Rethinking Value Chains

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Orchestrating environmental sustainability in a world of global value chains

Stefano Ponte

Introduction

Sustainability considerations are becoming mainstream in corporate strategy and are affecting the functioning of global value chains (GVCs). Production is moving to locations that can meet basic sustainability specifications in large volumes and at low cost. Multi-stakeholder initiatives (MSIs) on sustainability have come to play a key role in GVCs.

Because of this new reality, public authorities cannot shape sustainability only through regulation and international agreement formation. They need to orchestrate sustainability through various direct and indirect, hard and soft instruments, and in ways that take into consideration the power dynamics that characterise different GVCs. In this chapter, I examine the different kinds of power dynamics that characterise two specific value chains (coffee and biofuels), and the role that
sustainability issues play in them, with particular focus on environmental aspects. What leverage points can be used by public orchestrators and with what instruments in different GVCs? How can various actions (applying different kinds of power) be used to undermine unequal bargaining positions?

**Orchestration for sustainability**

The concept of ‘orchestration’ can help with understanding the role of public actors can play in shaping sustainability in a GVC context – as the conductor of an orchestra seeks to make musicians work towards a common goal, public authorities seek to combine different kinds of instruments for the public good (Abbott and Snidal, 2009). Usually, two broad sets of orchestrating mechanisms are operated: ‘directive’ and ‘facilitative’. On the one hand, directive orchestration relies on the authority of the state and seeks to incorporate private initiatives into its regulatory framework (through mandating principles, transparency, codes of conduct). On the other hand, facilitative orchestration relies on softer instruments, such as the provision of material and ideational assistance (financial and technical support, endorsement) and is used to kick-start new initiatives and/or to further shape and support them. Successful public governors often use a combination of mechanisms in attempting to achieve policy goals. But outcome effectiveness is linked to different overlaps of these mechanisms that are GVC-specific, rather than to the superiority of one governance form or institutional setting over another. In other words, we can expect more successful orchestration when public authorities employ a combination of substantial directive and facilitative instruments.

Lister et al (2015) propose two other factors that can enable public orchestration in successfully addressing sustainability issues along GVCs: issue visibility and interest alignment. On issue visibility, we can expect more potential for orchestration if the product, industry and/or related set of environmental issues are visible to the general public, and particularly to
consumers. This can occur because the environmental issue itself is obviously visible (such as accumulating trash on urban streets, or dark exhaust fumes coming from ships) or because it is rendered so through consumer labels, public campaigns or social media exposure. Therefore, orchestration is more likely to succeed in GVCs that handle consumer-facing and branded products and/or in those that have been targeted by social movements and the media. When an environmental issue is not clearly visible to key stakeholders, orchestration efforts should include instruments that can enhance visibility.

On interest alignment, we can expect better orchestration possibilities if there is substantial overlap between public and private interests (Schleifer, 2013). Because different value chain nodes are regulated by different authorities, there may be different kinds of (mis)alignments between private and public sector interests in different GVC nodes. While it is rare for interests to be aligned at all nodes, alignment at key nodes can provide a strong entry point for orchestrators to stimulate the transmission of environmental improvements along the whole GVC. An additional complication is that alignment between public and private sector interests may differ in different group of countries (such as coffee producing countries in the Global South and coffee consuming countries in the Global North). In any case, interest alignment is not static and should be addressed as a specific objective of orchestration.

**Governance and power in GVCs**

The term GVC refers to the full range of activities that firms, farmers and workers carry out to bring a product or service from its conception to its end use, recycling or reuse. These activities can include design, production, processing, assembly, distribution, maintenance, disposal/recycling/reuse, marketing, finance and consumer services. In this context, ‘lead firms’ are groups of firms that operate at particular functional positions along the chain and that are able to shape who does what
along the chain, at what price, using what standards, to which specifications, and delivering in what form and at what point in time (Gereffi et al, 2005). GVCs can be unipolar, bipolar or multipolar – depending on how many groups of lead firms play a dominant role in shaping it and on whether civil society organisations, social movements, consumer groups, networks of experts and policy makers, and MSIs for sustainability also play a role in governing them.

