

Coordinating multi-level collective action: how intermediaries and digital governance can help supply chains tackle grand challenges

Collective
action in
supply chains

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Abstract

Purpose – Driven by increasing concerns for sustainable development and digitalization, intermediaries have emerged as relevant actors who can help supply chains tackle grand societal challenges. They can also trigger significant changes in structure, shape and governance models of supply chains. The goal of this research is to advance the understanding of supply chain intermediation and digital governance as coordinating mechanisms for enabling multi-level collective action to address the world's grand challenges.

Design/methodology/approach – This is a conceptual research paper that uses a vignette approach, where real examples are described to help question and expand theoretical insights and provide a basis for future

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research. The examples are drawn from past and ongoing extensive primary and secondary data collection efforts in diverse types of supply chains.

Findings – Three contexts are proposed to illustrate how intermediaries and digital governance can play a key role in helping supply chains tackle grand challenges. The first and second context highlight the differences between material and support flow intermediaries in a triadic supply chain relationship. The third context illustrates intermediation within a multi-level network which can be industry-specific or span across industries. The three contexts are evaluated on the level of intervention, the focus on material or support flows, and traditional or digital governance. The specific Sustainable Development Goals which can be tackled through intermediary intervention are also indicated.

Originality/value – Intermediaries are often hidden actors in global supply chains and have received limited attention in the academic literature. The conceptual foundation provided in this manuscript serves as the basis for future research opportunities. Three main avenues for further research in this domain are proposed: (1) novel forms of intermediation beyond economic and transactional arrangements; (2) novel forms of digital governance; and (3) translating multi-level collective action into sustainable development outcomes. Research on intermediation driven by sustainable development and digitalization trends can spur empirical advances in sustainable supply chain and operations management with important societal impact.

Keywords Intermediaries, Digital governance, Sustainability

Paper type Conceptual paper

Introduction

Grand challenges are defined as urgent issues that need to be tackled to solve important societal problems with a high likelihood of global impact, from poverty to climate change, from inequality to biodiversity loss (George *et al.*, 2016; United Nations, n.d.). As supply chains are globally dispersed and embedded in economic, social and environmental systems (Montabon *et al.*, 2016), diverse labor and environmental practices are examples of grand challenges to be tackled (Kim and Davis, 2016). The increasing interest in grand challenges has led scholars to conceptualize and operationalize them in different ways (Dorado *et al.*, 2022), yet the most widely adopted approach relates to the Sustainable Development Goals (SDGs), formulated by the United Nations (UN) in 2015 (Wickert *et al.*, 2021). To address the SDGs, there is a need for multi-level collective action (George *et al.*, 2016).

Multi-level action has been noted as a governance mechanism that incorporates both horizontal (consistency in goals and principles within domains and within the policy area) and vertical (consistency in actions at local, national and global level) coherence in action (Gupta and Nilsson, 2017). Pursuing and realizing multi-level action presents a major challenge for global supply chains. The primary issue is that actors operate at multiple levels including the individual level (person), community level (village or city), national, regional and international level, as well as the multilateral level (UN). Actors' behaviors have multi-level influences and can trickle down or have bottom-up effects. For example, socially responsible purchasing has evolved to consider social and ethical issues advocated by organizational stakeholders to ensure good business practice through the supply network (Maignan *et al.*, 2002; Zorzini *et al.*, 2015; Van den Brink *et al.*, 2019).

Another challenge involves the complexity of aligning actors with diverse needs and aspirations, and located in institutional settings with competing demands, working toward a shared agenda and coordinating efforts to align complementary capabilities (George *et al.*, 2016). Particularly in challenging contexts, intermediation activities can play a crucial role in mobilizing, engaging, linking and mediating stakeholder interactions at multiple levels.

An increasingly widespread acknowledgement of the urgency to achieve the SDGs and of the opportunities offered by the digitalization wave have driven the emergence of new types of intermediaries and the use of digital governance to mediate relationships between buyers and suppliers and other multi-level stakeholders (George *et al.*, 2021). The intermediaries and digital governance have triggered a proliferation of solutions in practice to tackle grand challenges such as food waste, sourcing of sustainable agri-food products (e.g. palm oil, cacao) and increasingly important welfare issues related to farmers and workers in

developing countries. These solutions include different forms of collective action, different forms of organizations mediating and moderating multi-level collective action and a stronger focus on ethics in enacting supply chain initiatives. The focus on multi-level action in various contexts has been addressed in the literature (Smith *et al.*, 2010; Howard *et al.*, 2022), however, the intermediation and digital governance perspectives allow novel insights into how to better address some of the world's grand challenges inherent to global supply chains.

Notable examples include new forms of intermediaries in food supply chains that bring farmers to the forefront (e.g. Moyee Coffee), digital platforms which link supply and demand for food waste (e.g. TooGoodToGo) and multi-stakeholder initiatives with new ways to address labor issues in developing countries (e.g. the Social and Labor Convergence Program). Taken together, these examples illustrate the emergence of novel forms of intermediaries relevant for global supply chains and their role in addressing the SDGs.

While these novel forms of intermediaries can help supply chains tackle the SDGs, they also present an unknown territory with inherent challenges and tensions. The emergence of these intermediaries can trigger major changes in supply chain shape and structure, the nature of supply chain relationships and expose firms to risk (Ritchie and Brindley, 2000; Oxborrow and Brindley, 2014). Intermediaries therefore must handle the unprecedented opportunities and complexities deriving from their entry in supply chains, to contribute to achieving the SDGs.

Over the last few years, scholars have assigned increasing attention to the emergence of novel forms of intermediaries, yet current insights tend to focus on individual forms of intermediation and are scattered across different streams of literature, such as business ethics (Ciulli *et al.*, 2020), supply chain management (e.g. Soundararajan and Brammer, 2018) and sustainability management (e.g. Saunders *et al.*, 2019). This fragmentation does not capture the multifaceted nature of the phenomenon, the differences and similarities between new kinds of intermediaries, the unique challenges they face and the implications for research.

To address this gap, this research considers the scholarly knowledge developed to date and leverages topical examples from practice, to provide an account of novel forms of intermediation for sustainable development and propose a research agenda with questions for future studies to address. The specific research question addressed in this paper is:

RQ1. How can novel forms of intermediaries and digital governance help supply chains tackle SDGs?

Consequently, the purpose of this article is threefold. First, it reflects on the extant literature regarding intermediation in supply chains. Second, a framework of differing levels of intermediation is proposed, including the level of intervention, nature of flows, digital and traditional governance and the SDGs tackled. Illustrative examples are used from research projects of the author team to outline several different contextual relationships, types of intermediaries and challenges. While intermediation in supply chains can help tackle a variety of SDGs, our study concentrates on a sub-set for illustrative purposes. Third, this integrated conceptual foundation serves as the basis for introducing future research opportunities. A research agenda is proposed with three future research avenues outlining key questions and related theoretical perspectives. Managerial and societal implications are discussed.

Research approach

The aim of this conceptual paper is to outline the emergence of novel forms of intermediation in supply chains with potential for addressing grand challenges. A research agenda is advanced by leveraging insights from current literature and illustrative examples of intermediaries from research projects of the author team. A relatively brief literature review, as suggested by Gilson and Goldberg (2015) for conceptual contributions, is provided before

addressing the areas in need of further inquiry via theoretical lenses to offer an integrated framework and guide future research inquiry.

The goal is to integrate current theories, provide cross-disciplinary linkages, multi-level insights and extend the scope of thinking in the field (Gilson and Goldberg, 2015). The paper combines insights from sustainability management, digital governance and supply chain management to advance the study of intermediaries driven by sustainability and digitalization as major societal trends.

Although this paper is conceptual in nature, illustrative examples are introduced to support the analysis and logic of the framework. The examples presented for each context follow a vignette approach, where real examples are described to question and expand theoretical insights as well as provide a basis of future research avenues [1]. The proposed taxonomy of supply chain intermediation expands the dyadic, economic, and transactional focus in the current literature and outlines timely and interesting questions which can be explored. This paper employed the criteria proposed for a conceptual paper by Whetten (1989) summarized in Table 1. In brief, the criteria discussed illustrate that this is a highly relevant topic with significant managerial and societal implications.

Defining intermediation in a supply chain context

Intermediaries are organizations from the public, private or not-for-profit sector that connect stakeholders at multiple levels, diffuse knowledge and coordinate activities among multiple

Research criteria	Contributions of this manuscript
What's new?	Driven by sustainability and digitalization, intermediaries assume an important yet evolving role in supply chains. This research proposes a classification of intermediaries in three different supply chain contexts, namely, triadic supply chain (material flows and support flows) and multi-level network. Theoretical comparison of these three types of intermediaries reveals important differences and implications on sustainability (in the form of SDGs) and provides a basis for future research avenues
So what?	The type of intermediary can be related to underlying theoretical bases, providing a solid foundation for further empirical research. Novel forms of supply chain intermediation with different characteristics and implications can change the structure and shape of supply chains and advance sustainable supply chain management
Why so?	The theoretical dimensions of three intermediary types and the related text provides vignettes or illustrative examples of organizational practices
Well done?	The types of intermediaries are clearly linked to respective theoretical bases and illustrated with real cases from past and ongoing research efforts
Done well?	The central arguments are reiterated throughout the paper, which was crafted in line with the journal's author guidelines
Why now?	Sustainability has been gaining importance over the last years, and SDGs provide a blueprint for a more sustainable future. The need for multi-level collective action is urgent in addressing sustainability challenges and SDGs. Intermediaries with a sustainability focus are operating in multiple areas and they can provide much needed solutions to current challenges. With the recent changes in the legal/governmental landscape, e.g. in the European Union, it is likely that the topic will surge. Besides, recent development of digitalization enables different roles and forms of intermediaries
Who cares?	The paper is aimed at scholars in Supply Chain and Operations Management, Social Entrepreneurship and Business Ethics, and research in this area offers valuable managerial implications for supply chain, sourcing and sustainability managers, as well as public policy makers

Table 1.
Research criteria for
conceptual papers

Source(s): Based on Whetten (1989)

partners (Kistruck *et al.*, 2013). According to intermediation theory rooted in transaction costs economics, the intermediary acts as a “go-between” or bridge between buyers and sellers. In economics, there is a common distinction between a “market maker” and a “broker” intermediary (Resnick *et al.*, 1998), where the former handles inventory and the latter provides services without owning inventory. The role of the intermediary is to mitigate the differences or frictions and create innovative business models to reduce transaction costs for improved efficiency (Spulber, 2003). The unit of analysis of intermediation theory is the firm and the focus is on relative transaction capabilities of an intermediary in relation to buyers and suppliers, thereby moving from a dyadic to a triadic focus (Kistruck *et al.*, 2013). The main goal of intermediation theory is to predict under which conditions an exchange will take place directly or indirectly via the intermediary (Kistruck *et al.*, 2013).

