacts and maximize positive outcomes. This approach is becoming increasingly important as businesses are facing growing pressure to reduce their environmental footprint and take responsibility for labour conditions. Supply chain disruptions keep growing. Therefore, sustainable supply chains should be agile, resilient, and responsible (Fearne, 2012).

Disruptive events, such as COVID-19, extreme weather, or the Suez Canal blockage, have exposed vulnerabilities in traditional supply chains, leading to shortages of essential goods and making it essential to have a resilient and adaptable supply chain. The supply chain becomes increasingly strategic in a society that strives towards a sustainable economy. Regulatory demands force businesses to conduct due diligence and demonstrate transparency, and consumer expectations for social and sustainable practices are increasing.

> **"Supply chains cannot tolerate even 24 hours of disruption. So, if you lose your place in the supply chain because of wild behaviour you could lose a lot."**
> — Thomas Friedman

As a result, many businesses are recognizing the importance of sustainable supply chains and are taking steps towards transforming their operations. This transformation includes adopting sustainable practices, such as reducing carbon emissions, sourcing sustainable materials, and ensuring ethical labour practices. These efforts not only contribute to sustainability of supply chains but can also lead to cost savings and increased efficiency. By prioritizing sustainability and taking proactive steps towards transformation, businesses can mitigate risks, increase resiliency, and contribute to a more sustainable future to thrive in the long term.

In the first section of this whitepaper, we discuss a broader perspective on supply chains within a circular economy (CE). In section two, we explore the link between the circularity and changing procurement. In section three, we dive deeper into responsible supply chains both from a nature positive and social perspective

