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A Guidebook

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Sustainable Value Chain Entrepreneurship: A Guidebook

By: Rachel Alexander & Peter Lund-Thomsen

Center for Business and Development Studies

Copenhagen Business School

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Abstract

This guidebook presents an overview of key issues related to sustainable value chain entrepreneurship. Actors engaging in sustainable value chain entrepreneurship are identified as lead firms (brands and retailers), suppliers, business model innovators, and those supporting and shaping these businesses' activities and shaping the environments in which they work, including technology and service providers, issue-focused nongovernmental organisations, trade unions and workers, and public-sector organisations. Different forms of initiatives that have been developed globally by all of these actors are identified and dynamics shaping their success are discussed. Throughout the text, real world examples are provided to illustrate concepts.

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1. Introduction

Sustainable value chain entrepreneurship is a growing phenomenon in the twenty-first century. It is a practice that has the potential to reshape global economic systems in ways that can make a difference to the futures of global communities. The world faces impending threats related to climate change, and destruction of ecosystems. Large segments of the population are living in poverty with difficulty accessing decent work. In response, many new businesses and initiatives are being developed to try to address these pressing sustainability challenges.

The concept of sustainable value chain entrepreneurship covers a diverse range of practices that are carried out by a large set of actors pursuing a wide variety of goals. This book provides an introduction to key aspects of this topic and discusses dynamics related to types of sustainable value chain entrepreneurship, strategies and goals of initiatives, and the future of this type of practice. Throughout the book, concepts are illustrated with real-world examples.

We thus set out to answer four interrelated questions in the book:

1) What is sustainable value chain entrepreneurship?
2) Who are the actors involved in sustainable value chain entrepreneurship?
3) Which practices do these actors engage in as part of sustainable value chain entrepreneurship?
4) Why are these practices likely to be (un)successful in achieving their aims?

This guidebook is targeted at graduate students but may also be of interest to other readers, such as practitioners, policy-makers, or academics interested in sustainable sourcing. The rest of this chapter outlines key concepts and presents an overview of the following chapters.

1.1 Sustainability

To explore the concept of sustainable value chain entrepreneurship it is important to have an understanding of the concept of sustainability. This concept has often been seen to have social,

environmental, and economic dimensions. While business clearly has a commercial or economic element, it is important to also consider that almost all business actions have social and environmental impacts.

In order to study businesses' behaviours related to social and environmental impacts, and in order to regulate these behaviours, different terms have been developed. Key terms that have been used include "corporate social responsibility" (CSR) and "corporate sustainability".[1] Both terms have been associated with multiple definitions. A common definition of CSR is "the social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time".[2] Users of the term CSR have at times focused on social and economic dimensions, while in other instances, it has also been used to incorporate environmental dimensions. With regards to corporate sustainability, many researchers have used definitions that consider whether current actions can exist "without compromising the ability of future generations to meet their own needs".[3] Researchers and practitioners using the term "sustainability" have posited that sustainable development must consider economic, social and economic pillars. However, in some cases researchers have used the term "sustainability" to refer to environmental issues, often using the term "ecological sustainability". Related to the variation within these definitions, some companies internally divide considerations of social and environmental risks, while in other companies they are integrated objectives.

The concept of sustainability has been a major global concern for decades and the global community came together to establish a set of unified goals in 2015. The resulting United Nations' Sustainable Development Goals[4] agreement identifies three dimensions of sustainable development as economic, social and environmental and specifies 17 goals.

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[1] Montiel, I. (2008). Corporate social responsibility and corporate sustainability: Separate pasts, common futures. *Organization & Environment*, 21(3), 245-269.
[2] Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review*, 4(4), 497-505.
[3] World Commission on Economic Development. (1987). *Our Common Future*. Oxford, UK: Oxford University Press.
[4] United Nations (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. A/RES/70/1. New York, NY: United Nations Department of Economic and Social Affairs.

1. End poverty in all its forms everywhere.
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3. Ensure healthy lives and promote wellbeing for all at all ages.
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. Achieve gender equality and empower all women and girls.
6. Ensure availability and sustainable management of water and sanitation for all.
7. Ensure access to affordable, reliable, sustainable and modern energy for all.
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10. Reduce inequality within and among countries.
11. Make cities and human settlements inclusive, safe, resilient and sustainable.
12. Ensure sustainable consumption and production patterns.
13. Take urgent action to combat climate change and its impacts.
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

While Goal 12 is explicitly focused on sustainable production, activities in value chains can be linked to multiple goals. Sustainability in value chains is connected to diverse practices, which range from raw material production or extraction to manufacturing activities to waste disposal to transportation systems.

1.2 Value chains

Critical to the concept of sustainable value chain entrepreneurship is the definition of a value chain. A value chain is "the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use".[5] While these chains exist for products and services, this book focuses on product value chains. However, product value chains can involve service businesses that contribute to the production of products. This book also focuses on the production stage of products' lifecycles with a small amount of coverage on topics related to the use and post-use phases.

The production processes for different items are diverse. Activities involved in production can include mining, farming, petroleum extracting, and various forms of manufacturing. Contemporary production processes often involve large networks of producers contributing to the production of one product. The networks can connect a wide variety of producers and service providers across multiple places, from rural, informal sector, agricultural-based businesses to large multinationals. Global value chains involve production related actors that are distributed around the world.[6] The networks involved are dynamic and constantly in flux and can exist for a short time or many years. Connections can relatively localized or can link diverse global regions. As such, the networks have been described as multi-scalar with international, regional, national, provincial, and local levels.[7]

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[5] Kaplinsky, R., & Morris, M. (2002). *A Handbook for Value Chain Research*. http://www.fao.org/fileadmin/user_upload/fisheries/docs/Value_Chain_Handbool.pdf, accessed 11 June 2021.
[6] Ponte, S., Gereffi, G., & Raj-Reichert, G. (2019). Introduction to the handbook on global value chains. In S. Ponte, G. Gereffi & G. Raj-Reichert (eds.) *Handbook on Global Value Chains*. Cheltenham, UK: Edward Elgar Publishing, pp. 1-28.
[7] Coe, N. M. & Yeung, H. W.-C. (2015). *Global Production Networks: Theorizing Economic Development in an Interconnected World*. Oxford, UK: Oxford University Press.

1.3 Entrepreneurship

The third concept in the term "sustainable value chain entrepreneurship" is "entrepreneurship". The OECD provides a two-part definition of economic entrepreneurship as:

> Entrepreneurial activity is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets. Entrepreneurship is the phenomena associated with entrepreneurial activity.[8]

As such, entrepreneurship can involve the development of new businesses and can also occur within larger organisations, a phenomenon, which has been called intrapreneurship.

Different types of entrepreneurship have been identified, which are related to sustainable entrepreneurship. One is social entrepreneurship, which is defined as having the following components:

> 1) identifying a stable but inherently unjust equilibrium that causes the exclusion, marginalization, or suffering of a segment of humanity that lacks the financial means or political clout to achieve any transformative benefit on its own;
>
> (2) identifying an opportunity in this unjust equilibrium, developing a social value proposition, and bringing to bear inspiration, creativity, direct action, courage, and fortitude, thereby challenging the stable state's hegemony; and
>
> (3) forging a new, stable equilibrium that releases trapped potential or alleviates the suffering of the targeted group, and through imitation and the creation of a stable ecosystem around the new equilibrium ensuring a better future for the targeted group and even society at large.[9]

Eco-entrepreneurship is another related branch of entrepreneurship. Eco-entrepreneurship has been considered as "venturing activity based on environmental awareness".[10] This type of

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[8] Ahmad, N. & Seymour, R. G. (2008). Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection. *OECD Statistics Working Papers* 2008/01. Paris, France: OECD.
[9] Martin R. L. & Osberg, S. (2007). Social Entrepreneurship: The Case for Definition. *Stanford Social Innovation Review*, Spring 2007, 29-39.
[10] Galkina, T. & Hultman, M. (2016). Ecopreneurship–Assessing the field and outlining the research potential. *Small*

entrepreneurship may be developed based on a sincere motivation to address an environmental challenge. However, many companies have been accused of "green washing", which is a process of presenting an environmentally friendly image to the public, which does not match the company's actual behaviour.

Entrepreneurship also occurs outside of the commercial sphere. The concept of institutional entrepreneurship refers to the "activities of actors who have an interest in particular institutional arrangements and who leverage resources to create new institutions or to transform existing ones".[11]

Sustainable entrepreneurship can be seen to bring together qualities of the above three forms of entrepreneurship. Sustainable entrepreneurs have been described as:

> Actors and companies … generat[ing] new products, services, techniques and organizational modes that substantially reduce environmental impacts and increase the quality of life. . . Sustainable entrepreneurs destroy existing conventional production methods, products, market structures and consumption patterns, and replace them with superior environmental and socialproducts and services. They create the market dynamics of environmental and societal progress.[12]

1.4 Sustainable Value Chain Entrepreneurship

This book uses a broad definition of sustainable entrepreneurship. It includes entrepreneurship with broad sustainability-related objectives and also includes activities that focus solely on environmental issues or solely on social issues. Both the creation of new ventures and intrapreneurship are also included. Furthermore, it includes various forms of institutional entrepreneurship that involve actors in public and not-for-profit organisations. The uniting factor is that the innovation is intended to change market conditions related to social and/or environmental issues in value chains.

Enterprise Research, 23(1), 58-72.

[11] Maguire, S., Hardy, C., & Lawrence, T. B. (2004). Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada. *Academy of Management Journal*, 47(5), 657-679.

[12] Schaltegger, S. & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Business Strategy and the Environment*, 20(4), 222-237.

National and international institutions play a major role in shaping the opportunities and need for sustainable value chain entrepreneurship. Formal and informal regulations shape the ways businesses behave in relation to communities and the natural environment and shape the dynamics of the markets in which such behaviours take place.[13] Around the world, these types of dynamics can differ greatly.

One key driver for sustainable value chain entrepreneurship is the existence of sustainability challenges. When sustainability challenges are ongoing and regulation, or lack of enforcement of regulation, is allowing problematic practices to continue, individuals and groups can voluntarily take action to address the problems. The existence of these challenges can be seen as being created through gaps in public regulation and entrepreneurs can be seen to be filling these governance gaps.

On the other hand, government policies can also be drivers of sustainable value chain entrepreneurship. Sustainability-focused policies can specifically be designed to encourage private sector innovation. This can include setting sustainability goals or targets and leaving companies to be creative in figuring out how to meet them. Governments and NGOs can also engage in supportive actions, such as running incubators or providing financial incentives, which seek to help start-ups with sustainability related agendas.

Finally, another driver for sustainable value chain entrepreneurship is market demand. Demand for products marketed to the public as having sustainable characteristics is growing. Many customers like to hear stories about how products were made. Companies can advertise that their products have social and environmental attributes in order to appeal to customers. There is a growing emphasis on consumers being part of the solution when it comes to sustainability challenges.

Another side of market demand is that it can create drivers which perpetuate sustainability challenges. For example, customers seeking to keep up with the latest trends can buy new items rapidly while disposing of their existing items. This activity is particularly a problem when the

[13] Fransen, L. (2013). The embeddedness of responsible business practice: Exploring the interaction between national-institutional environments and corporate social responsibility. *Journal of Business Ethics*, 115(2), 213-227.

items are not designed to have a useful after-use life (e.g. recyclable, biodegradable or reusable) or when the products are sent through waste processing systems that contribute to environmental contamination. A key dynamic of demand-related sustainability challenges is that the characteristics of population groups can shape their level of demand for different products. For example, communities with low trust in public services can have higher demand for bottled water, which is linked to serious environmental challenges.[14] In these cases, opportunities for sustainable value chain entrepreneurship also exist, such as making sure that products that are disposed of at high levels are rapidly biodegradeable or reusable, and developing sustainable production processes.

1.5 Theoretical Approach

This book uses an approach based on value chain analysis. This type of analysis involves analysing the dynamic that exist in buyer-seller relationships as well as looking beyond these relationships and incorporating a consideration of the diverse set of actors which shape the conditions in which interfirm relationships operate, such as states, nongovernmental organisations (NGOs), and trade unions. Value chains are also considered as having institutional features based the various locations where they are embedded. Import categories of embeddedness include territorial (i.e. geographic places), network (i.e. the system of ongoing connections between actors), and cultural (i.e. norms and customs of social groups).[15]

Firms, governments, workers, and other actors connected to global value chains can have divergent priorities related to profitability, growth, and economic development.[16] Conflicts between these priorities have been considered as value chain struggles.[17] Consequently, global

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[14] Alexander, S. M. (2020). *The Social Construction of At-home Drinking Water Behavior: A Mixed-Methods Study of Two New York City Apartment Buildings*. Doctoral dissertation. Ithaca, NY: Cornell University.
[15] Henderson, J., Dicken, P., Hess, M., Coe, N., & Yeung, H. W. C. (2002). Global production networks and the analysis of economic development. *Review of International Political Economy*, 9(3), 436-464; Hess, M. (2004). 'Spatial' relationships? Towards a reconceptualization of embedded ness. *Progress in Human Geography*, 28(2), 165-186.
[16] Lund-Thomsen, P. & Lindgreen, A. (2014). Corporate social responsibility in global value chains: Where are we now and where are we going?. *Journal of Business Ethics*, 123, 11-22.
[17] See: Neilson, J., & Pritchard, B. (2009). *Value Chain Struggles: Institutions and Governance in the Plantation Districts of South India*. Chichester, UK: Wiley-Blackwell.

value chains are seen as contested fields "in which actors struggle over the construction of economic relationships, governance structures, institutional rules and norms, and discursive frames".[18] In light of these tensions, power relations have been seen to be neither unidirectional nor structurally determined and to involve instances of "cooperation and collaboration" and "conflict and competition".[19] While, internal tensions exist, these networks have been seen as being driven by key actors, which can include individual brands, manufacturers or in some cases multiple actors that contribute to shaping production processes.[20]

Both horizontal (local, territorial) and vertical (buyer-seller) connections shape outcomes in value chains.[21] Horizontal influences include institutional pressures related to laws and norms, which operative at multiple geographic scales. Vertical pressures are based on the power relationships between buyers and suppliers.

Forms of Power

Power can be seen as something which an actor has the capacity to use, which they may or may not choose to exercise.[22] If they do choose to exercise their power, it can be targeted through different channels and can involve formal or informal mechanisms. Within a value chain, two important factors shape power.[23] One is the position of each actor and the other is the relationships that exist between the actors.

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[18] Levy, D. L. (2008). Political contestation in global production networks. *Academy of Management Review*, 33(4), 943-963.
[19] Coe, N. M., Dicken, P., & Hess, M. (2008). Global production networks: Realizing the potential. *Journal of Economic Geography*, 8(3), 271-295.
[20] Multipolar governance has been found in computer and bio-fuel value chains, see: Ponte, S. & Sturgeon, T. (2014). Explaining governance in global value chains: A modular theory-building effort. *Review of International Political Economy*, 21(1), 195-223.
[21] Neilson, J., & Pritchard, B. (2010). Fairness and ethicality in their place: The regional dynamics of fair trade and ethical sourcing agendas in the plantation districts of South India. Environment and Planning A, 42(8), 1833-1851; Lund-Thomsen, P., & Coe, N. M. (2015). Corporate social responsibility and labour agency: the case of Nike in Pakistan. *Journal of Economic Geography*, 15(2), 275-296; Gereffi, G., & Lee, J. (2016). Economic and social upgrading in global value chains and industrial clusters: Why governance matters. *Journal of Business Ethics*, 133(1), 25-38.
[22] Lukes, S. (2005). *Power: A Radical View* (2nd ed.). Basingstoke, UK: Palgrave Macmillan.
[23] Coe, N. M. & Yeung, H. W.-C. (2015). *Global Production Networks: Theorizing Economic Development in an Interconnected World*. Oxford, UK: Oxford University Press.

Actor in value chains can wield different types of power, which can be considered across the dimensions of dyadic vs collective and direct vs diffuse. These categories generate four ideal types of power in fragmented production.[24] First, bargaining power involves direct dyadic relations. Second, institutional power involves collective actors acting directly to set rules and standards. Third, demonstrative power involves individual firms behaving in ways that others seek to emulate. Finally, constitutive power involves collective actors perpetuating norms.

Throughout the examples in this book actors engaged in sustainable value chain entrepreneurship have chosen to use different forms of power to create or promote their ventures. Simultaneously, other actors must react to these applications of power. The intersections of multiple forms of power being exerted and felt by diverse actors can make engaging in sustainable value chain entrepreneurship a complicated process.

Buyer-Supplier Relationships

The dynamics shaping the relationships between lead firms and suppliers have been the focus of a large body of academic research. Two perspectives have been used to analyse these relationships. On one hand, these issues can be considered as part of power relationships which link countries. On the other hand, the issues can also be explored when looking at the relationships between individual companies. Each of these perspectives has produced rich and informative research which helps to contextualize the actions of actors engaging in sustainable value chain entrepreneurship.

Considering national-level connections, one stream of research explores distinctions between the centre and the periphery. This type of analysis is featured in early work which considers production as taking place within commodity chains.[25] Such considerations question the roles played by different countries within global production systems. Historically, these have often involved some countries seeing high levels of per capita income accompanied by high levels of

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[24] Dallas, M. P., Ponte, S., & Sturgeon, T. J. (2019). Power in global value chains. *Review of International Political Economy*, 26(4), 666-694.

[25] Gereffi. G. (1994). The Organization of Buyer-Driven Global Commodity Chains: How U.S. Retailers Shape Overseas Production Networks. In G. Gereffi & M. Korzeniewicz (eds.) *Commodity Chains and Global Capitalism*. Westport, CT: Praeger, pp. 95-122; Gereffi, G. (1999). International trade and industrial upgrading in the apparel

consumption, while other countries have been responsible for high level of global production processes in contexts where many people in the populations cannot afford high levels of consumption. However, some of these patterns have begun to change in recent years.[26]

Considering firm-level connections, the types of relationships that take place between lead firms and their suppliers have been analysed and categorised from multiple perspectives. A prominent framework places market-based relationships and vertical integration at opposite ends of a spectrum of coordination, with three forms of relationships (modular, relational and captive) existing in between.[27] Three key determinants shaping the relationship types are identified as complexity of transactions, codifiability of information, and capability of suppliers. Each of these can be classified as "high" (+) or "low" (-). The various combinations produce eight possibilities. However, only five are actually found to occur, which include:

1. Market governance (-complexity/+codifiability/+capability): short-term relationships, often based on single transactions with low switching costs
2. Modular governance (+complexity/+codifiability/+capability): longer relationships in which production is carried out based on buyers' design specifications
3. Relational governance (+complexity/-codifiability/+capability): long-term relationships with mutual dependence, with connections benefiting from spatial proximity and often involving family or ethnic ties
4. Captive governance (+complexity/+codifiability/-capability): long-term relationships involving suppliers being highly dependent on buyers, often incorporating high levels of monitoring and control
5. Hierarchal governance (+complexity/-codifiability/-capability): suppliers being owned by lead firms

These relationships can be influenced by the context in which production takes place. Firms which act as suppliers within global value chains operate within distinct innovation systems. These systems can be considered to be "constituted by elements and relationships that interact in the production, diffusion and use of new and economically useful knowledge". Innovation

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commodity chain. *Journal of International Economics*, 48(1), 37-70.

[26] Horner, R., & Nadvi, K. (2018). Global value chains and the rise of the Global South: unpacking twenty-first century polycentric trade. *Global Networks*, 18(2), 207-237.

[27] Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International*

systems are often considered as being determined at the national level but can also be specific to sub-national regions or production clusters. Innovation systems have been seen to play a role in shaping the types of governance relationships that develop in global value chains by shaping the determinants of codification, competence and complexity. Strong innovation systems can reduce complexity and enable modular or relational governance, reducing the risk of being in a captive or hierarchical relationships (e.g. being bought by a lead firm). When transactions are complex, strong innovation systems can help to make the information codifiable. Additionally, strong innovation systems can lead to higher supplier competence.

Another dynamic of buyer-seller relationships that has been considered are norms and conventions.[28] One key aspect of this issue is quality conventions, which shape how a product's quality is assessed. Six forms of quality conventions have been identified that are associated with different measures of quality (see Table 1.1). When considering a product, these quality conventions can overlap or be combined and change at different points along a value chain, such as raw materials being judged differently than final products.

Table 1.1: Orders of Worth and Quality Conventions[29]

Orders of Worth / Quality Conventions	**Measure of Product Quality**
Market	Price
Industrial	Formal quality testing
Domestic	Trust, repetition, and history
Civic	Social, labour, environmental, and collective impact
Inspirational	Spirit, personality, or newness
Opinion	Opinion poll, social media coverage, or subjective judgement by expert

Another important actor to consider related to sustainable value chain entrepreneurship that has not been discussed thus far is the end consumer. Often sustainability related ventures carried out

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Political Economy, 12(1), 78-104.

