

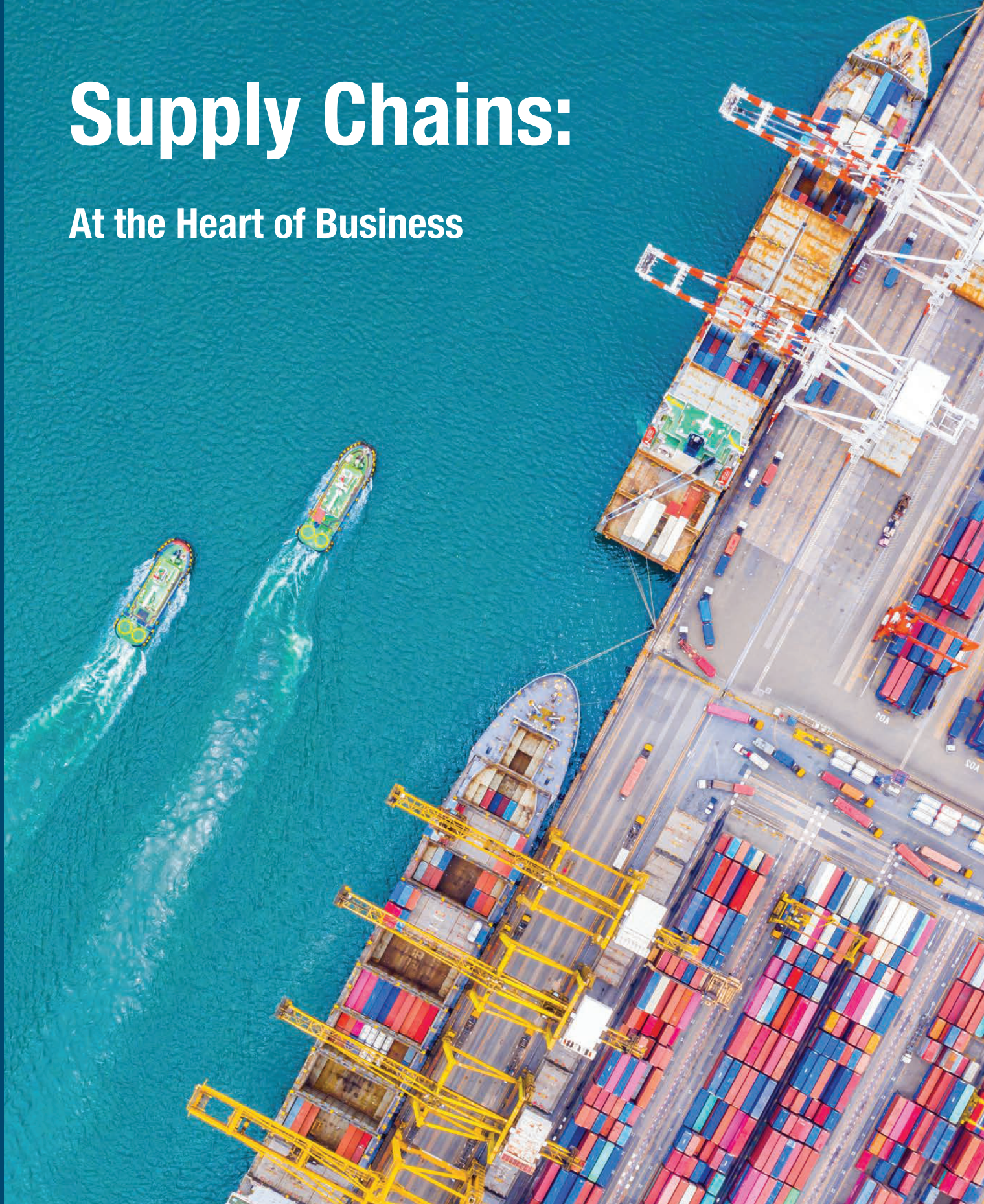
EDENTREE INSIGHT



investment
management

Supply Chains:

At the Heart of Business



Foreword



Foreword by Mike Barry, Member of EdenTree's Responsible Investment Advisory Panel and Former Director of Sustainable Business at Marks & Spencer

Behind every well-known brand and all its shiny pronouncements on sustainability lies a complex supply chain sprawling across the globe. In many cases it will be poorly understood and barely visible to the brand.

Yet as this Insight shows, it typically generates on average 5 times more carbon emissions than the brand's own operations. It is a source of growing reputational risk, as the welcome spotlight of transparency is shone into its deepest recesses. It is vulnerable to a growing risk of geopolitical and extreme weather disruption, and for all the much vaunted benefits of globalisation, it is rarely truly efficient.

Over the last decade, many companies have sought to put a 'sticking plaster' over these flaws. Doing more auditing and creating supply chain maps. Joining wider corporate partnerships to share the burden of change in far-away countries. Using new technologies such as blockchain to improve traceability and satellites to monitor forest loss. A few Governments have tentatively set supply chain due diligence requirements on companies who place products on the market (e.g. the UK's Modern Slavery Act and recent consultation on deforestation in supply chains for commodities such as palm oil and soya).

Yet these fragmented initiatives are dwarfed by the scale of the social and environmental challenges the world faces in the next decade. Partly because they are so deep rooted in the 500-year history

of capitalism, reaching back to the horrific trans-national trade in slaves. But also because of the sheer scale of the problem. If even medium-sized retailers can count the number of corporate participants (factories and farms) in their supply chains in the tens of thousands, human participants in the millions, and products produced in the billions, then you get a feel for the enormity and probable futility of today's triage.

Only a wholesale re-imagining of what a 'supply' or 'value' chain means will allow the economy and the millions of corporate actors who participate in it to become much more sustainable. Fewer participants, all of them visible. 'Adult-to-adult' rather than 'parent-child' relationships. Circular linkages and a fairer allocation of risk and reward between participants. More resilience and redundancy. These are all attributes of a new approach to supply. Easy words to say; much harder to action. Yet those companies which have the courage and ability to create sustainable supply chains in the future will prosper in the future, and those that don't, won't.

A word to the wise though. No action, however well meaning, is without consequence. We need to recognise that this positive shift has the capacity to create 'winners and losers'. The seductive call of circularity, of hire, rental and reuse, of indoor farms and 3D printed products, whilst positive environmentally, threatens millions of jobs from Bangladesh's clothing factories to Africa's smallholders. We needed a rounded approach to the sustainable supply chain revolution.

Introduction



Jon Mowll
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We have written extensively in other EdenTree Insights on a range of topics intrinsically linked to the question of supply chains – shipping, ‘sustainability’, inequality, waste, transport, food and water, ‘natural capital’, to name a few. This Insight therefore seeks to synthesize some of this previous work, adding detail where necessary.

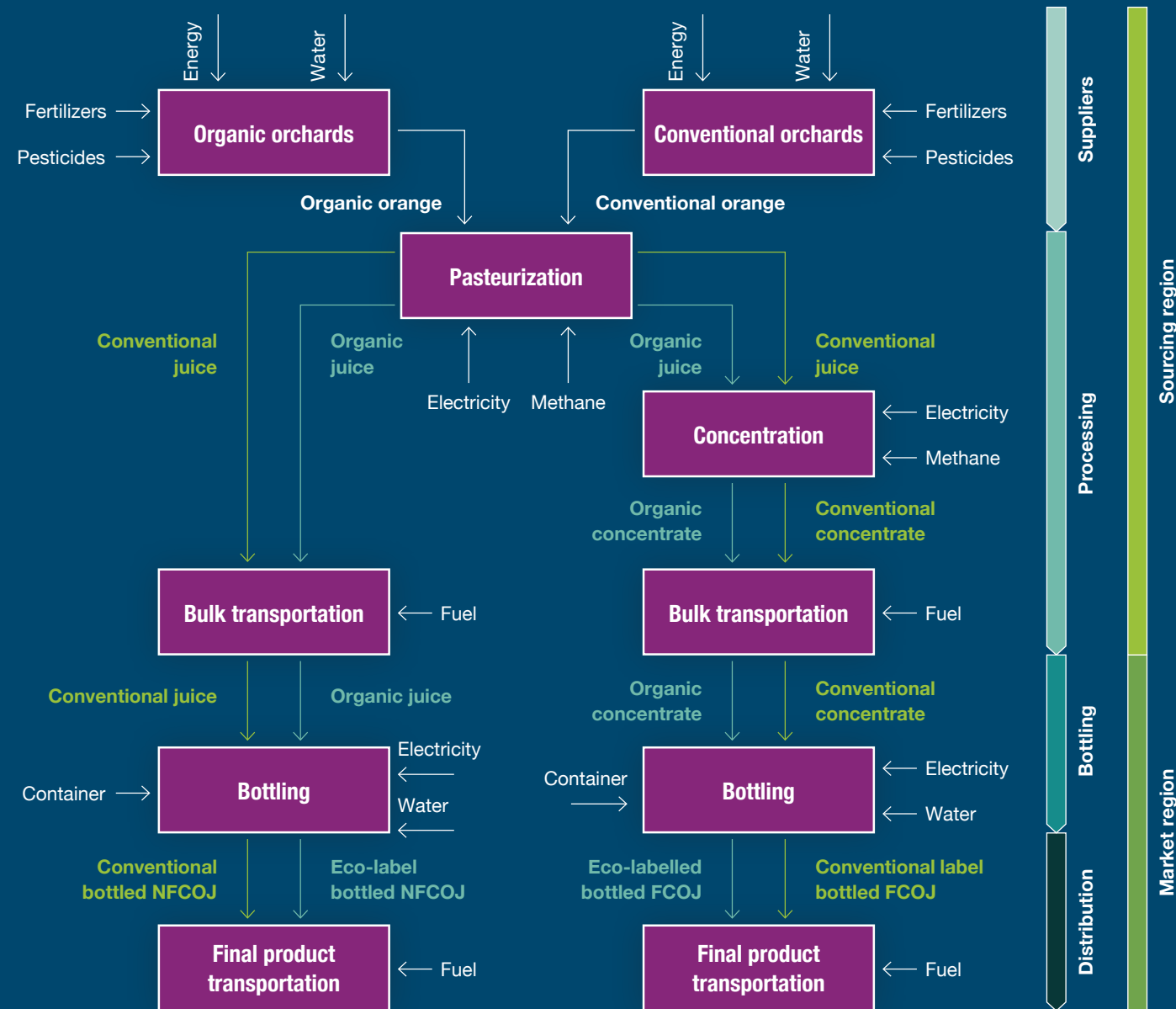
We highlight risks and impacts in supply chains, and their fundamental drivers, and consider some examples of best practice in supply chain management. From the perspective of responsible investment, we reflect on how EdenTree evaluates and engages with investee companies on their supply chain impacts, and touch on how unacceptably high risks or poor supply chain management may act as a brake on investment or prompt divestment in certain instances. Throughout the Insight, we note pockets of particularly strong practice that we have seen over our many years of responsible investing. Later on, we will look at the prospects of fundamentally redrawing and reconceptualising supply chains.