The transition from a dyadic to a triadic focus in the supply chain context is important because it emphasizes transaction costs from a wider supply chain perspective and allows the investigation of the relational dynamics among various actors upstream and downstream in the chain (Choi and Wu, 2009a, 2009b). Moreover, advances in intermediation theory recognize a hybrid spectrum of activities and intermediary functions in which a transaction arrangement between a buyer and a supplier can be centered around one or more of the following transactional arrangements: searching, negotiation, monitoring and enforcement (Wu, 2004).

The shift toward a wider range of actors involved and the different nature of the transactional arrangement may require special attention to new forms of supply chain governance. In supply chains, governance “embraces the coordination, control and regulation of interfirm relationships” (Keller *et al.*, 2021, p. 1062). The role of governance in supply chains has attracted significant attention among scholars (Yu *et al.*, 2006; Cao and Lumineau, 2015; Dolci *et al.*, 2017), who have increasingly underlined its relevance for the attainment of sustainability objectives (Vurro *et al.*, 2009; Alvarez *et al.*, 2010; Barbieri *et al.*, 2021). Extant literature has particularly distinguished between contractual and/or relational governance, as traditionally adopted within supply chains (Cao and Lumineau, 2015; Lumineau *et al.*, 2021). While the former emphasizes the role of contracts, formalized rules and sanctions, the latter aims to reduce opportunism in a supply chain through informal, trust-based relationships and social norms (Cao and Lumineau, 2015).

To develop an initial typology of intermediaries in a supply chain context, the distinction of material and support flows provided by Carter *et al.* (2015) is integrated. The insights from different research streams are synthesized below to outline the key insights regarding the two forms of intermediaries. Depending on the type of flows supported or facilitated, a more nuanced view can be provided on the role intermediaries play for addressing grand challenges.

Material flow intermediaries

In a supply chain context, the focus has been predominantly on material flow intermediaries – middlemen in supply chains who are transaction focused and support the flow of materials. These material flow intermediaries are typically economically oriented and act as bridges between buyers and suppliers in global supply chains (Li and Choi, 2009; Spulber, 2003). In multi-tier supply chains, intermediaries can fulfill agency functions by relaying orders, providing information and facilitating the process (Mena *et al.*, 2013). They often have a double agency role of responding to sustainability requirements of the buying firm while disseminating sustainability standards further upstream in the supply chain (Wilhelm *et al.*, 2016).

First tier suppliers play an intermediary role, by linking and translating sustainability standards between buyers and lower tier suppliers (Jia *et al.*, 2021). These intermediaries play a key role in framing and translating the social sustainability requirements of the buyers to further actors upstream in the supply chain and the framing mechanisms used can strongly influence the responses of the sub-suppliers (Soundararajan and Brammer, 2018). As a result

of their supply chain position, these material flows intermediaries have a mixed reputation. In agri-food supply chains, they are known to often defraud producers, take advantage of their vulnerabilities and take a large share of the profit (Grabs and Carodenuto, 2021).

Recent advances in technology have triggered the emergence of new forms of material flow intermediaries with a slightly different focus compared to the multi-tier context in fashion or electronics supply chains. An example includes “circularity brokers” (Ciulli *et al.*, 2020), i.e. digital platform organizations that connect actors on the supply and demand side at various stages of the supply chain to recover waste, with particular emphasis on saving food waste (e.g. Ciulli *et al.*, 2020; Michelini *et al.*, 2020; Mazzucchelli *et al.*, 2021). By the same token, sharing platform organizations facilitate the sharing of underutilized goods to tackle overproduction and reduce resource exploitation (Richter and Slowinski, 2019). These are examples of intermediaries that do not handle the material flows but facilitate linkages between suppliers and buyers to exchange different forms of material flows with the goal of addressing various sustainable development challenges.

In addition to facilitating material flows, intermediaries can play other important roles. Vedel and Ellegaard (2013) suggested that sourcing intermediaries can help focal companies manage supply risks in global sourcing by providing design availability and support and operating high-risk markets. Grabs and Carodenuto (2021) highlighted the role of intermediaries in agri-food supply chains in serving as the sustainability governance actors in global supply chains and linking corporate sustainability ambitions to on-the-ground impact. Moreover, intermediaries can be of great value for serving marginalized markets, as they help manage transactions with marginalized consumers more efficiently (Rosca and Bendul, 2019).

Support flow intermediaries

Support flow intermediaries are linked with the focal firms without directly facilitating material flows. While previous supply chain research has acknowledged the role of support flows such as finance and logistics services (Carter *et al.*, 2015), more recent studies show the instrumental role such intermediaries play for businesses pursuing sustainability goals (Bals and Tate, 2018), e.g. to coordinate and interpret local informal market requirements to firms operating in emerging markets (Heuer *et al.*, 2020). These intermediaries provide support flows to the focal firm and access to relationships with other stakeholders with relevant resources, for example, financial and knowledge resources (Cole and Aitken, 2020).

While this new function and role of intermediaries is understudied in the literature, several notable examples should be mentioned. Hannibal and Kauppi (2019) studied the role and position in the supply chain of third-party assessors to enhance social sustainability in multi-tier supply chains. Billington and Davidson (2013) encouraged the use of open innovation intermediary networks which can enable focal firms to source innovative ideas from outside traditional supplier networks. Studying the role of a third-party organization in the supplier diversity context, Adobor and McMullen (2014) found that supplier diversity councils can reduce the power asymmetry and overall transaction costs in the exchanges between large buying organizations and small diverse suppliers to build successful diverse buyer-supplier relationships. Varga and Rosca (2019) explored how hybrid intermediaries, a new type of non-traditional partner in supply chains, which use their capacity building and network building capabilities, support focal firms in developing local distribution networks in the base of the pyramid (BoP) markets for social impact creation.

The emerging importance of such forms of non-transactional intermediation with focus on sustainability is exemplified by multiple studies in the wider management literature, that have explored intermediaries as substitutes for formal, macro-level institutions in emerging markets to either address institutional voids (Mair *et al.*, 2012) or providers of incubation

services for entrepreneurs (Dutt *et al.*, 2016). Moreover, recent research shows that the role of intermediaries goes beyond facilitating and brokering, their interventions can enable changes in social relations, patterns of collaboration and reconfiguration of networks structures (Hernández-Chea *et al.*, 2021; Levänen *et al.*, 2022).

Taken together, existing literature provides several insights regarding the emerging and increasingly complex role and novel forms of intermediaries. First, this literature has touched upon the importance of different forms of intermediaries, who can provide the bridges and linking mechanisms for distant or disconnected stakeholders of the focal firm, to facilitate sustainability initiatives (Saunders *et al.*, 2019). Understanding this evolving role from facilitation and coordination to resource mobilization and orchestration across multiple levels, while helping organizations deliver both economic and social impact on the grand challenges, remains an important research gap with relevant managerial implications.

Second, recent years have also witnessed the growth of technology-based intermediaries among the material and support flow intermediaries. In a similar vein, it has been suggested that intermediaries can facilitate the deployment of blockchain technology. Blockchain is a distributed chain of digital blocks (or ledgers), on which transactions are recorded (Du *et al.*, 2019; Wang *et al.*, 2021). Core features of blockchain are that it keeps an “immutable, irreversible, and permanent record of transactions” (Pun *et al.*, 2021, p. 865) occurring in a supply chain and it is centered on a decentralized “system of trust”, where the network of users validates and agrees on all changes executed on the chain (Hastig and Sodhi, 2020; Wang *et al.*, 2021). These features improve data transparency and operational efficiency which can be key for sustainability (Tate *et al.*, 2019; Tseng and Shang, 2021). Third, recent research has also noted that sustainability and increasing digitalization may require new forms of supply chain governance, beyond traditional approaches focused on contractual and/or relational governance (Lumineau *et al.*, 2021).

Novel forms of supply chain intermediaries driven by digital technologies and sustainability

Two major societal trends, the increased attention to sustainable development and the fast digitalization of the economy, have led to the emergence of an increasing number of intermediaries that facilitate the achievement of the SDGs in supply chains in different ways. Building on the previously discussed literature, a set of dimensions is considered that includes differences in the tasks of the various intermediaries.