[28] Ponte, S., & Gibbon, P. (2005). Quality standards, conventions and the governance of global value chains. *Economy and Society*, 34(1), 1-31; Ponte, S., & Sturgeon, T. (2014). Explaining governance in global value chains: A modular theory-building effort. *Review of International Political Economy*, *21*(1), 195-223.

[29] This framework was developed by Ponte, S., & Sturgeon, T. (2014). Explaining governance in global value chains: A modular theory-building effort. *Review of International Political Economy*, *21*(1), 195-223 drawing from: Boltanski, L. and Thévenot. L. (1991) *De la justification: Les économies de la grandeur*. Paris, France: Gallimard.

by lead firms rely on consumers choosing to consider sustainability issues when making purchasing decisions. Consumers' roles in such systems can also be explored from different perspectives.

In the 21st century, the mainstream global value chain model is based on the division of production across multiple sites and a division between production and consumption. In this system consumers are distanced from the production and disposal conditions of products they buy and use. Many attempts at sustainable value chain entrepreneurship try to connect consumers to production and disposal processes by sharing stories about how these activities take place or by actually bringing these processes closer to consumers.

Two key challenges can be identified related to the power consumers have over practices in global value chains. One issue is related to how much control consumers can actually have. In the current system, consumers choose from the choices presented to them and may have feelings of control, yet the companies choose what the consumers see. For consumer facing ventures, consumers typically see the story presented by the company, which may focus on positive impacts of their initiative or product and ignore problematic aspects. A related concern is that this system can rely on consumers' opinions about which sustainability challenges they want to support, which may not be aligned with the urgency or scope of the most pressing global sustainable challenges.

A second key issue is that the power of individual consumers differs. One key element of this issue is that the level of spending a consumer carries out or their "purchasing power" shapes their ability to express their perspective. As such, this model creates a situation in which those who do not have enough money do not get their opinions heard. Relatedly, products which are intended to address sustainability challenges can be more expensive or more difficult to access and therefore, are out of reach for many consumers. Furthermore, another challenge with this model is that only some consumers have the motivation, time and resources to research the products they buy and choose to buy products designed to resolve sustainability challenges.

Sector Dynamics

The dynamics of sustainable value chain entrepreneurship differ across sectors. Some products and sectors have been given more attention than others when it comes commercial actions related to sustainability.[30] Some key issues that can shape these dynamics are whether a sector is public facing and whether a sector has prominent brand names.

Dynamics of different sectors can shape how marketing takes place related to sustainable value chain entrepreneurship. In some cases, activities take place behind the scenes and are not actively marketed to buyers. In cases where activities are part of marketing this can focus on business-to-business relationships and/or business-to-consumer relationships.

Another key issue is that sectors' risk portfolios are different. The OECD has identified key sector-based risks for several sectors.[31] Key risks can be identified as being connected to each phase of a product's lifecycle and can differ based on how an item is created, how it is used, how long it is used for, and what happens to it after its primary use phase.

A sector that has had a lot of attention related to sustainability issues is the garment industry. This is an industry that faces severe sustainability challenges across product lifecycles and that has been the focus or a large amount of sustainable value chain entrepreneurship. Box 1 provides an overview of range of sustainable value chain entrepreneurship initiatives that have taken place related to garment value chains.

It is also important to note that sectoral differences are not always the best way to analyse sustainability challenges in value chains. Within sectors, risks can also vary based on factors such as where production is taking place and the type of technology that is being used. Therefore, in some cases it can be more valuable to consider issues based on a geographical or technology-focused lens.

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[30] Jackson, G., & Apostolakou, A. (2010). Corporate social responsibility in Western Europe: An institutional mirror or substitute?. *Journal of Business Ethics*, 94(3), 371-394; Brown, D., & Knudsen, J. S. (2015). Domestic institutions and market pressures as drivers of corporate social responsibility: Company initiatives in Denmark and the UK. *Political Studies*, 63(1), 181-201.

[31] See: OECD (n.d). *OECD Guidelines for Multinational Enterprises*. Paris, France: OECD.

Box 1: Sustainable Entrepreneurship in Garment Industry Value Chains

Lead firms in the garment industry are typically brands and retailers that do not engage in their own manufacturing practices. The largest garment brands and retailers have billions of USD turnover each year (see Table 1.2). At the other end, garment brands can also be very small businesses. Garment value chains involve a number of steps that are usually carried out by different businesses, which can range from small scale farmers to large scale yarn spinners. However, in some cases one firm is responsible for multiple stages of production.

Table 1.2: Top Selling Apparel Retailers in 2020[32]

Company	**Global Apparel Retail Sales 2020 (Billions USD)**
Inditex, Industria de Diseño Textil SA	18.4
Fast Retailing Co Ltd	18.2
H&M Hennes & Mauritz AB	15.4
Nike Inc	15.2
adidas Group	14.1
Gap Inc, The	12.9
Hanesbrands Inc	7.9
Levi Strauss & Co	7.0
PVH Corp	7.0
LVMH Moët Hennessy Louis Vuitton SA	6.0
C&A Mode AG	5.7

The main steps in the typical garment production process include fibre production, yarn and textile production, wet processing and garment production. Fibre production can be carried out through very diverse methods. Some of the major methods include farming (e.g. cotton), animal rearing (e.g. wool or fur), or chemical synthesis (e.g. polyester made from petroleum or rayon made from cellulose in wood). Each of these processes requires different types of technology and production techniques which face diverse sustainability challenges.

Yarns can be made through spinning shorter fibres or generated through extruding a single long synthetic filament. Yarns are often used to make textiles. Common ways to make textiles that are used in apparel are to either knit or weave yarns. These are manufactured product that can also be involved in diverse sustainability challenges.

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https://mneguidelines.oecd.org/sectors, accessed 11 June 2021.

32 Source: Euromonitor (2021). Passport [database]. London, UK: Euromonitor.

Wet processing refers to a series of processes that can be done to textiles or garments. These include bleaching, dyeing or applying treatments that can affect the appearance or function of the final garment. Such processes are often be associated with sustainability challenges related to how chemicals and water are used.

Finally, garment production takes place in thousands of factories around the world and is often supported by layers of subcontractors carrying out parts of the assembly process. Garment production often involves high levels of human labour and has often been associated with sustainability challenges related to working conditions. Garments can also include additional non-textile components, such as buttons and zippers. Each of these will have their own value chains, which can also face sustainability challenges.

Lead firms, functioning as brands or retailers, sit at the end of the production process and buy garments. These companies often generate designs (or subcontract the design stage to a third party) and provide design specifications to garment manufacturers. Or in some cases, they choose from designs created by manufacturers or collaboratively develop designs. Design designs can play a key role in shaping sustainability challenges as they can determine the types of production processes that are needed and can effect product recycling options.

As each stage of garment production can face sustainability challenges, many opportunities exist for sustainable value chain entrepreneurship in this sector. Hundreds of businesses and sustainability focused initiatives can be identified which are seeking to address sustainability issues related to fibres, textiles and garments. Furthermore, the staff in many large businesses in garment value chains have engaged in intrapreneurship related to sustainability.

Appendix A lists a selection of global initiatives. Looking at this sample of initiatives, high levels of diversity can be found within one value chain. The initiatives involve lead firms, suppliers, business model innovators, and third parties and takes place across different stages of the product lifecycle. These initiatives include a variety of new types of products that can be made or disposed of with more environmentally friendly methods. Business model innovations can be seen in organisations offering product leasing and creating circular systems in which items previously disposed of as waste are incorporated as inputs creating circular production models. Additionally, many of the examples of innovation involve the creation of new technologies which have diverse benefits, such as facilitating better forms of communication. Furthermore, some initiatives involve the creation of new types of equipment which enable more sustainable production processes. Finally, some organisations are creating standards and carrying out training and auditing procedures that are intended to improve working conditions across the industry.

1.6 Book Overview

The rest of the book focuses on four different types of actors that are involved in sustainable value chain entrepreneurship. Chapter 2 focuses on brands and retailers as lead firms in global value chains and considers different forms of sustainable value chain entrepreneurship that they have been carrying out. These businesses are often large multinational companies that simultaneously carry out a variety of activities which can be considered as sustainable value chain entrepreneurship. A number of factors which can shape the impacts of lead firms' sustainability initiatives are discussed.

Chapter 3 focuses on sustainable value chain entrepreneurship activities that have been engaged in by suppliers. These businesses are responsible for production that is carried out to make products for the lead firms discussed in Chapter 2. As with lead firms, they are also found to engage in a wide variety of sustainable value chain entrepreneurship. However, they often are restrained by their embedded locations, particularly the power that lead firms have over their activities.

Chapter 4 focuses on business model innovators that are engaging in sustainable value chain entrepreneurship. These businesses are creating new systems of production, which can, in some cases, result in stimulating new structures in global value chains. This type of sustainable value chain entrepreneurship has the potential to create transformational changes. However, business model innovators often face multiple barriers related to scaling their operations.

Chapter 5 considers a variety of third-party actors which support and shape activities in value chains. This chapter includes a discussion of diverse businesses and organisations which provide products and services to buyers and suppliers. Initiatives by third-parties have been found to involve new products and services that are specifically targeted as sustainability objectives and also found to include existing products and services which have had new sustainability attributes added. The chapter also discusses initiatives developed by nongovernmental organisations (NGOs), trade unions, workers, and government agencies which are designed to influence suppliers and lead firms and to shape the environment in which they work. Each of these types of

organisations are found to have designed diverse initiatives which can address sustainability challenges in value chains while facing a variety of challenges.

Finally, Chapter 6 provides a conclusion that considers the future of sustainable value chain entrepreneurship. Key opportunities and challenge for sustainable value chain entrepreneurship to have large-scale impacts on sustainability challenges are presented. The chapter also identifies potential paths for future research.

2. Consumer Facing Brands and Retailers as Sustainable Value Chain Entrepreneurs

Consumer facing brands and retailers, considered as lead firms, are often seen as being responsible for production in value chains that are involved in creating the products they sell. In some cases, these companies are manufacturers themselves, such as in the car industry, where typically a car brand owns its own production facilities and relies on suppliers to produce component parts.[33] In other cases, lead firms do not own any of their own manufacturing facilities, which is common for light goods, such as clothing or toys. Similarly, retailers selling fresh products do not typically own farms or carry out other primary production activities, such as fishing.

Notwithstanding their varying levels of connections to production practices, lead firms have engaged in a variety of ways to address challenges related to sustainability in value chains. Buyers can have multiple reasons to engage in sustainable value chain entrepreneurship. For some companies, management or owners can have strong internal motivation related to sustainable production. Additionally, companies can have multiple external drivers. Customers, investors and potential employees can be attracted by companies associated with sustainability. Also, companies can feel pressures from public policies, civil society or investors. A key point of the chapter is that the evolution of the global sustainability agenda is so quick that no sooner have brands "invented" a new approach to sustainable value chain management before a new challenge presents itself that once again requires brands to further act in relation to sustainable value chain entrepreneurship.

To address sustainability challenges, lead firms have engaged in diverse practices related to sustainable value chain entrepreneurship. One domain of action is related to the design of their products. Another is taking actions specifically aimed at changing behaviours of others in their

[33] Gereffi. G. (1994). The Organization of Buyer-Driven Global Commodity Chains: How U.S. Retailers Shape Overseas Production Networks. In G. Gereffi & M. Korzeniewicz (eds.) *Commodity Chains and Global Capitalism*. Westport, CT: Praeger, pp. 95-122.

value chains. A third is that they have been engaging in efforts to improve value chain transparency. This chapter presents an overview of how brands and retailers have engaged in sustainable entrepreneurship related to each of these key domains and also considers how lead firms have developed collective initiatives to address sustainability challenges.

2.1 Product Design

Product design plays a large role in determining the risks that are faced in value chains. Challenges can include products using materials that are produced in risky conditions or having features that require dangerous production practices. Another issue that is important to consider is that product design can shape recycling options. Examples of entrepreneurship related to these elements of product design are considered here.

Sustainability Related to Product Composition

At a fundamental level, if a lead firm is designing a product, then they choose the material components. Product designs can be very complex and include many component parts, such as for a mobile phone, or very simple, such as a soup bowl. In some cases, lead firms have detailed knowledge of all of the components in a product. However, in other cases, a lead firm may be acquiring a product that is designed externally. For many products, component parts may be designed externally.

Each component of a product can be associated with particular sustainability challenges. Producing components of a manufactured product can be related to activities directly tied to natural resources, such as mining or farming or involve some level of processing, such as making steel or paint. Production processes involved in making some products are complex and can involve proprietary practices. In order to reduce risks of contributing to sustainability challenges, designers can exclude products which are associated with high levels of sustainability risks or can seek to include components which have defined sustainability criteria, such as products bearing sustainability certification (see Sections 2.2 and 5.1).

An example of situation in which a company has engaged in entrepreneurship related to product composition can be seen in the case of cobalt in batteries. Cobalt is a component of lithium-ion rechargeable batteries that are used for mobile phones, laptops, and electric cars.[34] Most of the world's mined cobalt comes from the southern part of the Democratic Republic of Congo. This mining takes place in an unstable and often violent environment. Cobalt mining has been associated with health risks to workers and numerous problematic impacts on local communities, including lack of public consultation, land grabs, violence and environmental destruction. One type of action that has been taken by sustainable entrepreneurs has been to seek to develop products that do not use cobalt. Tesla, a US-based lead firm in the car industry has recently announced it will sell cars with cobalt-free cathodes in their batteries.[35]

Sustainability of Components' Manufacturing Processes

Lead firms can have limited knowledge of production processes that are used in their products. This can be a serious challenge for buyers as the processes that were used may not leave any evidence in the final product that they receive. Ways that buyers try to control production processes are discussed in more depth below (see Section 2.2). However, buyers can control elements of product design which shape the types of risks that maybe be more likely to be faced during production. For example, when a large-scale retailer or brand offers a product that is hand-made, production may be more likely to take place in informal and less regulated spaces, such systems using home-based work. While home-based work is not a problem in and of itself, it can occur in situations where workers are subject to problematic working conditions, such as piecework payments being lower than legal minimum wages.[36]

Sometimes, particular production practices are known to create high levels of risk for health or environmental damage. In their design processes, companies can ban features which require such

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[34] Scheele, F. de Haan, E., & Kiezebrink, V. (2016). *Cobalt Blues: Environmental pollution and human rights violations in Katanga's copper and cobalt mines*. Amsterdam, Netherlands: SOMO.
[35] Calma, J. (2020, September 22). Tesla to make EV battery cathodes without cobalt. *The Verge*. https://www.theverge.com/2020/9/22/21451670/tesla-cobalt-free-cathodes-mining-battery-nickel-ev-cost, accessed 11 June 2021.
[36] von Broembsen, M. (2020). Regulating corporations in global value chains to realise labour rights for homeworkers. In M. Chen & F. Carré (eds.) *The Informal Economy Revisited*. Abingdon-on-Thames: Routledge, pp. 143-150.

practices. A process ban has been used in the case of sandblasting, a technique that has been used on jeans to make them have a worn-in look. The process was often done manually, which involved workers spraying sand at high pressure onto fabric. This activity has been associated with causing silicosis, a condition in which the lungs are damaged through inhaling small particles.[37] In order to prevent the risk of this practice being used in their value chains, in 2010, Levi Strauss & Co and H&M, two major sellers of jeans, announced that they would ban sandblasting in all of their product lines.

In addition to preventing harm, opportunities also exist to support positive practice through product design. Products can include components that are made through processes which have positive social and environmental outcomes. Conscientious design decisions can allow entrepreneurs to develop products and companies which have positive impacts as part of their core business. This can be seen in the case of Natura, a Brazilian multinational cosmetics, hygiene and beauty products company, which uses plant-based ingredients.[38] Their products contain inputs which are grown by 2000 small-scale Brazilian farmers. Their engagement with these farmers is designed to involve fair trade principles and ongoing community engagement. Through these efforts, they claim to have preserved 18,000 square kilometers of Amazonian forest.

Addressing Sustainability Challenges during Product Use

Product design is also critically important for shaping sustainability challenges during a product's use. A number of issues are important to consider related to this issue and have been connected to a wide variety of sustainable value chain entrepreneurship initiatives.

Energy use is a key element of products' sustainability that is shaped by design. Energy generation can create high levels of CO2 emissions, which are a major contributor to climate change.[39] One issue is the amount of energy a product requires to function. An example of

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[37] Riddselius, C. (2010). *Fashion Victims: A Report on Sandblased Denim*. Stockholm, Sweden: Fair Trade Center.
[38] Natura (2020). Preserve the Forest. Sao Paulo, Brazil: Natura. https://www.naturabrasil.fr/en-us/our-values/sustainable-development/preserve-the-forest, accessed 11 June 2021.
[39] Fecht, S. (2021). *How Exactly Does Carbon Dioxide Cause Global Warming?*. New York, USA: Colombia Climate School.

sustainable value chain entrepreneurship can be found related to light bulbs. Traditional light bulbs (incandescent and halogen) use high levels of energy during their use phase. Notably, at the turn of the millennium, electrical lighting consumed about 20% of worldwide electricity production.[40] Additionally, lighting-related greenhouse gas (GHG) emissions for 2005 were estimated to be about 7% of the total global CO2 emissions from the consumption and flaring of fossil fuels. Products that incorporate lighting can choose to use LEDs in order to have less energy use and conserve resources because LED bulbs last longer.[41] Many companies have engaged in sustainable entrepreneurship by incorporating LEDs into their product designs. For example, Ikea has switched all of their lighting to LEDs.[42]

Another energy related issue is the types of energy products use. Vehicles are a product that has been a major contributor to pollution due to their use of petroleum-based fuel. In the EU, transportation accounts for 30% of CO2 emissions with 72% of this level produced by road transport.[43] Cars are the biggest source of road transport emissions contributing 61% of the sector's emissions. Cars powered by electricity over fossil fuel do not create exhaust emissions. A number of companies have innovated related to offering electric cars. Tesla is an example of a company that was founded based on this product, which has seen high levels of success.

Addressing Sustainability Challenges Related to Products' Post-Use Life

While most of this book focuses on the production stage of products' lifecycles, the product design stage is a crucial factor shaping the options for a product's post-use life. Some materials can biodegrade or be recycled, while others have limited post-life uses and may end up in landfills or polluting waterways. Below there is further discussion on businesses that take previously discarded post-use items and turn them into new products (see Section 4.3).

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[40] Zissis, G. (2016). Energy Consumption and Environmental and Economic Impact of Lighting: The Current Situation. In R. Karlicek, C-C. Sun, G. Zissis and R. Ma (eds.) *Handbook of Advanced Lighting Technology*. Basil, Switzerland: Sprinter International Publishing, pp. 921-933.
[41] Navigant Consulting. (2012). *Life-Cycle Assessment of Energy and Environmental Impacts of LED Lighting Products*. Washington, DC, United States of America: US Department of Energy.
[42] edie newroom (2015, August 11). Ikea lights the Way with Switch to Full LED Range. *edie*. https://www.edie.net/news/6/Ikea-lights-the-way-with-switch-to-full-LED-range, accessed 11 June 2021.
[43] European Parliament (2019, April 18). CO2 emissions from cars: Facts and figures. *News: European Parliament*. https://www.europarl.europa.eu/news/en/headlines/society/20190313STO31218/co2-emissions-from-cars-facts-and-figures-infographics, accessed 11 June 11 2021.

A key issue related to design and products' post-use lives is the choice of materials. Companies can choose biodegradable or easily recycled materials or they can choose materials that are not easy to recycle or those which may be dangerous during the post-use phase. Plastic is a common material that is in a lot of products but many forms of it cannot be recycled or are difficult to recycle. Some entrepreneurial businesses are starting to use alternative substances where plastic has been commonly used. For instance, coffee pod machines were an innovation that became very popular. However, with the high levels of growth came claims that the single use pods were creating high levels of waste. To address this problem, entrepreneurs designed a variety of eco-friendly pods. For example, Halo Coffee is a UK-based company that designed fully compostable pods that are made with waste sugar cane and paper pulp.[44] Another challenge that entrepreneurs have sought to address is designing products that have a reduced need for single-use components. Furthermore, products can also create harmful by-products during their use, which is another problem that innovative companies can try to address during the design stage.