Today, supply chains are typically thought of in linear and material terms: ‘moving and transforming raw materials into finished products, transporting those products, and distributing them to the end-user’.¹

Particularly since the 1970s, ‘globalisation’ – an evolving phenomenon whose roots can be traced back to early European capitalism – has created sprawling supply chain networks across the globe. As supply chains have grown in time and space, so too have they become – in many cases – increasingly intricate and complicated, with dozens of intermediaries and actors within a single product supply chain. As noted in a *Financial Times* article of May 2020, “Most supply chains [now] resemble an entangled web of manufacturers, sub-manufacturers, distributors and logistics-handling agents that are all responsible in part for making the final transaction a reality.”²

The chain for something as seemingly simple as a glass of orange juice (assuming you haven’t picked the oranges from your own grove outside your house, and pressed them yourself) can have multiple layers, relying on transport networks to move the product from one end of the supply chain (the orange grove) to the other (the customer). Even the diagram on the next page is a little simplified, with the additional supply chains of all the ‘inputs’ (e.g. fertilizer, fuel, electricity) ignored.





Visualisation of a supply chain (orange juice). Source: M.A. Miranda-Ackerman, C. Azzaro-Pantel, A.A. Aguilar-Lasserrec. 'A green supply chain network design framework for the processed food industry: Application to the orange juice agrofood cluster'. *Computers & Industrial Engineering*, Volume 109, (July 2017), Pages 369-389

Many accept that the period of globalisation has also been characterised by a swift 'race to the bottom' on environmental and labour standards.

"Companies, large and small, have tended to seek out and establish supply networks in countries where, for instance, legal minimum wage levels are low or non-existent, or where environmental protections are slack, in the pursuit of lower costs and higher profits."

This is the basic context within which this Insight rests.

Context: Corporate Responsibilities – Legal & Moral

In terms of environmental, social, ethical, and governance issues, there are few legal requirements of companies to ensure that actors in their supply chains are not contributing to or causing harm. In theory, suppliers have to follow legal requirements in their own country or region (for instance, EU laws), such as on minimum wages, discharges of hazardous chemicals into waterways, labour standards, or air pollution.

Much depends on enforcement, however, and there are countless instances where organisations fail to meet minimum legal standards.

Frameworks such as the UN Guiding Principles on Business and Human Rights, which address supply chains in some respects, are not legally binding. Similarly, the UN Global Compact's 10 Principles imply that signatories extend the principles to their supply chains; nonetheless, violations of the Principles, even by signatories, are relatively commonplace, with a focus placed on remediation.

Due to the lack of binding legal frameworks, expectations with regard to the management of environmental, social, ethical, and governance issues within supply chains are largely left to individual companies to determine. To an extent, of course, they are guided by expectations and demands of various stakeholders, including shareholders.

However, there are some signs that supply chain due diligence may soon become a legal requirement in certain jurisdictions. European Commissioner for Justice, Didier Reynders, announced in April 2020 that the European Commission will propose new rules on mandatory human rights and environmental due diligence in EU companies' global supply chains, as part of the Commission's 2021 work plan and the European Green Deal.³ At the time of writing, the UK Government is also proposing some level of mandatory due diligence to combat deforestation in UK companies' supply chains.⁴ Investors and companies alike will have to keep a close eye on further developments in the legal landscape.

Issues at Stake for EdenTree

As responsible investors, our first task – like that of our investee companies – is to understand some of the risks and impacts within supply chains, be they social or environmental in nature (or, as is often the case, a combination of the two), or indeed what we might term ‘ethical’ risks.

Next, we touch on some salient risks and impacts in supply chains. Some are more relevant to some sectors than others; some will be a concern in almost all supply chains. Certain risks and impacts occur deeper in supply chains (e.g. at the point of raw material extraction); some occur in the transportation stage; some occur in the transformation stage (transforming raw materials into finished products); some occur after the supply chain, as usually conceptualised, has ‘ended’ (waste, pollution, and disposal of products). Whilst we divide these into ‘environmental’, ‘social’, and ‘ethical’ risks/impacts, it is clear that most are inter-related, and multi-dimensional: deforestation, for example, is at once a biodiversity, climate change, water, and land rights issue.



Environmental, Social, and Ethical Risks & Impacts in Supply Chains

Environmental and ecological risks and impacts in supply chains are many and varied.

Depending on the particular supply chain in question, they may include disruption, degradation, and destruction of ecosystems (e.g. deforestation, seabed dredging), erosion of topsoil, greenhouse gas emissions, over-consumption of water and other materials, localised air-, land-, and water-pollution, waste and ‘end-of-life’ impacts. Similarly, risks and impacts which might be thought of as falling under the ‘S’ (‘social’) of ‘ESG’ are manifold. These may include working conditions, pay and recruitment fees, Modern Slavery, forced and child labour, and human, indigenous and land rights. Certain risks are more ‘ethical’ in nature, such as the treatment of animals where they feature in supply chains, and the collection, harvesting, and use of personal data, itself a valuable commodity.

Environmental Footprints

In terms of environmental impacts, deforestation is one of the more salient and familiar risks / impacts in numerous supply chains – those of soy, beef, palm oil, timber/logging, and industrial agriculture more generally.

Transport networks and infrastructure are also to blame, both for fragmenting and destroying forested regions, and for allowing mining and logging companies access to previously inaccessible areas. Deforestation and other land-use change has knock-on impacts on **biodiversity**, weather patterns and access to freshwater, flooding, carbon emissions; it is also often a land rights issue. Even now, of the 350 corporates and 150 investor bodies most exposed to supply chains with high deforestation risk, around half have not publicly committed to eliminate deforestation from their supply chains.⁵

The globalisation of many supply chains has ‘offshored’ some problems with **localised pollution** associated with industrial processes. Nonetheless, in some places in wealthy nations, the problem persists, such as in the vicinity of the US Gulf Coast’s petrochemicals and oil refining industry, in agro-chemical run-off in the UK, or in certain specialist recycling industries in northern Europe. Wealthier countries are also not free from localised pollution linked to logistics/distribution stages in supply chains, such as pollution from road vehicles and shipping, or local spills from oil & gas infrastructure. Oil remains the lifeblood of many supply chains and economies. Yet oil supply chains are particularly risky in terms of localised impacts on water; threats to marine and terrestrial life are profound, as are the knock-on impacts on affected communities.⁶

Over 90% of global trade is still carried by sea, and **pollution of marine environments** is also associated with sea freight. Container ships are responsible for pollution such as ballast water, biocides (chemicals used in anti-fouling paints), waste (such as sewage and garbage from human

activity), and sometimes oil spills. It’s thought that pollution kills over one million seabirds and 100,000 sea mammals every year because they cannot survive in toxic waters.⁷ This is an often under-appreciated impact of globalised supply chains!

