

# Externalities in global value chains: Firm solutions for regulation challenges

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## Abstract

**Research summary:** Negative externalities in global value chains (GVCs) create challenges for regulation. We establish conditions under which firms are more likely to adapt their GVCs to rectify negative externalities that occur at global scale. Firms in GVCs vary in relation to their active involvement in attending to negative externalities in a predictable way, according to their awareness (A) of these externalities, motivation (M) to address them, and the capability (C) to do so. Firms in GVCs can self-correct imperfections by strategy changes, or new firms can be recruited into the GVC with the awareness, motivation, and the capability to attend to negative externalities. National governments may find these externalities to be a significant policy challenge, particularly when they extend across national jurisdictions.

**Managerial summary:** Private mechanisms, through firm strategy or new entrants into an industry, can address negative externalities created in GVCs. The agency of GVC members is crucial in self-correction via awareness, driven by GVC integration; motivation to act, driven by GVC accountability; and the capability to implement the necessary changes, driven by GVC leadership. GVCs with more exchanges of knowledge and information among members will be more aware of the costs they generate on third parties. GVCs with

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members who are more involved with stakeholders and who prioritize CSR will have greater motivation to attend to their externalities, and larger GVCs that span national borders, dominated by a strong member, may be more capable of having greater influence on the externalities the GVC creates.

#### KEYWORDS

firms, global strategy, GVCs, multinational enterprises, negative externalities, policy

## 1 | INTRODUCTION

Global value chains (GVCs) have changed the organization of international production. This reorganization has produced benefits that are wide ranging (OECD, 2013) and matters well beyond the boundaries of the GVC, altering the economic development prospects for nations (Baldwin, 2012; Gereffi, 1999), reducing costs, increasing consumption worldwide, and stimulating economic growth. However, there are costs and benefits that derive from a firm's GVC participation which are often difficult to gauge (Gereffi, 2019), and the costs are not always addressed by the firm providing the value activity. These costs can impact both locally and into other national jurisdictions. GVCs generate externalities such that their private benefits and costs differ from their social benefits and costs, rendering them difficult to observe and manage (Libecap, 2014). To possess complete knowledge of this myriad of value-creating activities within a GVC, and the possible externalities that ensue, is difficult for any one firm. While the lead firm in the GVC could possibly be aware of negative externalities being produced, it will be an impossibility for this firm to know of everything that is happening in a complex GVC, at all times, and be able to rectify all of these externalities. But the lead firm is best-positioned to have influence over the complete GVC.

In the auto industry, with large and dominant manufacturing MNEs in the chain as lead firms, no one established member had advocated for a radical change in the GVC of that industry to address pollution from exhaust emissions, let alone other damaging externalities. The large auto firms have the same GVC architecture, which is anchored in substantial prior investments in the current value chain that have relied on gasoline, a fossil fuel. These firms are globally integrated and they are necessarily locally responsive in that they adapt their finished products to country-specific market mandates, and they must adhere to local national regulations, but they have not until recently been motivated to change their common dominant praxis. Changes that have been introduced by the large auto makers have been always small, such as increased fuel efficiency and emissions control, and incremental, such as hybrid electric cars. It has fallen to a new firm, Tesla, to champion fully electric cars that directly address carbon emissions and pollution concerns.

GVC member firms are motivated to act in their own best interests, determining the nature and organization of their participation through their strategy choices (Sako & Zylberberg, 2018), and leveraging their competitive advantage in the rivalrous market for GVC tasks, a worldwide market for market transactions in these tasks (Liesch et al., 2012). However, optimizing the

overall functioning of the GVC system of production is more challenging than it is for domestic value chains and this optimization does not always meet societal expectations beyond the firm's goals (Pananonond et al., 2020). While generally the existence of negative externalities has called for government intervention (Dybvig & Spatt, 1983), this solution is challenging in the case of GVCs as activities are spread across countries and industries, and they are subject to different regulatory regimes and national governments. Our focus is the lead firm in a GVC as this firm has potential to be influential over the entirety of the GVC. We ask the question: Under what conditions is a GVC lead firm more likely to adapt its GVC to deal with negative externalities at global scale?