Another issue related to design that shapes what can be done with a product after its use is how easily its component parts can be extracted. Some design processes involve attaching materials in ways that are difficult to separate and make even recyclable components very difficult to recover. To help address such sustainability challenges, companies can take this consideration into their design processes. An emerging phenomenon in this vein is e-waste. As an increasing number of products incorporate digital technology, the production and disposal of e-waste is becoming a more pressing concern. Some of it ends up in landfills and some gets sent to low-income countries for informal recycling processes which creates high levels of health risk for workers.[45] Separating out different materials from e-waste is difficult in a number of aspects. One issue is that consumer electronics contain many potentially toxic substances, such as lead, mercury, flame retardants, and PCBs. The way these materials are usually incorporated can result in releasing these substances during recycling processes. This sustainability challenge is shaped

[44] Halo Coffee (2019, July 18). Our Story. London, UK: Halo Coffee. https://halo.coffee/blogs/blog/our-story, accessed 11 June 2021.
[45] Related issues occur with regards to the after-use of a product. For example: Laha, S. (2014). Informality in e-waste processing: An analysis of the Indian experience. *Competition and Change*, 18(4), 309-326.

by how products are designed. To address this challenge, Nokia created a mobile phone prototype that self-disassembles when exposed to high temperatures.[46]

Packaging is another area where companies can be innovative. Companies can use packaging design to add brand value. While single use plastics have become a very common way to package products, some companies are developing alternatives. Excessive packaging can also create high levels of waste and require products to take up more space during shipping processes, which can be associated with high CO2 emissions related to transportation.

Many products are sold with packaging that creates high levels of waste that is not recyclable or is not recycled. A key component of much packaging has been polystyrene (commonly known by the brand name Styrofoam). This is a petroleum-based plastic product. Most plastics do not biodegrade and instead slowly break down into smaller fragments known as microplastics. Studies suggest that items made of expanded polystyrene foam can take up to thousands of years to decompose and cause contamination of soil and water.[47] In a study of marine litter in the UK, 8% of waste was identified as polystyrene.[48] Dell, an American multinational computer technology company, originally shipped their products in packaging which used polystyrene. To address the high levels of waste that were being created, they changed their packing design to use new materials, which have included bamboo and mushroom based options.[49]

2.2 Promoting Behaviour Change for Producers

Some companies have their own manufacturing facilities and others may outsource all production activities. For companies that do carry out manufacturing processes, it is common to

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[46] Nokia (2005). *Integrated Product Policy Pilot Project Stage I Final Report: Life Cycle Environmental Issues of Mobile Phones*. Espoo, Finland: Nokia Corporation. https://ec.europa.eu/environment/ipp/pdf/nokia_mobile_05_04.pdf, accessed 11 June 2021.
[47] UNEP (2018). *Single-Use Plastics: A Roadmap for Sustainability* (Rev. Ed). Nairobi Kenya: UNEP.
[48] Lopez Lozano, R., & Mouat, J. (2009). *Marine litter in the North-East Atlantic Region: Assessment and priorities for response*. London, United Kingdom: OSPAR
[49] Kruschwitz, N. (2012, July 17). How Dell Turned Bamboo and Mushrooms into Environmental-Friendly Packaging. *MIT Sloan Management Review*. https://sloanreview.mit.edu/article/how-dell-turned-bamboo-and-mushrooms-into-environmental-friendly-packaging, accessed 11 June 2021.

use component parts that are manufactured externally. Consequently, most lead firms rely on a network of independent suppliers.

Brands and retailers' sustainable value chain initiatives targeted at changing suppliers' behaviours began emerging at a large-scale in large companies in the 1990s and have evolved over the years. When these initiatives started, they often were based on buyer-developed standards, using an approach which has been called a compliance paradigm.[50] Over the years, after limited successes with compliance-based approaches, a new form of approach emerged, which has been called the cooperative paradigm.[51] Furthermore, some companies have opted for a market-driven approach.[52]

Seeking to change behaviour in value chains is not a straight-forward process. For many large brands and retailers, they face the prospect of trying to influence thousands of firms around the world. Retailers and brands have developed specialised roles and sometimes have even created departments that focus on ensuring suppliers use sustainable practices.

Compliance Paradigm

A major element of attempts to transition to more sustainable production processes has been the creation of standard systems. These systems typically outline a number of suggested or mandatory elements that a supplier should follow. These can include behaviours, equipment or input specifications, undergoing inspections, or types of impacts, among others. Standard or certification systems can be designed by a variety of actors. Addressing growing public concern about working conditions in value chains in the 1990s, Sainsbury's, a British supermarket chain, developed a supplier code of conduct that was launched in 1998.[53] They used this code to evaluate suppliers for their own branded products. Alternately, some companies have chosen to

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[50] Lund-Thomsen, P., & Lindgreen, A. (2014). Corporate social responsibility in global value chains: Where are we now and where are we going?. *Journal of Business Ethics*, 123(1), 11-22.
[51] Ibid.
[52] Alexander, R. (2020). Emerging roles of lead buyer governance for sustainability across global production networks. *Journal of Business Ethics*, 162(2), 269-290.
[53] Fridd, P., & Sainsbury, J. (1999). The Role of Voluntary Codes of Conduct and Regulation—a Retailer's View. In S. Picciotto & R. Mayne (eds.) *Regulating International Business*. London, UK: Palgrave Macmillan, pp. 221-234.

follow more broadly applied standard systems that have been developed by external actors or coalitions (see Section 4.1).

Compliance can be ensured through first-party verification (i.e., self-assessment), second-party verification (i.e., assessment by the organisation managing the standard or a buyer assessing a supplier) or third-party verification (i.e., independent assessment). Some systems use a combination of these approaches.

Lead firm compliance approaches have been found to have limited effectiveness.[54] Problems can occur for a number of reasons. One issue is that suppliers have a number of potential responses to buyer-imposed standards. Specifically, five types of responses can be identified.[55] The first is to "acquiesce" (or conform), which involves succumbing to the pressure. The second is to "compromise", which involves making strategic changes. The third is to "avoid", which involves ignoring the pressure. The fourth is to "defy", which involves public resistance. Finally, the fifth is to "manipulate", which involves finding a way around the pressure. Researchers have found that related to labour issues, standard systems tend to be more effective for measurable standards as opposed to enabling rights, that are harder for an outsider to observe, such as freedom of association.[56] This dynamic can be seen in the outcomes of a global assessment of the impact of codes of conduct that were used by a set of brands and retailers that were members of the UK's Ethical Trading Initiative in the early 2000s.[57]

Cooperation Paradigm

While the practices associated with the compliance paradigm have become widespread in major global companies, concern with the lack of impact created by many standards has led to a broad exploration of alternative approaches for buyers to engage in related to influencing production

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[54] Locke, R. M. (2013). *The Promise and Limits of Private Power: Promoting Labor Standards in a Global Economy*. Cambridge, UK: Cambridge University Press; Bartley, T. (2018). *Rules Without Rights: Land, Labor, and Private Authority in the Global Economy*. Oxford, UK: Oxford University Press.
[55] Oliver, C. (1991). Strategic responses to institutional processes. *Academy of Management Review*, 16(1),145–179.
[56] Barrientos, S., Gereffi, G., & Rossi, A. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, 150(3-4), 319-340.
[57] Barrientos, S., & Smith, S. (2007). Do workers benefit from ethical trade? Assessing codes of labour practice in global production systems. *Third World Quarterly*, 28(4), 713-729.

practices. Many companies have now embraced approaches which involve higher levels of cooperation with their suppliers.

The cooperative paradigm has been associated with three main features.[58] The first is a consideration by buyers about their impact on suppliers, such how their scheduling of orders allows suppliers to plan and use resources efficiently, the lengths of buyer-supplier relationships, and coordinating activities between the separate staff that are often responsible for buying and those responsible for corporate social responsibility.[59] In some cases, buyers' behaviours have been found to drive sustainability challenges related to production processes. One problematic behaviour is pushing suppliers to have fast production turnaround which can require excessive pressure on workers. Another issue can be creating high levels of cost pressure which can create incentives for producers to cut corners or take other actions that lead to sustainability challenges, such as decreasing the quality of employment relations.[60] To address this issue some retailers are starting to evaluate their own practices and make changes in order to reduce the negative pressures they have placed on producers, such as rewarding buying staff for incorporating labour standards into buying decisions.[61]

A second feature of the cooperative paradigm is that buyers can support capacity development for suppliers, with worker training on rights and responsibilities as a potential way to strengthen suppliers' performance. An example of a capacity building approach can be seen in Philips, a large Dutch electronics company that focuses on health technology, which has developed programmes to provide classroom training sessions for suppliers.[62] They also have sustainability experts that regularly visit suppliers to provide on-site consultancy and training. When new

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[58] Lund-Thomsen, P., & Lindgreen, A. (2014). Corporate social responsibility in global value chains: Where are we now and where are we going?. *Journal of Business Ethics*, 123(1), 11-22.
[59] Ashwin, S. Schüßler, E., & Lohmeyer, N. (2020, August 9). Intraorganizational tensions around being good: Explaining (de-)coupling of purchasing and CSR in garment brands and retailers [Paper Presentation]. American Sociological Association Annual Meeting 2020, online.
[60] Anner, M. (2019). Predatory purchasing practices in global apparel supply chains and the employment relations squeeze in the Indian garment export industry. *International Labour Review*, 158(4), 705-727.
[61] Ethical Trading Initiative (2021). Company Purchasing Practices. London, UK: Ethical Trading Initiative. https://www.ethicaltrade.org/issues/company-purchasing-practices, accessed 11 June 2021.
[62] Philips (n.d.). Leading the change towards a healthier, safer and more ethical supply chain. Amsterdam, Netherlands: Philips. https://www.philips.com/a-w/about/company/suppliers/supplier-sustainability/our-programs/improved-working-conditions.html, accessed 11 June 2021.

sustainability issues emerge, they develop programmes focused on specific topics. Lead firms can directly support capacity building among suppliers or they can engage other organisations to do so. Chapter 4 has further discussion on some organisations providing such services.

A third feature of the cooperative approach involves a move away from auditing in the way that it has traditionally been carried out in the compliance approach. Lead firms can use more open approaches to assess their suppliers as opposed to an external auditor filling in a checklist. Buyers can develop participatory social auditing programmes which involve stronger contacts with workers and local organisations where production takes place (see Section 5.1 for an example).

Market Based Approaches

Another way that buyers are involved in sustainable value chain entrepreneurship is by designing mechanisms that shape market incentives. These can function internally within large businesses. For example, to promote innovation related to sustainability, Marks and Spencer, a British general retailer, has used market mechanisms within its own business.[63] As part of their sustainability strategy, called Plan A, the company set a goal that every product must incorporate at least one sustainability attribute from a list they have defined, which motivates staff to innovate. Additionally, directors have sustainability targets as part of their annual bonus objectives. Furthermore, the company set up the Plan A Innovation Fund, which supports processes of intrapreneurship.

Market incentives can also be targeted at suppliers. In 2016, Puma, a German sports company, launched a programme that was designed to incentivize improvements to suppliers' sustainability performance.[64] The programme, which was carried out in partnership with IFC, gave suppliers

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[63] Marks and Spencer. (2012). *The Key Lessons from the Plan A Business Case*. London, UK: Marks and Spencer. https://corporate.marksandspencer.com/documents/plan-a-our-approach/key-lessons-from-the-plana-business-case-september2012.pdf, accessed 11 June 2021.

[64] Sustainable Brands. (2016, September 8). PUMA Launches Financing Program to Reward Suppliers for Sustainability Performance. San Francisco: CA: Sustainable Brands. https://sustainablebrands.com/read/organizational-change/puma-launches-financing-program-to-reward-suppliers-for-sustainability-performance, accessed 11 June 2021.

access to loans with preferential funding conditions if they performed well in PUMA's regular supplier audits, which cover social, environmental, and health and safety components.

Broadly speaking, setting sustainability-related standards for future purchases can create incentives for producers to adopt the specified standards. Additionally, buyers can create diverse other types of incentives. One form can be through marketing best practices in ways designed to appeal to producers. Activities in this vein include developing online resources targeted at producers that are related to improving environmental or social impacts during the production process.

2.3 Transparency and Traceability

Demand for lead firm transparency is growing from consumers and civil society groups and also through emerging public regulation. Providing visibility into production practices can help with the process of identifying and remedying problematic situations. Lead firms have developed several types of transparency initiatives.

A key issue related to the role of brands and retailers as buyers is that they often sit at the top of long and complex value chains and they do not know who is involved in all of the processes that go into making a final product.[65] As sustainability in value chains has become a more salient concern, the idea of mapping the businesses involved in producing individual products has emerged as the concept of product traceability.

Many brands and retailers have begun to publish information on their first-tier suppliers.[66] An attempt at traceability can be seen in the case of chocolate value chains. Cocoa farming is an activity that has been associated with high levels of farmer poverty, extensive deforestation, human and labour rights violations including forced labour and child labour, and an

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[65] Alexander, R. (2019). Limits to Buyer-Driven Governance for Sustainability in Global Production Networks. *Garment Supply Chain Governance Discussion Paper Series* No. 02/2019. Berlin, Germany: Garment Supply Chain Governance Project.

[66] Schüßler, E., Frenkel, S. J., Ashwin, S., Kabeer, N., Egels-Zandén, N., Huq, L., Alexander, R., Oka, C., Lohmeyer, N., Rahman, S., & Rahman, K. M. (2018). *Changes in the Governance of Garment Global Production Networks: Lead Firm, Supplier and Institutional Responses to the Rana Plaza Disaster, Garment Supply Chain*

over-dependency on pesticides.[67] A US chocolate company, Uncommon Cocoa, was a pioneer in transparency in the cocoa sector in the mid-2010s.[68] Their information sharing has included a variety of information on production conditions in their value chain, including prices paid to farmers, participation of women and aspects related to biodiversity in farming.

Some companies have gone on to publish the names of businesses involved in parts of their lower-tier supplier bases. However, the large sizes and complex relationships involved, limits the growth of such actions. A range of traceability initiatives and technologies have been developed by third-parties, which are discussed in Chapter 4.

Lead firms have increasingly been publishing a variety of reports which provide different forms of information about their value chains. Companies have also thought to be innovative in how their share information. An example of an innovative transparency initiative is Asket, a Swedish clothing retailer, providing customers with Impact receipts.[69] These receipts outline levels of CO2 , water, and energy use involved in making each product.

2.4 Collective Action Among Lead Firms

Another way that lead firms have found to address sustainability standards in their value chains is through various forms of collective action. In some cases, this is through formal business associations. This can involve actions taken by business associations with broad-ranging mandates. Also, some business associations have developed explicitly to address sustainability challenges. Amfori is a business association based in Belgium that has over 2,400 members who are retailers, importers, brands and associations from more than 40 countries.[70] Their mission is to enable organisations to enhance human prosperity, use natural resources responsibly and drive

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Governance Interim Report November 2018. Berlin, Germany: Garment Supply Chain Governance Project.
[67] Fountain, A. C., & Huetz-Adams, F. (2020). *Cocoa Barometer 2020*. Ede, The Netherlands: Cocoa Barometer Consortium.
[68] Uncommon Cocoa. (n.d). Transparent Trade. Easton, MA: Uncommon Cocoa. https://www.uncommoncacao.com/transparenttrade, accessed 11 June 2021.
[69] Asket (n.d.). The Impact Receipt. Stockholm, Sweden: Asket. https://www.asket.com/us/transparency/impact, accessed 11 June 2021.
[70] Amfori. (n.d.). About Amfori. Brussels, Belgium: Amfori. https://www.amfori.org/content/about-amfori, accessed 11 June 2021.

open trade globally. They provide their members with support on promoting socially and environmentally sustainable value chains and carry out advocacy on behalf of their members' interests. Business associations can differ in their structures and can be business-led or be multi-stakeholder organisations.[71]

Lead firms can also work collectively through less formal arrangements. This can involve developing ad hoc working groups to deal with emerging sustainability challenges. In some cases, such ad hoc groups can take collective actions. Such a situation was experienced in Cambodia in 2014. In January, several days of garment worker protests ended with military police shooting protesters resulting in 5 deaths, more than 30 injured, and 23 union leaders being detained without trial. This incident led to a group of global garment brands coming together to respond.[72] Seven brands wrote a letter condemning the violence. A few months later a group of brand representatives went to Cambodia to meet with government representatives. Following this meeting brands began to threaten to withdraw their orders from Cambodia and the government released the detained activists.

2.5 Limitations of Buyer-Centric Approaches

In all of the approaches discussed in this chapter, the lead firms have freedom to take the desired actions and members of their value chains must react to these changes or creation of new demands. While the activities carried out by lead firms may be intended to address a sustainability challenge, they can result in the creation of new sustainability challenges being experienced by suppliers.

A key challenge is that new social or environmental inventions may be designed to reflect the concerns of stakeholders in the global North without taking advantage of already (potentially) more sustainable practices existing in the global South. For instance, global brands and retailers in the textile and clothing industries are increasingly concerned about the re-use, resale, and

[71] Marques, J. C. (2016). Private Regulatory Strategies: Theory and Evidence from the Global Apparel Industry. In Academy of Management Proceedings, 2016(1), doi.org/10.5465/ambpp.2016.287.
[72] Oka, C. (2018). Brands as labour rights advocates? Potential and limits of brand advocacy in global supply chains. *Business Ethics: A European Review*, 27(2), 95-107.

recycling of clothing. Hence, they may encourage their suppliers in the global South to become involved in circular economy initiatives, largely designed by multi-stakeholder initiatives, internally by staff in the brands themselves, or by third parties that specialize in this area. Hence, suppliers in the global South may "mirror" the sustainability priorities of their international buyers in the global North – in this case, with reference to circular economy initiatives. However, this dynamic may drive the creation of redundant initiatives as there are already pre-existing mechanisms for handling post-production waste in many localities. For instance, in the Pakistani town of Faisalabad, there are existing value chains for re-using textiles wastes which are turned into new products.[73]

An important issue is that many lead firms have large and diverse supplier bases. Different production locations can face distinct sustainability challenges, or distinct causes for seemingly similar challenges. This issue can result in lead firms' actions being experienced differently and resulting in divergent outcomes.[74]

Another key challenge with lead firms' sustainable value chain entrepreneurship activities is that the priorities can change frequently. Their actions can be based on pressure from external campaigns or stories that are in the media. Consequently, responses can be short-term, ad hoc projects.

Both the preponderance of short-term projects and the large number of sustainability challenges involved in production, are challenges that can be exacerbated by a lack of traceability. Often lead firms' value chains are characterized by high levels of opacity, with lead firms having limited knowledge of the dynamics taking place during production. This can lead to initiatives that are poorly designed.

Another issue to consider is that consumer facing lead firms may encounter pressures which can shape their freedom to engage in sustainable value chain entrepreneurship. Many businesses face strong competition which can limit their ability to increase prices. While customers often state

[73] Noman, M., Batool, S. A., & Chaudhary, M. N. (2013). Economic and employment potential in textile waste management of Faisalabad. *Waste Management & Research*, 31(5), 485-493.
[74] Bartley, T. (2018). *Rules Without Rights: Land, Labor, and Private Authority in the Global Economy*. Oxford, UK: Oxford University Press.

they prefer products associated with sustainability-related attributes, in behavioural studies, they have been found to choose items with lower prices.[75]

A related challenge is that publicly traded lead firms face is high pressure to have short-term returns. [76] This economic structure in itself drives sustainability challenges in value chains. Additionally, such pressures can limit the ability of lead firms to expand efforts on addressing social and environmental challenges.

A major limitation of the sustainable entrepreneurship efforts of many lead firms is that they often do not touch their core business practices – their purchasing practices in particular. Hence, even if lead firms invent new ways of working with sustainability in their value chains, the changes may not necessarily affect their pricing strategies, their lead times, frequent changes to orders, and their pitting different suppliers against one another in different production locations around the world.[77] The so-called price squeeze on suppliers means that international buyers may demand from their suppliers that they should be more innovative and forward thinking in relation to making products and processes more socially and environmentally sustainable, while the same buyers have subjected their suppliers to continuous prices declines over the last thirty years in many industries.[78]

As a result of lead firm initiatives, suppliers often have to make new investments in production sites without necessarily reaping any financial benefits from doing so.[79] Moreover, buyers may even sometimes use the new inventions by their suppliers – if they are not patented in time by the suppliers – and mainstream these throughout their entire value chains globally. Hence, the brands

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[75] Hassan, L. M., Shiu, E., & Shaw, D. (2016). Who says there is an intention–behaviour gap? Assessing the empirical evidence of an intention–behaviour gap in ethical consumption. *Journal of Business Ethics*, 136(2), 219-236.
[76] Palpacuer, F. (2008). Bringing the social context back in: governance and wealth distribution in global commodity chains. *Economy and Society*, 37(3), 393-419.
[77] See: Khan, M. J., Ponte, S., & Lund-Thomsen, P. (2020). The 'factory manager dilemma': Purchasing practices and environmental upgrading in apparel global value chains. *Environment and Planning A*, 52(4), 766-789.
[78] Marslev, K. (2019). The Political Economy of Social Upgrading: A class-relational analysis of social and economic trajectories of the garment industries of Cambodia and Vietnam. PhD Thesis, Roskilde, Denmark: Roskilde University.
[79] Khan, M. J., Ponte, S., & Lund-Thomsen, P. (2020). The 'factory manager dilemma': Purchasing practices and environmental upgrading in apparel global value chains. *Environment and Planning A*, 52(4), 766-789.

may pay little of the development costs for these new initiatives, but instead reap the benefits, for instance, once a new and more “sustainable” technology has been developed.