Because many listed companies’ extended supply chains are vast, the impacts throughout them often dwarf those resulting from a company’s direct operations. This is certainly true in terms of **greenhouse gas (GHG) emissions**. The CDP reports that companies’ supply chain GHG emissions are, on average, 5-and-a-half times as high as their direct emissions. The share of emissions from supply chains varies considerably by sector, of course; for food retailers or housing developers, embedded emissions in the products they sell (including transport) can represent upwards of 90% of a company’s total emissions.⁸ We will later look at both climate impacts on supply chains, and efforts to decarbonise them.

‘Waste’, as we conventionally think of it, can occur at any stage in material and energy supply chains, from the extraction or production of raw materials, through to the use and disposal of products. Typically, the true cost is borne by global commons and ecosystems (such as the atmosphere, landfill sites, waterways and oceans), and the communities which rely on them. Reconceptualising waste within supply chains presents an enormous opportunity to use fewer virgin resources and lessen environmental impacts. We have written in the past on the global problem of waste, and considered the need to move from a linear economy to a circular one. When we come to think about reconceptualising supply chains later in this Insight, we will look again at the circular economy, and how ‘waste’ doesn’t exist in such models.

Social and Ethical Concerns

In terms of social considerations, ‘working conditions’ in supply chains can be used as something of a ‘catch-all’ term, encompassing issues within supply chains such as hours, quality of worker accommodation, health & safety, and so on.

Long working hours and forced overtime are a major concern, for instance, among workers in the garment industry. Factory managers typically push employees to work between 10 and 12 hours, sometimes 16 to 18 hours a day. As many garment supply chains work on just-in-time delivery contracts and with deadlines around new ‘seasons’ of products, working hours get longer as deadlines get closer. We have highlighted this in our 2020 Expert Briefing on Fast Fashion. Moreover, health & safety when dealing with hazardous chemicals, or working in dangerous conditions, is also a major problem in many industries’ supply chains, including those of tech hardware products such as smartphones.

One pernicious risk in many of these supply chains is **child labour**. The ILO estimates that some 220 million children between 5 and 17 years old are in employment today. Some of the highest risk sectors/commodities are coffee, cocoa, cotton, bricks, garment production, tobacco, cobalt and conflict minerals (tungsten, tin, tantalum, and gold). In parts of Asia, Africa and South America, for instance, children sift for small nuggets of gold in riverbeds – gold which may end up in consumer electronics. They are at high risk of contracting dysentery, malaria, meningitis and tuberculosis due to the unclean water.⁹

As ‘labour’ itself (i.e. people) is now regularly treated as a supply chain in its own right, concerns around **recruitment fees, migrant- and bonded-labour** are also on our radar. This is a particular concern in certain parts of the world, such as the Middle East, and is inevitably going to become more pressing as climate impacts trigger mass migration.

In addition, land rights and indigenous rights are a concern in many supply chains, especially where governments fail to uphold traditional indigenous land rights. We see this with oil & gas pipelines in the US, with proposed timber/logging in Africa and Latin America, and with open-cut mines in Southeast Asia. In short, it is often at the farthest end of supply chains that these rights are threatened.

As responsible investors, we also have to think about some more ‘ethical’ issues in relation to investee companies’ supply chains. Our previous Insight, for instance, considered some of the ethical dilemmas and issues surrounding the use of animals in various supply chains – from perfumes and scents to entertainment; from fur, wool, and leather to food supply chains and pharmaceutical products. As technologies are developed, we have also been grappling with ethical implications in data supply chains. Transparency around data usage, which data is collected, data privacy and security are the most important issues for us to consider.

These are far from all risks which exist in companies’ supply chains. Every sector and every region has its specifics. However, having touched upon some of the more familiar risks and impacts, we will now explore how companies today are attempting to manage and mitigate them.

Supply Chain Management Today

Where these potential issues and risks in their supply chains are currently addressed by companies, approaches generally fall under the umbrella of ‘sustainable supply chain management’ (SSCM).¹⁰ This has evolved in many industries as a result of customer pressure. Such an approach has a number of features, stages, and methods, which we will explore here.

Companies typically follow a similar approach to tackling them, relying on supply chain mapping, risk identification and mitigation, certifications and auditing, and remediation. Collaboration with other stakeholders – be they employees, industry peers, NGOs or government actors – is often critical, and we will later explore a couple of case studies around collaborative efforts to address critical social and environmental risks in companies’ supply chains.

These approaches, however well-constructed and implemented, are frequently designed to deal with problems after they have arisen (as well as to prevent re-occurrence). Following this, we will look at underlying, systemic drivers of these problems, and how they might be addressed.



Mapping Supply Chains

Mapping supply chains down to the level of raw material production or extraction is the first step in identifying risks and impacts. Companies need to map intermediary layers too.

Few companies are able to do this, however. Many can map to ‘first tier’ suppliers, but at each tier, the number of actors within a supply chain is multiplied, and the mapping process becomes increasingly difficult. If we imagine a company with 10 suppliers in its first tier, and each of those has 10 suppliers, and so on, by the time we get to the fifth tier, the company at the ‘top’ of the supply chain is having to map 100,000 different actors. Such complexity can often result in whole industries being at risk of being implicated in harms within supply chains; we have seen this recently, for instance, with stakeholder claims that the supply chains of ‘most major apparel brands and retailers are tainted by Uyghur forced labour’.¹¹

Best Practice: Marks & Spencer

Marks & Spencer’s interactive map shows the regions from which the company – held in EdenTree’s Funds – sources raw materials (fish & shellfish; beef; milk; tea & coffee; wool; and man-made cellulosic fibres).

By way of example, a screenshot of its tea & coffee supply chains is shown below. This is part of the company’s commitment to transparency. Anyone can search this map and database, seeing from which factories Marks & Spencer’s is sourcing some key products.



(<https://interactivemap.marksandspencer.com/>)

Identifying Risks & Impacts

Risk identification – in terms of environmental or social impacts, among other risks – often takes place at the country and/or product (raw material) level. This process is best conducted alongside other stakeholders, such as NGOs, academic institutions, other corporates facing the same risks, unions, regulatory bodies and governments.

Often, some sort of materiality or risk matrix is produced, to demonstrate areas of high risk (e.g. deforestation in beef supply chains in Brazil; indigenous land and water rights in Chile’s lithium industry, or North American oil & gas infrastructure), and lower risk. The risks to companies downstream could be reputational, legal, or financial in nature. The first step here is simply for companies to acknowledge the problems within their supply chains.

A poignant example is how Nestlé now reports on child labour in its cocoa supply chain. In its latest communication on its progress, the company reported that it has uncovered 18,000 instances of child labour, with 55% of these children having been able to stop their child labour activities; it has provided remediation for over 80,000 children since 2012.

Nestlé has admitted that it may take many more years to eradicate child labour in its cocoa supply chains, but maintains its target of achieving 100% sustainable (child-labour-free) cocoa by 2025.¹²

We ultimately support this level of transparency, despite its discomfort, as it identifies deep, systemic challenges few other companies may acknowledge.

Mitigating Risks & Impacts

Risk mitigation can be achieved in a number of ways. Strong initial due diligence when selecting suppliers is a good start, but, as we have seen, often companies only map their supply chains after they are established, and their work on risk mitigation is necessarily reactive on occasion.

Often, the first step is to produce a supply chain code of conduct, or similar, which sets out expectations of suppliers with respect to human rights or labour standards. Whilst this by itself is far from sufficient to mitigate risks in supply chains, it is a first step to encouraging dialogue and common understanding on these issues. In addition to (or instead of) expectations made of suppliers, it is possible for companies to use third-party certifications to try to ensure strong sustainability credentials in the products and services they are sourcing.

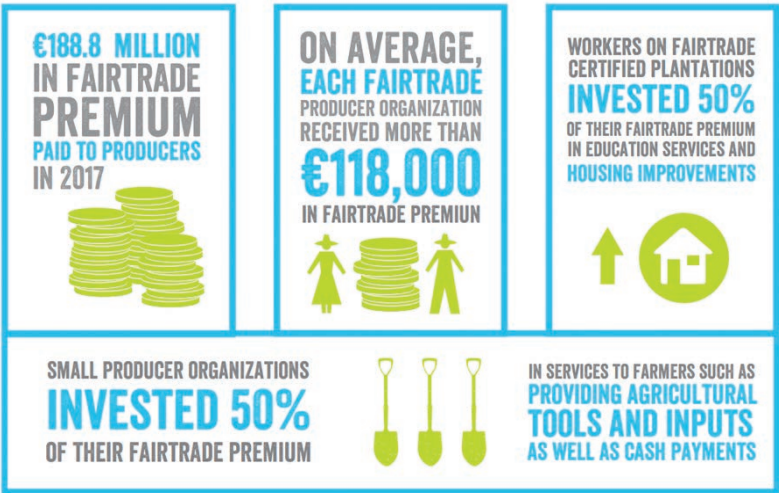


Case Study: Fairtrade

One such certification is Fairtrade. Fairtrade standards require smallholder farmer and larger hired labour production set-ups to comply in key environmental and social areas.