We present an awareness–motivation–capability (A-M-C) model, which has psychology origins, but has been applied in IB (e.g., see Cui et al., 2014; Hutzschenreuter & Grone, 2009; Meyer & Sinani, 2009) and management studies (e.g., Chen, 1996; Chen et al., 2007; Shi et al., 2020, 2021; Shu et al., 2020), in the analysis of firm actions and reactions in competitive markets. Our main proposal is based on the firm-level perspective, through the A-M-C model of competitive behavior, but we take into account the macro level (principally government regulations) and the GVC level (based on where negative externalities arise along the GVC). We assert that the firm-level perspective is the essential focus to enhance understanding of externality management in GVCs because of the lead firm's determination of the strategic direction of the entire GVC. Thus, our paper privileges the micro/firm level of analysis, rather than the macro (regulations) and the meso (GVC) levels of analysis giving firm-level solutions for regulation challenges. We conclude that the more integrated a GVC is, and the more the lead firm is aware, motivated and possesses the capability to act, the more negative externalities can be managed by this lead firm. As such, this private mechanism can complement public policies in addressing negative externalities that result from GVC activities.

## 2 | GVC EXTERNALITIES: INTEGRATING GLOBALLY AND RESPONDING LOCALLY

Following Meade (1973, p. 15), “An external economy (diseconomy) is an event which confers an appreciable benefit (inflicts an appreciable damage) on some person or persons who were not fully consenting parties in reaching the decision or decisions which led directly or indirectly to the event in question,” and these effects are not reflected in prices. For example, GVCs generate waste throughout the length of the chain and these costs are transferred to overall society, producing more waste than is desirable because these costs are not fully accounted for by the member firms in the GVC in the prices set throughout the chain. This notion is well-established and not controversial, but it is the foundation of the “grand challenge” (Buckley et al., 2017) for business and government that we address in this paper. As *The Economist* (2019, p. 13) writes, “supply chains have grown complex and global ... As links have multiplied so, too, have points of possible failure.” Transactions within a given GVC and its stakeholders in one specific geography may have important effects on third parties in other geographies whose costs and benefits have not been incorporated in market-clearing prices, thus generating suboptimal allocation of resources.

While the concept of externalities has always played a key role in the field of economics, global environmental and human rights externalities have attracted increased public attention recently (Libecap, 2014). Climate change is one such prescient issue. Multinational enterprises (MNEs) are critical players, both producing social costs and, and as we will propose, presenting potential solutions in the global domain. Firms display different degrees of corporate social

responsibility in addressing the externalities that their activities generate (Bagnoli & Watts, 2003; Barboza, 2018; Calveras & Ganuza, 2015; Garcia-Gallego & Georgantzis, 2009; Giannakas & Yiannaka, 2008). To understand the consequences of GVC activities, we adopt an internalization theory perspective, drawing on the complementary global integration–local responsiveness (I-R) approach to the firm's decision making in international strategy to accommodate the tensions that emerge for the lead firm as it manages across national jurisdictions. Following Coase (1937), internalization theory has provided a robust explanation of the existence, growth, and scope of MNEs and their dominance of particular sectors of the world economy (Buckley & Casson, 1976).

Alongside internalization theory, as applied here, and elaborated by Bartlett and Ghoshal (1989), the I-R framework, first identified by Fayerweather (1969), complements internalization theory for our application. The I-R framework offers insights into the strategy process within the firm that can be expanded beyond its boundaries to the broader GVC. It recognizes the inherent tensions in managing the overall global integration requirements of a fully functioning and efficient GVC with the need to be cognizant of the local context within which GVC production activity is taking place.

Internalization theory posits that firms internalize imperfect external markets to the point where the costs of further internalization outweigh the benefits (Buckley & Casson, 1976), which determines the scope of the firm and its interface with its external market context. In IB, the nature of the firm and its activities cannot be understood without fully accounting for the nature of the markets within which the firm operates. Understanding how the firm organizes asks “what is the nature of the market(s) in which it participates?,” hence the firm in the market is the IB context. The growing worldwide market for market transactions (Liesch et al., 2012) has opened up the possibilities of a widespread increase of trade in tasks (Baldwin & Robert-Nicoud, 2014; Lanz et al., 2011), with many new and often smaller firms, often from emerging markets, entering the global market (Buckley & Prashantham, 2016). The competitive dynamics among supplier firms favors externalization of the transaction (Jacobides & Hitt, 2005) into locations often away from the home country of the MNE, thus generating a GVC that reaches far beyond the boundaries of its lead organization.