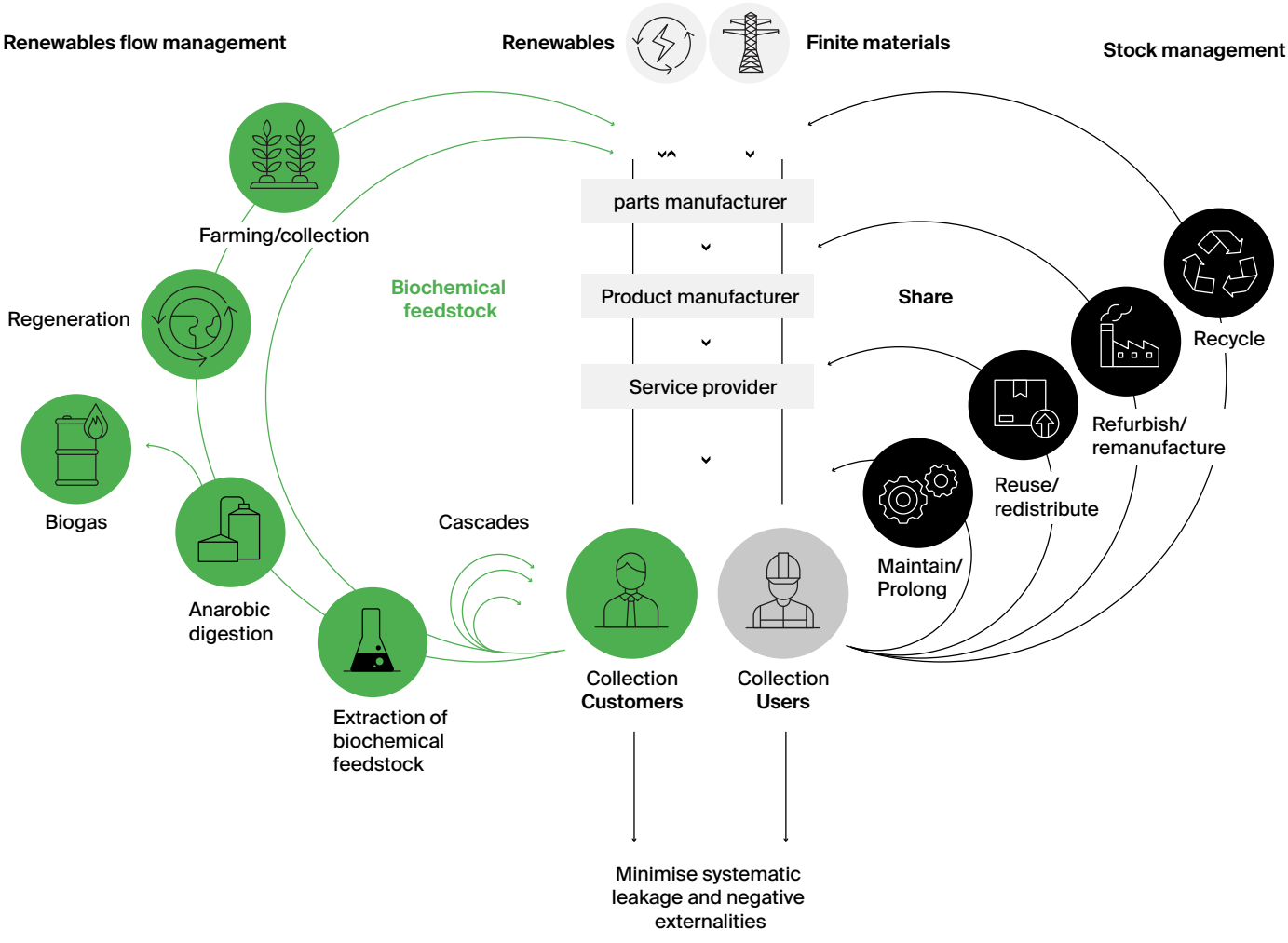
1 The Circular Economy

The European Commission's Circular Economy Action Plan defines the CE as an economy where the value of products, materials and resources are maintained for as long as possible, and the generation of waste is minimised (EU, 2018). This applies to businesses as well, where organisational change is needed to ensure more sustainable and responsible strategies, processes, and products or services (EU, 2018). According to the Ellen MacArthur Foundation, circularity is based on three principles, driven by design (EMF, 2019):

→ Eliminate waste and pollution
→ Circulate products and materials - at their highest value
→ Regenerate nature

Consequently, to keep products and materials in circulation, two fundamental cycles can be envisioned: the technical and the biological cycle, as depicted in Figure 1. This incorporates the 9 R-principles: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle and Recover (Potting et al., 2017).

FIGURE 1: **LEFT - THE BIOLOGICAL CYCLE; RIGHT - THE TECHNICAL CYCLE (EMF, 2019)**



Unfortunately, even after several years of increasing popularity of circular economy and an overall increase of the sense of urgency for sustainable development, the 2023 Circularity Gap Report, shows that our global economy decreased in circularity from 9.1% (2018), to 8.6% (2020), to 7.2% in 2023(Deloitte, 2023). The big challenge is to create a critical mass of companies and of employees to start working in more circular ways. According to Noah Schaul, who provides game-based Circularity learning solutions, the following trends could put us on an upward trend towards an increasingly circular global economy (Inchainge, 2022):

1 Natural disasters are becoming more widespread globally. In particular, the environmental crisis is becoming increasingly visible in industrial economies (e.g., American fires, European heatwaves, Australian flood). Professionals and hence companies are realizing that this is no longer just an environmental crisis, but a planetary or human-survival crisis, which could create a mutual understanding of the urgency for sustainable action.

2 Legislation is pushing companies to the extent that those that have been doing the minimum are starting to realize that they are behind the curve. The European Green Deal has brought many policies and directives to life. With the Corporate Sustainability Reporting Directive (CSRD), which entered into force in 2023, the pressure is mounting even more. This will increase access to information, improve transparency, reduce reporting costs, and encourage strategies for both short- and long-term horizons.

3 Companies that have launched successful circular products, operations, or value chains, are inspiring others to follow their lead, or even pushing competition to go in the same direction. An example is Apple, which has been quiet for many years on this topic, but now has implemented the refusal of some toxic materials, a buyback program, and a second-hand sales channel, as well as introducing tailormade robots to disassemble products and recycle materials. This more circular value chain lowered Apple's commodity risk during the recent rise in raw material prices and material scarcity. Other proactive companies include Patagonia, Bosch Siemens Home Appliances, and Fairphone.

4 Behavioural changes are occurring in the consumer landscape. Increasingly, customers are thinking twice before buying something new, repairing broken products, embracing more minimalist lifestyles, or returning products for recycling. This makes a valuable contribution to change, as it prompts companies to adapt to shifting societal norms. Education plays a key role here too.