3. Business-to-Business: Suppliers as Sustainable Value Chain Entrepreneurs

Global suppliers are a diverse set of businesses. The largest ones rival the sizes of top global brands.[80] Whereas the smallest ones can be micro-enterprises involving informal sector homeworkers. Producers' outputs can be standard products or ones that are custom-made for particular buyers.

As with lead firms, lower tier producers can also have multiple motivations for engaging in sustainable entrepreneurship. Innovation related to sustainability for producers in value chains can have elements which are designed to appeal to buyers or it may not. The innovation can also be confined to addressing sustainability challenges in ways that buyers are not even aware of.

Research on producers in value chains has explored different types of firm upgrading that can occur.[81] These has been categorised into four forms. The first is product upgrading, which involves increasing products' sophistication or value. The second is process upgrading, which involves improving businesses' internal workings. The third is functional upgrading, which involves firms providing new functions to supplement their existing offerings, such as packaging or design. The fourth is sectoral upgrading, which involves firms bringing their skills into new sectors. Entrepreneurs among producers can take any of these paths related to the sustainability of their businesses.

Upgrading related to sustainability has been considered as environmental upgrading[82] and social upgrading.[83] Meanwhile, combining these forms of upgrading with economic upgrading has

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[80] Raj-Reichert, G. (2019). The role of transnational first-tier suppliers in GVC governance. In S. Ponte, G. Gereffi & G. Raj-Reichert (eds.) *Handbook on Global Value Chains*. Cheltenham, UK: Edward Elgar Publishing, pp. 354-369.
[81] Humphrey, J., & Schmitz, H. (2002). How does insertion in global value chains affect upgrading in industrial clusters?. *Regional Studies*, 36(9), 1017-1027.
[82] De Marchi, V., Di Maria, E., Krishnan, A., & Ponte, S. (2019). Environmental upgrading in global value chains. In S. Ponte, G. Gereffi & G. Raj-Reichert (eds.) *Handbook on Global Value Chains*. Cheltenham, UK: Edward Elgar Publishing, pp. 310-323.
[83] Barrientos, S., Gereffi, G., & Rossi, A. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, 150(3-4), 319-340.

been called synergistic upgrading.[84] Supplier's sustainable entrepreneurship could involve solely environment or social trajectories or can also involve synergistic upgrading.

3.1 Product Upgrading

As with lead firms, suppliers can develop new products that address sustainability challenges. This can involve offering products with particular sustainability related features. Product innovation for sustainability can change the way the product functions or can be address sustainability impacts without affecting how the product is used. For example, a product can use a material with similar attributes but that is more environmentally friendly. This could involve features such as being biodegradable or recyclable or being made from alternative substances that have fewer toxic components. Such innovation can be seen in the example of Essentra Components, a UK-based producer of plastic injection moulded, vinyl dip moulded and metal components with can be used for a range of industries and applications.[85] They offer over 45,000 standard parts, which include caps and plugs, wire and cable management, flange protection, knobs, handles and grips, access hardware, PCB and electronics hardware, that are produced in 14 manufacturing facilities. Essentra Components has sought to develop more sustainable plastic parts through increasing the use of post-consumer recycled content in their low-density polyethylene (LDPE) and polypropylene (PP) standard product ranges. They are also working on developing the capability to offer alternative materials to virgin polymers. This includes exploring the use of bio-based polymers derived from plants, and biodegradable additives blended with recycled and virgin resins.

Alternatively, innovation of producers can change the features of final products. Changes of this sort could involve features such as energy use (e.g., a product being more energy efficient or

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[84] Alexander, R., Oka, C., Rahman, S. & Egels-Zandén, N. (2021, July 2-5). Business Case Sustainability Initiatives as Pathways to Synergistic Upgrading in GVCs: Experiences of Bangladesh's Garment Sector [Paper presentation]. SASE 2021 Annual Conference, online.

[85] Essentra Components. (n.d.). *Injection Moulding Capabilities*. Kidlington, UK: Essentra Compoenents. https://www.essentracomponents.com/en-gb/about-us/capabilities, accessed 11 June 2021; Lane, T. (2021, May 13). Essentra increases use of post-consumer recycled plastics in LDPE-manufactured components. *The Manufacturer*. https://www.themanufacturer.com/articles/essentra-increases-use-post-consumer-recycled-plastics-ldpe-manufacture d-components, accessed 11 June 2021.

using an alternative energy source), the length of time a product lasts, or the ways in which the product can be used. Changes to use that result from sustainability upgrades can create improvements in how a product is used.

One way that component manufacturers can innovate in a way that makes final products more sustainable is through creating lighter weight parts which can help products function with less energy requirements. This is particularly pertinent for the automotive, shipbuilding and aerospace engineering industries where less weight results in less fuel consumption. Rompa Group is a plastics specialist that produces plastic parts, (sub)assemblies and fully-finished products with inbuilt electronic components as well as plastic packaging solutions, which specialises in automotive, consumer goods, industrial applications, medical, and packaging materials. They have sought to innovate related to sustainability by offering lower weight component parts. Specifically, by using injection molding, Rompa has created plastic parts that have 25% less weight than metal alternatives, while maintaining high mechanical strength.[86]

3.2 Process Upgrading

Making changes to production practices is another way that producers can address sustainability challenges. Changes to practices can reduce problematic outcomes related to conventional practices. This can include factors such as the type of energy that is used in a factory and how waste is managed. An example of a company that has improved the environmental impact of its production practices by using cleaner production techniques is Curtigran, a Colombian leather tannery with 13 employees. Curtigran's main activity is skin-tanning until the state of crust. The crusted hides are then supplied to other local tanneries, which finish off the tanning process. In 1994, Curtigran participated in a project run by the association for small and medium eco-efficient enterprises in Latin America (PROPEL-- Promoción de la Pequeña Empresa Eco-Eficiente Latinoaméricana). Through the programme, the company developed clean and

[86] Rompa Group (2021, Feburary 4). Manufacturing on a diet: Energy efficiency with lightweight components. Boxtel, Netherlands: Rompa Group. https://www.rompagroup.com/news/energy-efficiency.aspx, accessed 11 June 2021.

efficient technologies which led to a 50 per cent reduction in pollution, and improved product quality and yield.[87]

3.3 Functional Upgrading

Suppliers can also seek to expand the range of production tasks in which they are involved through functional upgrading. As part of such expansions, companies can be involved in sustainable entrepreneurship. For example, if they begin to offer packaging services, they can use environmentally friendly packaging options. Producers can use sustainability improvements to market themselves when seeking to expand their portfolio of services.

Research on functional upgrading has indicated that it is more likely to occur for privileged suppliers compared to disadvantaged suppliers.[88] Privileged suppliers may operate in stable economies, have high levels of firm-specific resources, larger size, significant industry position, and receive government support. Disadvantaged suppliers may have smaller sizes, weaker industry and global value chain positions, receive less support in their home countries and face high levels of competitive pressures from foreign-owned suppliers.

Dilmah is a company that has undergone functional upgrading while engaging in sustainable value chain entrepreneurship. In the early 1980s, Merril J. Fernando upgraded his Sri Lankan bulk tea exporting business to develop his own brand called Dilmah.[89] This involved developing local processing and packaging. Dilmah has obtained a variety of sustainability related certifications covering social and environmental aspects. In 2017, Dilmah achieved a goal of being a carbon neutral company.

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[87] United Nations (1996). Eco-efficiency in a Leather Tannery: The Case of Curtigran in Colombia. United Nations Department of Social Affairs Sustainable Development. https://sustainabledevelopment.un.org/content/dsd/dsd_aofw_mg/mg_worktradunio_specday/casestud1.shtml

[88] Choksy, U. S., Sinkovics, N., & Sinkovics, R. R. (2017). Exploring the relationship between upgrading and capturing profits from GVC participation for disadvantaged suppliers in developing countries. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, 34(4), 356-386.

[89] Dilmah (n.d.) Dilmah Global Timeline. Peliyagoda, Sri Lanka: Dilmah Ceylon Tea Company. https://www.dilmahtea.com/timeline.html, accessed 11 June 2021.

3.4 Sectoral Upgrading

Producers of component parts can also try to enter new value chains or sectors. If a company has made sustainability improvement to its products or practices, this can be a path to growth which can lead to expanded positive impacts. Companies can also seek to enter new markets connected to a sustainability related agenda. For example, they can contribute to the value chains for products designed to have sustainable elements, such as reusable straws. Another form of sustainable sectoral upgrading can be to find markets for by-products created during production processes.

An example of a company involved in sustainable entrepreneurship that has engaged in sectoral upgrading is Fansa Farm in Vanuatu. The farm uses traditional sustainable agricultural practices and has worked with the national Department of Agriculture in developing climate-smart agriculture techniques by planting specially selected new crop varieties. They have now expanded into eco-tourism by offering opportunities for tourists to visit.[90]

3.5 Collective Action Among Suppliers

Suppliers also engage in collective endeavours that constitute sustainable value chain entrepreneurship. These can take multiple forms. Some of these are discussed below.

A group of suppliers that can face particular challenges with innovating on their own are micro, small, and medium enterprises (MSMEs). These firms typically face challenges in relation to accessing knowledge, infrastructure, and capital that allow them to innovate and create new approaches to sustainable value chain entrepreneurship. A potential sustainable value chain entrepreneurship opportunity for these enterprises thus lies in their engaging in collective action approaches, where the MSMEs innovate to create new solutions to addressing challenges such as

[90] Capacity4dev. (2017, January 20). Linking Farmers & Tourists to Solve Development Challenges in SIDS. Brussels, Belgium: European Union. https://europa.eu/capacity4dev/articles/linking-farmers-tourists-solve-development-challenges-sids, accessed 11 June 2021.

environmental pollution and child labour. Such processes can involve cooperation with external partners, such as public sector agencies or international organizations.

An example of MSMEs engaging in collective action can be found in the case of the football cluster in Sialkot, Pakistan.[91] This cluster housed mostly small and micro firms that hand-stitched high-quality footballs for global brands and had a long history of collective action to address common challenges. In the mid-1990s, the cluster began to face international media scrutiny related to the use of child labour. At the time, a large segment of production was conducted by homebased workers, including children.

To address this challenge the Atlanta Agreement was signed based on negotiations between a variety of stakeholders, including major sports brands, global and local industry associations, and NGOs. The agreement proposed a monitoring mechanism and a social projection programme to help child stitchers enrol in school. Following this agreement, producers engaged two types of cooperative sustainable value chain entrepreneurship. One was developing a system of registered stitching centres, which were linked to individual exporting firms, where workers who were previously home-based could work in one location. These centres became the dominant mode of production as they could facilitate a worker monitoring process. A second initiative was the "home-grown CSR model", which involved suppliers providing a range of social support for piece-rate workers. This initiative used joint funding from lead firms and supplier firms, but was managed by the suppliers. This case shows an example where a group of producers took action based on pressures that were being created by their buyers, who were global lead firms.

In areas that suffer from issues such as lack of employment or poor infrastructure, economic investments into new products and productions can be considered as addressing sustainability challenges. Another example of cooperation in the same region is that the Sialkot Chamber of Commerce and Industry was instrumental in making the city's manufacturing industry co-finance and establish an airport to ensure greater connectivity between the city and its international customers and investors. It also met the local population's and overseas Pakistanis' needs for international travel. More recently, the Chamber of Commerce and Industry in Sialkot

[91] Lund-Thomsen, P., & Nadvi, K. (2010). Clusters, chains and compliance: Corporate social responsibility and

was instrumental in starting their own airline, AirSial, which helps in ensuring greater connectivity, cargo and service trading and transport links between the city and international customers.[92] There is little doubt that increased connectivity between Sialkot and international destinations will create more business in the region and thus help in sustaining the creation and expansion of the number of jobs available in the city. Hence, this is an innovative way of enhancing value chain linkages. While, at the same time the creation of an airport could be seen as creating a new sustainability challenge related to the environmental impacts of the airport. This contradiction is discussed further at the end of this chapter (see Section 3.6).

Another form of collective action that can address sustainability challenges is creating producer cooperatives. A cooperative is defined as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise".[93] Cooperatives can take multiple forms. Some involve producers owning a company that sells their collective production.

A prominent example of a supplier cooperative can be found in the Gujarat Milk Marketing Federation, popularly known as Amul, that involves thousands of Indian milk producers cooperatively owning a large dairy company.[94] The business was founded in 1946 to allow producers to avoid being exploited by middle men. Amul has flourished over the decades and now sells their milk products around the world. From only two village societies being involved at the start, it now has 18,600 village societies with 18 district cooperative milk producers' unions. Altogether, these involve 3.6 million producer members. In recent years, the company has also been involved with a large tree planting drive.[95]

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governance in football manufacturing in South Asia. *Journal of Business Ethics*, 93(2), 201-222.

[92] AirSial (2021). About us. Sialkot, Pakistan: AirSial. https://airsial.com/about-us; Sialkot International Airport (2021). About SIAL. Sialkot, Pakistan: Sialkot International Airport. https://www.sial.com.pk, accessed 11 June 2021.

[93] International Co-Operative Alliance. (2015). *Guidance Notes to the Co-operative Principles*. Brussels, Belgium: International Co-Operative Alliance.

[94] Gujarat Cooperative Milk Marketing Federation (n.d.). About Us – The Amul Model. Anand, India: Gujarat Cooperative Milk Marketing Federation. https://www.amul.com/m/about-us, accessed 11 June 2021.

[95] India CSR Network (2016, September 2). Amul Coops plant 5.92 Cr trees, Contributing to sustainable ecological development. Mumbai, India: India CSR Network. https://indiacsr.in/amul-coops-plant-5-92-cr-trees-contributing-to-sustainable-ecological-development, accessed 11 June 2021.

A further form of collaboration among suppliers is the creation of industrial ecosystems. In such systems, a group of related businesses can be located in close proximity and have high levels of interactions, such as using each other's waste products as inputs. These collaborative business models have the potential to facilitate zero waste production.

An example of a successful application of an industrial ecosystem is the Kalundborg Symbiosis. This initiative involves a group of nine manufacturing companies in Denmark who have been trading waste products since the 1960s. The initiative has been found to have annual savings of 36 million EUR, 635,000 tons of CO2, 3.6 million m3 water, 100 GWh of energy, and 87,000 tons of materials.[96]

Another smaller scale example can be found in the relationship between Lupin, a pharmaceutical company, and Ambuja Cement, both based in India.[97] At Lupin's manufacturing site, they were creating waste that they used to pay to have incinerated. They have now begun to process the waste to turn it into an alternative environmentally friendly fuel source. Ambuja Cement has been able to use this fuel for their cement kiln to replace the use of coal. Thus, this new model reduced waste created by Lupin and carbon emissions from Ambuja's previous coal use.

3.6 Limitations of supplier-centric approaches

While lead firms have a lot of freedom to take actions which create changes in their value chains, suppliers often face high levels of pressure from their buyers which can stifle their ability to engage in sustainable value chain entrepreneurship. For many suppliers, they have very little freedom in how they organise their businesses. One dynamic, which has been observed, is that firms can lose innovation capability when they join global value chains. Firms can begin to use

[96] Ellen MacArthur Foundation (2021). Kalundborg Symbiosis: Effective Industrial Symbiosis. Cowes, UK: Ellen MacArthur Foundation. https://www.ellenmacarthurfoundation.org/case-studies/effective-industrial-symbiosis, accessed 11 June 2021.
[97] Jain, B., Rathod, P. R., Bhendwal, H., & R. A. Pandey. (2015). Cleaner Production Case Studies. Gandhinagar, India: Gujarat Cleaner Production Centre. http://www.gcpcenvis.nic.in/Books/22_case_studies.pdf, accessed 11 June 2021.

production processes which are determined by their buyers. This can, for example, involve closing internal R&D department as focus shifts to producing items designed by buyers.[98]

Furthermore, lead firms can place pressures which can exacerbate or create sustainability challenges. Buyers can run auctions which involve suppliers bidding to do production runs for the lowest price. Also, high pressure often exists related to production timelines, with buyers often changing orders at the last minute based on emerging sales trends. Such occurrences can make it difficult for suppliers to plan.

A fundamental challenge with the model of production being outsourced is that much of the risk related to production is pushed onto suppliers. Lead firms adopt just-in-time production systems, which involves companies keeping minimal stock and producing products as needed. However, this can force suppliers to face the risk of keeping inventory in stock to be ready to make last-minute orders from buyers. Often times buyers pay on receipt and they can cancel orders at the last-minute leaving producers to absorb the sunk costs.

Another challenge which can inhibit the development of sustainable value chain entrepreneurship is that production practices can face a variety of pressures to maintain existing systems.[99] Barriers can range from local norms to economic priorities of powerful actors to risk aversion.[100] Businesses that want to engage in sustainable value chain entrepreneurship often have to be able to break through existing pressures for stability.

A further challenge is that firms' capabilities are developed based on their interactions with their environment.[101] In some value chains, suppliers are located in contexts with weak innovation systems. In these situations, suppliers might have low innovation capabilities, which have been

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[98] See: Lorentzen, J. (2005). The absorptive capacities of South African automotive component suppliers. *World Development*, 33(7), 1153-1182.
[99] Geels, F. W. (2014). Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. *Theory, Culture & Society*, 31(5), 21-40.
[100] Alexander, R. (2021). Governance in global production networks and local sustainability challenges: experiences of sustainability transitions in cotton garment production in India. In M. B. Rana & M. M. C. Allen (eds.) *Upgrading the Global Garment Industry*. Edward Elgar Publishing, pp. 339-361.
[101] Lundvall, B. Å. (2016). National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. In B. Å. Lundvall (ed.) *The Learning Economy and the Economics of Hope*, pp. 85-106; Fagerberg, J., & Srholec, M. (2017). Capabilities, economic development, sustainability. *Cambridge Journal of Economics*, 41, 905-926.

defined as "the capabilities needed to imagine, develop and implement innovations in the goods and services an economy produces and in how it produces them".[102] In some cases, firms can upgrade their capabilities by joining global value chains. Notably, firms have been found to learn through participating in global value chains. Types of learning that can take place include mutual learning through interactions, lead firms training their suppliers, knowledge transfer from lead firms to suppliers, and pressure to adopt international standards.[103] It is also notable that firms can benefit from having additional learning paths created by being connected to multiple value chains.[104] However, as noted above, suppliers can also lose innovation capabilities when they participate in certain value chains.

As argued above, sustainability agendas for global value chains are often set in the North but then operationalized or contextualized in the global South. For instance, in the case of the Sialkot football manufacturing industry in Pakistan, an innovative mechanism was developed for monitoring child labour amongst the football stitching community and for shifting children from football stitching to going to school instead. However, given the focus on eradicating child labour from the football manufacturing industry in response to the demands from international sports brands, a perhaps more serious social issue was overlooked in the same locality. Sialkot – as the rest of Punjab province in Pakistan – is home to a large number of brick kilns that often employ members from the lower social strata, that work as bonded laborers (as part of debt bondage). Typically, this also involves children in the making of bricks, including physically very demanding labour in the scorching heat and sun of Punjab.[105] Hence, whereas child labour was largely removed from the football industry, the efforts in the football manufacturing industry were not directly linked to efforts at combating child labour in the brick kiln industry, despite the fact that sometimes the football stitchers and brick kiln workers were living in the same villages. Hence, there is a risk of such narrow targeting creating "regulatory enclaves".[106] Even if a social

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[102] Bell, M. (2009). Innovation Capabilities and Directions of Development. *STEPS Working Papers*, 33. Brighton, UK: STEPS Centre.
[103] De Marchi, V., Giuliani, E., & Rabellotti, R. (2018). Do global value chains offer developing countries learning and innovation opportunities?. *The European Journal of Development Research*, 30(3), 389-407.
[104] Pietrobelli, C., & Rabellotti, R. (2011). Global value chains meet innovation systems: are there learning opportunities for developing countries?. *World development*, 39(7), 1261-1269.
[105] Iqbal, M. J. (2006). Bonded labor in the brick kiln industry of Pakistan. *The Lahore Journal of Economics*, 11(1), 99-119.
[106] Posthuma, A. (2010). Beyond "regulatory enclaves": Challenges and opportunities to promote decent work in

and environmental innovation involving suppliers in a given local area may be seen as being successfully developed and implemented, a focus on global value chains can create a risk of "overlooking" or "sidelining" more serious issues within the same or nearby localities.

Another key challenge related to supplier-level sustainable entrepreneurship in value chains is that in many production locations, sustainability challenges are complex. In the case of the creation of an airport in Sialkot, which was discussed above, the intervention provided benefits for the community related to social and economic sustainability. However, increased air traffic to and from the city may also create increased CO2 emissions and other forms of pollution. A common situation is that people in communities which suffer from poverty and experience low levels of economic activity may benefit from developments which have negative environmental consequences.[107] Most initiatives bring a diverse range of positive and negative outcomes. Thus, it can be difficult to determine which actions of suppliers can be considered as "sustainable entrepreneurship".