Recognizing that these foreign markets are not homogeneous, and that in many sectors, there is no global market, I-R considerations also implicitly take the “firm in the market” as a point of departure, and in its international strategy implementation, the MNE will know that its activity in the market must be “adapted to the diversity of local environments” (Fayerweather, 1969, p. 133). This tension between unification and fragmentation, between global integration and responsiveness to the local context, is particularly acute when international production is organized into a GVC, and this tension complicates the already complex externality context. Nevertheless, local initiatives must be coordinated within the global scope of the MNE as the lead firm, and differences in perceiving the tension created in coordinating activities across different markets, and how these perceptions are processed, creates variation in the strategies of firms. For the MNE, local priorities and global obligations will not always align, but they must be managed.

This misalignment can have additional consequences when externalities are created by the firm's actions in the locations in which it operates and in other markets that may be affected. The potential for obfuscation will differ across different jurisdictions, not least because different jurisdictions will have different legal systems and practices. This potential for obfuscation will be magnified by the nature and quality of regulation in both the local and global contexts. The lead firm orchestrating a GVC will have differential power and influence over local regulatory authorities, and will necessarily strategize to optimize the GVC, a global integration imperative.

Its superior orchestration abilities will be used in this optimization (Buckley & Casson, 2019). The tensions between the local responsiveness imperative that ensues from its own GVC positioning and dominance alongside its local responsiveness obligations to its various host-countries, and its global integration requirements for sustained international competitiveness and its global citizenship obligations will be highlighted when negative externalities derive from its global activities and those of its partner firms.

To address this complexity, and the tensions that arise in these firms between local responsiveness and global integration, we need to move beyond the theory of the firm and multinational organizations into a higher-level of analysis, specifically the GVC. As firms establish themselves to be leaders within GVCs, we observe the emergence of “global factories”—MNEs that orchestrate but do not necessarily own these networks of trade in tasks that span national borders and industries (Buckley, 2011, 2018a; Buckley & Ghauri, 2004; Gereffi, 2019; Jacobides & Winter, 2005). This new organization of international production into GVCs, with its varied participants, large and small, self-interested and localized with knowledge domains often limited to their immediate location, has implications on third party costs and benefits and the market prices that are determined.

Alongside the coordinating role of the market, management fiat plays a key role in the organization of GVCs. Attention to negative externalities and possibly the exploitation of positive externalities in the GVC is generally attributed to the lead firm, usually the brand owner. The brand owner will own the product as it progresses through the GVC and will be the source of strategic information on the opportunities for creating and capturing value. This has the virtue of coordinating strategic decisions across the GVC (integration), but decision makers may be remote in time and space from the locus of the externality suffered by third parties, reducing local responsiveness. While the sensibilities of head office may determine attitudes to externalities in remote and very different countries host to supplier member firms, orchestration of the value chain by the lead firm may not be always optimal for every country, home to member firms in the chain. In summary, a complete analysis of externalities in GVCs should ultimately apply to the entire value chain and not exclusively to the one lead firm, and in organizing and managing these GVCs, there is tension inherent in fulfilling GVC organizational optimization and in responding to local responsiveness obligations and demands.

### 3 | DEALING WITH GVC EXTERNALITIES: A CONCEPTUAL FRAMEWORK

We propose that the extent to which the lead firm in a given GVC accounts for externalities in its decisions on global integration and local responsiveness differs among GVCs in a systematic way.