Various levels of state action and authority have important structuring effects on GVCs (Horner, 2017). States can act as intentional orchestrators of GVCs, regulate (or deregulate) their functioning, and choose to redistribute (or not) the extra wealth generated through GVCs. States can also be important direct actors in GVCs, for example through state-owned enterprises and public procurement. This is why the concept of public orchestration comes handy in combination with analyses of governance and power in GVCs.

To further understand governance dynamics, we should also examine the power dynamics that underpin them. Dallas et al (2019) propose two dimensions of power in GVCs: a transmission mechanism and an arena of actors. The transmission mechanism of power is anchored by two ideal types: direct and diffuse. On the one end are circumstances where GVC actors (individually or collectively) seek to exert direct forms of influence over other actors or actor groups. On the other end are more diffuse forms of power where the actors or collectives and the objects of power may be less clearly identifiable, and actions less intentional. The arena of actors specifies whether power is wielded in dyads or by collectives. Combining these two dimensions yields a four-category typology that incorporates many of the types of power observed in GVCs: bargaining, demonstrative, institutional and constitutive power (Dallas et al, 2019). Bargaining power (dyadic, direct) operates on a one-to-one basis, exhibits different degrees in different kinds of value chain linkages, and is shaped by the relationship between lead firm requirements and supplier competencies, including those on sustainability. Demonstrative
power (dyadic, indirect) operates through informal transmission mechanisms along GVCs between individual actors (such as buyers and suppliers or aspiring suppliers) and is shaped by conventions and best practices, including those on sustainability management, that are implicitly accepted by the parties of a dyadic transaction. Institutional power (collective, direct) operates through government regulation and/or multi-stakeholder sustainability initiatives or other institutionalised forms, and can be leveraged through collective standards or codified ‘best practices’. Constitutive power (collective, indirect) is based on broadly accepted norms, conventions, expectations and best practices (financialisation, just-in-time supply chain management, environmental stewardship) and shapes what is systemically acceptable and desirable (green capital accumulation, sustainability-based value extraction from suppliers) (Dallas et al, 2019).

In the rest of this chapter, I examine the intersections of governance and power in the GVCs for coffee and biofuels to highlight the possible mechanisms and strategies that public orchestrators can use to shape environmental outcomes for the public good.

**Empirical insights from the coffee and biofuels GVCs**

In this section, I draw from the analysis of power, governance and upgrading in the coffee and biofuels GVCs carried out in more detail elsewhere (Ponte 2019) to examine how governments and international organisations could combine a variety of orchestration instruments in different GVCs – depending on their governance structures and the power dynamics that underpin them. In order to develop a portfolio of strategic choices that public actors can use to successfully orchestrate sustainability in different GVCs, I address three questions in the following discussion: (1) how can orchestrators choose what kinds of directive and facilitative instruments to use, and with what balance? (2) how can they
enhance issue visibility? And (3) how can they better align private and public sector interests?

**Coffee**

The coffee GVC was characterised by high concentration at the key nodes of trading and roasting for decades until the late 1990s. However, the degree of concentration at the roaster level has now decreased. In 1998, the top five roaster groups controlled 69 per cent of roasted and instant coffee markets. By 2014, their share had decreased to 50 per cent (Grabs and Ponte, 2019). This is not surprising, given the growth of specialty coffee and the ongoing fragmentation of consumption channels and offerings. However, there have been recent signs of increased merger and acquisition (M&A) activity, which are leading to renewed concentration. In the next sub-sections, I examine the dynamics of different kinds of power in the coffee GVC (drawing from Ponte, 2019) to then return to the issues of GVC governance and orchestration.

**Bargaining power**

Historically, bargaining power in the coffee GVC had been heavily shaped by institutional power dynamics under an international regulatory regime that lasted from 1962 to 1989. Under the International Coffee Agreement (ICA) regime, collective power relations were relatively balanced between producing and consuming countries, thus strengthening the bilateral bargaining power of suppliers, farmers and their cooperatives. The end of ICA led to a general weakening of bargaining power by producing countries and their producers. In the following three decades, the increasing concentration in the roasting and trading functions of the coffee GVC compounded this dynamic. Despite the relative fragmentation of the roaster segment of the coffee GVC in recent decades, and the continuing consolidation in the international trader segment, mainstream roasters have maintained their upper
hand in terms of bargaining power over other GVC actors (see Figure 3.1).