The Standards also promote training for farmers, which can include advice on switching to environmentally friendly practices. Fairtrade enlists companies to pay a minimum price for commodities from member farms if market prices plunge, and offers to certify products made from such ethically sourced commodities. Fairtrade is half-owned by its producer cooperatives, so its standards and metrics are decided in large part by the representatives of farmers. Companies looking to ‘ditch’ Fairtrade and move to their own sustainability standards (e.g. Sainsbury’s and tea) are not beholden to the interests of those farmers deep within supply chains.

Risk mitigation comes very much from a ‘do no harm’ approach to supply chain management. Beyond this, companies are increasingly active in trying to engage with suppliers to improve working conditions, worker pay, greenhouse gas emissions, and environmental outcomes. This may involve ensuring restoration of areas which have been subjected to open-pit mining or quarrying, including creating a biodiversity ‘net gain’, or driving better health & safety standards in supplier factories, for instance.



Auditing

Audits and assessments on-the-ground are an important part of sustainable supply chain management. Once companies higher up the supply chain have established a mapping process, laid out some expectations of suppliers, and perhaps put in some initial steps to mitigate risks (such as requiring sustainable or ethical certification of suppliers), auditing and checking compliance are next.

As we will see shortly, when looking at remedial action and working collaboratively, a close relationship with suppliers and other stakeholders is often necessary throughout an audit process. Ideally, audits of key or high risk suppliers should be done on a regular basis (such as annually), although it does depend to some extent on whether clauses within supplier codes of conduct are being violated as to whether more frequent monitoring would be necessary. Studies have shown that auditors tend to cite fewer violations at factories where they have ongoing relationships, so regular rotation of the people conducting the audits is advised. Moreover, audits should be both announced and unannounced, to give the best chance of uncovering malpractice or violations of policies.¹³

Third parties can assist here – for instance, IMPACTT, an ethical consultancy focused on supply chain impacts, conducts interviews with workers, building mutual trust, and can often uncover problems overlooked by (or hidden from) traditional audits.¹⁴



Remediation

For responsible investors, it is sometimes difficult when we see investee companies reporting that audits or investigations into whistleblowing/allegations have found non-compliance with policies and, sometimes, quite severe human rights or environmental violations.

For some, it is best that these issues are uncovered – only then can they be addressed; for others, it points to poor due diligence in the supply chain in the first instance.

What is agreed upon is that, once issues are uncovered – whether that's bribery and corruption, poor animal welfare, human rights abuses, illegal working practices, high levels of toxic pollution, or deforestation – companies sourcing from these suppliers have a responsibility (moral, or on occasion legal) to act in remediation. This responsibility is stressed, for example, in the United Nations Guiding Principles on Business and Human Rights.

A Collaborative Approach

All of these methods are best applied in dynamic, collaborative and emergent systems. Collaborative approaches to dealing with environmental, social, ecological and/or ethical issues in supply chains often yield the most successful and longest-lasting results.

Collaboration means actors at some (ideally, all) stages of the supply chain working together with common goals. It also means involving communities, NGOs, civil society groups, local and national governments, and shareholders in discussions. A key contributor to success in collaborative efforts to address challenges within supply chains is long-standing relationships with actors within different tiers. The following case studies provide two examples of companies, held in EdenTree Funds, which are working with partners to address environmental, social, and ultimately financial, reputational, and legal risks and impacts in their extended supply chains.





Collaboration in Action – Carrefour, Farmers, and Biodiversity

Food retailers are highly dependent on healthy, functioning ecosystems and abundant biodiversity to maintain long-term security of food supply. Retailers, such as France’s Carrefour, need to work closely with supplier farms to ensure biodiversity is protected and enhanced, if they are to have robust and resilient supply chains.

Carrefour has long-standing relationships with many supplier farms in France, where it works with 1,700 farmers through specific partnerships as part of Carrefour Quality Lines (CQLs). Launched in 1992, CQLs are a range of mostly fresh products with short food processing lines over which Carrefour has very good visibility. CQL requirements include 10 key features of agroecology, including the minimization of GMOs, better protection of soils, lower fertilizer/pesticide use – practical things at farm level which can enhance biodiversity. There are also initiatives to set aside land between fields for plants favourable to pollinators.

To support farmers transitioning to organic farming methods, Carrefour provides technical support where necessary, and financial security through long-term commitments to offtake (volume) and price. The Paris-listed company is also providing direct financing to farmers who are transitioning to more sustainable agroecology and organic farming practices, designed in part to reduce negative impacts on wildlife, soil, and ecosystems.

In addition to its own partnerships with farmers, Carrefour is working with other national brands in France to accelerate a ‘food transition’, to implement global projects in partnership. Five key priorities are identified within the transition strategy, one of which is biodiversity (enhancing biodiversity as well as limiting negative impacts).

Ultimately, the aim is to bring different stakeholders together across food supply chains to produce healthy food locally and sustainably, drawing down carbon from the atmosphere, restoring degraded ecosystems, and boosting local economies.





Collaboration in Action – TUI Group and Tackling Modern Slavery¹⁵

TUI Group, held in EdenTree Funds, is one of the largest tourism groups in the world.¹⁶ By dint of its sector and some of the regions in which it operates, it has a high risk of Modern Slavery in its supply chains (especially the supply of 'labour').

TUI's approach to Modern Slavery follows the steps outlined in the supply chain management section above: mapping, risk identification, mitigation, auditing, remediation, and repetition. Its disclosures emphasise the importance of multi-stakeholder collaboration in tackling Modern Slavery in its accommodation and third-party labour supply chains.

In 2019, for instance, the Group joined a number of collaborative initiatives aimed at tackling Modern Slavery in the sector, including the World Travel & Tourism Council's (WTTC) Human Trafficking Task Force and Orphanage Tourism Task Force. These were established to foster cooperation between tourism companies on the issues of trafficking and exploitation of children within the sector.

In addition to industry-wide collaborations with its peers, TUI's work on Modern Slavery also highlights the need for strong relationships with suppliers and NGOs.

TUI's 2020 Modern Slavery Statement gives an example of where an issue was uncovered, and TUI worked with various partners to remediate and try to prevent future occurrence. In 2019, a third-party hotel in Thailand was audited by Travelife (one of TUI's partners) and was found to be discriminating against migrant workers; this included sub-standard staff accommodation compared to staff accommodation for Thai and other foreign employees, and different contracts and terms & conditions.

TUI reports that Travelife worked with the hotel to change their processes and provide evidence that they were complying with their standards in the key areas of concern. Once this process was complete, a senior auditor went to the property to verify that the steps the hotel promised to take were in fact implemented. As a result, the certification body was satisfied that the issues were addressed and that they received enough compliance evidence to certify the property.

TUI's Modern Slavery disclosures are not typical of the hospitality and tourism industries, however. Most other companies in these industries are doing far less to address this systemic risk within their accommodation and other supply chains.

What Does EdenTree Look For?

EdenTree engages and encourages investee companies to do whatever they can to address social, environmental, ethical, and ecological risks and impacts in their supply chains, right through to the use and disposal of products. Two recent examples are engagements on Modern Slavery and biodiversity.

In our screening and review process, and our engagements, we are looking for transparency, examples of best practice, learning from past mistakes, and a range of measures, policies, practices, and relationships with various stakeholders aimed at minimising negative impacts (and ideally having positive impacts) on communities, workers, and the environment throughout their supply chain. We do screen companies out of the EdenTree Funds where environmental or social risks in supply chains are considered too great, and/or too poorly managed.

Ultimately, we are looking for evidence that companies are applying the required time and effort to each of the ‘stages’ of sustainable supply chain management outlined earlier – mapping of high risk supply chains, risk identification and mitigation, auditing, remediation, and so on.

That said, problems within supply chains persist. Companies frequently acknowledge that getting on top of these problems is one of their most significant challenges, particularly when they are embedded deep in complex supply chains. If even some of the most responsible companies are struggling to deal with these problems, perhaps there are more systemic, underlying drivers that need attention?

Modern Slavery

EdenTree continues to engage with the construction sector in the UK around what might be termed ‘labour supply chains’. This is still a high-risk sector, and one where much work needs to be done. We have published a blog on our initial findings.

Additionally, EdenTree is working collaboratively as part of the investor-led ‘Find It, Fix It, Prevent It’ initiative, to address Modern Slavery in other high-risk sectors and ‘labour supply chains’. This is focusing both on company-specific engagements, and on working with law-makers to tackle the challenge through legislation. A blog of our findings is available on our website.

Biodiversity

This was a new engagement theme for EdenTree, recognising the impacts on biodiversity in a range of company supply chains and operations, including food retailers (agriculture, plastics, etc.), mining companies, paper & pulp manufacturers, and construction companies.