5 Training for professionals and companies, as well as education for upcoming generations of decisions makers, is helping to drive the circular transition. The world is changing fast, and innovative solutions are needed to solve problems that did not exist a few years ago (or we were not aware of – or too ignorant to see), so the right set of state-of-the-art education and training is required to make sure companies and professionals work on the right things in the right way.

"The secret of getting ahead is getting started" — Mark Twain

2 Circular Supply Chains

The classical supply chain refers to a traditional linear model of production and consumption, incorporating upstream economic activities (sourcing, production, and procurement), and downstream activities (sales and use or consumption). This model does not consider externalities such as social and environmental impacts, regulatory demands, or future disruptions. It is a short-term, profit-driven approach that ignores the long-term sustainability of the business.

On the other hand, futureproofing the supply chain entails a shift toward a circular economy. Since raw material prices are volatile, non-virgin resource streams become progressively more interesting. The circular economy focuses on reducing resource consumption and waste by designing products for reuse and recycling. A futureproof circular supply chain includes decoupling economic growth from resource use, which ensures business efficiency when virgin resources are less available.

However, establishing a circular supply chain requires fundamental changes that entail vast amounts of planning and coordination, reducing the focus on resource consumption, and including services that promote circularity, such as maintenance, repair, refurbishment, and remanufacturing. As a result, the role of procurement is changing, especially when it comes to selling materials for circular and responsible products.

The process of supplier selection and supplier relationships is evolving to include criteria relating to environmental and social footprints, alongside total cost of ownership (TCO) savings. Procurement professionals now need to have 'material literacy' and innovation awareness, in addition to supply market knowledge. It is also crucial to integrate tools that can measure and track the right key performance indicators (KPIs) to ensure that environmental and social considerations are properly addressed.

To assess the sustainability of products and technologies as well as to compare alternatives, life cycle assessment (LCA) is a widely used method. LCA evaluates the environmental impacts of products and processes throughout their life cycles, from raw material exploitation to end-of-life and disposal (Guinee et al., 2011).

The introduction of additional tools can also widen the view including social and economic considerations. One example that is already incorporated in EU policy is the Product Environmental Footprint (PEF) guide for measuring the environmental performance of a product throughout its life cycle. This guide can help procurement professionals select suppliers based on their environmental performance, ensuring that circular products are truly sustainable. However, the PEF has proven to be ineffective in producing comparable results across different sectors. Additionally, it has demonstrated compatibility challenges with the Environmental Product Declaration system and the European Ecolabel (Bach et al., 2018; Durão et al., 2020).

The changing role of sales is also affected by the move towards circular and responsible products. Go-to-market strategies and customer relationships must change to reflect the new economic mindset. Revenue is no longer generated solely from single-sale points, but from a total lifetime cost perspective. In addition, sales professionals must be prepared to shift from product sales to service sales, including maintenance and insurance offerings. To ensure success in this new system, the right KPIs must be set to reach sales targets. Sales professionals must also be able to incorporate delayed revenue through a rental or lease model, and separate cost calculations for maintenance must be included next to standard product sales price setting. By offering maintenance contracts and measuring revenue from them, sales professionals can generate more revenue and ensure customer satisfaction.

3 Responsible Supply chains

Responsible sourcing of (raw) materials represents a paradigm shift in the way we extract and utilize Earth's resources. By considering environmental, social, and economic factors, responsible sourcing practices aim to minimize negative impacts, protect human rights, and promote sustainable development. It requires collaboration among governments, industries, and civil society to establish frameworks, standards, and certifications that enable transparent and accountable supply chains. Only through the adoption of responsible sourcing practices can we ensure a more sustainable and just future for both current and future generations. In this section we want to elaborate on responsible sourcing to reduce environmental and social risk exposure as well as to enhance reputation.

Nature positive supply chains

Nature is in crisis, placing human and planetary health at risk. This decade ought to be the turning point where we apprehend the value of nature, while transforming our world into a place where people, economies and nature thrive. One of the fundamental pillars of responsible sourcing is environmental stewardship. Raw material extraction often involves activities such as mining, deforestation, and intensive agriculture, which can lead to habitat destruction, soil degradation, and pollution. Responsible sourcing seeks to mitigate these impacts through the implementation of sustainable practices, such as land restoration, biodiversity conservation, and the use of cleaner technologies. It emphasizes the adoption of circular economy principles, which aim to minimize waste, promote resource efficiency, and encourage recycling and reuse.