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global production networks. In A. Posthuma & D. Nathan (eds.) *Labour in Global Production Networks in India*. New York, NY: Oxford University Press, pp. 57-80.

[107] Such tradeoffs are often reflected in debates surrounding action related to climate change, see: Morgan, J., & Waskow, D. (2014). A new look at climate equity in the UNFCCC. *Climate Policy*, 14(1), 17-22; Chin-Yee, S., Nielsen, T. D., & Blaxekjær, L. Ø. (2020). One voice, one Africa: The African Group of Negotiators. In C. Klöck, P. Castro, F. Weiler & L. Ø. Blaxekjær (eds.) *Coalitions in the Climate Change Negotiations*. Abingdon-on-Thames: Routledge, pp. 136-155.

4. Business Model Innovators Engaging in Sustainable Value Chain Entrepreneurship

Some entrepreneurs are reimagining the structures of global chains. While a broad range of businesses are involved in the activities described above, an emerging phenomenon is the growth of new businesses and new business models that are created with the purpose of addressing sustainability challenges. Entrepreneurs have been creating a wide variety of start-ups which have sustainability as a core focus of their businesses. These initiatives can act as lead firms or suppliers in existing value chains or function in models where such distinctions are not applicable. Several key types are discussed here.

4.1 Servitizers

Some companies have developed which lease products that have conventionally been purchased. This phenomenon has been called servitization. This model can help to reduce waste as multiple people can have access to the services that one product provides. Growth of this type of business model has the potential to radically change how economies function. Benefits of this model include better customization, recurring revenues, deeper customer relationships, better quality of services provided by products, creating seamless experiences, and cost efficiency and predictability.[108] This new model can also have environmental benefits. One is that it decreases a motivation that conventional manufacturing companies may have to design planned obsolescence into their equipment. Companies using their equipment to provide a service have an incentive to make sure that their equipment will last as long as possible.

Servitization has been used by companies involved in business-to-business transactions. A pioneering example can be seen in the case of Xerox. When they first invented a photocopying

[108] Aubertin, C. (2019, July 2). From Product to Product-as-a-Service: A New Business Model Shaping the Future of Industries. *Medium*. https://medium.com/swlh/from-product-to-product-as-a-service-37baed471cd6

machine in the late 1950s, it was too expensive to sell so they began to lease them.[109] Additionally, the company uses parts from older machines to create new equipment in a process of remanufacturing.[110]

Industrial inputs have also been offered as services. Innovation is quite diverse in this area and ranges from IT services to chemical leasing. Such processes can result in creating less waste. For example, through chemical leasing systems that use chemicals more efficiently.[111] In chemical leasing, the relationship between user and supplier is changed. Instead of users paying for a set amount of a chemical, the user pays for their performance. For example, depending on the type of chemical involved, a user could pay for the number of pieces cleaned or the total surface area coated. An example of a situation where chemical leasing has been effectively applied is in the relationship between ABB ARAB, an Egyptian manufacturer of high and low voltage equipment and Akzo Nobel Powder Coatings S.A.E., a Dutch paint and performance coating provider.[112] In 2008, they signed a chemical leasing contract related to powder coatings. After this agreement, powder waste was taken back for recycling. Production processes used less pressure, and consequently less energy, and produced higher quality outcomes with less rejects.

The concept of offering products as services has also been attempted by companies that operate business-to-consumer models. ByCyklen is an initiative that used this model.[113] This urban bike share programme was launched in 1995 in Copenhagen, Denmark. They used specially designed bikes with parts that could not be used on other bikes. Bikes were made available free to users who paid a deposit that was refunded if they complied with use regulations. The business model relied on getting funding through selling advertisements on the bicycles. This initiative involved

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[109] Massa, L., & Tuci, C. L. (2013). Business Model Innovation. In M. Dodgson, D. M. Gann & N. Phillips (eds.) *The Oxford Handbook of Innovation Management.* Oxford, UK: OUP Oxford, pp. 420-441.
[110] Kamigaki, K., Matsumoto, M., & Fatimah, Y. A. (2017). Remanufacturing and refurbishing in developed and developing countries in Asia–A case study in photocopiers. *Procedia CIRP*, 61, 645-650.
[111] UNIDO (2021). Chemical Leasing. Vienna, Austria: UNIDO. https://www.unido.org/our-focus-safeguarding-environment-resource-efficient-and-low-carbon-industrial-production/chemical-leasing, accessed 11 June 2021.
[112] Schwager, P., & Decker, N. (2016). *Global Promotion and Implementation of Chemical Leasing Business Models in Industry*. Austria, Vienna: UNIDO. https://chemicalleasing.org/sites/default/files/case-study_egypt-surface-protection.pdf
[113] Intelligent Energy Europe. (2009). *European Best Practices in Bike Sharing Systems*. Brussels, Belgium: European Union. https://ec.europa.eu/transport/sites/default/files/cycling-guidance/european_best_practice_bikesharing.pdf, accessed

the products-as-a-service model and also created additional sustainability related outcomes. It encouraged bike riding which helps to reduce pollution created by fossil fuel powered transportation options and also supported public health by promoting exercise.

4.2 Social enterprises

Companies and brands have also been created that are directly connected to supporting a sustainability-related cause. Such causes can be directly related to conditions in value chains or linked to non-connected causes. In cases, where the cause is related to value chains, businesses can link the cause directly into their operations, such as hiring people from a disadvantaged group or the cause can be tangential to production, such as funding primary schools in areas where production takes place.

A key form of sustainable entrepreneurship in this category is mission-driven businesses focusing on promoting fair trade.[114] Ellilta is a business with a mission. Ellilta is an Ethiopian social enterprise that was founded to provide opportunities to women at risk of sexual exploitation and trafficking.[115] It is a private company that is owned by the charity Ellilta Women at Risk (EWR). The business sells leatherwork, semi-precious stones and other handicrafts with trading profits going to support EWR. Ellilta employs 46 female artisans, most of whom are former sex workers.

Arthur and Friends is another company with this type of objective. It is a hydroponic farming business based in the United States that was developed with a social mission.[116] The founder wanted to provide employment for disabled people. The business grows and markets organic lettuce, leafy vegetables, plants, and herbs. Production is sold to local restaurants, schools, and

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11 June 2021.

[114] Doherty, B., Haugh, H., Sahan, E., Wills, T. & Croft, S. (2020). *Creating the New Economy: Business models that put people and planet first*. Culemborg, Netherlands: World Fair Trade Organisation & Gateshead, UK: Traidcraft.

[115] Ibid.

[116] Katz, E., & Kauder, R. (2011). *Social Enterprise Businesses: A Strategy for Creating Good Jobs for People with Disabilities*. New Brunswick, NJ: John J. Heldrich Center for Workforce Development & West Orange, NJ: The Kessler Foundation. https://kesslerfoundation.org/sites/default/files/2019-07/Social_Enterprises_Report.pdf

participating stores and wholesale markets, the general public at farmers' markets, and via the Internet. They operate based on a four-part mission:

1. Provide fresh, healthy produce for the community;
2. Offer meaningful work for people with developmental and other types of disabilities, and also for others underrepresented in the labour force, such as ex-offenders, at market wages in integrated settings;
3. Prepare people with disabilities to work in other businesses, such as farms, garden centers, and greenhouses; and
4. Become a sustainable business able to generate a profit.

Additionally, initiatives tied to causes can take place as intrapreneurship ventures and involve an existing company developing a new product or service with a social or environmental mission. For example, AAK is a Swedish oils and fats producer that developed the "Kolo Nafaso" programme, which is based on establishing a new sustainable value chain.[117] The company started working directly with shea harvesters in Burkina Faso, who were mostly female smallholder farmers. This was a change from the common practice of buying shea from intermediary traders. AAK hired local extension officers to recruit farmers and showed them a safer, faster, and less resource intensive way to remove the kernel from the nut than they had been using. AAK also offered partial pre-payments, which helped women with cash flow problems. The programme has grown rapidly and expanded to Ghana, the Ivory Coast, and Nigeria. More than 300,000 women were enrolled in 2020.

4.3 Waste Recyclers and Waste Minimizers

New business models are also being created that seek to reduce waste and reuse waste. Entrepreneurs have been creative in designing products and production systems that achieve these objectives. In some cases, they use simple technology and in other cases, these businesses are using cutting edge technology. Initiatives can be related to changing what happens during the

[117] Chattopadhyay, A. (2020, November 2). Transforming a Supply Chain into a Social Enterprise. *INSEAD Knowledge*. https://knowledge.insead.edu/responsibility/transforming-a-supply-chain-into-a-social-enterprise-15486, accessed 11 June 2021.

post-use phase of a product or the development of longer lasting products compared to single-use or short-use products. For some products, innovation in this area involves returning to older modes of production and use.

One type of emerging business model is for companies to use materials that were previously considered as waste as the inputs for creating new products. Chako is a company that produces lighting and other home products in Zanzibar.[118] They use found items such as liquor bottles, glass, wood and dhow sails. When the company started, the concept was called Tourist2Tourist. They sold souvenirs to tourists that were made from waste created by tourists. The company has now grown and they sell products around the world. This type of business helps to create a circular economy.

While Chako is using a low-tech process for reusing waste items, other companies have developed technologies that can use waste products to create completely new materials. For example, Full Cycle, US-based company, uses bacteria to transforms organic waste into PHA (polyhydroxyalkanoate) biopolymers, which have material characteristics similar to petroleum-derived polymers.[119] The product they produce is a non-toxic, and compostable replacement for oil-based plastics.

Companies have also been developing products that do not create waste and those which minimise waste creation compared to conventional products. For example, toothpaste is a product that is connected to multiple sustainability challenges. One is that it is often sold in unrecylable containers. Additionally, the paste can contain microplastic particles. Denttabs are a product that has been developed as a sustainable and plastic-free alternative to conventional toothpaste.[120] The company was founded in Germany and sells tablets that dissolve into a toothpaste. The tablets are sold package-free at bulk stores or in compostable packaging.

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[118] Chako (n.d.) Who We Are. Mwanakwarekwe, Zanzibar: Chako. https://www.chakozanzibar.com/about, accessed 11 June 2021.
[119] Full Cycle (n.d.). Full Cycle PHA: The future of plastic. San Jose, CA: Full Cycle. https://fullcyclebioplastics.com/solutions, accessed 11 June 2021.
[120] Denttabs (n.d.). About. Berlin, Germany: Denttabs. https://denttabs.de/about/?lang=en, accessed 11 June 2021.

4.4 Limitations to Business Model Innovations

While a lot of opportunities exist related to creating new business models, entrepreneurs wishing to develop businesses in new formats can face a number of challenges. A key challenge, which is shared with conventional suppliers, is the strong pressures that can exist pushing for stability in production systems (see Section 3.6).

Another area of concern is that while new business model ideas may be designed to address a sustainability challenge in a creative way, the ideas need to function as viable businesses as well. This is a challenge which prevents the success of some ventures. In some cases, there is not an existing market for the product or service. Often business model innovators need to create new markets for their products. This can require firms to have and use dynamic capabilities, which have been defined as the "ability to integrate, build, and reconfigure internal and external resources/competences to address and shape rapidly changing business environments".[121] These capabilities involve firms' capacities to orchestrate activities and resources. Firms may require the ability to create or shape markets in ways that enable them to create and capture value, which can require extending, modifying or completely revamping their activities to maintain a good fit with their ecosystem or to change their ecosystem. Firms may need to be creative and have strong managerial capacity in order to successfully establish their venture.

Entrepreneurs developing new businesses can face the challenge of being able to compete, especially at the start-up stage. This is especially the case when an industry has strong incumbents. Overall, business model innovators can benefit from having access to grants or loans that are given with a high risk tolerance, which can support their early-stage development, with both private and public sources of funding playing important roles.[122]

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[121] Teece, D. J. (2010). Technological Innovation and the Theory of the Firm: The role of Enterprise-Level Knowledge, Complementarities and (Dynamic) Capabilities, In B. H. Hall & N. Rosenberg (eds.) *Handbook of the Economics of Innovation*. North-Holland, pp. 679-730.

[122] Hausmann, R., Rodrik, D., & Sabel, C. (2008). Reconfiguring industrial policy: a framework with an application to South Africa. *Harvard University Center for International Development Working Paper* No. 168 / *Harvard Kennedy School Faculty Research Working Paper* No. RWP08-031. Cambridge: MA: Harvard University; Mazzucato, M. (2018). *The value of everything: Making and taking in the global economy*. London, UK: Hachette UK.

A further challenge that can be faced by business model innovators is that some initiatives are not designed in a way which is scalable. Some projects are successful but they rely on systems that function at a small scale. For example, this can be the case for ventures the rely on artisanal production or the collection and reuse of waste products.

5. Other Actors Engaging in Sustainable Value Chain Entrepreneurship

A wide variety of third-party organisations are also engaging in sustainable value chain entrepreneurship. These include new ventures that have been established specifically to offer sustainability-focused products or services and existing businesses that are developing new products or services with new sustainability attributes. Additionally, a variety of actors are developing initiatives that are intended to change the ways that lead firms and suppliers behave through direct pressures or by changing the incentives in the environments where they work. These actors include unions and workers, issue-focused NGOs, and public sector organisations. This chapter provides an overview of diverse ways that third parties are innovating related to sustainable value chains.

5.1 New Sustainability-Focused Product and Service Providers

With the growth of sustainability objectives for companies in value chains, a new market has been created for sustainability-focused products and services. A diverse group of organisations have developed products and services that are specifically designed to support suppliers and lead firms in promoting sustainable value chains. These include businesses and not-for-profit organisations. They have a range of specialties and include organisations developing standards, auditing standards, providing traceability technology, offering capacity building services, and offering consulting services. The development of many of these businesses can be considered as value chain third parties engaging in business model innovation. Also, in some cases these products and services have been developed within larger organisations through processes of intrapreneurship.

Sustainability Standards and Auditing

The world has seen an explosion in the creation of voluntary sustainability standards, which have

been developed by both public and private sector organisations.[123] The United Nations Forum on Sustainability Standards (UNFSS) founded in 2013 plays a coordination role among United Nations agencies related to voluntary sustainability standards. The International Trade Center has put together a database that includes over 300 such standards active in 192 countries.[124] These standards have seen high levels of uptake. Currently large proportions of global production of many commodities are covered by voluntary sustainability standards (see Table 5.1).

Table 5.1: Proportions of Voluntary Sustainability Standard Certification[125]

Commodity	**Minimum Share of Global Production Area Certified**
Bananas	6.0%
Cocoa	26.8%
Coffee	20.7%
Cotton	18.2%
Oil palm	15.1%
Soybeans	1.6%
Sugarcane	7.4%
Tea	16.1%

Many of these standards are supported by third-party auditing firms. This has created a space for entrepreneurship in the auditing industry. Existing auditing firms have added sustainability-related services and new firms have emerged to focus on this area. One such example is Social Compliance Services Asia, a Hong Kong based firms that certifies compliance with social standards.[126] They have a team of auditors who work across multiple Asian countries and are affiliated with a number of global standards organisations.

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[123] See: Nadvi, K. (2014). "Rising powers" and labour and environmental standards. *Oxford Development Studies*, 42(2), 137-150; Langford, N. J. (2019). The governance of social standards in emerging markets: An exploration of actors and interests shaping Trustea as a Southern multi-stakeholder initiative. *Geoforum*, 104, 81-91; Fransen, L., Kolk, A., & Rivera-Santos, M. (2019). The multiplicity of international corporate social responsibility standards. *Multinational Business Review*, 27(4), 397-426; Marques, J. C. (2019). Private regulatory capture via harmonization: An analysis of global retailer regulatory intermediaries. *Regulation & Governance*, 13(2), 157-176; Krauss, J. E., & Krishnan, A. (2021). Global decisions versus local realities: Sustainability standards, priorities and upgrading dynamics in agricultural global production networks. *Global Networks*, ahead of print, doi.org/10.1111/glob.12325.
[124] See: ITC (n.d.) Standards Map Free Toolkit. Geneva, Switzerland: ITC. https://standardsmap.org, accessed 11 June 2021.
[125] Source: ITC. (2020, October 5). The State of Sustainable Markets – 2020. Geneva, Switzerland: ITC.
[126] Social Compliance Services Asia (n.d.) The SCSA. Hong Kong, China: Social Compliance Service Asia. http://www.scsagroup.com, accessed 11 June 2021.

As described in Section 2.2, cooperative approaches for influencing suppliers include participatory social auditing. An example of a third party who has adopted this approach is The Agricultural Ethics Assurance Association of Zimbabwe (AEAAZ), a tripartite organisation involving local businesses, trade unions and development agencies. They have developed a standard system that uses a participatory approach.[127] Through this initiative, they aim at supporting sustainable agricultural production through bringing together diverse views.

Traceability Services

As mentioned above, traceability is a growing concern related to sustainability in value chains. A growing number of companies have been created to provide services and technology related to traceability. This is an area that has seen a high level of technological based innovation. Companies have been developing systems that use technology such as block chain, DNA tracing, chemical tracing, and radio-frequency identification (RFID), among others.

An example of a company offering related services is ucrop.it, an Argentinian start-up that helps track agricultural production through using blockchain.[128] The company seeks to promote the use of sustainable production practices through increasing communication between buyers and producers. Their service allows farmers to certify specific practices during the crop cycle. The service is paid for by customers, which can be commodity processors, seed and biotech companies, inputs and service dealers, and financial institutions. Through using the service, farmers can receive better prices for their crops. The service has been used for almost 200,000 hectares of soybean production.

Capacity Building Providers

While, as discussed above, brands and retailers can provide training for their suppliers, a variety of organisations have also emerged to provide sustainability-related training for suppliers.

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[127] Dolan, C., Opondo, M., & Smith, S. (2004). *Gender, rights and participation in the Kenya cut flower industry*. NRI Report No.2768 / SSR Project No. R8077 2002-4. Chatham Maritime, UK: Natural Resources Institute.
[128] Manning, L. (2021, February 17). Argentine ag blockchain platform ucrop.it raises seed funding. *AgFunderNews*. https://agfundernews.com/ucrop-it-argentine-food-traceability-blockchain-platform-raises-seed-funding.html, accessed 11 June 2021.

Training can be related to helping suppliers be able to meet standards or can have broader aims, such as women's empowerment. Organisations involved in providing such services can be commercial enterprises, not-for-profits, or governments. These organisations can be based in supplier countries or be global organisations with offerings in multiple countries.

Eco Impact, a South African company, is an example of a company that offers training services for producers in global value chains.[129] Topics covered in their training include environmental issues, health and safety, food safety, and energy management. They also help companies to develop management systems related to these topics and provide auditing services.

A specific form of capacity building initiative that has been developed by private and public sector actors is business case sustainability initiatives.[130] These programmes can be designed to focus solely on the supplier level or in some cases seek to attract suppliers as participants and lead firms as sponsors. The programmes offer training and other forms of support, such as help with getting loans. The key element of such progammes is that they promise to help producers to make changes that result in their businesses being more profitable while also addressing a sustainability challenge.

The concept of business case sustainability initiatives saw a huge boost through a large programme run by the United Nations Industrial Development Organisation (UNIDO) and the United Nations Environmental Programm (UNEP) which founded a network of National Cleaner Production Centers (NCPCs) around the world.[131] These NCPCs are managed independently and provide services to domestic businesses across many sectors. Promoting resource efficient and cleaner production (RECP) has led to many benefits, which include reduced manufacturing and operating costs, while reducing energy, chemical, water use, and pollution. It also helps to grow employment opportunities, while increasing health and safety performance.

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[129] Eco Impact (n.d) Welcome to Eco Impact. Claremont, South Africa: Eco Impact. https://www.ecoimpact.co.za, accessed 11 June 2021.
[130] Oka, C., Egels-Zandén, N., Rahman, S. & Alexander, R. (2020). *Scale Matters: Scalability of Business Case Sustainability Initiatives in the Garment Industry*. Egham, UK: Royal Holloway University of London.
[131] UNIDO (n.d). National Cleaner Production Centres (NCPCs) & Networks. Vienna, Austria: UNIDO. https://www.unido.org/our-focus/cross-cutting-services/partnerships-prosperity/networks-centres-forums-and-platforms/national-cleaner-production-centres-ncpcs-networks, accessed 11 June 2021.

Cleaner production programmes have since been run by a variety of organisations around the world. An example of a cleaner production program is the Lake Victoria Basin Resource Efficiency and Cleaner Production (LVB-RECP) project.[132] The Basin of Lake Victoria includes major areas of 5 countries (Burundi, Kenya, Rwanda, Tanzania and Uganda). The Lake supports the world's largest freshwater fishery, which supports the livelihoods of over 30 million people. Large rural populations also depend on land in the upper basin, particularly in Burundi, Rwanda and the Kenya highlands. Water from the basin also generates an important source of hydropower for Uganda, Rwanda and Burundi and provides water supply to major urban centres. Furthermore, 25% of the basin is made up of protected areas which include national parks.