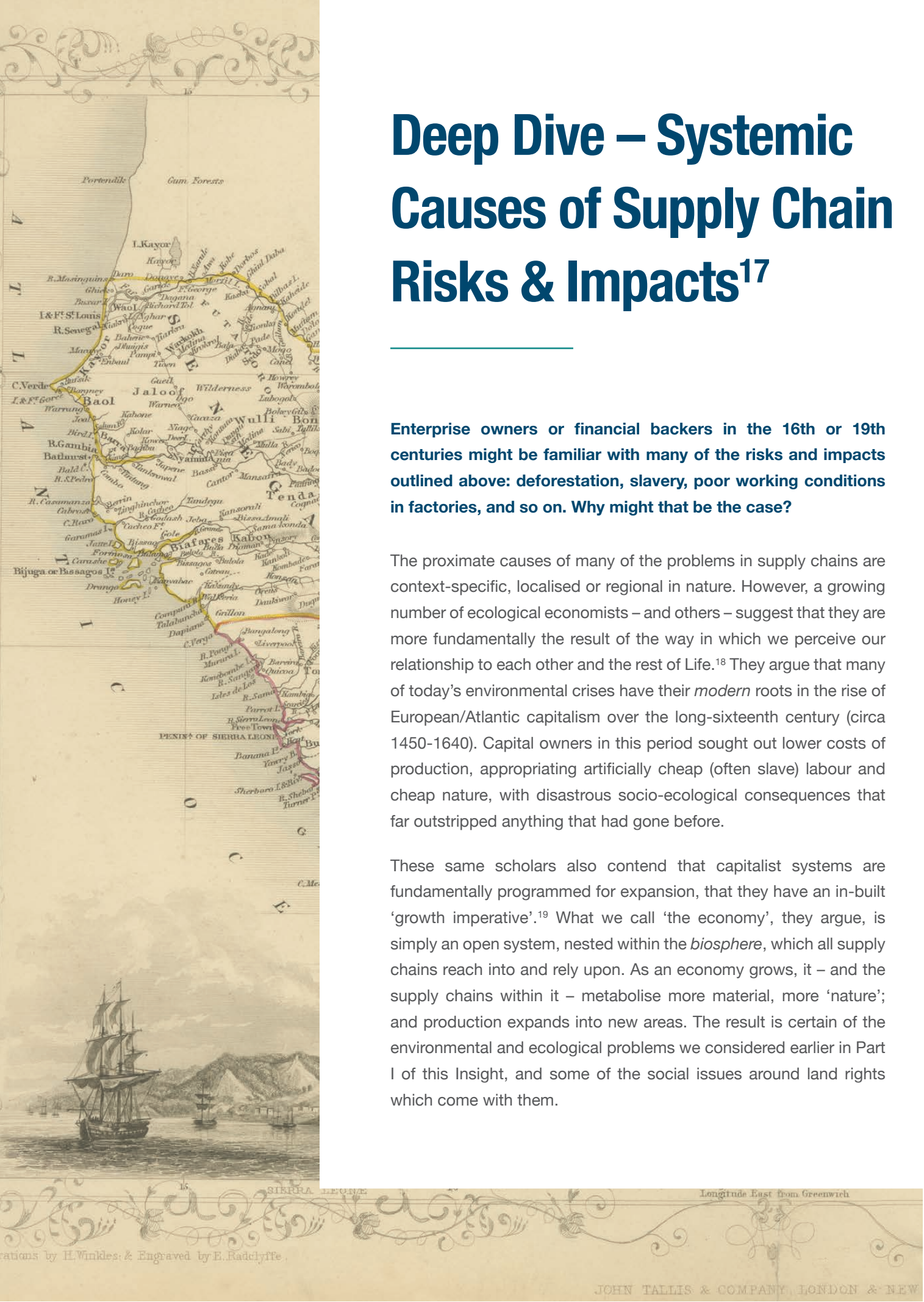
These have been chosen for either their direct reliance on biodiversity (food retailers), or because of the impacts that their operations and supply chains can have on biodiversity and ecosystem health more broadly. The engagement sought to understand the current state-of-play, identify pockets of best practice, and share learnings with the sectors targeted. A blog of our findings is available on our website.

Deep Dive – Systemic Causes of Supply Chain Risks & Impacts¹⁷

Enterprise owners or financial backers in the 16th or 19th centuries might be familiar with many of the risks and impacts outlined above: deforestation, slavery, poor working conditions in factories, and so on. Why might that be the case?

The proximate causes of many of the problems in supply chains are context-specific, localised or regional in nature. However, a growing number of ecological economists – and others – suggest that they are more fundamentally the result of the way in which we perceive our relationship to each other and the rest of Life.¹⁸ They argue that many of today’s environmental crises have their *modern* roots in the rise of European/Atlantic capitalism over the long-sixteenth century (circa 1450-1640). Capital owners in this period sought out lower costs of production, appropriating artificially cheap (often slave) labour and cheap nature, with disastrous socio-ecological consequences that far outstripped anything that had gone before.

These same scholars also contend that capitalist systems are fundamentally programmed for expansion, that they have an in-built ‘growth imperative’.¹⁹ What we call ‘the economy’, they argue, is simply an open system, nested within the *biosphere*, which all supply chains reach into and rely upon. As an economy grows, it – and the supply chains within it – metabolise more material, more ‘nature’; and production expands into new areas. The result is certain of the environmental and ecological problems we considered earlier in Part I of this Insight, and some of the social issues around land rights which come with them.



Moreover, it is argued that modern globalisation has been facilitated and enabled by governments and international trade rules, established principally in the interests of multinational corporations and countries in the Global North. We considered this briefly in our 2019 EdenTree Insight ‘Mind the Gap: Economic Inequality in the 21st Century’. In essence, the globalised economy is now characterised by national borders made porous to flows of materials, capital, and people.²⁰

We sometimes hear that globalisation of supply chains has led to a ‘race to the bottom’ in terms of workers’ rights, wages, and environmental protection. But if we think about longer-term trends, it may be more accurate to suggest that it was the other way round – it was a ‘race to the bottom’, which has been playing out over centuries, that spurred the modern globalisation of supply chains. This is important. If the problem is capitalist relations with nature and labour (and not ‘*just*’ post-war globalisation), and indeed a growth imperative, then the solution may need to be highly structural.

“

The country that does the poorest job of internalizing all social and environmental costs of production into its prices gets a competitive advantage in international trade... As national economies confront limits to their growth aspirations imposed by the carrying capacity of their territory and the extent of their national markets, they strive, by globalization, to grow into the ecological and economic space of all other countries, as well as into the remaining global commons.”

Herman Daly²¹



Case Study – Slavery and Nature in Early Capitalist Supply Chains

Early capitalism displayed a powerful tendency to exploit Nature and Labour. From 1530 to around 1700, Brazil’s Atlantic forests were clear cut to make way for what we would recognise as industrial sugarcane production.

This period also saw the near-extinction of Brazilwood (*Caesalpinia echinata*), harvested for its timber and, later, dyes. Hundreds of years later, the sugar produced in this region once rich in biodiversity is now used in ethanol.

Several hundred miles away, in the Caribbean, forests were also cleared to make way for sugar plantations. Similar destruction and (re)making of new ecosystems and new ‘Nature’ occurred in the southern United States, where the cash crop of choice was cotton. On these plantations, one of the most pernicious manifestations of capitalism’s need for Cheap Labour was ubiquitous – African slaves.

The Atlantic slave trade involved the transportation of enslaved African people, mainly to the Americas. ‘Modern’ supply chains of cotton, sugar, and their derivatives (such as rum and molasses) – and the wealth they generated in Europe and America – were built on the backs of some 13 million slaves, with an estimated 2 million more dying in the inhuman conditions of slave ships crossing from West Africa. But they were also built on large-scale destruction of ecosystems and biodiversity, with devastating consequences for local indigenous peoples. It is a legacy felt to this day.

The Future of Supply Chains



Warnings

In 2018, two separate studies published in the *Proceedings of the National Academy of Sciences* warned of the increased likelihood of simultaneous crop failures in business-as-usual warming scenarios.



When the researchers looked at the four biggest corn exporters—the U.S., Brazil, Argentina and Ukraine—they found that the likelihood of all four suffering yield losses of 10 percent or more at the same time rises from about 7 percent at 2°C warming to 86 percent at 4°C warming.”²²

Climate Impacts on Supply Chains

As atmospheric carbon dioxide reaches levels not seen in as much as 3 million years, the impacts of global heating are being increasingly felt across the world.

Even under the most optimistic decarbonisation scenarios, we will see markedly increased risks of extreme weather events, heatwaves, bushfires, floods, droughts, tropical storms and so on in the coming decades. The movement of goods and people, production of food, extraction of materials from the earth, location of industrial centres, are all likely to witness profound disruption.

One of the supply chains most critical to human welfare is that of food. Agriculture both contributes to global heating – principally through land-use change (e.g. deforestation), soil depletion, and ruminant methane emissions – and stands to be particularly badly affected by physical climate shocks. A warming climate may ultimately require major shifts in global food production, as rainfall patterns, temperatures, growing seasons, and soil quality undergo dramatic change. This will have huge implications for food retailers and other actors in food supply chains.

It is possible too that supply chains, including agricultural supply chains, will need to be shortened, reversing the globalising trend. Research on climate-resilient cities, for instance, has demonstrated the importance of sourcing food from the city-region, and keeping material flows within that same region. We will look at circularity and (re)localisation of supply chains in due course.