According to the World Economic Forum, a nature positive approach enhances the resilience of our planet and our societies (WEF, 2021). This approach enriches biodiversity, stores carbon, guarantees water and reduces pandemic risk. Moreover, the planetary boundaries or ecological ceilings for climate change, biodiversity loss, and land conversion have already been exceeded (Raworth, 2017). In what follows, we will dig deeper in the topics of biodiversity loss, carbon emissions, and water footprints along the supply chain.

1. Biodiversity

Research published concluded that more than 40% of all insect species are in decline and could die out (Sánchez-Bayo & Wyckhuys, 2019). While vertebrate populations have fallen by almost 70% since 1970 (WWF, 2022). Visser (2022) states that it took only 50 years to destroy millions of years of evolution. Three socio-economic systems, together with climate change, account for about 80% of threatened species, namely: our food system (agriculture, fisheries, etc.), infrastructure and the built environment, and energy provision.

In December 2022, the United Nations Biodiversity Conference (COP15) reached a landmark agreement to guide global action on nature through to 2030. Among other targets, 30% of Earth's lands, oceans, coastal areas, inland waters should be protected whilst reducing annual harmful government subsidies by $500 billion and cutting food waste in half.

Biodiversity is difficult to measure but conducting a biodiversity impact assessment is a good place to start. A small survey amongst about 20 European companies showed that onsite assessments are effective in assessing local biodiversity loss. Accounting for biodiversity loss along the value chain can benefit from measurement techniques like land use change, or the Potentially Affected/Disappeared Fraction of Species or Species Threat Abatement and Recovery (STAR) metric from IUCN. Although biodiversity loss has global implications, habitats vary locally. Hence, unlike carbon emissions, biodiversity offsetting is more difficult to justify and implement.

2. Water footprint

Globally, freshwater ecosystems are under stress from a variety of factors, including pollution, deforestation, and climate change. However, we rely on them for our food and drinking water, and they also protect us from climatic changes. According to Belgian Water NGO, Join For Water, "wet nature", such as swamps and wetlands, disappears three times faster than forest areas (JoinForWater, 2022). At the same time, people in Belgium use an average of 7400 litres of water per day. This includes one hundred litres of tap water and 7300 litres of water used to produce their food and consumer goods. As such, Belgians use twice as much water as the average world citizen while about two billion people do not have access to safe drinking water. This indirect consumption comes at the expense of water resources elsewhere in the world.

A water footprint is an important concept in the supply chain that refers to the amount of water used by a company or organization to produce goods or services. It includes the water used directly in production processes as well as the water used indirectly in the supply chain, such as for growing crops or producing raw materials. Understanding and managing water footprints in the supply chain is becoming increasingly important as water scarcity and pollution become more pressing global issues. It can help companies identify water risks and opportunities, improve water efficiency, reduce costs, and enhance their sustainability performance.

How to manage water footprints?

- **Measure and assess water use across the entire supply chain**
- **Develop water stewardship and targets**
- **Implement water-efficient technologies and practices in their operations**
- **Encouraging suppliers to adopt water-efficient practices and technologies**
- **Work with stakeholders to address water-related risks and opportunities**
- **Engage in collaborative initiatives to improve water management and governance at the local, regional, and global levels**

3. Climate

The Paris Agreement is a legally binding global agreement aimed at addressing climate change and limiting global warming to well below 2°C, and aiming to stay below 1.5°C, above pre-industrial levels. The agreement includes a goal of reaching net-zero emissions by 2050, which requires significant reductions in emissions across all sectors. Scope 1 emissions are direct greenhouse gas (GHG) emissions that occur from sources that are owned or controlled by a company. This can include emissions from burning fossil fuels in boilers or vehicles, or from chemical reactions that occur during manufacturing processes.

Scope 2 emissions are indirect GHG emissions that result from the generation of purchased electricity, heat, or steam. These emissions are generated from sources that are not owned or controlled by the company but are purchased by the company for its operations. For example, if a company purchases electricity from a power plant that generates electricity using fossil fuels, the resulting GHG emissions from the power plant's operations would be considered Scope 2 emissions for the company.