Despite its high level of importance, the Lake Victoria Basin has high levels of environmental degradation. This is directly affecting livelihoods through decreasing fish stocks limiting fishing; loss of forest cover and erosion of soils impacting agricultural productivity; water flows harming land, property and people's lives; flows of sediments and other pollutants reducing the supply of potable water, and causing algal blooms which limit tourism potential; and the spread of water hyacinth, an invasive floating plant that can block access to kilometers of lakeshore, preventing use of the lake. Moreover, climate change is expected to create increased environmental pressures on this region.

The Lake Victoria Environment Management Programme (LVEMP) works to address these challenges. One part of the programme is the LCB-RECP project, which targets the behaviour of the private sector - the basin housed about 1,000 businesses in 2010. Spending about two million USD on technical assistance (awareness and training of industries, and in-plant RECP assessments), led to over $80m in private sector investments in improved environmental practices. By 2017, a survey of 30 active firms in the programme (out of 88), revealed that factories were typically investing around one million USD in RECP technologies, with pay-back periods of around 2 years that mostly came from reduced energy and water use. Furthermore, initial assessments showed that actively participating industries were able to reduce pollution

[132] World Bank (2017). *Engaging Private Sector for Green Growth in the Lake Victoria. Project Information Document*, Report No. PIDC85596. Washington, DC: World Bank. https://documents1.worldbank.org/curated/pt/158791487856183967/text/SG-PRW-PID-CP-P161265-02-23-2017-1487856179987.txt, accessed 11 June 2021.

generation by around 90%. One notable element of this project is its goal of helping small businesses to use sustainable resources management to increase their competitiveness and provide value addition to their products. These improvements can make the small businesses more appealing to their buyers who are often larger companies.

Sustainability Consulting

Third-parties have also created a wide variety of business consulting services which can help to address sustainability challenges in value chains. Offered services include writing sustainability reports, developing sustainability plans, managing value chain engagement, and supporting the development of sustainable product design. The development of sustainability-focused consulting services has taken place within existing consulting companies and new companies have been founded with sustainability as their core mission. For example, Matrec is an Italian consulting and research company that specialises in sustainability and the circular economy.[133] They have a lab that identifies sustainable materials and they help companies to incorporate new materials. Their clients include major global brands working across diverse sectors including the food, fashion, electronics and automotive industries.

5.2 Production Equipment Providers

Production equipment providers comprise another category of sustainable value chain entrepreneur. These are companies that make the equipment that suppliers use to make products. A number of these firms have recently been developing production technology that is designed to help with sustainability challenges. Additionally, digital production monitoring technologies are being developed which can track what is happening in production sites. These technologies are increasing efficiency of production and can have sustainability-related benefits, such as helping to reduce accidents in the mining industry.[134]

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[133] Matrec (n.d.) Consulting. Anconda, Italy: Matrec. https://www.matrec.com/en/consulting, accessed 11 June. 2021.
[134] McNinch, M., Parks, D., Jacksha, R., & Miller, A. (2019). Leveraging IIoT to improve machine safety in the mining industry. *Mining, Metallurgy & Exploration*, 36(4), 675-681.

Production technology can address sustainability challenges from two different angles. One is related to the production of the manufacturing equipment itself. The other is related to how technology shapes sustainability of the processes surrounding its use. For example, equipment can be designed in ways that reduce health risks for workers. Industrial Maid is a US company that creates such products.[135] They produce air filtration and ventilation equipment which is designed to improve the health and safety of factory workers. Their equipment can be used by factories to protect people from exposure to welding smoke and fumes, grinding dust, wood dust, gases and odours, bacteria, viruses and mould, and other airborne contaminants.

5.3 Trading Intermediaries and Logistics

Intermediaries and logistics providers are also engaging in sustainable value chain entrepreneurship. Value chains often involve numerous intermediaries, which can connect buyers and suppliers at different stages of production.[136] Intermediaries can be micro businesses, which involve one person or they can be large companies. These firms play key roles related to sustainability issues, with key functions including selecting factories to carry out production and being conduits for sharing lead firms' sustainability requirements.[137] In these roles, the intermediaries can bridge differences between buyers and suppliers through translating expectations.[138]

In some cases, intermediaries have developed specific services related to promoting sustainable production. Examples of such services can involve arranging for producers to get a sustainability related certification, ensuring suppliers are chosen that have sustainability credentials, and contributing to multi-stakeholder organisations' activities. An example of such a business can be

[135] Industrial Maid (n.d.). About Industrial Maid. Cortland, NE: Industrial Maid. https://industrial-maid.com/company, accessed 11 June 2021.
[136] Serdijn, M., Kolk, A., & Fransen, F. (2020). Uncovering missing links in global value chain research–and implications for corporate social responsibility and international business. *Critical Perspectives on International Business*, ahead of print, doi.org/10.1108/cpoib-01-2020-0002.
[137] Soundararajan, V., & Brammer, S. (2018). Developing country sub-supplier responses to social sustainability requirements of intermediaries: Exploring the influence of framing on fairness perceptions and reciprocity. *Journal of Operations Management*, 58, 42-58.
[138] Soundararajan, V., Khan, Z., & Tarba, S. Y. (2018). Beyond brokering: Sourcing agents, boundary work and working conditions in global supply chains. *Human Relations*, 71(4), 481-509.

found in TIS Vietnam, a company that acts as an intermediary for global furniture sourcing from Vietnam.[139] As part of their service, they ensure that production meets required international standards related to social, chemical, and wood compliance. This involves helping suppliers to meet the required specifications.

A major area of concern related to sustainable value chains is transportation and logistics. Transportation in value chains can involve many forms, which include road vehicles, trains, boats, and planes. Businesses in this industry range from truck owner-operators to large multi-national logistics firms that coordinate global multi-modal shipping arrangements. In some cases, logistics systems require specialised equipment, particularly for perishable or time sensitive products.

Many sustainability campaigns focus on identifying carbon emissions associated with transportation. As a response to this challenge a number of developments have occurred related to sustainability innovation in transportation. Actions taken have involved changing technologies used in shipping with the purpose of minimizing environmental impact. For instance, with their headquarters in Norway, Wallenius Wilhelmsen is a company that offers logistics services for automotive, equipment, and breakbulk industries.[140] Wallenius Wilhelmsen have engaged in a variety of sustainability initiatives. Some of the actions that Wallenius Wilhelmsen have taken include trialling biofuel and wind power for shipping.

The logistics industry has also faced challenges with poor working conditions. For example, in some cases, drivers have to live in their trucks. Improving working conditions in the logistics industry is an ongoing challenge. In a 2019 survey with responses from 69 managers of road transport in Europe, social and working conditions in international transport were described as deteriorating by 68% of respondents.[141] The majority (79%) described competition based on

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[139] TIS Vietnam. (n.d.). About Us. Ho Chi Minh City, Vietnam: TIS Vietnam. https://tis4m.net/gioi-thieu, accessed 11 June 2021.
[140] Wallenius Wilhelmsen (n.d.). Sustainability. Lysaker, Norway: Wallenius Wilhelmsen. https://www.walleniuswilhelmsen.com/who-we-are/sustainability, accessed 11 June 2021.
[141] Vitols, K., & Voss, E. (2019). *Social Conditions in Logistics in Europe: Focus on Road Transport*. Berlin, Germany: EVA – Europäische Akademie für umweltorientierten Verkehr gGmbH. https://psl.verdi.de/++file++5d00b20c9194fb1d8bbc127f/download/Social%20Conditions%20Logistics%20in%20Europe.pdf, accessed 11 June 2021.

unfair practices and social dumping[142] as the most important trends in the road freight transport business with most (76%) describing competition between companies as an increasing phenomenon. Sustainable entrepreneurship related to logistics has been involved in seeking to address problematic working conditions. This includes actions such as developing codes of conduct which outline workers' rights and creating whistle blower programmes.

Drivers also face health and safety risks due to long hours which can cause fatigue. Several companies have developed technology that can help drivers to prevent accidents caused by fatigue. Optalert is an Australian company that has developed glasses that can help to prevent accidents during transport.[143] These glasses monitor eye movements and tell drivers when they are starting to show signs of fatigue. The company describes the glasses as being able to predict drowsiness up to 15-20 minutes prior to the onset of performance failure.

5.4 Unions and Workers

Unions and workers have also been sustainability entrepreneurs in value chains. Moving beyond their traditional roles of building agreements between workers and their direct employers, unions have been involved in developing a variety of transnational industrial relations agreements[144] which are targeted at behaviour in value chains. Such arrangements can be in the form of global framework agreements that involve individual brands. These agreements are negotiated at the global level between unions and companies. They are intended to protect workers' interests across companies' multinational operations and can include health, safety, and environmental practices. A global union federation that has focused on making such agreements is IndustriALL. An example of a specific global framework agreement is the agreement between IndustriALL's Swedish affiliate IF Metall and Saab AB, an aerospace and defence aircraft manufacturer that

[142] Social dumping can involve hiring workers from lower wage countries and giving contracts that do not have the same benefits as domestic workers would be entitled to.
[143] Optalert (n.d). About Us. Richmond, Australia: Optalert. https://www.optalert.com/about-us, accessed 11 June 2021.
[144] Ashwin, S., Oka, C., Schüßler, E., Alexander, R., & Lohmeyer, N. (2020). Spillover effects across transnational industrial relations agreements: The potential and limits of collective action in global supply chains. *ILR Review*, 73(4), 995-1020.

sells products in Europe, South Africa, Australia, and the US.[145] The agreement covers all of Saab AB's employees, suppliers, and subcontractors. Elements of the agreement include:

- non-tolerance of child and forced labour;
- providing employees with a safe and healthy working environment;
- committing to no discrimination, harassment or abuse at the workplace;
- recognizing freedom of association and the right to collective bargaining;
- not to organize or finance "company/«yellow»" unions, implement or support union busting activity, or adopt initiatives that discourage workers from forming unions; and
- contributing to sustainable development.

Unions can also develop multi-brand agreements. For instance, the garment sector has seen the development of several initiatives that involve multiple lead firms collectively collaborating with global unions. One example is the Bangladesh Accord on Building and Fire Safety.[146] This initiative seeks to promote health and safety in the garment and textile industries in Bangladesh. Another example is ACT, which seeks to promote a living wage in the garment, textile, and footwear sectors.[147]

In cases where workers are not in unions, they can still take action to address sustainability challenges. Non-unionized workers in value chains have also been involved in developing sustainability programmes. This can even occur where workers are in challenging circumstances, as was the case with the creation of the Fair Food Programme, which addresses challenges with agriculture in the USA, which is an industry that relies heavily on migrant workers with precarious and difficult working arrangements.

Facing this ongoing challenge, a group of migrant workers came together to form the Fair Food Programme.[148] From their place within the value chains of major American corporations, they sought to improve their own working standards. The programme functions with the cooperation and support of other industry stakeholders, including farmers and retail food companies. The

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[145] IndustriALL (2012, July 4). IndustriALL signs global agreement with Saab. Geneva, Switzerland: IndustriAll. http://www.industriall-union.org/industriall-signs-global-agreement-with-saab, accessed 11 June 2021.
[146] Accord on Fire and Building Safety in Bangladesh. (n.d.). About. Dhaka, Bandladesh: Accord on Fire and Building Safety in Bangladesh. https://bangladeshaccord.org/about, accessed 11 June 2021.
[147] ACT. (n.d.). Who We Are. Berlin, Germany: ACT. https://actonlivingwages.com/who-we-are, accessed 11 June 2021.
[148] Mieres, F. & McGrath, S. (2021). Ripe to be Heard: Workers' Voice in the Fair Food Programme. *International*

roots of the programme are that in 2001, the Coalition of Immokalee Workers launched the Campaign for Fair Food, which sought to bring the conditions of farmers to consumers' and brands' attention. This led to the development of the Fair Food Programme, which seeks to ensure fair wages and working conditions for fruit and vegetable farms. In the programme, participating lead firms agree to purchase only from farms that meet the standards required by the Fair Food Code of Conduct, as verified by the Fair Food Standards Council (FFSC). They also pay their suppliers a small "Fair Food Premium," which is passed on to farmworkers in their regular pay checks. Participating farms agree to implement the Fair Food Code of Conduct, be monitored by the FFSC, and to pay their workers the Fair Food Premium.

5.5 Issue-Focused NGOs

Globally, there are many organisations that have developed that are specifically focused on promoting sustainable production. These organisations have a variety of focuses. Some can be dedicated to addressing a small-scale local sustainability challenge facing a community and others can have global ambitions. These organisations often develop multiple projects and innovative ways to try to promote the causes they are aligned with. Actions have included being involved in providing the types of sustainability-related products and services that were discussed earlier in this chapter as well as other ways of influencing value chain actors and the environments in which they work.

One focus that NGOs have had related to influencing production processes is trying to influence the behaviour of lead firms in value chains. NGOs have developed a wide variety of tactics to achieve this aim. Such appeals have often involved name and shame campaigns. For example, No Dirty Gold' was a name and shame campaign developed to address challenges identified in gold mining that was feeding into large lead firms' value chains.[149] The campaign was started by Earthworks (formerly the Mineral Policy Center) and Oxfam America. They focused on making an impact on high-end jewellery brands who were concerned about their image. They wanted to

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Labour Review, ahead of print, doi.org/10.1111/ilr.12204.

[149] Bloomfield, M. J. (2014). Shame campaigns and environmental justice: corporate shaming as activist strategy. *Environmental Politics*, 23(2), 263-281.

ensure that jewellers sourced from suppliers that adhered to a set of social and environmental criteria. To meet these objectives, they sought to encourage companies to sign a pledge by carrying out various public shaming activities. These activities included street demonstrations, letter writing, public advertisements, disseminating information online, and providing media kits for journalists.

NGOs have also developed collaborative approaches in which they partner with lead firms to develop new policies and programmes. One example of an NGO partnering with a company to be a direct part of shaping the companies' activities is Conservation International's work with Starbucks, a USA-based global coffee chain.[150] Conservation International is an NGO with a mission to "conserve the Earth's living natural heritage, our global biodiversity, and to demonstrate that human societies are able to live harmoniously with nature". This partnership was built around defining and executing value chain sustainability standards for coffee production.

NGOs are also involved in a variety of other activities that are targeted directly at influencing suppliers in global value chains. These activities can also take different forms. For example, they can work with suppliers to provide support services for their workers.

Some NGOs take the form of multi stakeholder organisations, which have contributions from a diverse group of other organisations. Multi-stakeholder initiatives can play multiple roles in value chains, which include providing learning platforms, developing standards, developing enforcement mechanisms, and issuing labels and certifications.[151] While these organisations have the benefit of bringing diverse perspectives together, some have been criticised for failing to effectively balance the needs of all stakeholders.[152]

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[150] Perez-Aleman, P., & Sandilands, M. (2008). Building value at the top and the bottom of the global supply chain: MNC-NGO partnerships. *California Management Review*, 51(1), 24-49.
[151] Searcy, C., Kapuscinski, A. R., & Dooley, K. (2017). Multi-stakeholder initiatives in sustainable supply chains: Putting sustainability performance in context. *Elementa: Science of the Anthropocene*, 5:73, doi.org/10.1525/elementa.262.
[152] Soundararajan, V., Brown, J. A., & Wicks, A. C. (2019). Can multi-stakeholder initiatives improve global supply chains? Improving deliberative capacity with a stakeholder orientation. *Business Ethics Quarterly*, 29(3), 385-412.

An example of a large multi-stakeholder organisation is the Forest Stewardship Council (FSC) based in Germany. Their purpose is to promote environmentally appropriate, socially beneficial, and economically viable management of the world's forests. They have hundreds of members across the world, which include NGOs and companies. Their main activities involve certifying forestry products. By 2019, they had certified over 199 million hectares of forest to ensure it was being managed in a way that preserves biological diversity and benefits the lives of local people and workers, while ensuring it sustains economic viability; and had also issued over 37,000 chain of custody certificates for actors in other parts of value chains.[153] The FSC has had a major impact on the global forestry industry.[154]

5.6 Public Sector Policy Makers

A final important category of actors to consider related to sustainable value chain entrepreneurship is public sector agencies. Addressing challenges related to sustainable production in value chains often involve activities that cross through multiple locations. As such, regulating production can be a difficult process. Regulators across multiple scales, from local, national, regional to global have developed a range of policies and interventions which are intended to promote sustainable production. Working at each scale, policy makers have used different tactics, some of which are considered below. It is also important to consider that producers may be covered by layers of multi-scalar governance initiatives.[155]

Local

Often, problems related to sustainable production are felt strongly at a local scale. This may be from local pollution or through a community facing challenges related to working conditions. Local governments can create laws and run programmes which promote sustainable production practices. In cases where local governments do not have the jurisdiction to regulate pertinent

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[153] FSC (2020). *FSC Annual Report 2019*. Bonn, Germany: FSC. https://fsc.org/sites/default/files/2020-11/FSC%20ANNUAL%20REPORT%202019%20ENGLISH%20web.pdf
[154] Bartley, T. (2007). How foundations shape social movements: The construction of an organizational field and the rise of forest certification. *Social Problems*, 54(3), 229-255.
[155] Alford, M., Barrientos, S., & Visser, M. (2017). Multi-scalar labour agency in global production networks:

behaviour, they can seek to be innovative in developing programmes that can encourage desired behaviour change.

A key challenge for local governments is that some localities have a situation in which many people are employed by one dominant employer or industry. This can create conflicts of interest for local regulators at municipal or local regional (state or province) level related to promoting economic interests of constituents while supporting social and environmental sustainability. Local governments can be innovative in balancing these priorities.

An example of a local public sector programme that focused on production processes is the City of Cape Town's support of the Western Cape Industrial Symbiosis Program (WISP), which promotes an industrial ecosystem within the South African city.[156] The WISP programme is delivered by GreenCape, an NGO, with technical support from the City of Cape Town. The programme also involves cooperation with the Cape Chamber of Commerce and Industry (CCOC), the National Cleaner Production Centre (NCPC), and the Economic Development Partnership (EDP). Funding is provided by several sources, including the Western Cape Government, the City of Cape Town, and the British High Commission. The programme involves recruiting local businesses and assessing their operations. WISP is free and involves SMEs and larger businesses. WISP identifies waste streams and unused or residual resources to find potential connections with existing members. Examples include materials, energy, water, assets, logistics, and expertise. The programme has identified more than 4,000 potential synergies between almost 500 companies, many of which have been acted upon. This project enables businesses to cut costs and increase profit; improve operational efficiencies; create new revenue streams; learn; operate more sustainably; divert industrial waste from landfill; reduce greenhouse gas emissions, including CO2; develop new business opportunities and create jobs; and, attract new private investments.

Contestation and crisis in the South African fruit sector. *Development and Change*, 48(4), 721-745.

[156] See: Climate-KIC (2018). *Municipality-led circular economy case studies*. Brussels, Belgium: Climate-KIC. https://www.climate-kic.org/wp-content/uploads/sites/15/2018/12/Municipality-led-circular-economy-case-studies-compressed-ilovepdf-compressed.pdf, accessed 11 June 2021; Western Cape Government (n.d.) Western Cape Industrial Symbiosis Programme. Capetown, South Africa: Western Cape Government. https://www.westerncape.gov.za/110green/projects/western-cape-industrial-symbiosis-programme, accessed 11 June 2021.

Local programmes can also shape how residents use products. For example, the city of Copenhagen took over the local bike sharing scheme that was discussed above (see Section 4.1). When the ByCyklen programme was not able to support itself based on advertising revenue, the city government stepped up to manage the programme. This involved the city providing funding and obtaining corporate donors. By running this programme, the local government was able to promote bicycle riding as a sustainable local transportation option.

National

Many regulations which shape production practices are set at a national level. These regulations not only shape dynamics of practices used by domestic businesses but are also important for attracting foreign direct investment. A tactic which has been used by many countries related to global value chain production is to create export processing zones. These are regions which can have different regulations to the rest of the country and are often designed to appeal to foreign investors. While such zones have often been seen as places that are prone to sustainability challenges, in some cases, governments have engaged in sustainable entrepreneurship related to how they are set up, such as creating eco-industrial parks.

An example of the creation of eco-industrial parks can be found in Vietnam. Following a period of economic growth, in the mid-2010s, the country housed almost 200 industrial zones which were covered by basic environmental legislation but with weak enforcement.[157] Approximately 70% of effluent from these industrial zones was being discharged without being treated. This was causing severe water pollution. Solid waste, including hazardous materials, was also being disposed of without treatment. Furthermore, high uses of natural gas and coal were also creating high levels of greenhouse gas emissions.