Case Study: Locusts in the Horn of Africa

In early 2020, plagues of locusts spread across the Horn of Africa, threatening the food supply of tens of millions of people.

Such unprecedented swarms are thought to be the result of ‘a prolonged bout of exceptionally wet weather, including several rare cyclones that struck eastern Africa and the Arabian Peninsula over the last 18 months’. These weather events in turn are due to warming oceans.²³

Decarbonising Supply Chains

As noted earlier, companies’ supply chain GHG emissions are, on average, around 5 times as high as their direct emissions.

With companies increasingly seeking to ‘green’ all aspects of their business, and societies demanding action to curb emissions, the deep and swift decarbonisation of supply chains will be a key trend in the next decade. This presents challenges in a number of sectors, and also in the shipping and logistics stages of material supply chains. Our two case studies – shipping and cement – reflect on two industries that face different hurdles to the rapid decarbonisation required over the coming years.

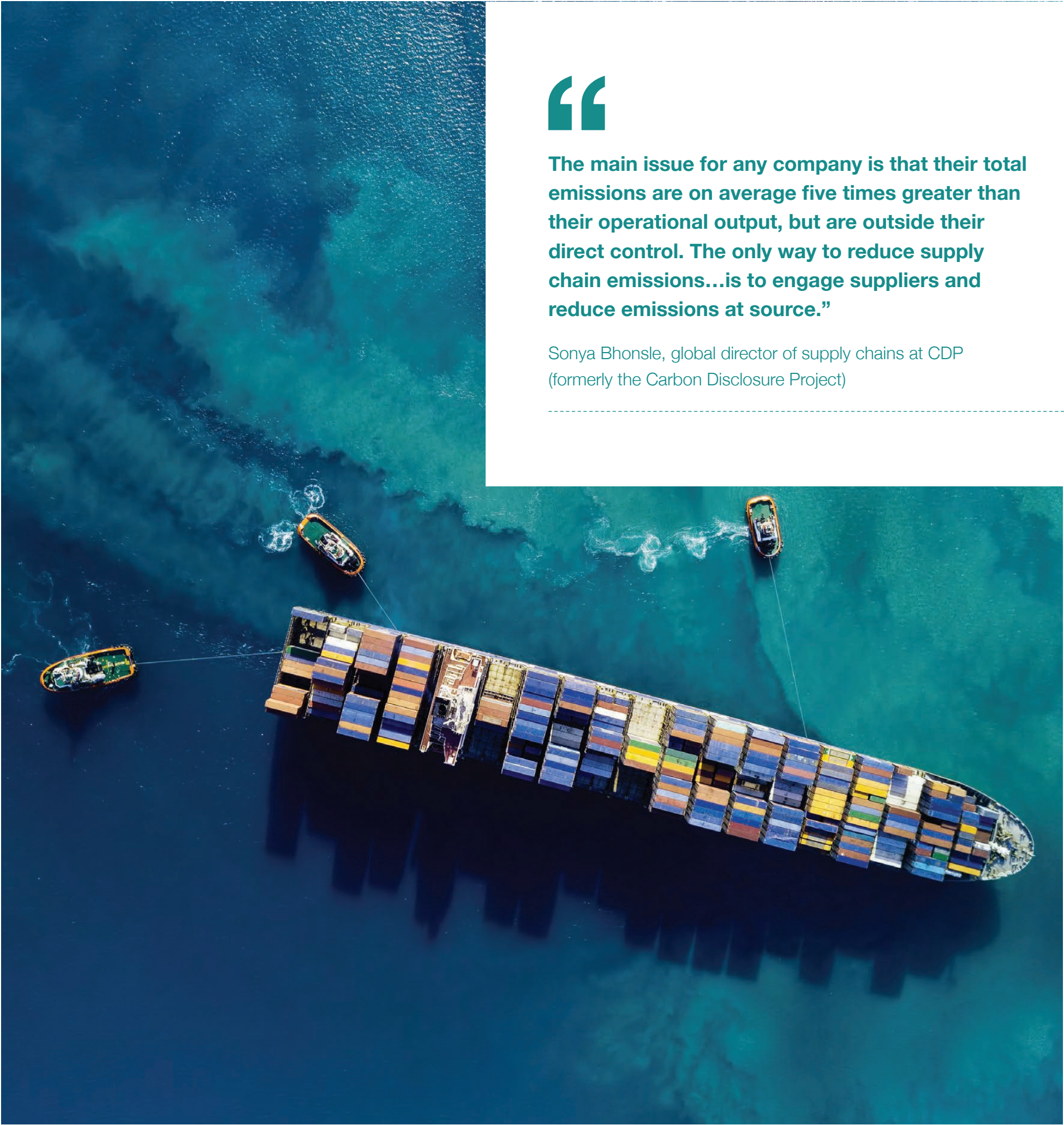


Case Study: Decarbonising Shipping

Most visions of zero-emission shipping – a sector which is responsible for perhaps 3% of global carbon emissions, and huge disturbance to marine ecosystems²⁴ – centre on hydrogen or ammonia-based liquid fuels, possibly combined with battery systems, replacing the ‘bunker fuels’ used today.

By contrast, **EcoClipper**, a private enterprise based in the Netherlands, envisions a return to an ancient technology – sail. EcoClipper’s cargo target group are businesses, most of which are small to medium-sized companies with a link to sustainability, ecological produce or fair trade. Having completed proof-of-concept, EcoClipper is now looking for investment to fund its first vessels.²⁵

It may well be that both ideas prove fruitful; in an industry as large as global shipping, it could take all shapes and sizes to achieve decarbonisation of this stage of supply chains.



“

The main issue for any company is that their total emissions are on average five times greater than their operational output, but are outside their direct control. The only way to reduce supply chain emissions...is to engage suppliers and reduce emissions at source.”

Sonya Bhonsle, global director of supply chains at CDP (formerly the Carbon Disclosure Project)

Case Study: Decarbonising Cement

Cement manufacturing represents 7% of annual GHG emissions, and is the second highest industrial contributor to GHGs after steel production.

Two thirds of global cement production is used for buildings, with the remainder typically used for roads, bridges and other infrastructure needs. It is therefore a key part of infrastructure supply chains, and the chemical and heating processes used in its production are major sources of CO₂ emissions.

Decarbonisation is currently being pursued through a range of measures: carbon capture; switching from coal to low-carbon fuels such as gas or biomass; and new concrete chemistries that require less cement and greater energy efficiency.

Other solutions in development include hydrogen-based production, using electricity as the main heat source, and alternative cement chemistries.²⁶

One company, **Hoffmann Green Cement Technologies**, is pioneering methods which makes its product the lowest-carbon cement in the world, *by a factor of 5*. Hoffmann's technology is based on changing the composition of cement so that it does not contain clinker, the main source of CO₂ emissions in traditional cement production, as well as creating a cold and clean cement manufacturing process (no firing of raw materials).²⁷ Hoffmann listed on the Euronext Growth market in Paris in late 2019, and is currently scaling up its production capacity; its first site in Cormicy, just north of Reims, is almost unrecognisable as a cement manufacturing facility – with no kilns nor chimneys!

Image from <https://www.ciments-hoffmann.com/>



Blockchain – Radical Transparency?

One technology that some anticipate may provide ‘radical transparency’ throughout global supply chains is blockchain, which has a number of potential applications, including in theory, allowing purchasers to assess the social and environmental impacts of certain products across their lifecycles.²⁸

Supply chain partners from upstream to end customers can follow and audit the history of data records stored as a chain of block. Since records on the blockchain are time-stamped and secure, data manipulation and fraud are detectable and traceable on the ledgers.²⁹

Blockchain is already being trialled in some supply chains. Early adopters in the cobalt sector include **Ford, Volkswagen, LG Chem, and Huayou Cobalt** (none of which are held in EdenTree Funds), which are founding members of the Responsible Sourcing Blockchain Network (RSBN). The RSBN's pilot projects have demonstrated how cobalt produced at Huayou's industrial mine site in the Democratic Republic of the Congo can be traced through the supply chain to LG Chem's cathode and battery plant in South Korea, and then to its final destination, a Ford plant in the United States.³⁰

Elsewhere, **Nestlé's** blockchain programs will start by tracing milk from producers in New Zealand to Nestlé's factories and warehouses in the Middle East. Nestlé expects to add palm oil sourced in the Americas at a later date.³¹

Despite some promising reports about the application of blockchain, problems persist in terms of ensuring the ethical or sustainable nature of products as they are passed along supply chains. Tracking ores such as cobalt is complicated. It is not inconceivable that ore mined by children or slave labour could get mixed up with ‘clean’ cobalt before being bagged by a vetted miner and given a digital tag (i.e. the start of the blockchain).