Scope 3 emissions refer to greenhouse gas emissions that occur in the supply chain of a company, including the production and transportation of goods and services by suppliers. These emissions are often the most significant source of emissions for many companies, and they can be challenging to measure and mitigate, as they occur outside of a company's direct control. To achieve this goal, companies must address Scope 3 emissions in their supply chains. This includes setting targets for reducing emissions, collaborating with suppliers to implement sustainable practices, and engaging with stakeholders to promote sustainable practices throughout the supply chain.

The Paris Agreement also includes mechanisms to support the reduction of emissions in the supply chain. For example, the agreement calls for the development of market-based mechanisms, such as carbon pricing, to incentivize companies to reduce their emissions. Additionally, the agreement encourages the sharing of best practices and technology to support sustainable practices throughout the supply chain

Case study transportation in and towards cities:
the most sustainable mile is the mile not driven
Prof. Alex Van Breedam

The transportation sector accounts for about 23% of global CO2 emissions, and concerns remain that emissions will not decrease due to the strong link between transport growth, economic expansion, and fossil fuel vehicles. Efforts to accelerate the reduction of transport emissions have been unsuccessful so far. Three approaches can help reduce transport emissions: greening, modal shifts, and avoidance.

Greening transport is a focus in many urban areas, with low or zero emission zones being established and plans to ban petrol and diesel vehicles. Last-mile operators are shifting to cargo bikes and electric vans, reducing emissions but not overall transport movement. This modal shift has only an effect on the reduction of emissions, but not the reduction of the transport movement in the city. However, the higher cost of electric vans hinders rapid electrification, as last-mile operators lack investment power and customers are unwilling to pay more for emission-free deliveries. Transport avoidance, or doing more with less, is essential. Approximately one in four trucks drive empty, and the average fill rate is only 57% (WEF, 2023), resulting in duplication, inefficiency, and congestion. Collaborative solutions are challenging because they require volume exchange, consolidation, and infrastructure accessibility for all operators. Open-access urban consolidation points can achieve beneficial consolidation effects.

City authorities must be involved to ensure direct access and determine locations and governance rules. Stakeholder engagement with last-mile operators, delivery organizations, and point-of-sale establishments is crucial for improving city liveability, and logistics sustainability. Innovative examples include open micro-hub networks with lockers and the appointment of preferred last-mile operators through public tendering. Collaboration at the city level serves as a proving ground for sustainable transport, and this approach can be scaled up for the entire sector to adopt new revenue models necessary for sustainability acceleration.

Socially responsible supply chains

Social considerations are another crucial aspect of responsible sourcing. Many regions that host valuable raw material deposits are often characterized by vulnerable communities, Indigenous populations, and marginalized groups. Irresponsible sourcing practices can lead to human rights abuses, including child labour, unsafe working conditions, and displacement of communities. Responsible sourcing emphasizes fair labour practices, community engagement, and the protection of human rights throughout the supply chain. It encourages transparency and accountability, ensuring that workers are treated ethically and that local communities benefit from the extraction activities.

Transparency

The importance of transparent supply chains is gaining traction among mid- and senior-level managers (Bateman, 2019). Companies are feeling pressure from governments, consumers, NGOs, and other stakeholders to disclose more information about their value chains, and the reputational value of failing to meet these demands can be high.

Three approaches to transparency in businesses supply chains are highlighted Dr Ravuri, Head of Sustainability at FrieslandCampina:

→ **Association:** Assigning unique self-sovereign IDs that recognize and map people in the supply/value chain
→ **Awareness**: Making a claim of transparency from producers to consumers e.g., "we know where it comes from"
→ **Action**: Making a qualified claim that a value chain is sustainable in ESG terms e.g., "we manage our environmental impacts and do not use forced labour"

> **"Sustainable supply chains are not just about managing and mitigating risk exposure or the cost of hidden externalities, but more about advancing opportunities to collaborate and forge long-term partnerships to create shared value."** — Dr Kishore Ravuri

According to an article published in Harvard Business Review, the following 5 steps can be taken to initiate this journey (Bateman, 2019). These steps should be considered continuously as supply chains are dynamic.