Vietnam's Ministry for Planning and Investment, along with UNIDO, developed a programme to transform conventional industrial zones into eco-industrial parks, which are defined as areas that ensure sustainability through the integration of social, economic, and environmental quality aspects into its siting, planning, management and operations. This has involved increasing the

[157] UNIDO (2020, January 24). Fostering Eco-Industrial Parks in Viet Nam. Vienna, Austria: UNIDO. https://www.unido.org/stories/fostering-eco-industrial-parks-viet-nam, accessed 11 June 2021.

use of clean technologies and practices for the minimization of hazardous waste, GHG emissions, and water pollutants, and improved chemical management, adopting RECP techniques, industrial ecosystems, improving social standards, sharing infrastructure and improving spatial zoning and management. In 2018, Vietnam developed new regulations covering industrial zones and economic zones. According to these regulations, enterprises involved in the development of infrastructure and firms in an eco-industrial zone will receive a number of benefits, which include access to preferential loans, participation in technical assistance programs and investment promotion programs, exchange of information related to the technology market, and cooperation related to production and business activities. [158]

International

International public sector regulation can take a number of forms. Regional agreements make up one form of international governance. One way that regional governance mechanisms can shape production processes is through provisions that are created in regional agreements. For example, the 1998 MERCOSUR[159] Social and Labour Declaration recognizes the ILO Declaration, together with declarations concerning human rights and civil and political freedoms, which cover topics such as non-discrimination, protection of migrant and cross-border workers, forced labour, child labour, freedom of association, trade union freedom, unemployment protection, vocational training, occupational health and safety, labour inspection, and the right to social security.[160]

International governance also often takes place at the global level. Governmental institutions at the global level have been exploring various ways to promote sustainable production. As mentioned in the introduction, the SDGs have been developed to set a series of global goals. Another major global governance mechanism is the OECD Guidelines for Multinational

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[158] Das, K. (2018). Vietnam's Industrial Parks and Economic Zone – Updated Regulations on Management. *Vietnam Briefing*. https://www.vietnam-briefing.com/news/vietnams-industrial-parks-economic-zones-updated-regulations-management.html, accessed 11 June 2021.

[159] MERCOSUR (the Southern Common Market) is a regional integration process that was established by Argentina, Brazil, Paraguay and Uruguay, and subsequently joined by Venezuela and Bolivia.

[160] Siroën, J. M. (2013). Labour provisions in preferential trade agreements: Current practice and outlook. *International Labour Review*, 152(1), 85-106.

Enterprises which were adopted in 1976.[161] They are an international legal instrument that provides a comprehensive international standard for responsible business conduct coving human rights, labour rights, environment, bribery, consumer interest, information disclosure, science and technology, competition and taxation. A key element of the OECD's approach is that companies should engage in risk-based due diligence. The guidelines have been adopted by all OECD members (37 countries) as well as interested non-OECD members. In total, around 50 countries have adhered to the guidelines or are in the process of adhering.

Another form of global governance that has been developing is attempts by governments to create regulation which can shape production practices of items that are imported into their country or region or are connected to the operation of domestically operating firms.[162] These are often focused on creating obligations for lead firms in value chains. This has included regulations such as the UK and Australia's Modern Slavery Acts, or France's Corporate Duty of Vigilance Law. The EU is also developing regulation related to this issue.

To provide a concrete example, to address concerns that modern slavery[163] was happening in connection to large businesses operating in the UK, the national government developed the Modern Slavery Act 2015. This act covers companies with an annual turnover over 36 million GBP or more, who operate in the UK, and supply goods or services. It stipulates that firms meeting these criteria would have to publish a report outlining the practices they have undertaken to address modern slavery within their business and in their supplier base. The law does not regulate what actions the companies need to take but seeks to use the reputational impact the reports would have in order to push firms into taking action to prevent modern slavery in their own practices and in their value chain operations that take place globally.

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[161] OECD (2019). *Annual Report on the OECD Guidelines for Multinational Enterprises 2019*. Paris, France: OECD. http://mneguidelines.oecd.org/2019-Annual-Report-MNE-Guidelines-EN.pdf, accessed 11 June 2021.
[162] A number of articles explore this type of law, see: Knudsen, J. S., Moon, J. & Slager, R. (2015). Government policies for corporate social responsibility in Europe: A comparative analysis of institutionalisation. *Policy & Politics*, 43(1), 81-99; LeBaron, G., & Rühmkorf, A. (2017). Steering CSR through home state regulation: A comparison of the impact of the UK bribery act and modern slavery act on global supply chain governance. *Global Policy*, 8, 15-28; Smit, L., Bright, C., McCorquodale, R., Bauer, M., Deringer, H., BaezaBreinbauer, D., Torres-Cortés, F., Alleweldt, F., Kara, S., Salinier, C. & Tejero Tobed, H. (2020). *Study on Due Diligence Requirements through the Supply Chain: Final Report*. Brussels, Belgium: European Commission.
[163] Modern slavery is defined by the UK government as "slavery, servitude and forced or compulsory labour; and

5.7 Limitations for Third Party Innovation

The third parties discussed in this chapter are diverse. As such, the dynamics they face when interacting with value chain actors are also diverse. In some cases, they have a strong amount of power, as is the case for many policy makers. In other cases, they are small organisations seeking to appeal to value chain actors in order to get a client or trigger a particular behaviour change. The way that third parties are connected to value chains fundamentally shapes the opportunities they have to promote sustainable practices.

Initiatives that are designed for suppliers and lead firms to voluntarily join face specific challenges. One is that they are likely not going to appeal to the worst performers. This dynamic can limit their impact as the initiative may help businesses with few sustainability challenges to improve their impacts but have limited to no impact on the businesses involved in the most severe problems.

Another challenge of voluntary initiatives is that companies can join and gain from a positive image, while actually continuing to use a variety of actions which perpetuate sustainability challenges. Buyers of products or services may not actually incorporate changes in their routines or they may only make changes to small portions of their operations. Additionally, for-profit third parties can have an incentive to help their clients create a positive image while allowing sustainability challenges to continue and thus keeping a demand for their services. A key barrier for voluntary initiatives is that the product or service provider has to be appealing to the companies which pay for their services, which can prevent certain sustainability from being addressed.

Third party organisations seeking to promote changes to value chain behaviours through direct pressures on individual firms or influencing the environments where value chain actors work also face challenges. In some cases, pressures they create may not have the intended effects. One issue is that these organisations can have weak leverage or low visibility. This is often the situation for workers, unions, and small NGOs when dealing with large multinational companies.

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human trafficking" (see Transparency in Supply Chains etc. A practical guide, Guidance issued under section 54(9)

In these cases, the organisations can benefit from collaborating with other actors in order to increase their leverage. Another issue is that value chain actors can modify their behaviours in ways that appear to address the sustainability challenge or accommodate new institutional pressures while actually just restructuring their businesses in ways that allow the challenge to continue in a slightly different form. This possibility also highlights the need to develop cooperative approaches, with this problem pointing to the need to include the businesses as part of a cooperative effort at developing solutions to sustainability challenges.

While government agencies have the ability to create binding regulations, they can also face various challenges related to sustainable value chain entrepreneurship. A key challenge is the fact that public regulation is often bound within a defined territory while multi-national companies can choose where they place different parts of their operations and value chains.[164] Global firms can be footloose and leave places when burdensome regulations are introduced. This can be an incentive for governments not to enact legislation that could restrict business behaviour. Another issue is that companies can find loopholes in which they can avoid regulations. Furthermore, government priorities can be conflicted related to addressing complex sustainability issues that may be part of economic systems that create both positive and negative sustainability-related outcomes. Overall, governments face steep challenges with designing regulation that can result in the desired impact.

Another issue is the role of the state as a facilitator for enabling other actors to develop sustainable value chain entrepreneurship initiatives. For instance, if trade unions and worker organizations are interested in developing new ways of defending the collective rights and entitlements of workers in value chains, this kind of sustainable entrepreneurship may either be enhanced or undermined by national governments. In some cases governments are systematically suppressing the ability of workers to organize collectively and freely negotiate their terms of employment with factories, which can make it difficult for trade unions to enhance the position of workers within value chains.[165] Conversely, national governments that help the organization

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of the Modern Slavery Act 2015).

[164] Coe, N. M., Dicken, P., & Hess, M. (2008). Global production networks: realizing the potential. *Journal of Economic Geography*, 8(3), 271-295.

[165] Pyke, F., & Lund-Thomsen, P. (2016). Social upgrading in developing country industrial clusters: A reflection

of worker representatives and the enforcement of labour legislation, as has been the case of Brazil for example, may also stimulate new and innovative ways for trade unions to enhance the bargaining position of workers within value chains.[166]

on the literature. *Competition and Change*, 20(1), 53-68.

[166] Posthuma, A., & Bigami, R. (2014). 'Bridging the Gap'? Public and private regulation of labour standards in apparel value chains in Brazil. *Competition and Change*, 18(4), 345-364.

6. Towards a More Sustainable Value Chain Entrepreneurship Future

Sustainable value chain entrepreneurship involves large and small businesses as well as diverse organisations that interact with value chains and shape the environment in which value chains operate. This book has identified a wide range of examples of organisations engaging in sustainable value chain entrepreneurship. Lead firms have been found to engage in initiatives that are related to product design, promoting change in suppliers' behaviour, increasing transparency and engaging in collective action related to sustainability. Suppliers have been found to engage in product, process, functional and sectoral upgrading, as well as also engaging in collective action. Entrepreneurs have been found to act as business model innovators which create ventures that have the potential to change the structures of conventional global value chains. Finally, a variety of third-party actors are found to have developed sustainability-focused services for value chain actors and to have incorporated sustainable value chain entrepreneurship into conventional products and services provided to suppliers and lead firms. Diverse actors, including unions, workers, issue-focused NGOs, and public sector organisations, are also developing sustainable value chain entrepreneurship ventures that are intended to directly influence suppliers and lead firms or to shape the environments where these businesses work.

While all of the above-mentioned actors are engaging in sustainable value chain entrepreneurship, they experience different opportunities and challenges. The emergence and growth of these diverse initiatives interact with existing value chains on many levels and sustainable entrepreneurs are found to operate in diverse contexts around the world. Ventures range in focus and scope for all actors. Some seek to sell a new product or service, while others have the objective of influencing market dynamics. Many of the initiatives involve multistakeholder collaboration. Their opportunities are often shaped by their place in or relationship to the networks that make up value chains and the local institutional environments in which they operate.

6.1 The Future of Sustainable Value Chain Entrepreneurship

In the coming years, we can expect a continued growth of sustainable value chain entrepreneurship. Through this process, innovation can help humanity to deal with complex sustainability challenges. Potential benefits include:

- Innovation that addresses complex challenges
- Low cost and potentially profitable business practices that are created to address sustainability challenges
- New ventures that can trigger large scale changes

However, sustainable value chain entrepreneurship is not a panacea. The practice also faces a number of challenges. Potential challenges include:

- Large lead firms rapidly changing the focus of their actions to address ever-changing emerging hot topics
- A large diversity of initiatives being developed which have differing levels of impact on sustainability challenges, but those that have the most success (or scale) may be the ones with higher market appeal, which can be disconnected from social and environmental impacts
- Suppliers being asked to comply with an increasing volume of standards creating unnecessary difficulties related to supplier management practices
- Some challenges being ignored by entrepreneurs as sustainability issues addressed may reflect their awareness of challenges as opposed to being focused on the most pressing challenges
- Sustainable ventures being limited to operating within existing markets (or within existing large businesses) while most businesses continue to use practices associated with sustainability challenges

As demonstrated throughout this book, entrepreneurs around the world have been developing an extensive number of initiatives that address diverse sustainability challenges. Considering the variety of opportunities and challenges can help to support more impactful projects in the future. Overall, sustainable value chain entrepreneurship is a way for diverse actors to help to generate solutions to current and emerging sustainability challenges at different scales.

6.2 Implications for Students Researching Sustainable Value Chain Entrepreneurship

The content of this book presents a variety of ways to view sustainable value chain entrepreneurship. A number of questions can be asked and multiple areas can be explored further to develop a deeper understanding of the topic. One way for research to proceed is to begin with an entry point focused on the perspective of a particular value chain actor.

- *Lead Firms*: Exploring the value chain dynamics of one lead firm, which can include examining or mapping members of the supplier base and identifying types of initiatives the lead firm carries out to promote sustainable production and identifying opportunities that may be available for the lead firm to engage in sustainable value chain entrepreneurship
- *Suppliers*: Identifying how the supplier has sought to address sustainability challenges and opportunities that may be available for the supplier to engage in sustainable value chain entrepreneurship
- *Business Model Innovators*: Exploring a case study of a firm that has developed a new business model or looking at a sector and identifying the range of new business models that are being developed
- *Supporting Actors*: Choosing an initiative developed by a third-party actor and conducting a case study

Alternately, research can start from perspective that are not actor-specific. For example, focusing on a specific product, such the example of garment value chains provided in the introduction. Topics of focus can also include sites of production or particular sustainability challenges.

- *Products*: Choosing a specific product and conducting research on how the product is made and the types of sustainable value chain entrepreneurship that are taking place related to its production
- *Production Sites*: Choosing a specific production, such as an industrial cluster or an eco-park and exploring the types of sustainable value chain entrepreneurship that are taking place
- *Sustainability Challenges*: Choosing a specific sustainability challenge, such as the use of micro beads in cosmetics or single use plastics, and researching the types of sustainable value chain entrepreneurship that are being carried out to address the challenge

When looking at any of these research topics, focus can be placed at different points in the process, which can include: looking at how a particular process or organisation emerged; how it functions, including pressures that support its continuation and pressures that exist for change; or looking at the impacts that are created. Overall, sustainable value chain entrepreneurship is a complex topic, which can be looked at from diverse perspectives. Each angle can help to develop unique insights.

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Appendix A: Garment Sector Sustainable Value Chain Entrepreneurship[167] & [168]

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
&Wider	..	Collects data on workers' experiences to provide to direct employers or lead firms	South Africa	Over 30 countries	Business	Third Party	Technology
Adidas	Clean Classics	Vegan shoes	Germany	Global	Business	Buyer	Product
Advance Denim	Bigbox Dying	System for using less resources for indigo dyeing	China	Global	Business	Supplier	Manufacturing Process
Aid by Trade Foundation	Cotton Made in Africa (CMIA)	Promoting social and environmental standards for smallholder farmers	Germany	Africa	NGO	Third Party	Certification
Algalife	..	Produces pigments and fibres made from algae	Germany	Global	Business	Supplier	Product
ALGI	..	CSR auditing services	USA	Global	Business	Third Party	Auditing
Amadou Leather	..	Leather-type product made from mushrooms	UK	Global	Business	Supplier	Product

167 Many of organisations and initiatives incorporate multiple types of sustainability innovations. The chart identifies examples of key aspects.

168 Sources: Textile Exchange (2020). Sustainable Cotton Matrix. Lamesa, TX: https://textileexchange.org/sustainable-cotton-initiatives-matrix, accessed 11 June 2021; OECD (2021). Garment Week Agenda. Paris, France: OECD. https://oecd-events.org/garment-forum/en/eventagenda, accessed 11 June 2021; Sustainable Apparel Coalition (2021). Our Members: Academic, Affiliates, Government, & NGO. Oakland, CA: Sustainable Apparel Coalition. https://apparelcoalition.org/govt-ngos-academics, accessed 11 June 2021; Tilstra, F., & Beatrice, G. (2021, April 12) The Sustainable Transition in Apparel and Home Textiles. The Hague, Netherlands: CBI. https://www.cbi.eu/market-information/apparel/sustainable-transition-apparel-and-home-textiles, accessed 11 June 2021; Preuss, S. (2020, October 16). 32 Sustainability efforts of the fashion industry in September 2020. *FashionUnited*. https://fashionunited.uk/news/business/32-sustainability-efforts-of-the-fashion-industry-in-september-2020/2020101651414, accessed 11 June 2021.

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Amfori	BSCI	System for monitoring labour in value chains	Brussels	Global	Business Association	Buyers	Code of Conduct, Data Sharing
Anthesis	..	Sustainabilty-focused consulting	UK	Global	Business	Third Party	Consulting Service
Apparel Impact Institute	..	Identifying, funding, scaling and measuring environmental initiatives related to apparel and footwear	USA	Global	NGO	Third Party	Macro-Level Industry Support
Arges Laser System	..	Laser textile finishing equipment	Turkey	Global	Business	Third Party	Technology
As You Sow	Responsible Sourcing Network	Multistakeholder coalition working on forced labor in cotton production; has run two related pledge campaigns and developed Yarn Ethically & Sustainably Sourced (YESS), a cotton standard for yarn spinners and fabric mills	USA	Global	NGO	MSI	Pledge/Voluntary Agreement, Standard
Asahi Kasei	Bemburg	Brand name for cupro, cellulose fibre made from cotton seed waste	Japan	Global	Business	Supplier	Product
Asket	Impact Receipt	A receipt which shows the impact of a product (e.g. CO2 emitted, water required, energy consumed)	Sweden	Global	Business	Buyer	Communication Material

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
ASOS	Circular Fashion Collection	Collection designed to use circular principles	UK	Global	Business	Buyer	Product, Business Model
B Corp	..	Certificaton for sutainable business	USA	Global	NGO	Third Party	Certification
BASF CropScience	e3	Promoting high quality, sustainable cotton for farmers	USA	USA	Business	Third Party	Certification
Better Buying Institute	..	Organisation enouraging better buying practices for lead firms	USA	Global	NGO	Third Party	Data Collection & Sharing
Better Cotton Initiative (BCI)	..	Promoting environmental and social sustainability for cotton farmers	Switzerland, UK	Global	NGO	Third Party	Certification, Training
Better Work	..	Garment factory assessments, training, advocacy and research focused on changing policies, attitudes, and behaviour	Switzerland	Bangladesh, Cambodia, Ethiopia, Egypt, Haiti, Indonesia, Jordan, Nicaragua, Vietnam	Intergovernmental Organisation	Third Party	Auditing, Training
Billerudkorsnäs	..	Fibre-based packaging material	Sweden	Global	Business	Supplier	Product
Bluesign	..	Certification for sustainable manufacturing	Switzerland	Global	Business	Third Party	Certification

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
BluWin Ltd	Sustainable Textile Solutions	Assisting brands, retailers and industry partners to implement sustainable textile production that makes more efficient use of resources through consultancy, auditing and capacity building	UK	Global	Business	Third Party	Consultancy Service, Auditing, Capacity Building
Brazilian Association of Cotton Production	ABR	Promoting fiber quality, traceability, sustainability and commercialization for cotton farmers	Brazil	Brazil	Producer Association	Supplier	Certification
BSR	..	Sustainability-related business support services	USA	Global	NGO	Third Party	Consulting Service
Bureau Veritas	..	Auditing service provider	France	Global	Business	Third Party	Auditing
CEMAsys	..	Sustainability-related business support services	Norway	Global	Business	Third Party	Consulting Service
Child Labour Due Diligence Act, Netherland	..	Law requiring companies selling in the Netherlands to determine whether child labour occurs in their value chains.	Netherlands	Netherlands	Government	Third Party	Regulation
Circos	..	Leasing, reusing, recycling baby apparel	Netherlands	Global	Business	Buyer	Business Model

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Circular Systems	Agraloop BioFibre	Agraloop BioFibre is a fibre made from agricultural waste	USA	Global	Business	Supplier	Product, Business Model
circular.fashion	..	IoT software to facilitate a circular economy system	Germany	Global	Business	Third Party	Technology
Cocoon	..	Renting handbags	UK	Global	Business	Third Party	Business Model
Colorifix	..	Product that uses biological process to desposit and fix pigments onto textiles	UK	Global	Business	Supplier	Product
Control Union	..	Sustainability certification	Netherlands	Global	Business	Third Party	Certification
Cos	Resell	Platform for buying and reselling Cos clothing	UK	Global	Business	Buyer	Business Model
Cotton Australia	MYBMP	Promoting environmental and social sustainability for cotton farmers	Australia	Australia	NGO	Supplier	Certification; Providing Training
CottonConnect	..	Supporting global brands to source sustainable cotton	UK	Global	Business	Third Party	Consulting Service, Industry Forum
CottonConnect	REEL	Promoting sustainable cotton	UK	China, India, Pakistan, Peru	Business	Third Party	Certification, Training
CottonConnect	TraceBale	Traceability software tool	UK	Global	Business	Third Party	Technology

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Cradle to Cradle Products Innovation Institute	..	Certification for products are made responsibly and using circular models	USA	Global	NGO	Third Party	Certification
Deckers Brands, Kassia+Surf	Sanuk and Kassia+Surf Collaboration on Capsule Collection	Capsule collection featuring sustainable materials	USA	Global	Business	Buyer	Product
Dedagroup	..	Data management service covering sustainability aspects	Italy	Global	Business	Third Party	Technology
Drywired	Textile Shield	Environmentally friendly fabric coating	USA	Global	Business	Supplier	Product
Dupont	Sorona	Fibre with 37% of the polymer made using annually renewable plant-based ingredients	USA	Global	Business	Supplier	Product
Dyecoo	..	Supplier of industrial CO_2 textile dyeing equipment and dye with 100% water-free and process chemical-free system	Netherlands	Global	Business	Supplier	Product, Technology
DyStar Group	Dystar Cadira	Water, waste and energy efficient dyeing system	Singapore	Global	Business	Supplier	Technology
Ecochain	..	Lifecyle analysis technology and consulting services	Netherlands	Global	Business	Third Party	Technology, Consulting Service