There will be variation in the capacity of GVC lead firms to attend to the external effects of the decisions they take with respect to their GVC activities, as there is incomplete information on value chain activity beyond the individual firm's participation locally, and GVCs differ. The concepts of internalization—externalization and integration—responsiveness are useful for our theoretical discussion of the mechanisms of externality management because they focus on the central role of the GVC lead firm (Buckley, 2011; Buckley & Ghauri, 2004), and this contrasts somewhat with an existing body of literature that has discussed GVC governance (Gereffi et al., 2005; Ponte & Sturgeon, 2014). This literature discusses the factors that determine the degree of integration in GVCs but focuses less on the strategic decisions of the lead firm whose strategy might address the suppression of negative externalities. We argue that it is mainly the

lead firm that addresses negative externalities, although the roles of other members of the GVC may play a role. The GVC literature considers the importance of supplier firms in shaping GVC strategy and structure (e.g., Lee & Gereffi, 2015; Pananond et al., 2020), and how interfirm strategies affect environmental concerns in GVCs (Havice & Campling, 2017). Not that other actors in GVCs have no role, but rather, we argue their efforts are orchestrated by the strategies of the lead firm in whose interest these decisions are taken.

Incomplete information at the level of the firm, and the misalignment of private interests of the firm with interests beyond participation in the GVC, and with societal interests, will diminish the firm's likelihood to act beyond those self-interests to address the negative externalities that they may generate in other locations. We also assume bounded reliability (Verbeke & Greidanus, 2009) to characterize these firms in that the decisions taken in the firm's best interests might lead to re-prioritization of motives that might possibly appear as changed commitments. As such, these firms are more so subject to benevolent preference reversals rather than displaying strong opportunistic behavior (Verbeke & Greidanus, 2009). Firm priorities might change as additional information becomes available, and with changed priorities, commitments could change as the firm adjusts its strategy. This additional information might appear as pressure and influence from societal members, who act to motivate firm behaviors beyond its self-interest. It might also come from stakeholders with a financial interest in the firm, who are influenced by changing societal norms.

To explain when the GVC lead firm will be more or less likely to act and deal with the negative externalities their GVC creates as it sets its global integration and local responsiveness (I-R) priorities, we invoke the A-M-C model of competitive behavior (Chen, 1996; Chen et al., 2007). The lead firm in a GVC will be a MNE, practising its global integration strategy but nonetheless simultaneously cognizant of its local responsiveness demands. The A-M-C model suggests that there are “three essential factors that underlie organizational action: the *awareness* of interfirm relationships and action implications, the *motivation* to act, and the *capability* of taking action” (Chen, 1996, p. 105, emphasis in original). Though this model has been applied primarily to the analysis of firm competitive dynamics, we propose that it can be directly applied to the context of GVCs and the lead firm's decision to take a pro-active approach towards externalities generated by its GVC. We identify the firm-specific attributes underlying the model when applied to the decision to address GVC externalities worldwide.

The A-M-C model has been applied in a variety of applications of competitive behavior in firms. In a study of the motivations of emerging economy firms to seek strategic assets by foreign direct investment in catch-up, Cui et al. (2014) adopt the A-M-C model to inform their selection of internal and external firm characteristics that predict strategic intent. A meta-analysis is reported by Meyer and Sinani (2009, p. 1075) in which they “explain cross-contextual variations of local firms upgrading their productivity in response to foreign entry.” As green management can be considered a competitive strategy in firms, the A-M-C model has been used by Shu et al. (2020) where environmental scanning is considered an awareness mechanism, slack resources the capabilities component and government support and industry competition as regulatory and market-based motivations. In a review of organizational spillovers, Shi et al. (2021) applied the A-M-C model to amalgamate and organize the literature on interorganizational spillovers that they identified to be fragmented, while an extension of the A-M-C model from its conventional competitive behaviors application to the governance domain has been reported by Shi et al. (2020) who applied the A-M-C model to portfolio spillovers of institutional investor activism.