First, the level of intervention may vary. For example, they may operate at a triadic supply chain level or serve as a platform for multi-level collective action (Mena *et al.*, 2013; Gupta and Nilsson, 2017) (Figure 1). This distinction has critical implications for the intermediaries because more intervention levels involve higher complexity of the intermediation processes and the related governance.

Second, the intermediaries differ in the type of flows facilitated, material flows or support flows. This distinction allows for a more granular mapping of the supply chain and the nature of value adding and recapturing activities (Carter *et al.*, 2015; Bals and Tate, 2018), which is particularly needed for sustainable development outcomes.

Third, they differ in the extent to which they leverage digital technologies for their intermediation. The more digital technologies become central in their activities, the more they shift from a “traditional” governance to a “digital” governance, which brings unprecedented opportunities and complexities.

Fourth, different SDGs and sub-targets can be addressed through the nature of the intermediary action where the greater the number of sustainable development objectives, the more this action contributes to tackle grand challenges. However, this introduces more tensions and trade-offs.

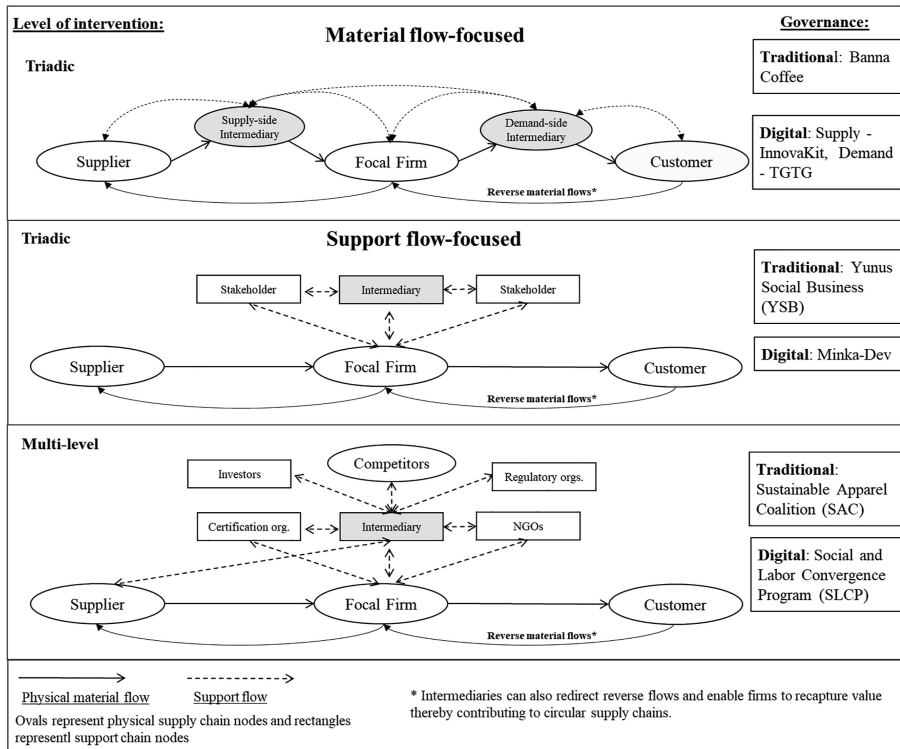


Figure 1. The nature of the relationship between the focal firm and the intermediaries – Triadic supply chain level with focus on material and support flows and multi-level intermediation

Stemming from these four dimensions, the supply chain configuration of three contexts is introduced in Figure 1. These configurations are then operationalized across the four dimensions in Table 2. For each context, exemplary examples adopting traditional and digital governance are presented.

Context 1. Triadic supply chain level intermediation with focus on material flows – The example of food supply chains.

Food supply chains involve different types of material flow intermediaries either upstream (supply-side) or downstream (demand-side) in the supply chain. Upstream, supply-side intermediaries in food supply chains typically link supply and demand, for instance farmers in developing countries with consumers in developed economies. A key example of such intermediaries is the importers-exporters that intervene in coffee supply chains and that link the smallholder coffee farmers with the roasters/retailers in developed economies. These upstream intermediaries maintain control over the chain and provide a wide range of support activities for farmers and roasters to guarantee the quality and reliability of deliveries (Borella et al., 2015). Very often, this type of intermediary has been portrayed as exploiting farmers and appropriating a large share of revenue in these supply chains (Grabs and Carodenuto, 2021). Increasingly, small firms are emerging that attempt to challenge these established structures and provide farmers with a stronger voice and fair share of income.

A case in point is the small coffee trader Banna from Colombia, an intermediary dedicated to promoting fair and direct trade between Colombian coffee growers and foreign coffee roasters, by generating greater consumer awareness and encouraging a fairer and more

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Theoretical dimensions	Context 1: Triadic supply chain level intermediation with focus on material flows. <i>The example of food supply chains</i>	Context 2: Triadic supply chain level intermediation with focus on support flows. <i>The case of intermediaries linking buyers and suppliers for sustainable development</i>	Context 3: Multi-level supply chain intermediation. <i>The case of multi-stakeholder initiatives</i>
Nature of intermediaries <ul style="list-style-type: none"> • Mission/goals • Mechanisms of operation • Role and capabilities • Relevant sectors 	<ul style="list-style-type: none"> • Frequently mission-oriented, social businesses • Linking global markets to local farmers • Providing support services, interpreting local requirements and/or technology solutions • Linking producers and consumers to reduce food waste • Agri-food supply chains 	<ul style="list-style-type: none"> • Sustainability-oriented intermediaries • Mediating and moderating partnerships, brokering relationships, changing mind-sets • Providing support activities for sustainability • Various sectors and industries, often non-industry specific 	<ul style="list-style-type: none"> • Sustainability-oriented intermediaries • Coordinating and mobilizing stakeholders from multiple levels, shaping the business and political context • Providing diverse range of support activities for sustainability • Various sectors and industries, often centred around a specific issue (palm oil, working conditions, blood diamonds)
Level of intervention	Triadic supply chain level	Triadic supply chain level	Multi-level
Material or support flows	Primarily material flows	Primarily support flows	Primarily support flows
Traditional or digital governance	<ul style="list-style-type: none"> • Traditional governance • Decentralized governance for supply chain visibility • Centralized governance via digital platforms 	<ul style="list-style-type: none"> • Traditional governance • Centralized governance via digital platforms 	<ul style="list-style-type: none"> • Traditional governance • Digital governance both as centralized and decentralized
Grand challenges	<ul style="list-style-type: none"> • <i>1 No poverty</i> • Target 1.5 – resilience for vulnerable stakeholders • <i>2 Zero hunger</i> • Target 2.3 – productivity and incomes of small-scale food producers • <i>12 Sustainable consumption and production</i> • Target 12.3 - reduced food waste 	<ul style="list-style-type: none"> • <i>1 No poverty</i> • Target 1.4 – Empowering the poor • <i>10 Reduced inequalities</i> • Target 10.2 – Diversity and inclusion • <i>17 Partnerships for the goals</i> • Target 17.1 – Strengthen domestic and international resource mobilization • Target 17.3 – Mobilize financial resources from multiple sources 	<ul style="list-style-type: none"> • <i>1 No poverty</i>, e.g. Target 1a – Mobilization of resources from diverse sources • <i>17 Partnerships for the goals</i> • Target 17.1 – Strengthen domestic and international resource mobilization • Target 17.3 – Mobilize financial resources from multiple sources • Target 17.6 – Enhance triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing

Table 2.
Summary of the three contexts

sustainable industry. The company provides training to and works in partnership with small farmers of specialty coffee to improve coffee quality, business models, and brand management.

By assisting those farmers in telling their stories, Banna helps connect them with companies/consumers to reduce transaction costs and facilitate a sustainable market. Banna specifically chooses to work only with partners (roasters, distributors) with a strong social orientation. Beyond its primary focus on coffee trading, Banna also operates as an intermediary for external coffee buyers by linking them with local farmers and farmer associations. However, instead of becoming a regular intermediary and requesting a fee, as it is common practice in traditional supply chains, Banna steps out of the relationship with the foreign buyer to make sure the farmers receive a higher income and mediates direct trading relationships. This example illustrates the emergence of material flow intermediaries which tend to position and define themselves as a sustainable alternative to mainstream competitors in traditional agri-food industries. This is not unique; there are other similar cases such as Moyee Coffee and Caravela Coffee.

These cases illustrate two important aspects. First, they challenge traditional assumptions for supply chain structure and the position of intermediaries in the supply chain. The requirements from their partners indicate the shifting priorities for businesses pursuing sustainability objectives, which has important implications for key supply chain decisions, namely sourcing, partnership selection and relationship management. Second, Banna facilitates material flows, and enables direct connections between local farmers and foreign buyers. This suggests that disintermediation can be an explicit tactic to improve social impact. Moreover, it shows the increasing relevance of partial transactional arrangements, where the intermediation activities can go beyond material flows and include locating farmers and negotiating terms for the benefit of farmers.

While intermediaries like Banna operate using a traditional governance approach, other intermediaries in the agri-food supply chain employ digital solutions to provide supply chain transparency. For example, Innovakit is a company from Colombia whose mission is to empower coffee communities through agri-technological innovations that facilitate economic and social transformation. Innovakit provides a wide range of services to coffee farmers and links major roasters from abroad with local coffee communities and cooperatives, but its main unique selling point is the use of digital technologies for empowering local farmers.