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Econic Technologies	..	Technology that turns waste CO2 as an input for plastic manufacturing, which can be used for vegan leather, foam used in shoe soles, and waterproof spray	UK	Global	Business	Third Party	Technology
ELEVATE	..	Sustainable value chain consulting	Hong Kong	Global	Business	Third Party	Consulting Service
Ethical Trading Initiative (ETI)	..	Multi-stakeholder association focused on promoting ethical value chains, with companies, trade unions, and NGOs as members	UK	Global	NGO	Third Party	Standard, Training, Industry Platform
European Outdoor Group (EOG)	..	Multi-stakeholder association promoting sustainability in the outdoor sector	Switzerland	Europe	NGO	Third Party	Industry platform
European Union	Registration, Evaluation, Authorisation & Restriction of Chemicals (REACH)	Regulates the production and use of chemical substances, and their potential impacts on human health and the environment	Belgium	Europe	Government	Third Party	Regulation
EVRNU	..	Recycling cotton garment waste into few fibres	USA	Global	Business	Supplier	Product, Business Model

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
EVRNU	NuCycl	Process for turning textile waste into new materials	USA	Global	Business	Supplier	Product, Business Model
Extensive Standard Technical Services Co., Ltd. (ESTS)	..	Sustainability certification and auditing for value chains	Hong Kong	Global	Business	Third Party	Certification, Auditing
Fairtrade	..	Promoting better working conditions for cotton farmers	Germany	Global	NGO	Third Party	Certification
Fairwear Foundation (FWF)	..	Works with garment brands and retailers to support garment workers rights	Netherlands	Global	NGO	Third Party	Standard, Industry platform
Farfarm	..	Promotes sustainable value chains	Brazil	Global	Business	Third Party	Consulting services
FastFeetGrinded	..	Collects used shoes and has developed a technology separate component parts, which are supplied to shoe, playground and sporting field manufacturers	Netherlands	Global	Business	Third Party	Product, Technology, Recycling Scheme, Business Model
Fibre Bio	..	Organic and fair trade textile producer	France	Global	Business	Supplier	Product

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Field to Market: The Alliance for Sustainable Agriculture	..	Promoting sustainable agriculture	USA	Global	NGO	Third Party	Data Collection & Sharing, Industry Platform, Providing Educational Material
Fiti Testing and Research Institute	..	Testing and analysis services for apparel and textiles covering quality and sustainability related issues	Korea	Global	Business	Third Party	Auditing and Testing
Flocus	..	Produced sustainable textiles from kapok fibre	Netherlands	Global	Business	Supplier	Product
Freedom Fund	..	Fund that invests in the most effective frontline efforts to eradicate modern slavery in the countries and sectors where it is most prevalent	UK	Global	NGO	Third Party	Fund
Fullcycle Bioplastics	..	Transforms organic waste into PHA, a high-performing, compostable alternative to oil-based plastics, including fibres	USA	Global	Business	Supplier	Product, Business Model
Galy	..	Cotton grown from cells in a lab	USA	Global	Business	Supplier	Product

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Gap and Textile Exchange Collaboration	Preferred Fiber Toolkit	A publicly available resource to help sourcing and design teams to inform companies on meeting their sustainability goals	USA	Global	Fashion Brand, Not-For-Profit	Buyer, Third-Party	Providing Educational Material
Ginetex	Clevercare.info	The clevercare.info logo can be included on lead firms' garment labels to advise consumers about the environmental impact of garment care	France	Global	Business	Third Party	Communication Material
Global Fashion Agenda	..	Forum for industry collaboration and public-private cooperation on fashion sustainability	Denmark	Global	NGO	Third Party	Industry Forum
Global Organic Textiles Standard (GOTS)	..	Organic standard	Germany	Global	NGO	Third Party	Certification
Good Fashion Fund	..	Investment fund focused on driving the implementation of innovative solutions in the fashion industry	Netherlands	Asia	Business	Third Party	Fund

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
GoodWeave International	GoodWeave Label	Label means that no child, forced or bonded labor was used in the making of a certified product, and that your purchase supports programs that educate children and ensure decent work for adults	USA	South Asia, North America, Europe	NGO	Third Party	Certification
Government of Australia	Modern Slavery Act 2018	Requires large organisations to report on the risks of modern slavery in their operations and value chains and actions to address those risks	Australia	Australia	Government	Third Party	Regulation
Government of France	Duty of Vigilance Law	Law that large companies operating in France must establish and implement a vigilance plan covering their operations and value chains	France	France	Government	Third Party	Regulation
Government of UK	Modern Slavery Act 2015	Requires large organisations to report on the risks of modern slavery in their operations and value chains and actions to address those risks	UK	UK	Government	Third Party	Regulation
Greendyes	..	Environmentally friendly dyeing	Spain	Global	Business	Supplier	Technology

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
GreenWhisper	..	Use agricultural residue (mainly banana fiber) to produce paper and textiles	France	Global	Business	Supplier	Product
Haelixa	..	Physically marks, traces, and authenticates products from producer to retail creating transparency along the entire value chain (linear or circular)	Switzerland	Global	Business	Third Party	Technology
Huntsman	Avitera SE	Environmentally friendly dye	Singapore	Global	Business	Supplier	Product
Huue	..	Grows dye from bacteria	USA	Global	Business	Supplier	Product
Imogo	..	New process for dyeing textile materials which reduces waste of water, chemicals and energy	Sweden	Global	Business	Third Party	Technology
Impactt	Benefits for Business and Workers Programme	Programme linking improved pay and labour conditions with increased productivity and profit for supplier factories, supported by lead firms	UK	3 Countries	Business	Third Party	Training
Impactt	..	Ethical trade-focused consulting fo lead firms and suppliers	UK	More than 25 countries	Business	Third Party	Consulting Service

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
IndiDye Natural Color Company Ltd	IndiDye	A natural dye	China	Global	Business	Supplier	Product
Indigo Mill Designs	..	More sustainable, economical and faster and indigo dyeing process	USA	Global	Business	Third Party	Technology
Infinited Fiber	..	Makes textile fibres out of waste	Finland	Global	Business	Supplier	Product, Business Model
Infor Nexus	..	Value chain management with enhanced visibility, collaboration, and predictive intelligence	USA	Global	Business	Third Party	Technology
Inspectorio	..	Software creating a network for key stakeholders in the production process to connect to execute, monitor, and report on quality and compliance activities in value chains	USA	Global	Business	Third Party	Technology
Interface	..	Recyled and carbon neutral flooring textiles	USA	Global	Business	Lead Firm	Product, Business Model
International Organization for Standardization	ISO 26000	Standards that outline social responsibility (an organisation cannot be certified)	Switzerland	Global	NGO	Third Party	Standard

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
International Sustainability and Carbon Certification (ISCC)	..	Promoting good agricultural practices for field crops, including cotton	Germany	Global	NGO	Third Party	Certification
Intertek	..	Testing, inspecting and certifying products, including to ensure they meet quality, health, environmental, safety, and social accountability standards	UK	Global	Business	Third Party	Auditing
Jeanologia S.L	..	Laser-based systems that support environmentall friendly textile processes	Spain	Global	Business	Third Party	Technology
KALANI-home	..	Fairtrade and organic bed linen company	Belgium	Global	Business	Buyer	Product, Business Model
Kenzo, WWF	TX2 Capsule Collection	Capsule collection with tiger theme made from cotton certified by the Global Organic Textile Standard (GOTS) with portion of revenue donated to support increasing the tiger population	France	Global	Business, NGO	Lead Firm, Third Party	Product
Know the Chain	..	Benchmarks current corporate practices related to value chains	USA	Global	Business	Third Party	Communication Material

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Le Qara	..	Produces a leather substitute using microorganisms	Peru	Global	Business	Supplier	Product
Leadership and Sustainability	..	Sustainability focused training and consulting	Germany	Global	Business	Third Party	Consulting Service
Lenzing	Refibra	Fabrics made of upcycled cotton scraps from pre & post consumer cotton waste and Lenzing™ Lyocell fibers coming from wood pulp	Austria	Global	Business	Supplier	Product, Business Model
Mango Materials	..	Uses waste biogas (methane) to produce poly-hydroxyalkanoate (PHA) powder which is made into a polyester replacement	USA	Global	Business	Supplier	Product
Marks & Spencer, Oxfam	Shwopping	Programme where customers can donate unwanted clothes and shoes of any brand or condition to Marks & Spencer stores to be either resold by Oxfam, reused by its social enterprise in Senegal, or recycled into new materials	UK	UK	Business, NGO	Buyer, Third-Party	Recycling Scheme
Materra	..	Technology for growing more environmentally friendly cotton	UK	Global	Business	Third Party	Technology

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
MonoChain	..	Uses blockchain to support resale of fashion items	UK	Global	Business	Third Party	Technology, Business Model
MSLgroup	Salterbaxter	Sustainability-related corporate reporting and stategising	USA, UK	Global	Business	Third Party	Consulting Service
MUD Jeans	..	Sells and leases jeans made with recycled and organic cotton; company collects apparel after use and recycles it	Netherlands	Global	Business	Buyer	Business Model
MycoTEX	..	Provides a seamless manufacturing method for clothes made from compostable mushroom roots	Netherlands	Global	Business	Supplier	Product
Nature Coatings	..	Transforms FSC Certified wood waste into black pigment	USA	Global	Business	Supplier	Product, Business Model
OECD	Guidelines for Multinational Enterprises	Non-binding principles and standards for responsible business conduct promoted by adhering governments	France	Global	Intergovernmental Organisation	Third Party	Standard
Officina+39	Recycrom	Transforms textile waste into colored powder dyestuffs	Italy	Global	Business	Supplier	Product, Business Model
Open Apparel Registry (OAR)	..	Open source map and database of global apparel facilities and their affiliations	USA	Global	NGO	Third Party	Communication Material

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Open Data Institute	..	Supports companies and governments in data sharing initiatives	UK	Global	NGO	Third Party	Technology
Orange Fiber	..	Creates fabric from citrus juice by-products	Italy	Global	Business	Supplier	Product
Oritain	..	Value chain traceability Service	New Zealand	Global	Business	Third Party	Technology
OT-Las S.r.l.	..	Designing and manufacturing of laser machines for cutting, marking and engraving	Italy	Global	Business	Third Party	Technology
Paptic	..	Recyclable & reusable packaging material made of renewable raw-materials	Finland	Global	Business	Supplier	Product
Partnership for Sustainable Textiles	..	A multistakeholder organisation focused on improving conditions in global textile value chains at all stages of lifecycle	Germany	Germany	NGO	Third Party	Industry platform
PEFC	PEFC certified fabric	Sustainable forest certification available for forest-derived textiles	Switzerland	Global	NGO	Third Party	Certification
Pelcor	..	Fashion & lifestyle brand that focuses on cork as a raw material	Portugal	Global	Business	Buyer	Product

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Pili	..	Biofabrication of a wide range of pigments produced by microorganisms as an alternative to petrochemical- based dyes	France	Global	Business	Supplier	Product
Pinatex	..	Textile made from waste pineapple leaf fibre	London	Global	Business	Supplier	Product
pond	..	Produces bio resin systems which are 100 % bio-based and fully bio-degradable, which can bind many types of natural fibers	Denmark	Global	Business	Supplier	Product
PrimaLoft Bio	..	Biodegradable 100% recycled synthetic insulation and fabric.	USA	Global	Business	Supplier	Product
Pronovias Group	#WeDoEco	Sustainably made bridal fashion considering materials and packaging	Spain	Global	Business	Buyer	Product
Provenance	..	Software platform for businesses to present information and stories about products and their value chains	UK	Global	Business	Third Party	Technology
Pure Strategies	..	Sustainability related consulting services	USA	Global	Business	Third Party	Consulting Service
Pure Waste	..	Textiles made from recycled materials	Finland	Global	Business	Suppliers	Product, Business Model

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
PVH	Forward Fashion	Company strategy with goals: 1. Reduce negative impacts to zero 2. Increase positive impacts to 100% 3. Improve 1M+ lives across our value chain	USA	Global	Business	Buyer	Pledge/Voluntary Agreement
QIMA	..	Inspections, supplier audits and lab testing	Hong Kong	Global	Business	Third Party	Auditing and Testing
Recover	..	Producing mechanically recycled cotton yarns	Spain	Global	Business	Supplier	Product, Business Model
REGENERATION BVBA	Resortecs	Produces melting stitching threads,has disassembling ovens, sells recovered textiles	Belgium	Global	Business	Supplier	Product, Business Model
Renewcell	Circulose	Producing textiles from textile waste	Sweden	Global	Business	Supplier	Product
Rent the Runway, ThredUp	Revive by Rent the Runway	Selling pre-rented clothing	USA	Global	Business	Third Party	Business Model
RePack	..	Reusable packaging, enables the return and reuse of delivery packaging for online retailers and their users	Finland	Global	Business	Supplier	Business Model
REPREVE	..	Transforms recycled bottles into textile fibers	USA	Global	Business	Supplier	Product
Reset Carbon	..	Energy and environmental solutions provider	China	Asia	Business	Supplier	Consulting Service

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Returnity Innovations	..	Help brands develop reusable shipping and delivery packaging systems	USA	Global	Business	Third Party	Consulting Service
Reverse Resources	..	Tracking and trading platform for textile waste that facilated recycling	Estonia	Global	Business	Third Party	Technology, Business Model
RINA	..	Offers auditing and management consulting services	Italy	Global	Business	Third Party	Auditing, Consulting Service
Rubia 100% Natural Colors	..	Natural colouring of threads, fabrics, leather, paper and cosmetics	Netherlands	Global	Business	Supplier	Product
Sapphire Mills	..	Produces denim fabric which combines organic and post-consumer recycled cotton and no dye	Pakistan	Global	Business	Supplier	Product, Business Model
SEDEX	..	Ethical trade-focused business association with multiple services	UK	Global	Business Association (buyers, suppliers, auditors)	All	Technology, Consulting, Auditing, Training
Sei S.p.A	Matrix Textile System	Laser system for denim processing, which uses no water and no chemicals and optimizes fabric utilization	Italy	Global	Business	Third Party	Technology

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
SGS	..	Inspection, verification, testing and certification company	Switzerland	Global	Business	Third Party	Auditing and Testing
Smartex	..	Automated quality inspection during textile production which reduces fabric waste	USA	Global	Business	Third Party	Technology
Social Accountability International	SA8000	Social certification program	USA	Global	NGO	Third Party	Certification
Social and Economic Council of the Netherlands (SER)	Dutch Agreement Sustainable Garments and Textiles	Multi-stakeholder agreement on responsible business conduct in the garment and textile sectors.	Netherlands	Netherlands	NGO	Third Party	Pledge/Voluntary Agreement
Solidaridad	..	Civil society organization focused on sustainable value chains working at 4 levels: -producer level, promoting good practices - business level, supporting business ecosystems -policy level, promoting an enabling policy environment - market level, encouraging market uptake	Netherlands	Global	NGO	Third Party	Various

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Sourcemap	..	Sourcemap's technology helps sourcing organizations gain insights into the end-to-end value chain to verify social, environmental, and compliance standards	USA	Global	Business	Third Party	Technology
SpinDye	..	Sustainably dyed polyester yarns and fabrics	Sweden	Global	Business	Supplier	Product
Spinnova	Collaboration with Bestseller	Fibre made with wood and waste used in a retailers producers	Finland	Global	Business	Supplier, Buyer	Product
Spintex	..	Spinning and silk materials created through a spider inspired process that is more energy efficient than synthetic plastic fibres and does not use hazardous chemicals	UK	Global	Business	Supplier	Product
SupplyShift	..	Promoting sustainable value chains for lead firms	USA	Global	Business	Third Party	Technology
Sustainable Apparel Coalition	Higg Index	Tools that standardizes value chain sustainability measurement	USA	Global	NGO	Third Party	Standard
Sustainable Cotton Project	Cleaner Cotton	Promoting sustainable cotton production	USA	USA	NGO	Third Party	Certification

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Sustainable Fashion Business Consortium (SFBC)	..	Sustainability-focused business association	Hong Kong	Hong Kong	NGO	Third Party	Industry platform
Teemill	..	Uses circular model to make t-shirts from old t-shirts, allows people to design own t-shirt brands, uses organic material and renewable energy	UK	Global	Business	Buyer	Business Model
TEKO	..	Socks made with sustainable materials, uses renewable energy, some are designed to be regenerated into new socks	UK	Global	Business	Buyer	Product, Business Model
Textile Exchange	Organic Content Standard (OCS)	Chain of custody standard	USA	Global	NGO	Third Party	Certification, Traceability Service
The Bangladesh Accord on Fire and Building Safety	..	Agreement between brands and trade unions to work towards a safe and healthy garment and textile industry	Bangladesh	Bangladesh	Union, Lead Firm	Buyer, Third-Party	Certification, Training

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
The Fashion Pact	..	Multistakeholder coalition committed to environmental goals in three areas: stopping global warming, restoring biodiversity and protecting the oceans	France	14 countries	Business	Buyers, Supplier, Third Party	Pledge/Voluntary Agreement
The Sustainability Consortium (TSC)	..	Member-based organisation offering science-based decision tools, services, and solutions that address value chain sustainability issues	USA	Global	NGO	Third Party	Consulting Service
The Sustainable Fashion Academy	..	Provides services and training that enables apparel professionals to address sustainability challenges	Sweden	Global	Business	Third Party	Consulting Service, Training
Tipa	..	Compostable packaging including, polybags, zipper bags, mailers, and garment bags	Israel	Global	Business	Supplier	Product
Tonello	..	Produces environmentally friendly laundry and dyeing machines	Italy	Global	Business	Third Party	Technology

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
True Price	..	Applies methodologies for impact measurement and valuation to calculate the external costs of value chains	Netherlands	Global	Business	Third Party	Auditing
TÜV Rheinland	..	Testing, training, certifying management systems	Germany	Global	Business	Third Party	Auditing, Training
TÜV SÜD	..	Testing, certification, auditing and advisory services	Germany	Global	Business	Third Party	Auditing
Uashmama	..	Design and manufacture lifestyle products using 3 main principles: innovation, functionality, and sustainability, using own washable paper material	Italy	Global	Business	Buyer	Product
UNFCCC	Fashion Industry Charter for Climate Action	Industry-wide environmental goals and commitment	Germany	Global	Intergovernmental Organisation	Third Party	Pledge/Voluntary Agreement
Uniqlo	Re.Uniqlo	Collects used items from customers in order to recycle them	Japan	Global	Business	Buyer	Recycling Scheme

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Unspun	Genesis	Creates custom jeans for each consumer, on demand, based on a digital body scan, creating less waste, using sustainable materials and processes	USA	Global	Business	Buyer	Business Model
Valora	..	Helps organizations to reconfigure their business models based on a sustainable development philosophy	Spain	Global	Business	Third Party	Consulting Services
VeChainThor	..	VeChainThor is a public blockchain designed for mass adoption by business users of all sizes	Singapore	Global	Business	Third Party	Technology
Vicunha	Twig	Fabric made with only recycled cotton, using no dyes	Brazil	Global	Business	Supplier	Product
Vienna Textile Lab	..	Produces textile dyes using natural occurring bacteria	Austria	Global	Business	Supplier	Product
Wolkat	..	Textile recycling company which collects, sorts, recycles and produces textiles	Netherlands	Global	Business	Supplier	Product, Business Model

Organisation Name	Initiative	Description	Headquarters	Geographic Coverage	Key Actors Engaging in Entrepreneurship	Position in Value Chain (Buyer-Supplier-Third Party)	Type of Innovation
Working Capital	..	An early-stage venture fund that invests in scalable innovations to meet the growing corporate demand for more transparent and ethical value chains	USA	Global	Business	Third Party	Fund
Worn Again	..	Recycling plastic and textile waste into few fibres	UK	Global	Business	Supplier	Product, Business Model
Wrangler	Jeans Redesign	Sustainably made jeans	USA	Global	Business	Buyer	Product
WRAP	Textiles 2030	A voluntary agreement on collaborating on carbon, water and circular textile targets, and contributing to UK policy discussions	UK	UK	NGO	Third Party	Pledge/ Voluntary Agreement
ZDHC Foundation	Roadmap to Zero Programme	Multistakeholder collaboration to reduce the textile and footwear industry's chemical footprint through developing guidelines, platforms and solutions	Netherlands	Global	NGO	Third Party	Standards, Pledge/ Voluntary Agreement, Industry Forum