Overall, sustainability content has become more important as major roasters now require third-party sustainability certifications for an important proportion of their purchases. But other roasters have been developing their own sustainability verification systems, which allow them to obtain precious information on suppliers’ cost structures as well, thus strengthening roasters’ bargaining power and ability to extract value in higher-margin markets. These dynamics suggest that the distinction between mainstream and specialty coffee markets is becoming less clear-cut. Thus, while specialty coffee actors have been taming some of the bargaining power of mainstream roasters, a powerful reaction by major roasting groups is under way, in view of regaining a better bargaining position.

**Demonstrative power**

Up to 1989, mainstream roasters were mainly focused on selling large quantities of relatively homogeneous and undifferentiated blends of mediocre to poor quality. But later demonstrative power started having an impact with the emergence of specialty coffee. In this context, Starbucks and other ‘pioneer’ roasters in the US West coast had a massive demonstrative effect in the industry by inspiring a large number of other smaller roasters and café chains. Until the early 2000s, traditional roasters remained slow in responding to the demonstrative power that was sweeping the specialty and sustainable coffee market. But a new phase started, when Procter and Gamble, in response to direct shareholder pressure, announced major purchase agreements to source fair trade coffee. Through a domino effect, Kraft and the Rainforest Alliance then announced a multi-year arrangement in 2004. Albert Heijn and other large European supermarket chains started requiring Utz certification for a portion of their purchases. Since then most of the major coffee roasters have been purchasing considerable amounts of certified sustainable coffee and have adopted their
Figure 3.1: Interactions of different kinds of power in the coffee global value chain

Source: Ponte (2019: 129)
own sustainability standards and verification systems. One after another, they have also acquired smaller specialty roasters and café chains.

Institutional power
Coffee was one of the first commodities for which control of world trade was attempted, starting in 1902 in the Brazilian state of São Paulo. The first ICA was signed in 1962 and included most producing and consuming countries as signatories. Under the ICA regulatory system (1962–89), a target price (or a price band) for coffee was set, and export quotas were allocated to each producer. Although there were problems with this system, most analysts agree that it was successful in raising and stabilising coffee prices. This all changed in 1989, when the US refused to renew the ICA, which profoundly affected the balance of institutional power in the coffee GVC. In turn, this reshaped bargaining power between individual operators to the benefit of consuming country-based actors (including their agents based in producing countries) and to the detriment of coffee farmers, local traders and producing country governments.

While during the ICA period sustainability issues rarely featured in institutional discussions, since the mid-1990s coffee has seen a proliferation of sustainability standards, certifications and verification systems. This has been accompanied by the growth of a large industry of standard developers, certification and accreditation agencies and related service and consulting outfits, which have an embedded interest in the continuing operation of sustainability certification initiatives. The emergence of these systems suggests that institutional power, originally exerted by governments in producing and consuming countries, is now partially wielded by transnational sustainability initiatives.

Constitutive power
Key changes in constitutive power in the coffee GVC relate to the emergence, since the early 1990s of new consumption
patterns, the growing importance of single origin coffees, the proliferation of café chains and specialty shops, and increasing out of home consumption. It is against the background of these changes that the specialty coffee industry emerged. This included the proliferation of sustainability standards and certifications (promoted by Rainforest Alliance, Conservation International and Oxfam).

However, in more recent years, and particularly in the past decade, sustainability has become a vector of quality management and supply chain risk minimisation. This has led to a relative weakening of third-party certification and an increasing acceptance in the industry of basic guidelines, company-owned verification systems, and CSR-like projects in coffee producing communities. In sum, sustainability has found an important place in the exercise of constitutive power in the coffee GVC, but in forms that have moved away from more genuine concerns with producers and their environment and towards corporatised forms that are designed to ensure risk minimisation and profit maximisation for roasters, thus enhancing their bargaining power (see Figure 3.1).