Via its Trace Coffee unit, Innovakit uses blockchain technology to trace the quality of the coffee, provides full transparency and visibility over coffee supply chains, and enables digital storytelling as a tool to engage final consumers. The use of blockchain technology for traceability enables Innovakit to connect buyers and consumers in developed economies with the farmers: geo-located data on coffee farming processes, including pictures and video footages, is transmitted in real time to consumers and roasters in western countries, which enables these buyers to source products directly from the coffee farmers. Blockchain technology allows for illumination of the quality of the product, and the human and social quality of the processes behind the product and the unique characteristics of the coffee region. This shows how material flow intermediaries can use digital technology as a driving force for positive change and deploy the exceptional traceability and transparency granted by blockchain technology to infuse a social meaning in the process and the products and engage end consumers and farmers.

Demand-side intermediaries facilitating material flows on a more local level can help address challenges in the downstream part of the supply chain and enable firms to recapture value by redirecting reverse flows to different customer groups. One notable example is TooGoodToGo (TGTG), a platform-app which links food consumers with restaurants and bars, enabling the latter to sell the leftover food instead of throwing it away. As of 2021, TGTG operates in 12 countries in Europe and is regarded as the driver of a social movement against food waste across Europe (Vo-Thanh *et al.*, 2021). Restaurants post baskets with food available for takeaway on TGTG's app and consumers select the preferred baskets and pick up the food themselves. Thereby, this digital intermediary facilitates material flows with the

goal of reducing food waste. TGTG is also actively working on a campaign of awareness and education on food waste; for example, consumers can also view various information related to food waste when using the app (Vo-Thanh *et al.*, 2021). This example shows the potential of a digital platform, that allows to bridge a hole in the supply chain to redirect material flows to viable markets, thereby recapturing value (Ciulli *et al.*, 2020).

The examples show how upstream material flow intermediaries contribute to reduce poverty by improving the livelihoods of coffee farmers (SDG 1.4, 1.5, 2.3). Both the upstream and downstream intermediaries described above can address hunger issues by improving the productivity of smallholder farmers and redistributing food waste to consumers (SDG 12.3).

Context 2. Triadic supply chain level intermediation with focus on support flows – The case of intermediaries linking buyers and suppliers for sustainable development

Intermediaries have emerged to provide support services to small and larger companies to address and incorporate sustainability in their supply chains. They range from sustainability consultancies such as Hystra or Endeava to initiatives of large multinational corporations such as Siemens through their Empowering People Network or Intellectap through their Sankalp Forum initiative. These support services are essential for both small and medium as well as large firms, because pursuing sustainability objectives often involves multiple stakeholders with conflicting goals and counter-intuitive behavior.

An example of such support flow intermediaries is Yunus Social Business (YSB), which serves as an intermediary for social businesses [2] to access impact investment funds, NGOs, and other relevant partners. YSB acts as a social investor and provides capital coupled with support and training activities for small enterprises. The training and support activities can be internally oriented (developing a business model, scaling strategies), targeted at the specific entrepreneurs (coaching programs, experts' services) or externally oriented with a focus on social impact creation, measurement and long-term monitoring.

Besides training and financial support, many support flow intermediaries specifically operate to link supply and demand for sustainability purposes. An example is YSB Colombia which links established corporations with small enterprises as suppliers. By doing so, this intermediary aims to develop new forms of alliances and supply chain structures which are aligned on sustainability goals, while promoting the idea of social procurement. Social procurement refers to medium and large firms' practices of buying products and services from small social businesses to scale impact in supply networks (Meqdadi *et al.*, 2020).

One example implemented in Colombia involves around McCain Foods, a global leading manufacturer of potato specialties, French fries and appetizers. With the help of YSB, McCain Foods partnered with the social business Campo Vivo to source potatoes and support local smallholder farmers in Colombia. Campo Vivo engages directly with the farmers and provides technical support, information on market prices and digital training, while McCain Foods represents a stable, major buyer for its products. Together, they can support local communities in Colombia and create impact at a large scale in an economically viable manner. This example further illustrates the relevance of intermediation activities with focus on support flows, (non-transactional) or partial transactional arrangements, where the intermediary supports focal firms to access finance, find new partners or mediate relationships.

Digital platforms with sustainability objectives have emerged recently to link relevant partners, thereby reducing transaction costs and filling in structural holes in existing ecosystems. One example is Minka-Dev, a Spain-based global intermediary which links small- and medium-sized businesses with social and environmental problems with a business opportunity to address the problems. Minka-Dev operates an online marketplace as an

intermediary, which links traditional for-profit small and medium sized businesses with opportunities for green, inclusive and circular business.

This support flow intermediary uses its platform to help firms develop more sustainable supply chains, by providing goods and services to boost alternative production and sustainable consumption models. Minka-Dev started as a platform linking organizations from the social sector with firms operating in low-income markets. This, however, has changed gradually into targeting a wider audience, which now includes regular Spanish companies wishing to make a social or environmental impact, as well as NGOs and companies which can create business opportunities by linking their value chains to (other) enterprises. Minka-Dev therefore has increasingly leveraged the connecting potential offered by digital platform technology to “enable value-creating interactions” (Constantinides *et al.*, 2018) between a broad range of actors and, as a result, foster the creation of novel supply chains centered on the SDGs.

These forms of intermediation can support focal firms to integrate smaller, marginalized suppliers and consumers in their supply chains, thereby addressing SDGs related to poverty and inequality reduction by empowering the poor and the marginalized (SDG 1.4, 10.2). Through their focus on brokering, mediating and moderating partnerships, these intermediaries also address the SDG 17 (17.1, 17.3).

Context 3. Multi-level supply chain intermediation – The case of multi-stakeholder initiatives

Intermediaries operating in a multi-level network connect actors at horizontal and vertical levels within and across supply chains. In particular, the example of multi-stakeholder initiatives (MSI) shows how they can create and maintain linkages beyond individual supply chains and operate at industry level to drive change. Typically, the MSI aims to offer value to participants at the network level, rather than at the firm (Drake and Schlachter, 2008). MSIs can do this as they are a form of “networked governance” that places corporate behavior under the scrutiny of multiple stakeholders including states, NGOs, unions, industry bodies and international organizations (Baumann-Pauly *et al.*, 2016). This type of intermediary can be seen as a “change agent” who performs traditional brokering roles but also acts as a knowledge repository for organizations to create innovative solutions (Howells, 2006).

These are intermediaries, such as the Sustainable Apparel Coalition (SAC), which link all relevant partners from specific industries and provide a wide range of services to all affiliated partners. SAC is a global, non-profit MSI which aims to transform the consumer goods industry by enabling collaborative partnerships, trusted leadership and groundbreaking tools for industry-level sustainability outcomes. SAC recognizes that the challenges the consumer goods industry is facing cannot be solved by individual firms alone, thus one of their core pillars is to develop and implement collective action strategies to promote social justice, reduce environmental impact and enable visibility across the supply chain. By translating scientific insights into managerial action, SAC brings a wide range of stakeholders together to scale sustainable impact solutions, track and develop reporting tools and provide educational support services such as peer-to-peer learning clubs, roundtables, best practice sharing webinars and sustainability hotlines. Among its developed tools is the Higg Index, which provides a standardized measurement for sustainability at the supply chain level.

While MSIs like SAC provide a wide range of activities, services, tools and voluntary standards, their impact is largely dependent on the strength, visibility and mobilization of their members. For instance, SAC includes a special program focused on translating scientific insights into actionable insights for companies across the globe. Yet, it is unclear to what extent these actions are adopted, sustained and formalized inside the focal firms and across their supply chains.

While MSIs present multiple intermediation practices such as knowledge brokerage, partnership mediation, context shaping and setting industry standards, there are also MSIs using the model of digital platforms as intermediation. One such example is the Social and Labor Convergence Program (SLCP) – a non-profit, self-sustained MSI which aims to address a highly pressing issue in the sustainable supplier sourcing and compliance discussion – audit fatigue. SLCP provides tools and methods for comparable data on working conditions at supplier factories to be used by all relevant industry stakeholders, with the aim to increase transparency in supply chains, reduce the need for social audits and improve working conditions. SLCP orchestrates various stakeholders as platform users, namely factories and workers sharing data in developing countries, verification bodies conducting the data quality checks, global buyers accessing the data, consumers and other MSIs active in the apparel sector such as SAC.

By providing a digital platform where suppliers can regularly update their factory data and by providing global buyers with access to the data, this MSI intermediates the relationship between buyers and suppliers in a novel format. This addresses a highly pressing issue and funds are redirected for auditing toward the development of impactful remediation practices. The use of the platform may also decrease the intensity and frequency of more traditional relationships between buyers and supplier factories. Previous research has shown that traditional relationships with focus on commitment between buyers and suppliers can significantly improve practices at supplier factories (Locke *et al.*, 2009), however it is unclear how the existence of such platforms impacts the improvement of working conditions in global supply chains.

MSIs have the potential to reduce poverty and inequity by mobilizing resources from diverse sources (SDG 1a). Most importantly, MSIs can facilitate partnerships for the goals through their interventions at horizontal and vertical levels (SDG 17.1, 17.3, 17.6). Like intermediaries from [context 2](#), their impact can expand through their linkages with focal firms.

Challenges for intermediaries as enablers of multi-level collective action

Stemming from the insights emerging from extant literature and from the illustrative examples, this section outlines three major challenges intermediaries face in supporting supply chains that are tackling grand challenges. While some challenges specifically pertain to the intermediary activity, some of them go beyond and concern focal firms and governance at the supply chain level.

Challenge 1. Novel forms of intermediation beyond economic and transactional arrangements

From a supply chain intermediation view, the novel forms of intermediation trigger two key challenges: the importance of sustainability-oriented governance in intermediation relationships and the focus on non-transactional intermediation.