It also doesn't circumvent the problem of needing to audit mine sites continually to ensure that there are no labour abuses occurring, and that environmental practices are strong. As Lara Smith, Managing Director of Core Consultants notes, “We are talking about applying a technological solution to a physical, manual problem that frequently involves governments and human frailty and so it remains an imperfect solution, although it can assist in alleviating some of the known issues and improving trust.”³²



Technology provides the options, but society chooses the future.”

Carlota Perez, Honorary Professor at the Institute for Innovation and Public Purpose (IIPP), University College London (as quoted in Roman Krznaric, *The Good Ancestor* (2020))

These technologies do not offer solutions to systemic drivers of environmental and social injustices. To assume that transparency alone will halt deforestation, human rights abuses, land-grabbing, pollution, waste etc. is at best naïve.

What's more, it is no longer enough to make sure that some companies' supply chains are ‘clean’ – as ecological tipping points are just around the corner, and social injustice and inequality persists, everything has to change. To address environmental and social problems within supply chains at a systemic level, we need to reconceptualise, reimagine, and redraw material and energy flows in an ecologically sustainable (preferably regenerative!) and socially just way.

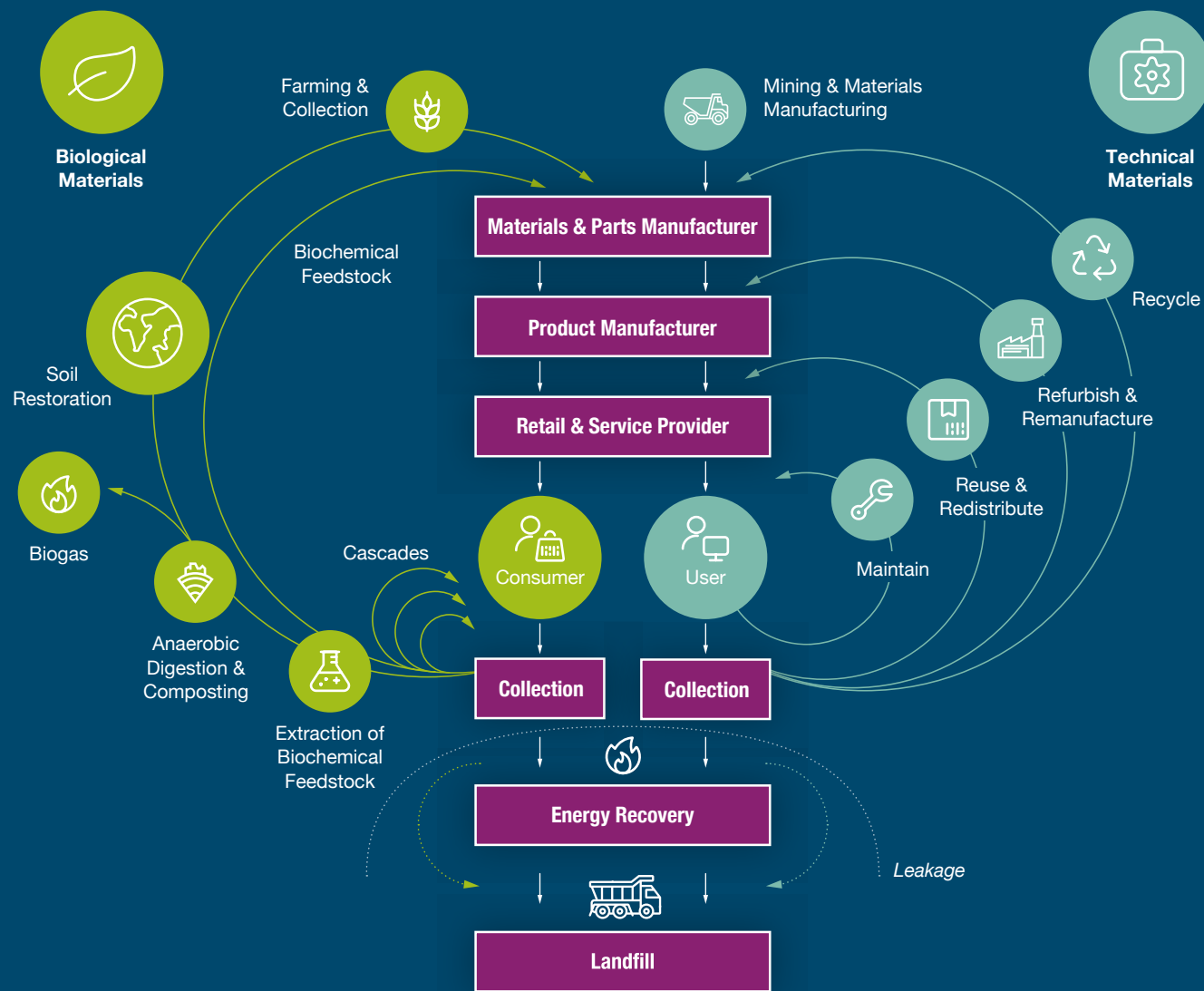
Redrawing Supply Chains – Circularity

The concept of a ‘circular economy’ was addressed in detail in an EdenTree Insight of 2018 – ‘The Waste Problem’. However, we can scarcely talk of the future of supply chains without considering the very necessary transition to circular models.

A circular economy is to minimise the creation of waste, or, rather, to view waste differently – as an input into another product. It essentially re-articulates how we view material supply chains, focusing on stages of repair, recycling, and re-use, and less on the extraction, linear processing, and ‘disposal’ of materials.

The Butterfly Diagram for Circular Economy

Source: Ellen MacArthur Foundation



We have highlighted elsewhere a number of companies held in EdenTree’s Funds which are using circular economy models across their operations, or focus on recycling of products. These include paper & packaging companies and specialist recyclers.

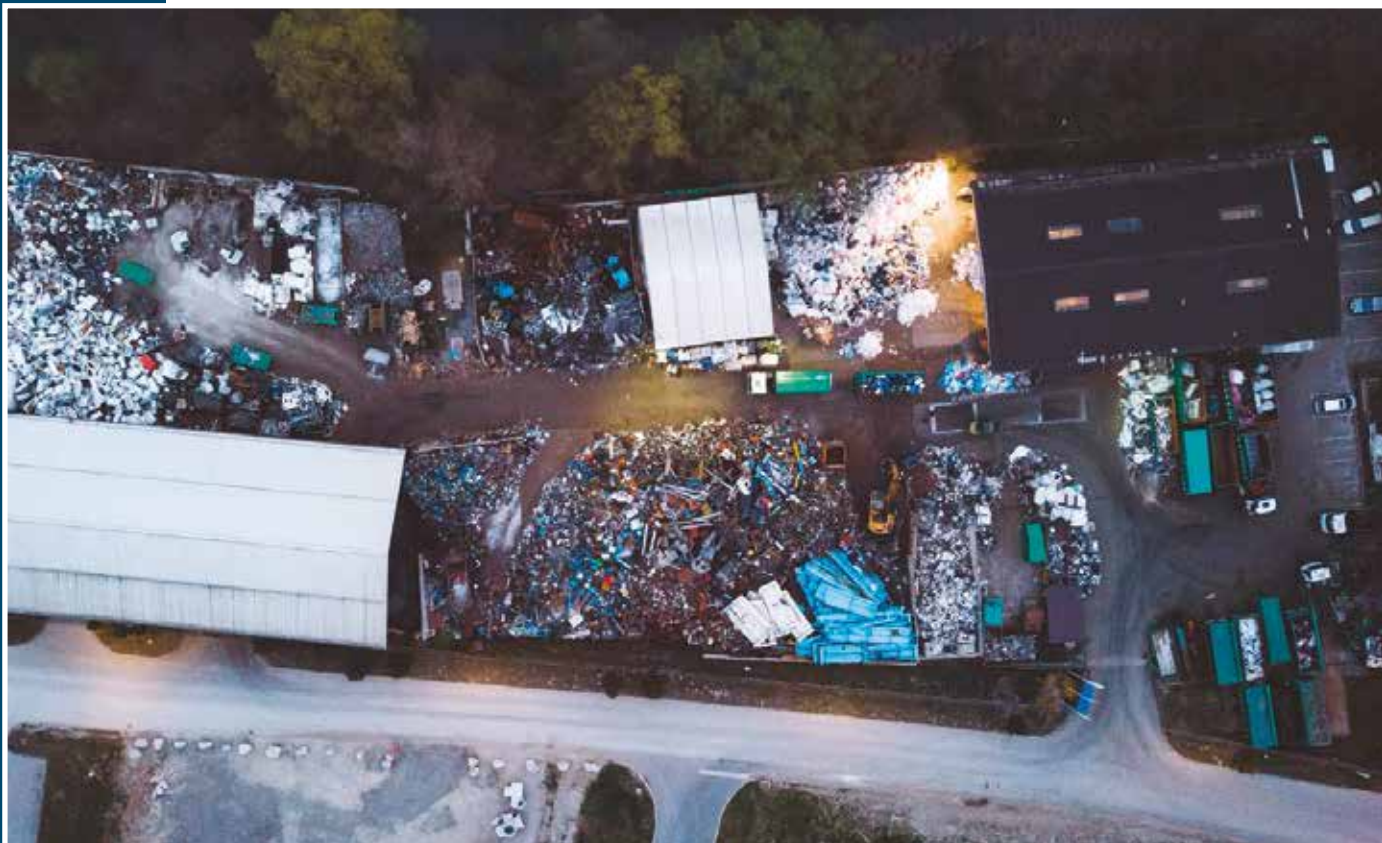
However, the Circularity Gap Report (2020) states that the global economy is today only 8.6% circular —just two years ago it was 9.1%. This decrease has been put down to: (i) high rates of extraction; (ii) ongoing stock build-up; and (iii) low levels of end-of-use processing and recycling.³³ It hints that some more fundamental changes need to occur in terms of how we design and think about supply chains.