Orchestration

In the coffee GVC, governance moved from being multipolar in 1960–90 to being unipolar in 1990–2018, with bargaining power increasing dramatically in the hands of coffee roasters (see Table 3.1). This transition took place through a major change in institutional power with the end of the ICA system. A more recent period of upheaval emanated from the demonstrative power of sustainability and specialty coffee industry actors, which led to a relative dampening of bargaining power by mainstream roasters until recently. This process, however, is now being reversed as mainstream roasters acquire smaller, specialty roasters, and as some specialty roasters have grown to become more mainstream in their operations and procurement systems. Sustainability issues have been an important component of these power dynamics. But what do
Table 3.1: Changes in power, sustainability and global value chain governance in coffee and biofuels

<table>
<thead>
<tr>
<th>GVC</th>
<th>Polarity (T1)</th>
<th>Changes in bargaining power (T1 to T2)</th>
<th>Changes in other kinds of power (T1 to T2)</th>
<th>Role of sustainability factors in shaping governance (T1 to T2)</th>
<th>Changes in GVC governance (T1 to T2)</th>
<th>Polarity (T2)</th>
<th>Lead firms (T2)</th>
<th>Intensity of bargaining power wielded by lead firms (T2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>Multipolar</td>
<td>From balanced to more buyer power</td>
<td>Institutional ++ Demonstrative +</td>
<td>Significant</td>
<td>Major shock in institutional power (end of ICA) together with increasing concentration moves GVC governance from multipolar to unipolar and buyer-driven (by roasters); demonstrative and constitutive power effects of specialty and sustainable coffee initially tame buyer-drivenness; more recently, roasters re-strengthen unipolarity through M&amp;A of specialty</td>
<td>Unipolar</td>
<td>Roasters</td>
<td>High</td>
</tr>
</tbody>
</table>

(continued)
Table 3.1: Changes in power, sustainability and global value chain governance in coffee and biofuels (continued)

<table>
<thead>
<tr>
<th>GVC</th>
<th>Polarity (T1)</th>
<th>Changes in bargaining power (T1 to T2)</th>
<th>Changes in other kinds of power (T1 to T2)</th>
<th>Role of sustainability factors in shaping governance (T1 to T2)</th>
<th>Changes in GVC governance (T1 to T2)</th>
<th>Polarity (T2)</th>
<th>Lead firms (T2)</th>
<th>Intensity of bargaining power wielded by lead firms (T2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofuels</td>
<td>Multipolar</td>
<td>Remains relatively balanced</td>
<td>Constitutive ++ Institutional +</td>
<td>Essential</td>
<td>Institutional power plays major role in industry formation; major change in constitutive power recasts legitimate biofuels as only those that are certified sustainable; no major changes in overall governance, which remains multipolar, but blenders and 2nd generation biofuel producers strengthen their position</td>
<td>Multipolar</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Source: Adapted from Ponte (2019: 131)
these observations entail in relation to public orchestration for sustainability?

Given that the ICA regulatory role is unlikely to be restored, it is public authorities at the national level in producing and consuming countries that could play a sustainability orchestration role in the coffee GVC by exerting their institutional power. Further improvements can be stimulated in combinatory efforts, issue visibility and interest alignment (see Table 3.2). In relation to combinatory efforts, both consuming and producing countries can further ramp up many of the facilitative efforts they are already carrying out to support producers, cooperatives and exporters that are seeking voluntary certifications. Producing countries could also include sustainability considerations in national branding efforts, and consuming countries could lobby to raise the low level of sustainability standards currently embedded in some of the basic standards programmes (such as the Common Code for the Coffee Community, 4C). In terms of directive efforts, producing countries could set a minimum sustainability standard for export, charge a sustainability export tax at times of high international prices, and/or include sustainability standards in indications of geographic origin. Consuming countries could more forcefully enact demands for sustainable coffee certification for public procurement (for example in schools and hospitals) and/or require sustainability standards to be imported – as the WTO has been relatively open and lenient in accepting the protection of the environment and health as legitimate policy objectives.