First, [context 1](#) with social businesses acting as intermediaries in global agri-food supply chains illustrates the emergence of sustainability-driven governance approaches for managing transactional relationships. Managing these relationships with a strong focus on normative norms creates challenges for traditional buyer companies because, even when they have the motivation, the capabilities to sustain such relationships may be lacking.

The divergence of institutional logics is also relevant for triadic support flow intermediaries from [context 2](#) because this will impact the intermediation practices, the services provided and the relationship with the focal firms. The institutional logic of an organization guides decisions around resource allocation, organizational structures, collaboration, incentives and relationship management (Montabon *et al.*, 2016; Pullman

et al., 2018). From a triadic perspective, both for material and support flow intermediaries, the existence of divergent institutional logics between the intermediary and the connected firms can be detrimental to both operational efficiencies in the short-term and sustainability outcomes in the long-term, unless the intermediary practices are explicitly focused on bridging the institutional logics between the partners (Levänen *et al.*, 2022).

Second, the examples presented in contexts 2 and 3 outline the increasing importance of intermediation focused on support flows to enhance focal firms' capabilities for sustainability. These types of arrangements are either partially transactional or non-transactional. The non-transactional arrangements present challenges from a governance perspective, but also from an operational perspective both for the intermediaries and for the focal firms involved. Both firms and intermediaries are unlikely to fully possess the adequate capabilities for sustaining effective non-transactional relationships. It is unclear under which conditions intermediation arrangements are conducive to sustainable performance and how these relationships should be managed.

Challenge 2. Novel forms of intermediaries and digital governance

The use of digital technologies in the three contexts has triggered novel challenges related to the governance of relationships along the supply chain. Based on their distinctive features, different types of platform intermediation may face these challenges to a different extent or in a different way.

The first challenge for a digital platform intermediary consists of attracting a "critical mass" of users which, due to network effects [3], are critical for its survival (Ondrus *et al.*, 2015). Importantly, the critical mass a platform has to attract consists of two or more "distinct groups of users" (Cennamo and Santalo, 2013); each user group represents a different "side" of the platform (Bakos and Katsamakos, 2008; McIntyre and Srinivasan, 2017). Then, the platform needs to coordinate and control this vast network of users located on different sides (Barbieri *et al.*, 2021). A digital platform intermediary has the challenging task of effectively orchestrating users' activities (Zhang *et al.*, 2022), to ensure their continued participation and contribution to the platform. As different groups of users are likely to have distinct interests, resources and power, the higher the number of user groups or sides, the more complex the governance is for platform intermediaries.

Contexts 1 and 2 differ from context 3 in the number of sides platform intermediaries must govern. In triadic supply chain intermediation (contexts 1 and 2), platforms are frequently "two-sided": they must attract and govern two groups of users, for example food suppliers and food buyers in the case of TGTG, to attain their sustainable development objectives. In contrast, in multi-level supply chain intermediation platforms have more than two sides, because they must involve multiple groups of users (Loux *et al.*, 2020) who reflect the different kinds of relevant stakeholders. For example, SLCP has to bring on board and manage factories, verification bodies, global buyers, consumers and other stakeholder groups. Hence, for platform intermediaries like SLCP, governance is particularly challenging, as they must attract and govern diverse groups of users.

Second, the complexity of managing a large user network, combined with the new functionalities offered by digitalization, has led to the diffusion of novel governance mechanisms. Although these mechanisms facilitate intermediation, they also introduce new issues. While relational forms of supply chain governance usually involve direct interaction between the lead firm and its (direct) suppliers, in digital governance these mechanisms are increasingly replaced by automation (Barbieri *et al.*, 2021; Keller *et al.*, 2021). Although relational mechanisms between platform users can still be deployed (Keller *et al.*, 2021), platform intermediaries tend to limit them due to the higher efficiency afforded by automated processes. Yet, replacing the human component with automation may lead to an inadequate understanding of issues hindering the achievement of sustainable development goals along a

supply chain. The deployment of automated governance is likely to exhibit differences across the three contexts, leading to distinct implications.

In [context 1](#), the implementation and enforcement of contracts for material flows, a pillar of contractual governance, can be automated with the integration of blockchain technology via smart contracts ([Papathanasiou et al., 2020](#); [Lumineau et al., 2021](#)). Although this increases efficiency, it also brings “inflexibility costs”, as contracts are “*executed based on the ‘letter of the law’*” ([Murray et al., 2021](#), p. 627–628), excluding all human interpretation or intervention. These risks can be particularly detrimental when supply chain actors are exposed to factors outside their control, such as institutional voids. For example, when digital illiteracy or lack of adequate Internet infrastructure hinder farmers in developing countries from accessing the platform and ensuring the transparency expected by buyers, “analog” relational governance mechanisms are critical ([Daum et al., 2021](#); [Sengupta et al., 2021](#)).

In [context 2](#), the platform intermediary may be triggered to automatize the support services it provides to supply chain actors, for example by offering an automated matching of its users, based on a set of indicators. While this automated mechanism increases efficiency, it is deprived of the relational component which may be key for an intermediary to effectively support social value creation. In [context 3](#), governing MSIs in relation to social issues characterized by high complexity and uncertainty requires a constant engagement in “*re-understanding, re-assessing, adjustment and adaptation*” ([Dentoni et al., 2018](#), p. 340). This makes automated processes non-optimal to manage MSIs. Therefore, to achieve their sustainable development objectives, digital platform intermediaries in the three contexts face the challenge of designing their governance approach with the appropriate integration of automation and relational components.

In [contexts 1](#) and [3](#), platform intermediaries can enable a stringent tracking and monitoring of their users’ sustainability practices, thanks to the higher traceability granted by digital technologies ([Ciulli et al., 2020](#)), particularly blockchain ([Hastig and Sodhi, 2020](#)). Yet, digital platform intermediaries must account also for concerns and risks tied to this higher potential for data collection and sharing along the supply chain.

In [context 1](#), smallholder farmers, the most vulnerable supply chain actor and active on the platform as supply side users, may face risks for data protection and privacy when sharing data about their farming processes. Conversely, the most powerful actors along the chain, active on the platform’s demand side, business buyers, may exploit transparency to their advantage, strengthening their negotiating power and exerting unfair pressures over smaller suppliers. In [context 3](#), as different kinds of stakeholders have access to the data shared via the platform, supply chain parties may oppose transparency, due to lack of trust and concerns about their reputation, competition and negotiating power ([Galati, 2021](#)). Digital platform intermediaries in [contexts 1](#) and [3](#) face the challenge of governing not only the actors in the supply chain but also the data they share, to encourage participation and ensure fairness and security. They must decide on the degree of (de-)centralization of data governance, for example by determining who controls access to data ([Pereira et al., 2019](#)).

Challenge 3. Moving from multi-level action to SDGs impacts and outcomes

The examples presented in all three contexts clearly illustrate how intermediaries can facilitate and coordinate multi-level action by mobilizing different groups of stakeholders and sources of revenue, and by orchestrating resources. Through these levers, they have the potential to address various SDGs. Yet, the outcomes of these forms of intermediation and how they tie to SDGs is less clear.

First, bringing stakeholders together does not mean that it will directly lead to sustainable development impact and outcomes. This challenge manifests itself differently for different forms of intermediaries. For triadic supply chain intermediaries ([context 1](#)) aiming to reduce poverty and improve equality among farmers, beyond standard impact measures, farmers’

perception is relevant. For intermediaries with focus on support flows and multi-level interventions in [contexts 2](#) and [3](#), the involvement of a wide range of stakeholders complicates the question of assessing intermediaries' contribution to impact ([Ebrahim and Rangan, 2010](#)).

Second, support flow intermediaries from [contexts 2](#) and [3](#) assist firms in identifying external knowledge but how firms can convert this into specific outcomes for a wide range of stakeholders across the supply chain remains subject to the firms' internal capabilities. The different stakeholders are linked by the intermediaries with a focus on resource complementarities, but resource complementarity does not always lead to synergistic performance ([Song et al., 2005](#)). It remains unclear how resource complementarities are internalized by the firm, what actions are needed to achieve synergies when resource complementarities exist and how it can be ensured that the resources provided are further used by the firm.

Highlighting areas for future research: advancing the study of supply chain intermediation and digital governance for sustainability

Following the insights from the three contexts presented and the three key challenges outlined, three avenues for future research are proposed ([Table 3](#)). The goal in this research is to illuminate the areas with significant developments in practice and research gaps in the literature and present opportunities for developing new theories and expanding the scope of existing.

Future research avenues	Context 1 : Triadic supply chain level intermediation with focus on material flows. <i>The example of food supply chains</i>	Context 2 : Triadic supply chain level intermediation with focus on support flows. <i>The case of intermediaries linking buyers and suppliers for sustainable development</i>	Context 3 : Multi-level supply chain intermediation. <i>The case of multi-stakeholder initiatives</i>
Novel forms of intermediation beyond economic and transactional arrangements	<ul style="list-style-type: none"> Capabilities of focal firms to manage collaborations with social businesses as intermediaries (contexts 1) Impact of tensions and institutional logics on intermediation practices of sustainability-driven intermediaries, the services provided and the relationship with the focal firms (contexts 2 and 3) Active reconciliation of differing institutional logics, requiring proactive facilitation practices and capabilities (contexts 1–3) Governance approaches and capabilities needed for non-transactional arrangements (contexts 2 and 3) 		
Novel forms of intermediaries and digital governance	<ul style="list-style-type: none"> Governance mechanisms and influences on supply chain actors' participation in two-sided (contexts 1 and 2) or multi-sided platforms (context 3) Leveraging automation for multi-level collective action (contexts 1–3) The role of data governance in triadic (contexts 1 and 2) or multi-level intermediation (context 3) 		
Moving from multi-level action to SDGs impacts and outcomes	<ul style="list-style-type: none"> Impact and outcome creation by intermediaries toward SDGs (contexts 1–3) Effectiveness of support flow intermediation activities (contexts 2 and 3) Contingency factors including compatibility, relational governance approaches (contexts 1–3) Role of intermediaries in creating inclusive and diverse supply chains (context 2) 		

Table 3.
Outlining a research agenda

Future research avenue 1. Novel forms of supply chain intermediation beyond economic and transactional arrangements

Aligned with the key challenges intermediaries face regarding an increased focus on sustainable development and non-transactional arrangements, ideas for future research are proposed.