Moreover, the concept of circularity does little to address many of the social and ethical issues we encounter when we think about supply chains. For that, future supply chains may need to embrace some new (and old) ideas!

“

If it can’t be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned, or removed from production.”

Pete Seeger



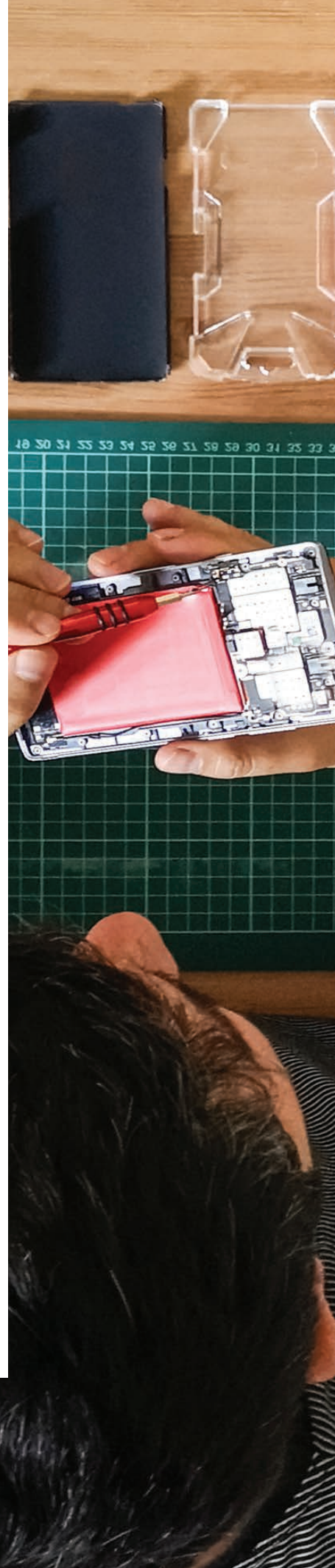
(Re)Localisation of Supply Chains

As we have seen, globalisation has created vast, geographically sprawling supply chains in many industries. It has principally been the result of (a) firms seeking lower costs of production to increase profits, often irrespective of social and environmental costs, and (b) international trade laws constructed to support this endeavour.

With mounting tensions in certain spheres of international relations, an increased focus from policymakers and executives on security of supply may lead to the creation of shorter, better-connected, local supply hubs.

‘Short’ supply chains are actually a key feature of circular economy models: products are repaired, recycled, and re-used within local settings, such as a city, city-region, or country. From the EU to the United States, new laws are being developed to support the ‘right to repair’ to reduce waste radically, make things last longer and make them easier to repair. In some countries, ‘repair cafés’ have been established, where volunteers lend their expertise to repair damaged products like clothing, furniture, or electronics. 11 years since the first Repair Café was set up in Amsterdam, there are now over 1,700 Repair Cafes offering their services in 35 countries around the world. These initiatives and the values that underpin them contrast dramatically with the ‘planned obsolescence’ models of many multinationals, from well-known smartphone manufacturers to fast-fashion brands and retailers producing dozens of new, inexpensive fashion trends each week.³⁴

Linear-economy models, combined with planned obsolescence, have meant that supply chains have constantly returned to the biosphere for new materials, rather than making the most out of already-extracted materials. Ultimately, a (re)localisation of supply chains to keep materials in use for longer could take considerable stress off workers in supply chains such as fast fashion and consumer electronics, as well as off the biosphere (both from an extraction perspective, and in terms of the volume of ‘waste’ being dumped into global ecosystems).³⁵



Embedding Values in 21st-Century Supply Chains: Social Justice & Post-Extractivism

The global Covid-19 pandemic has led many to re-evaluate the value society places on workers who are essential to providing basic goods and services, and ensuring the smooth operating of supply chains that are key to maintaining broad societal wellbeing.

This has been seen, for instance, with migrant fruit and vegetable pickers in the UK, or people involved in supply chain logistics roles (such as drivers and seafarers).

Combined with greater transparency, heightened levels of consumer awareness, and the risk of severe reputational damage, we hope to see social justice – in terms of fair pay, good working conditions, strong employment protections, respect for human rights – cascade through all supply chains at all tiers and intermediate levels (transport/logistics). Corporations should not be able to simply ‘up-sticks’ and move on when wages in one country increase – a trend we have seen in the apparel sector, for instance, where a rise in wages and protections around working hours in China led many companies to shift supply chains to India, Pakistan, and Southeast Asia, where wages are lower and workers’ rights, on the whole, even less well protected.

Post-Extractivism

‘Post-extractivism’ is a term that may be unfamiliar to many asset owners and investment managers. We began this insight by noting that supply chains today are usually thought of in anthropocentric, linear, and material terms.

By contrast, post-extractivism ‘as a system of thought and action... encourages us to think from an Earth-centred perspective about our role and our place on a living planet, and draws upon indigenous thinking.’³⁶

It proposes radical alternatives to current models of development thinking and explores fields of action for a just transition towards new, reciprocal ways of being present to one another and our living planet. Rooted in indigenous cultures of the Americas and elsewhere, it sees the natural world not as a ‘resource’ to be plundered, but as a web of life, of inter-connected, reciprocal ecosystems, of which humanity is part.

Post-extractivism might be usefully seen as an adjunct to the circular economy model. It would seek to minimise the exploitation of nature (including humans), whilst offering a very different worldview to that which predominates today through globalised capitalism.

“**In Brazil, there are two words to describe the appropriation of resources from Nature: extrativismo describes the collecting of natural products from the forest by Amazonian hunter-gatherer communities, while extractivismo (with an extra ‘c’) refers to the pillaging, pollution, and destruction of nature that is now widespread in the region and beyond.**”³⁷

Post-extractivism would have us tread lightly upon the Earth. It would do away with fracking for methane gas, deep-sea dredging for sand, mountaintop removal for mining, clear-cutting and burning of forest for agriculture, and devastation of boreal forests for oil sands. Mountains, rivers, animals, and forests would become embedded in a sacred geography, not be seen simply as mounds of rocks or rows of trees to be exploited, commoditised, and turned into financial capital. We would (re)-learn to live in harmony with natural cycles, assuming again our role as a stewardship species. Even in adopting just some fragments of such a worldview, supply chains, nested within the biosphere, would start to look very different indeed!



Conclusions

Supply chains have grown increasingly complex through the 20th and 21st centuries, especially with the rise of modern ‘globalisation’. Multinational corporations and those with sprawling supply chains face increased pressure from customers, investors, regulators, and civil society to address many of the injustices which pervade supply chains.

There are numerous tools and methods, explored earlier in the Insight, which are being deployed to map supply chains, mitigate risks and impacts, and remediate where necessary.

However, many of the issues we are concerned about as responsible investors – deforestation, (Modern) Slavery, human rights abuses, animal welfare, working conditions – would have been familiar as far back as the 1500s.

This suggests that some deeper systemic drivers are at play. Building on the work of ecological economists and historians, the Insight has suggested that the globalisation of supply chains in the post-war period (and especially since the 1980s), could be seen as the latest phase of an increasingly integrated, global, capitalist economy exploiting the availability of ‘Cheap Labour’ and ‘Cheap Nature’. As such, systemic alternatives are required.

The future of supply chains must therefore address some fundamental issues: supply chains – methods of production, transportation, extraction, use, and disposal – will have to take the pressure off the biosphere, and address social injustices. In practical terms, this will involve elements of circularity; in terms of worldview and underlying values, economies

may have to become ‘post-extractivist’ in nature, with social justice at their heart. Supply chains will also have to be made resilient to the impacts of climate change, and zero-carbon. Greater levels of transparency may be required too; here, technologies may be able to help.

EdenTree regularly engages with investee companies – both unilaterally and in collaboration with other stakeholders – on supply chain risks and impacts. We seek to understand how companies work to drive positive, long-lasting impacts in supply chains, and mitigate risks.

We have outlined some pockets of good practice from investee companies throughout this Insight, such as Carrefour’s work with its supplier farms in France, companies pioneering circular economy models which change how we think of supply chains, and collaborative work to root out Modern Slavery among contracted labour forces.

Ultimately, and in the future, the companies we invest in will increasingly need to position themselves and their supply chains to flow with the broad trends outlined in the final part of this Insight.

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