Improving environmental issue visibility in the coffee GVC is a more complex challenge. Coffee stories, labels and certifications are already dotting the packaging landscape that speaks directly to consumers. The demonstrative power of specialty and sustainable coffee has been key in partially limiting the bargaining power of mainstream roasters in recent decades. Thus, one idea is that orchestrators could reinvigorate demonstrative (and eventually constitutive) power in alliance
### Table 3.2: Overview of orchestration options in coffee and biofuel global value chains

<table>
<thead>
<tr>
<th></th>
<th>Coffee</th>
<th>Biofuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in GVC governance</td>
<td>From multipolar to unipolar</td>
<td>Remained multipolar</td>
</tr>
<tr>
<td>Key kinds of power that interacted with bargaining power</td>
<td>Institutional, demonstrative</td>
<td>Constitutive, institutional</td>
</tr>
<tr>
<td>Key public orchestrators of sustainability</td>
<td>National governments</td>
<td>National governments, EU</td>
</tr>
<tr>
<td>GVC pressure points for orchestration</td>
<td>Mainstream roasters, specialty coffee actors</td>
<td>Multiple</td>
</tr>
<tr>
<td>Current level of orchestration effort</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Change needed in combinatory efforts</td>
<td>From medium to high</td>
<td>Only marginal improvements needed</td>
</tr>
<tr>
<td>Possible directive instruments</td>
<td><em>Consuming countries</em>: public procurement; raising the low bar set by 4C; require sustainability certification for coffee to be imported <em>Producing countries</em>: require a minimum sustainability standard for export; charge a sustainability export tax</td>
<td>Calling for minimum standards on the quality of governance in private certification systems that are recognised by the EU</td>
</tr>
</tbody>
</table>

(continued)
Table 3.2: Overview of orchestration options in coffee and biofuel global value chains (continued)

<table>
<thead>
<tr>
<th>Coffee</th>
<th>Biofuels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Possible facilitative instruments</strong></td>
<td>Assess impact of sustainability certifications on actual outcomes; further support the scaling up of next-generation biofuels</td>
</tr>
<tr>
<td>Further support producers, cooperatives and exporters seeking voluntary certifications; embed sustainability in national branding efforts</td>
<td></td>
</tr>
<tr>
<td><strong>Change needed in issue visibility</strong></td>
<td>Only marginal improvements needed</td>
</tr>
<tr>
<td>From medium to high</td>
<td></td>
</tr>
<tr>
<td><strong>Approaches to improve issue visibility</strong></td>
<td>Shape constitutive power to strengthen the framing of sustainability in biofuel production, for example, by facilitating a better incorporation of indirect land change use (ILUC) in calculations of greenhouse gas emission abatements</td>
</tr>
<tr>
<td>Shape demonstrative power by engaging with (smaller) specialty coffee roasters to include, for example, carbon sequestration as part of sustainability and/or minimum farmer prices for meeting specific environmental standards; facilitate initiatives in producing countries that seek to frame sustainability as part of geographic origin and/or national branding</td>
<td></td>
</tr>
<tr>
<td><strong>Change needed in interest alignment</strong></td>
<td>From medium to high</td>
</tr>
<tr>
<td>From medium to high</td>
<td></td>
</tr>
<tr>
<td><strong>Approaches to improve interest alignment</strong></td>
<td>Long-term transition measures to facilitate a smooth transition away from first-generation biofuels in order to better align the interests of different groups within the private sector, as this also improves the alignment of private and public interests</td>
</tr>
<tr>
<td>Producing countries: charging a mandatory sustainability export tax at the export level to be returned to farmers meeting these standards</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Ponte (2019: 204–205)
with (smaller) specialty coffee roasters in view of including, for example, climate change and carbon sequestration as part of sustainability. They could also promote efforts to pay a minimum price at the farmer level for coffee that meets certain environmental criteria. Initiatives in producing countries that seek to frame sustainability as part of geographic origin and/or national branding can act in this direction as well. Finally, in relation to interest alignment, orchestrators could charge a mandatory sustainability export tax to be returned to farmers. This would provide more direct sustainability incentives at the farm level, as well as better align public and private interests in producing countries – given that many producers perceive sustainability as an imposition placed by buyers and abetted by their governments.

**Biofuels**

Three systemically important countries/regions are key in understanding the biofuels GVC: Brazil, the US and the EU. Together with Argentina and Indonesia, they account for 90 per cent of global production, and together with China and Canada for 44 per cent of consumption. Global biofuel production and consumption increased nearly seven-fold since 2000 and doubled since 2007. National (Brazil, US) and regional (EU) biofuel industries have existed for decades and have operated fairly independently from each other, indicating that until recently there were a variety of loosely coupled biofuel value chains. In the last two decades, however, we have witnessed a gradual establishment of a global biofuel value chain.