First, for [context 1](#), both social businesses as intermediaries and the focal firms need the capabilities to manage hybrid collaborations, thus the study of social management capabilities for this context is an interesting aspect for future research ([Huq et al., 2016](#)). Prior research noted that complementary resources present opportunities for enhanced learning as well as for the development of new capabilities. Allowing firms to combine acquired resources with their own resource sets allows for the creation of a resource bundle that provides unique and difficult-to-imitate value ([Harrison et al., 2001](#)). Therefore, resource and capability complementarity could be an interesting way to view this phenomenon.

Second, trade-offs and tensions between business value and societal value are present in the sustainability journey, especially in the context of hybrid interactions ([Howard et al., 2022](#)) as it is illustrated by [contexts 1, 2 and 3](#). One important question worth exploring is how intermediaries can manage the tensions that arise due to misaligned institutional logics between focal firms and supply chain partners. Identifying specific institutional logics applied by the parties they interact with is the first step of recognizing the tensions, and the type of tensions determines corresponding relationship management approaches ([Pullman et al., 2018](#)). As the supply chain structures change and new socially oriented actors are involved in material and support flows, new sources of risk also arise, such as dependence on key actors, profitability risks, or tensions related to pursuing multiple sustainable development objectives ([Wontner et al., 2020](#)). Therefore, further research should investigate how intermediaries can help focal firms mitigate tensions while reducing transaction costs and enabling supply chain efficiency ([Spulber, 2003](#)).

Third, as both material and support flow intermediaries are pushing for higher social standards across the supply chain, the focus is on innovative approaches to govern the relationships that emerge for the three contexts. Active reconciliation of differing institutional logics becomes particularly relevant, requiring proactive facilitation practices and capabilities. [Levänen et al. \(2022\)](#) suggest that intermediaries are in an advantageous position to identify institutional differences among partners and coordinate collaborative practices to handle sensitive issues in constructive ways. In the case of conflicting institutional logics between the intermediary and the focal firm, the focus should be on proactive facilitation practices and capabilities to interpret the co-existence and align different logics ([Currie and Spyridonidis, 2016](#)).

Fourth, an increased focus on non-transactional forms of intermediation as illustrated by [contexts 2 and 3](#) requires further research into effective forms of governance and capabilities needed to manage these relationships. Related governance modes should follow traditional guidelines for informational intermediation on how to design coordination mechanisms to avoid adverse selection, considering which mechanisms are relevant to synthesize dispersed information to reduce information asymmetries ([Wu, 2004](#)). However, they should account for the particularities of sustainable development, namely a wide range of stakeholders involved embedded in social, economic and environmental systems. Dynamic capabilities might provide a valuable theoretical lens for studying these questions as they relate to how firms develop and manage capabilities to respond to external environmental factors ([Teece et al., 1997](#)).

Future research avenue 2. Novel forms of intermediaries and digital governance

Stemming from the opportunities and challenges inherent to novel forms of intermediation, that leverage digital technologies to contribute to the SDGs in a supply chain context, three different research avenues are proposed.

First, future research should investigate the digital governance mechanisms influencing the supply chain actors' participation on a (blockchain-based) digital platform and their contribution in attaining sustainable development objectives in the three different contexts. Such research should account for the variety in the design of the platform, e.g. whether it is usually two-sided as in contexts 1 and 2, or has more than two sides, as in [context 3](#), and examine what implications these have for the effectiveness of centralized vs decentralized governance.

Second, it is of particular interest to explore the implications of leveraging automation to coordinate supply chain actors toward the achievement of sustainable development objectives, and the extent to which automation fosters participation, trust, collaboration and inclusion in each of the three contexts. Also looking at whether intermediation is triadic or multi-level, further research is needed to illuminate when automation-based governance should replace relational governance, but also when and how these two forms of governance should be integrated for an effective intermediation. It would be interesting to appraise whether and how the nature of the primary flows the digital platform intermediary is facilitating (material flows or support flows) influences the integration of these two forms of governance and its effectiveness in addressing grand challenges.

A third promising research avenue consists of assessing the role of data governance in the framework of the governance efforts of a digital platform for triadic or multi-level supply chain intermediation. Specifically, scholars are advised to delve into the implications of the transparency and traceability afforded by blockchain technology along the supply chain, particularly the trade-offs and tensions that may ensue, for example in relation to the level of intervention or to the grand challenge to address, and the governance mechanisms that should be adopted to tackle them. To examine the implications of data governance it is important to understand whether the supply chain configuration exhibits a high concentration of power or competition. An interesting research focus would be comparing how digital platforms engaged in triadic and multi-level intermediation integrate data governance within the wider coordination and control of interfirm relationships along the supply chain and how this influences value creation for sustainable development.

Future research avenue 3. Moving from multi-level action to SDGs impacts and outcomes

Nurturing and developing relationships and inter-dependence with intermediaries can facilitate access to critical capabilities and resources, especially for businesses pursuing positive social and environmental impact ([Smith et al., 2016](#)). Yet, moving from multi-level action to SDG outcomes through different forms of intermediation should be further investigated.

First, scholars should expand research on different types of intermediaries and their contribution to impact created internally and through their linkages to the focal firm. Research should clarify under which conditions intermediaries are able to represent sustainability values and which factors may hinder or strengthen their ability to do so.

Second, further research should investigate the effectiveness of different forms of support flow intermediation (contexts 2 and 3) and related mechanisms for impact created by the focal firms. Relevant issues include how the focal firm can convert external knowledge into value for different groups of stakeholders, relevant for all three contexts. To answer this question, absorptive capacity theory may provide useful insights. Absorptive capacity is the ability of firms to acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability ([Zahra and George, 2002](#)). Through these capabilities, the firm can reconfigure its resource base and adapt to the changing market conditions to achieve competitive advantage ([Knockaert et al., 2014](#)). [Muscio \(2007\)](#) mentioned that firms learn from a variety of external sources and must master the capabilities required to search, find, access and interpret information from external organizations, such as support flow intermediaries.

Firms with absorptive capacity can build linkages between new knowledge and existing knowledge and if they lack sufficient internal resources, they will be more dependent on inter-

organizational collaborations such as intermediaries (Knockaert *et al.*, 2014). If firms are to acquire new knowledge, or knowledge that is lacking, they must know where and how to find it, and how to assimilate and diffuse it within the organization (Zahra and George, 2002). To embed sustainability along the supply chain, firms must first be able to access knowledge and acquire information to increase their absorptive capacity (Falk, 2007). Intermediaries act as both a recipient and an emitter of knowledge ensuring that the mission of the focal firm is forwarded and facilitated to other network participants. The intervention of the intermediary allows for an increase in overall competence and an increase in potential network partners, or growth of the network (Knockaert *et al.*, 2014).

Third, different contingency factors may be relevant for further understanding the implications of intermediation for impact. This includes the compatibility between the intermediary and the focal firm, the relationship governance mechanisms employed, performance measurement used, the nature of transactional arrangements or the role and network positions of intermediaries and changes over time.

Fourth, support flow intermediaries such as Minka-Dev or YSB can play a key role in creating inclusive and diverse supply chains by linking buyers with small-scale, diverse, and minority-owned suppliers. This area has many relevant research questions such as how intermediaries can enable focal firms to create sustainable value from business models and technologies of small enterprises, or how the relationships between focal firms and small enterprises as suppliers or customers can be managed (Wagner, 2021).

Implications for practice and public policy and concluding remarks

This research set out to investigate how novel forms of intermediaries driven by sustainability and increasing digitalization can help supply chains tackle the SDGs. Insights from different research streams have been integrated to assess the scholarly knowledge developed to date and illustrative examples of intermediaries in three different contexts have been put forward to expand current theoretical insights and set the stage for empirical advances triggered by these societal developments.

In addition, the relationship between three contexts, whether it is an evolution or context-dependent situation, remains to be explored by further research. Moreover, there is still ample room to shed light on intermediaries' role in moving toward a circular economy, as intermediaries may also act as marketplaces for reverse flows and digital platforms for industrial symbiosis (Tate *et al.*, 2019).

Research in this area has important implications for theory, practice, public policy makers, and society at large. As there is an increasing responsibility to address the SDGs, firms are struggling to find the right tools, knowledge, and partners to implement sustainability in their supply chains while maintaining their economic goals. The insights of this research point to increasing relevance of digital governance, sustainability mindsets and increasing focus on non-transactional forms of intermediation. Novel forms of intermediaries enable multi-level collective action by integrating horizontal and vertical action within and across supply chains.