Following this well-established model in psychology (Chen, 1996), and the increasingly diverse applications noted here, for the lead firm to change the GVC's behaviors with respect to the externalities they create across borders, they first need to be aware that they are actually contributing to those externalities. Awareness of the situation at-hand is essential for subsequent action and response, but by definition, it is generally difficult to identify the extent to which externalities affect third parties. This is particularly important in the case of externalities created by GVCs that may occur in locations where the lead firm is not present. The information space of every member in a GVC is specific to that member's position in the chain and this localization is country-specific, possibly region or even city-specific. Firms will respond to the localized information to which they have access and that which they bring into their decision-making frames. The ease of transferring information from the location of the affected third parties to that of the decision makers will be instrumental in determining whether the externality is recognized. The limited calculative capacity (Slater & Spencer, 2000) of individual member firms, exacerbated by the length, complexity and internationality of many GVCs renders awareness of events and consequences beyond their own participation challenging. Geographical distance and separation between GVC members render the information spaces of individual members limited and this is accentuated when national borders are traversed. Economic, institutional and cultural heterogeneities across the countries home to GVC members amplifies the variation in propensities of individual members to recognize externalities that are created along the chain. Depending upon an array of factors, institutional, cultural and economic, for example, that are likely to influence a GVC member's awareness of the third-party consequences of their activities, these impacts will, or will not, be recognized.

It is possible, for example, that member firms in countries with lesser developed economies and institutions which are more lenient to negative third party consequences will not be alert to externality effects, and these will go unnoticed. These economies will be home to many GVC members. IKEA has production facilities in developing and emerging economies, with design in Sweden and final production sold throughout the World, particularly into advanced economies. Externalities will be generated by these production facilities, and also after final consumption. While there is potential for the lead firm in this IKEA GVC, through its orchestration role, to know more about the chain and its members than will be known and recognized locally (other than the nuances of the localized operations which remain with the local GVC member), the lead firm cannot however have full information of all activities of member firms as this is an informational impossibility. Similarly ambitious is to attribute to the GVC lead firm full information on the variations in all local institutional and legislative statutes that govern members' GVC activities which will determine the scope of their responsibilities. With externalities undetected and impacting well beyond the source, GVC integration will determine the awareness that is necessary for the lead firm to take action. Greater integration within the GVC facilitates awareness of impacts on third parties, in contrast to more dispersed GVCs with more isolated members who would have less information about the impact of activities in their GVC on third parties in other locations. The IKEA GVC is a case in point. It has a well-integrated GVC, and it has awareness potential. Without a sufficient level of integration of the entire GVC, it will not be possible to detect the social costs that the GVC as a whole may be generating, so that the GVC lead firm cannot identify the problems that need to be addressed.

The second dimension of the A-M-C model is the motivation of the GVC lead firm to act. Pressure, and incentive, to respond will vary widely across GVCs, depending on the nature, extent and severity of the negative externalities, the affected parties, and the relative power of stakeholders, such as consumer and social groups with an interest in the particular GVC.

As such, accountability is likely to be a key determinant of the firm's motivation to act, driven by internal and external factors. We should expect greater motivation to deal with externalities when the GVC lead firm is held accountable, legally or socially, for their own activities and for those of their partner organizations in other locations, possibly other countries, such as occurs with respect to the well-publicized labor conditions of some suppliers. As such, distance again could be a factor in determining a firm's motivation to respond to the external effects that they are made aware of from along the GVC, although their motivation to respond might be indirect and operate through their awareness of the externality and ambiguity with respect to its source and impact. If aware of the external effects they create, most member firms will most likely be motivated to attend to those effects attributable to them, but not to others, and some such effects are likely to have ambiguous sources. In these cases of ambiguous sources, it is unlikely any one local member will assume responsibility and hence will have little motivation to attend to the effect. However, if the negative effect is substantial and impacts constituencies beyond the immediate who are aware of the effect, such as a global constituency, it is likely the lead firm in the GVC will be attributed responsibility because of its pre-eminence in the chain. The motivation to respond might gravitate to this lead firm, particularly if it is the brand owner, as is likely to be the case, and as reputational damage is lasting and costly.