**Bargaining power**

With the exception of Brazil, substantial developments in the biofuels GVC can be traced to the last two decades. International alliances in the private sector and an increasingly complex web of cross-regional investments have emerged in the biofuels GVC, starting tentatively during the 2000s
and spreading dramatically during the 2010s – in terms of size, number and geographical spread of international joint ventures and the new involvement of global agro-food traders, oil majors, auto manufacturers and the aviation industry in biofuels (Ponte, 2014).

The global players involved in some of these investments exert dramatic bargaining power in other GVCs, but are still relatively new to biofuels, or had previously played only a marginal role in it (see Figure 3.2). Several global agro-food traders have developed major interests in biofuels. These processes have often led to increased vertical integration in the industry, in order to secure supply, control costs to maximise returns, and ensure processes and sources of supply of certified sustainable biofuels for the European market. This means that bargaining power is still fairly balanced among different kinds of actors in the biofuels GVC, although blenders/distributors have gained some traction by being able to demand sustainability certification in markets where regulation requires it, and by passing on the implementation costs upstream to the producers of feedstock.

Demonstrative power

The flurry of new investments that took place in the past two decades suggests an important role for demonstrative power, as corporations that compete in other industries entered the biofuel craze and mimicked consortium and joint venture models from each other. This involved a disparate combination of actors in the automobile, aviation, biotechnology and energy industries. Demonstrative effects are also evident among major oil companies, which are also investing in biofuel research, in ethanol production facilities and/or in integrated distribution of fuels. Aircraft manufacturers, major global airlines and the US Navy are carrying out projects for the production of ‘drop-in’ biofuels for aviation. Developers of GM crops are working on feedstocks dedicated to biofuels, also through cooperation agreements with global agro-food traders. In sum,
Figure 3.2: Interactions of different kinds of power in the biofuels global value chain

Source: Ponte (2019: 130)
demonstrative power is clearly at play in the biofuels GVC, but differently from coffee, it has been wielded by players in several different functional positions of the value chain and has been underpinned in no small measure by government support.

**Institutional power**

Institutional power is key in understanding the dynamics of the biofuels GVC. Since the 1990s, governments in Brazil, the US and the EU have been heavily promoting biofuels, often under pressure from industry and agricultural lobbies. These policies have been justified in relation to climate change mitigation (especially in the EU), energy security (especially in the US) and farmer support and rural development (in Brazil, but also in the US and the EU).

From the late 1990s to around 2006/07, government interventions enacted policies that effectively forged the various national and, in the case of the EU, regional foundations of an increasingly global biofuel value chain. But as criticism mounted on biofuels (see under ‘Constitutive power’), the EU enacted demands for sustainability standards for the production, trade and use of biofuels in member countries. The US also fine-tuned its subsidies and regulation to increase support for next-generation biofuels relative to first-generation biofuels. And Brazil increased its public relations effort aimed at showing that sugarcane-based ethanol production in the country has a positive impact on greenhouse gas emission reductions. Thus, sustainability in the biofuels GVC has become a ‘must have’ feature in main consumption markets. This is because sustainability standards play a key role in the basic definition of its tradability and are thus a key feature of institutional power dynamics.

For example, the EU promulgated the 2009 Renewable Energy Directive (RED) (2009/28/EC), which required 20 per cent of energy use in the EU and 10 per cent of transport fuels to come from renewable sources by 2020. It also set sustainability requirements for the use of biofuels in the EU,
including minimum greenhouse gas savings in comparison to fossil fuels and the double counting of credits for biofuels produced from waste and residues to decrease the impact on feedstock that can be used for food. The Commission set up an accreditation system for private certification schemes that meet its RED sustainability criteria, which has led to a veritable scramble in getting access to the captive EU market. Much of this market has been captured by one particular certification system, ISCC – International Sustainability and Carbon Certification. This means that part of the strong institutional power wielded by public authority has been transferred to private certification organisations that are in charge of verifying compliance with the RED directive.