From a public policy perspective, understanding the effectiveness and contributions of intermediaries is particularly important, as many support flow intermediaries are publicly funded and many socially oriented material flow intermediaries generate revenue via grants. Governments might consider how to make conditions for intermediaries more favorable, as they could become a hub for a multitude of focal firms to engage with and help alleviate social and environmental issues. Moreover, public funding can be geared toward platforms that directly promote diversity and inclusion in supply chains. Many multinational organizations aim to incorporate small social enterprises into supplier diversity and inclusion programs. These companies are starting to look outside of the traditional walls of diversity to include suppliers from under-represented regions of the world. This can be an excellent opportunity

for suppliers to gain recognition and for buyers to employ suppliers that can help meet diversity goals, inspire innovation and creativity, and create flexibility for the buying firm (Adobor and McMullen, 2014).

From a managerial perspective, there are more demands for firms to “care” and act positively to both the social and environmental impacts. Whether the intermediaries provide access to impact investors [4], sustainability expertise, supply chain visibility, or linkages to diverse small-scale suppliers, they can play an essential role in driving the sustainable agenda for the business sector. For businesses, linking with intermediaries more consciously and actively provides an opportunity to improve their access to such resources as well as accelerate their sustainability agendas. Businesses have become active in vocalizing their concerns about the lack of viable and effective solutions and have been working with governments and multilateral agencies as intermediaries to address the many crises with the goal of providing socially inclusive growth. Managing this wide network of multiple stakeholders with conflicting interests introduces complexity in dealing with the flow of goods, services, information, and finances necessary to operate (Lee and Tang, 2018). This research is relevant for supply chain actors, from developed country MNEs to smallholder farmers in developing countries, as it points at the opportunities and challenges related to partnering with novel types of (digital) intermediaries, particularly for the achievement of social and environmental objectives.

The research also contains several valuable implications for intermediaries. It shows that “simply” deploying a digital technology, such as a digital platform or blockchain technology, is not sufficient for intermediaries to achieve the SDGs. It is critical, instead, that the intermediary builds a governance design that allows for opportunities granted by the technology and tackle the challenges it entails. By providing digital platform intermediaries an overview of the main challenges they are likely to face, they can take them into account when making their governance choices. The research also allows intermediaries which leverage, or aim to leverage digital technologies, to identify and appraise the different avenues available to address grand challenges, in terms of level of intervention and kind of flow to facilitate.

This research puts forward a novel and exciting way in which novel forms of intermediaries can support supply chains to achieve sustainability goals. The role of intermediaries as orchestrators and enablers for the collective action needed to address grand challenges is highlighted. Thereby, this research opens fascinating opportunities for further research to push the boundaries of what is known about the role of intermediaries and improve public policy toward more sustainable global supply chains.

Notes

1. For more details regarding data collection and analysis which has been the basis for this conceptual paper please see [Appendix A1](#). For each of the three contexts, more examples and background information are presented in [Appendix A2](#).
2. We define social businesses as organizations which combine social and economic goals and thereby aim to address social issues enabled through economic activities (Pullman *et al.*, 2018).
3. Network effects occur “when the benefit of network participation to a user depends on the number of other network users with whom they can interact” (McIntyre and Srinivasan, 2017, p. 143)
4. Impact investors are investors which aim to generate not only financial returns but also positive social and/or environmental returns.

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A1: Data collection insights

This study is based on insights from extensive data collection in Europe (Germany and the Netherlands), Colombia and Haiti between 2016 and 2021. Primary data was collected via interviews, workshops, and field visits with more than 20 social businesses, and different types of intermediaries linked with these social businesses. The primary data was complemented with additional archival data provided by the social businesses and the related intermediaries. The data collection centred around key questions including supply chain structures, the relationship between the social businesses and different types of intermediaries, resources and capabilities provided by the intermediaries and tensions related to balancing economic with social/environmental objectives. Additionally, secondary data collection was conducted to identify and analyze more than 50 multi-stakeholder initiatives and 70 intermediaries operating in the inclusive business sector. The rationale for this approach was to provide an overview of the different types of intermediaries in practice, rather than adding cases to make this an empirical study.

A2: Background information and further examples of intermediaries

Context 1: Triadic supply chain level intermediation – The example of food supply chains

Banna (<https://www.bannacoffee.com/>) is a company dedicated to promoting fair and direct trade with Colombian coffee growers by generating greater consumer awareness and encouraging a fairer and more sustainable industry. Realizing that coffee growers in Colombia are not willing to grow coffee anymore because they are not paid well or fairly, Banna is committed to transforming the industry to be more sustainable (see Figure A1). The company provides information and training to and works in partnership with small farmers of specialty coffee to improve coffee quality, business models, and brand management. Furthermore, Banna helps those farmers tell stories of themselves to achieve product differentiation and educates consumers on specialty coffee to establish a stronger connection, enabling higher prices and expanded market share. Serving as a new middleman, the company connects the farmers with companies/consumers to reduce transaction costs. As a result, coffee farmers will get better paid to stay in the coffee growing business, thus facilitating a sustainable market.

Innovakit (<https://innovakit.co/>), established in 2012, is a commercial company of benefit and collective interest (BIC) which is defined by the Colombian law as a company that is registered in accordance with the current legislation, which, in addition to the benefit and interest of their shareholders, will act in the interest of the community and the environment. The company's mission is to empower coffee communities through agri-technological innovations that facilitate economic and social transformation. Innovakit is a firm believer that innovation is the best tool for development in agriculture, and it provides services and tools to farmers in Central America, South America, and

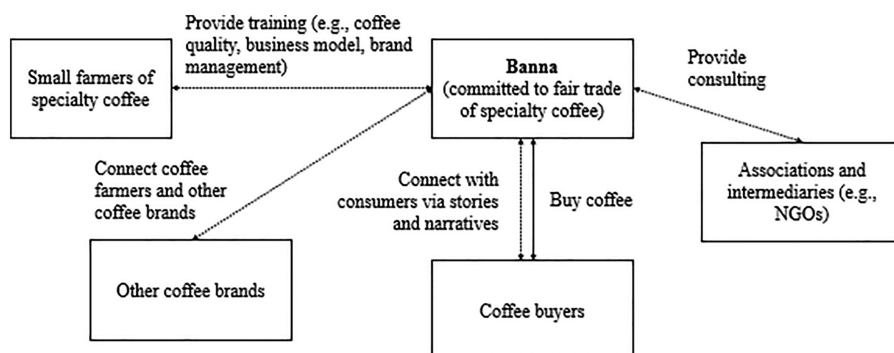


Figure A1.
Ecosystem of Banna

Collective action in supply chains

East Africa to improve quality and productivity and address poverty (see Figure A2). For example, the post-harvest kit offers tools for coffee farmers to optimize coffee production and reduce water consumption, thus decreasing costs and increasing profits. Innovakit uses technology for product traceability. The company works with farms to collect data to track the quantity, quality, and weight of coffee, and due to the traceability and transparency enabled by data collection efforts, coffee buyers have a better understanding of the coffee quality and are more motivated to maintain the sourcing relationship.

TooGoodToGo (TGTG, <https://toogoodtogo.com/en-us/>), established in 2015, is committed to creating a planet with no food waste. The company developed a mobile application that connects stores and restaurants with unsold, surplus food with customers who can buy the surplus food at a much lower price than normal (see Figure A3). Food waste is prevalent in the food industry, and by selling the surplus food, stores and restaurants can generate additional revenue, attract new customers, and contribute to the sustainability agenda. As for the customers, they can stop thinking about what food

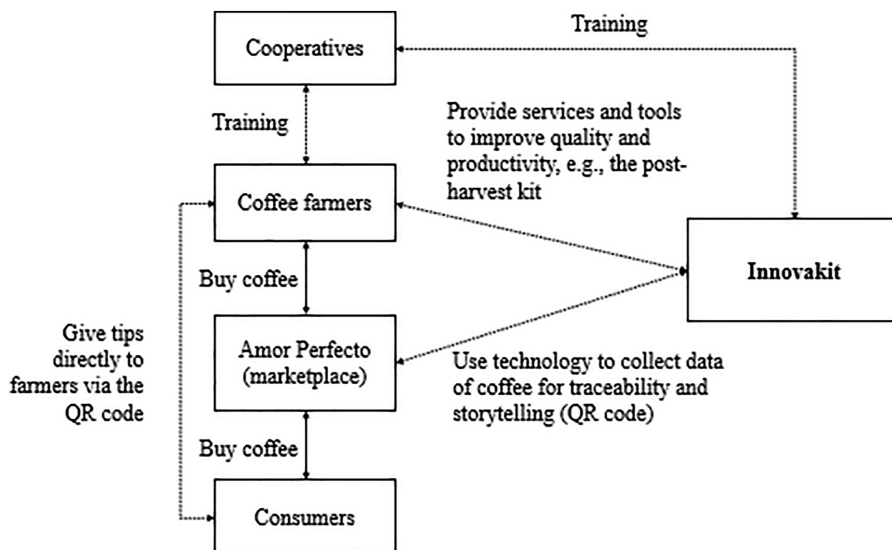


Figure A2. Ecosystem of Innovakit

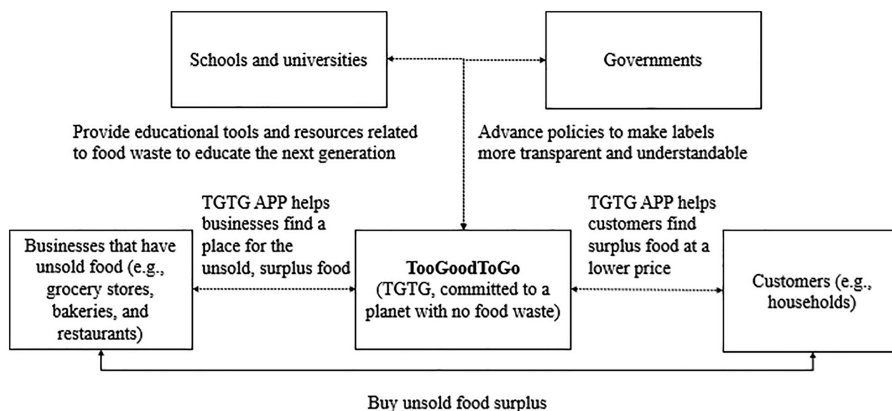


Figure A3. Ecosystem of TooGoodToGo

they need to buy, and their requirements can be met at a low cost. TGTG believes that everyone needs to take actions against food waste. The company partners with schools and universities and provides educational tools and resources regarding food waste to the latter to teach the next generation how to protect our planet. Furthermore, TGTG works with governments toward UN Sustainable Development Goal 12 on responsible consumption and production. Specifically, the company tries to advance policies to make date labels more transparent and understandable.