→ Assess risks, define materiality, and set goals
→ Visualize the supply chain
→ Collect actionable information and verify practices
→ Engage supplier contact and collaboration, monitoring, and support
→ Disclose

Case study: transparency in the coffee value chain using IDs

The Bluenumber Foundation generates free B#IDs and governs the ethical use of this data, thereby promoting the responsible use of digital identity by governments, companies, and communities.

Imagine Emily. Emily is a coffee retailer. She only sells ethical and sustainable coffee, which is traced to farmers with good practices, who are paid fair prices, and are free of child labour. Her B#ID shows all her suppliers. She gets direct stakeholder feedback. She can survey suppliers and customers directly, who can thank and tip growers directly from their own B#IDs.

Lakshmi farms coffee. She uses her B#ID to work with B#Partners to buy farm supplies, check the weather forecast, and get tips on how to be more sustainable and successful farmer. She also gets market information through B# enabled partner application for fair prices.

Jess studies climate impacts. She uses B# analytics to secure farm data for her climate research and identify vulnerabilities of her cooperative partners to climate change. She asks Lakshmi questions directly and pays her for her data as well as raises awareness.

Yau is a conscious consumer. He values ethical sourcing. He creates his own B#ID using a QR code on his coffee packaging and the local coffee shop. He sends a thank you tip directly to Lakshmi's co-op. Yau also wants to support brands that prove how they help farmers earn a living income, do not use forced labour, and preserve the environment. He can easily track Emily, Lakshmi, and Jess. He does not have to rely on just the brand label as they all have Blue IDs.

"...The Business Principles equally apply, and Randstad encourages a continued active dialogue with stakeholders in the world of work. We treat others fairly, act with care, consideration, and respect human rights. We do not tolerate intimidation or harassment in any form. We value diversity and inclusion. We are committed to equal opportunities and do not discriminate."
— Randstad

Fairness & inclusivity

Fairness is all about acknowledging that everyone has rights and responsibilities, whereas inclusion means respecting the differences in values, skill sets, and work ethics. Both are essential in ensuring the effectiveness of collective bargaining agreements, freedom of movement, zero exploitation, non-discrimination, and diversity. Value is created from improved health and safety coverage, upskilling and reskilling, shared responsibilities, cocreation and symbiotic growth.

"Diversity is a fact; inclusion is an act" — Zabeen Hirji

How to ensure fairness and inclusivity for internal and external procedures and practices?

Ask the following questions:

- **Are supplier relationships fair and inclusive in the context of terms of engagement and shared value creation?**
- **Are the supply chain policies and processes inclusive and equitable for distinct categories of suppliers?**
- **Do suppliers have a collective understanding of relevant dimensions of fairness and inclusion?**
- **Is the understanding aligned across different markets and different business segments?**
- **Is there a strong motivation to operationalize fair and inclusive supply chain policies?**

"...We want to partner with our suppliers to further develop their sustainability performance in our supply chain. Our Supplier Code of Conduct includes our expectations to suppliers in terms of their Environmental, Social and Governance performance." — BASF

Conclusion

In conclusion, this white paper has provided a comprehensive examination of responsible, circular, and sustainable supply chains, emphasizing the need for system change, and coordinated action to address the environmental and social impacts of global supply chains. As the world becomes more interconnected and supply chains grow increasingly complex, it is crucial to understand their effects on society and the environment.

The decline in the global economy's circularity highlights the urgency for widespread adoption of circular practices by companies and individuals. This transformation can be facilitated by heightened awareness of the planetary crisis, supportive legislation, successful circular showcases, consumer behavioural change, and comprehensive education and training. Procurement professionals play a pivotal role in driving circularity by considering environmental and social factors alongside cost savings, utilizing sustainability evaluation tools, and fostering innovation.

Responsible supply chains require collaboration, transparency, and accountability among stakeholders, focusing on areas such as biodiversity loss, climate change, water footprints, fair labour practices, and community engagement. Transparency in supply chains is essential, necessitating risk assessment, data collection, supplier engagement, and disclosure of practices.

To create a future that prioritizes responsible, circular, and sustainable supply chains, it is crucial for organizations, governments, and stakeholders to embrace the interconnected nature of our economic, social, and environmental systems and work together to drive meaningful change. Only through collective action can we create a comprehensive vision of value chains that addresses the challenges we face and paves the way for a more sustainable future.

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