Constitutive power

In the early days of the biofuel industry, an unusual coalition of agricultural, environmental and military interests, together with a vibrant biofuel conference circuit, exercised constitutive power by establishing the idea that biofuels could achieve a number of collective objectives: revitalise rural areas, decrease CO$_2$ emissions, and ensure domestic energy independence. This perfect storm also facilitated the institutional support that further stimulated the expansion of this industry. However, increasing food prices and the related food riots of 2006/07 dramatically altered this picture in following years. Civil society groups and researchers started holding biofuel production as a major cause of increasing food prices because it takes land and water away from food production. Many studies highlighted deeply problematic aspects of land investments. Doubts also started to be cast on the impact of biofuel production on greenhouse gas emission reductions. The contours of what is generally seen as ‘sustainable biofuel’ have changed through these debates. Constitutional and institutional elements of power have been feeding each other in the past decade – with regulation tightening the conditions what is considered acceptable in relation to sustainability (indicated by more
support placed on second-generation biofuels), and with constitutive power dynamics playing out in the global biofuel conference circuit (Ponte, 2014).

**Orchestration**

In the biofuels GVC, we did not observe major changes in the multipolar nature of governance in the past two decades or so (see Table 3.1). However, important changes took place in the overlap of different kinds of power, which has key implications for orchestration strategies. Institutional power played a major role in the industry formation period, and bargaining power remained fairly equally distributed among multiple groups of firms in different functional positions. It was a major shift in constitutive power, following the food price crisis of the mid-2000s, that recast biofuels as acceptable only when they are certified or verified as sustainable.

Orchestrators, such as the EU and the US, have already carried out important combinatorial efforts to seek improvements in sustainability, including substantial directive and facilitative measures (see Table 3.2). However, there is still margin for improvement. For instance, private certification systems that are recognised by the EU to meet its RED directive vary widely, thus calling for minimum standards on governance processes; and the impact of sustainability certification needs to be assessed in view of actual outcomes on the ground. Given that changes in constitutive power dynamics led to a major reshuffling of regulatory instruments, the same could be leveraged to improve issue visibility. Orchestrators could, for example, promote a more open debate and consideration of indirect land use change use in the calculations of greenhouse gas emissions abatement in biofuel production. Finally, orchestration measures that are strengthening the position of second-generation feedstock and biofuel producers vis-à-vis first-generation operators should include long-term transition measures to facilitate a smooth transition away from first-generation biofuels, thus improving
the overall interest alignment between the public sector and different segments of the private sector.

Conclusion

The current fragmentation of sustainability governance entails the need for public authorities to act as orchestrators – by combining directive and facilitative instruments. However, we still do not know the effectiveness of these actions in the context of the everyday practices of lead firms and other actors in GVCs, even though this system of economic organisation has become a dominant feature of the global economy in the past few decades. In this chapter, I proposed three possible enabling factors that can help orchestration to succeed in addressing sustainability issues along GVCs: combinatory efforts including both directive and facilitative instruments; high issue visibility; and interest alignment between public and private actors. While environmental improvements led by GVC actors are most likely to take place in unipolar GVCs (Lister et al, 2015), public orchestration tends to be more successful in multipolar GVCs.

Although improving the chances of successful orchestration involves appropriate combinations of directive and facilitative instruments, ways of enhancing issue visibility and tools to better align private and public sector interests, possibly also across jurisdictions, these choices and strategies are issue- and GVC-specific and cannot stem from a general model of orchestration. They have to be informed by the specific power and governance dynamics that characterise relevant GVCs. This entails targeting appropriate leverage points along a GVC with the right instruments, depending on the balance of bargaining power among different actors and on whether this balance is (or has been) underpinned or challenged by various overlaps of demonstrative, institutional and constitutional power.
In conclusion, for public orchestrators regulation remains essential, but the scale and complexity of the problems at hand require governments and international organisations to use a combination of tools, direct and facilitative, in view of enhancing the visibility of the environmental issues that are more hidden, and of providing incentives and infrastructure to align private and public interests. This requires an understanding of how GVCs are governed and by whom – and the power dynamics that facilitate these processes. Orchestrators need to act not only through their institutional power, but also through shaping constitutive power through ideational change and demonstrative power through collaboration with key influential actors in view of taming the bargaining power of lead firms.

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