Context 2: Triadic supply chain level intermediation – The case of intermediaries linking buyers and suppliers for sustainable development

Yunus Social Business (YSB, <https://www.yunusbs.com/>), founded in 2011, aims to address poverty and the climate crisis. YSB works toward the objectives from two angles (see Figure A4). One is the bottom-up approach, providing financial and non-financial support to social businesses to grow their business and multiply the impact. In Colombia, YSB invests in five sectors, culture, education, waste management and renewable energy, Fintech, and social or impact tourism. The company also conducts research to better understand the needs of social businesses. The other is the top-down approach, leveraging multinationals' business experience and competences and guiding them in integrating social business into the business model and realizing social impact. YSB believes that big companies are essential in transforming the society because they have business acumen, financial capability, and potential relationships with governments to enable the changes. Therefore, the company works with both social businesses and corporations and strives to address societal challenges in a financially viable way.

Minka-Dev (<https://www.minka-dev.com/>), founded in 2011, is committed to inclusion and sustainability. The company generates sustainable business solutions to address social and environmental problems, promoting equal access to opportunities and favoring the creation of economic development ecosystems that are comprehensive, inclusive, and sustainable. In response to complex social and environmental challenges, Minka-Dev promotes inter-sectoral alliances and public-private partnerships. The for-profit company serves as a platform and offers a marketplace to link business opportunities for social and environmental impact (see Figure A5). Minka-Dev focuses on three types of businesses: (1) businesses that contribute to the protection of the environment; (2) inclusive businesses that improve access to opportunities for vulnerable populations; and (3) businesses that promote the production of sustainable products and services.

Context 3: Multi-level supply chain intermediation – The case of multi-stakeholder initiatives

Multi-stakeholder initiatives (MSIs) work as a collaboration among various stakeholders, such as corporations, civil society organizations, governments, and local communities, to address challenging issues around the world. The MSI Database, released in June 2017, provides an overview of the governance and operations of such initiatives that focus on international standard-setting (<https://msi-database.org/>). The table below (Table A1) shows some selected MSIs from the database.

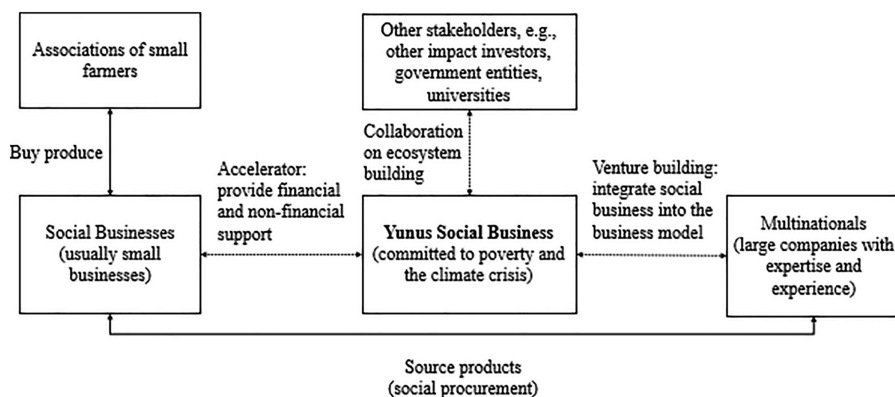


Figure A4.
Ecosystem of Yunus social business

Collective
action in
supply chains

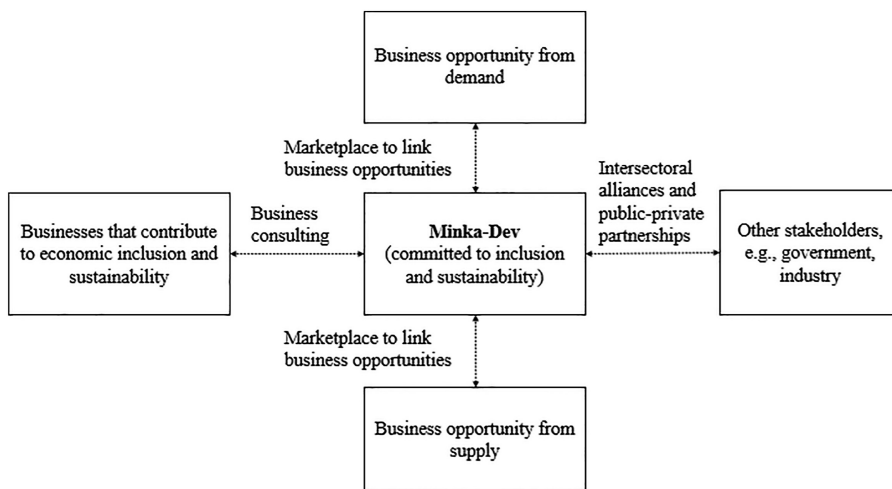


Figure A5.
Ecosystem of
Minka-Dev

Table A1.
Selected MSIs

MSI name	Website	Industry	Purpose/Mission	Stakeholders involved in decision making	Main intermediation activities
Sustainable Apparel Coalition (SAC)	https://apparelcoalition.org/	Consumer Goods	The mission of SAC is to combine efforts of apparel, footwear and textile brands, retailers, suppliers, service providers, trade associations, non-profits, NGOs, and academic institutions to reduce environmental impact and promote social justice throughout the global value chain	Government, Industry, Civil Society	- Develops the Higg Index, a suite of tools that standardizes value chain sustainability measurements for all industry participants
Social and Labor Convergence Program (SLCP)	https://slconvergence.org/	All Industry	The mission of SLCP is to implement a Converged Assessment Framework that supports stakeholders' efforts to improve working conditions in global supply chains	Government, Industry, Civil Society	- Provides tools to measure working conditions for high-quality verified data - Provides a hosting and sharing system that allows facilities to share their verified data with other stakeholders, improving efficiency and reducing duplicative social audits - Provides certification to growers, ranchers, producers and packers for sustainability and transparency in the food system
Food Alliance	https://foodalliance.org/	Agriculture, Forestry and Fishing	Food Alliance works at the juncture of science, business, and values to define and promote sustainability in agriculture and the food industry, and to ensure safe and fair working conditions, humane treatment of animals, and careful stewardship of ecosystems	Industry, Civil Society	- Works with independent, third-party inspectors to carry out product/operation evaluation for certification

(continued)

MSI name	Website	Industry	Purpose/Mission	Stakeholders involved in decision making	Main intermediation activities
Global Network Initiative (GNI)	https://globalnetworkinitiative.org/	Technology and Tele-communications	The mission of GNI is to protect and advance freedom of expression and privacy rights in the ICT industry by setting a global standard for responsible company decision making and serving as a multistakeholder voice in the face of government restrictions and demands	Industry, Civil Society	Four strategic pillars - Fosters accountability - generating trust - Empowers policy - promoting human rights - Provide framework - improving responsible decision making - Enable learning - shaping best practices
Fair Labor Association (FLA)	https://www.fairlabor.org/	Consumer Goods	The mission of the FLA is to combine the efforts of business, civil society organizations, and colleges and universities to promote and protect workers' rights and to improve working conditions globally through adherence to international standards	Government, Industry, Civil Society	- Provides accreditation signifying that a company has effective systems in place that protect workers in their global supply chain - Provides ongoing analysis and feedback to accredited companies - Provides a third-party complaint system to report workplace issues
Forest Stewardship Council (FSC)	https://fsc.org/en	Agriculture, Forestry and Fishing	The mission of FSC is to promote environmentally sound, socially beneficial, and economically prosperous management of the world's forests	Industry, Civil Society	- Provides certification to forests which are under responsible and sustainable forest management

(continued)

Collective
action in
supply chains

Table A1.

Table A1.

MSJ name	Website	Industry	Purpose/Mission	Stakeholders involved in decision making	Main intermediation activities
International Sustainability and Carbon Certification (ISCC)	https://www.iscc-system.org/	Agriculture, Forestry and Fishing; Mining and Energy; Industrials	ISCC aims to contribute to the implementation of environmentally, socially, and economically sustainable production and use of all kinds of biomass in global supply chains	Industry, Civil Society	<ul style="list-style-type: none"> - Provides certification to all feedstocks by - Implementing social and ecological sustainability criteria - Monitoring deforestation-free supply chains - Avoiding conversion of biodiverse grassland - Calculating and reducing greenhouse gas (GHG) emissions - Establishing traceability in global supply chains - Creates the global common language for organizations to report their impacts
Global Reporting Initiative (GRI)	https://www.globalreporting.org/	All Industry	GRI exists to help organizations be transparent and take responsibility for their impacts so that we can create a sustainable future	Industry, Civil Society	