The literature on corporate social responsibility (CSR) assists in informing which firms may be more motivated to adapt their GVC activities in order to reduce the social costs worldwide that may not be properly accounted for by market mechanisms. Aguilera et al. (2007) analyze the instrumental, relational and moral motives for social actors at different levels, from individuals to MNEs and transnational entities, to promote social change through their CSR activities. However, given the fuzzy boundaries of GVCs and the absence of formal governance mechanisms across the entire chain, it may be even more difficult to gauge the motivation of the GVC lead firm to redesign the dispersed activities worldwide to reduce social costs. The commitment of key executives in the GVC lead firm to social objectives is a crucial determinant of this motivation. The Frito-Lay case, to be discussed, exemplifies this commitment and motivation to act. As a major global manufacturer of potato crisps, Pepsi Frito-Lay is acutely aware, and importantly motivated to act, to reduce potato waste which is prevalent in all potato producing countries. The reduction of potato waste, and its consequent widespread negative externalities, is not prominent with individual potato producers, but Frito-Lay, as a lead firm, has shown its motivation to respond by championing a novel seed potato produced by a minnow firm which attenuates potato waste.

The third dimension of the A-M-C model to be considered is the capability dimension. Each participating firm in a GVC has been contracted to deliver a particular value activity for which it should enjoy a competitive advantage as it has won this role in a competitive market. However, the productive capabilities of participant firms in their designated tasks do not necessarily, nor often, translate to a capability to act and change the configuration of the GVC worldwide. The lead firm will be best placed to attend to the externality, and if not immediately capable, it will be best placed to build the capability to respond. For this to occur, the orchestration role by the GVC lead firm will need to be sufficiently powerful to adapt the activities of GVC members and reduce social costs in other locations. Not all GVCs will have a powerful leader with the potential to exercise this orchestration role effectively, especially if they see themselves as too small or limited in influencing social costs at global scale (e.g., ocean pollution). We suggest that a strong lead firm within the GVC is essential, a firm with sufficient size and power within the GVC (relative to the other members) to influence the entire GVC and tilt its architecture and behavior so as to reduce social costs across organizational and national boundaries. Frito-Lay is this lead firm, with the capability to influence the entire GVC.

Extending from the A-M-C model, we suggest that only those GVCs with a lead firm with sufficient levels of integration, accountability, and leadership will try to deal with the externalities that their global operations may generate. Towards the lower end of the A-M-C spectrum, it will be unlikely that externalities will be addressed, so that public policy will be essential in these cases to reduce social costs. In these cases, a defensive position that promotes greater inertia for the existing members (no change to the GVC to address externalities created in other countries) is more likely to occur, maintaining their short-term profitability within the current architecture of the GVC. In contrast, when a GVC lead firm is closer to the upper end of the A-M-C spectrum, it will be more open to change and adapt the GVC to deal with the social costs they generate, often supporting the emergence of new players that make it easier for the GVC to internalize those externalities across markets. The global auto industry is an exemplar case of a sector with readily recognized and long-standing manufacturers that individually have not exercised their potential capability to respond substantively to the global CO<sub>2</sub> emissions crisis. It has been left to a new entrant lead firm, Tesla, in the GVC in electric autos, that has built the capability to produce electric autos, to revolutionize this sector, with new firms entering the sector.

In view of these conjectures, Table 1 presents a schema placing the GVC lead firm on a spectrum from high to low on each dimension of A-M-C and the factors that may determine their level. In a global factory, the focal firm does not own all the entities in the value chain, but its authority is akin to orchestration rather than direction and fiat. The entire GVC will also include suppliers, subcontractors and licensees, each having different features and possibly being located in other countries. We cannot assume uniformity across the value chain on the elements of A-M-C. However, it seems reasonable that all three elements are necessary for the GVC lead firm to take action. We should not expect any GVC changes to address externalities if they have not been recognized by the lead firm in the first instance, nor if there is not sufficient motivation to address them; similarly, it is not likely that the GVC will change without the lead firm capable of altering the chain's configuration and its behavior. In sum, we propose that the three A-M-C dimensions for the GVC lead firm need to be analyzed conjointly to determine

**TABLE 1** Awareness–motivation–capability analysis applied to GVC externalities

<b>Dimension</b>	<b>Factors each dimension depends on: from low to high</b> →
Awareness of externalities, driven by GVC integration	<ul style="list-style-type: none"> <li>• Degree of leader attention</li> <li>• Distance from externality</li> <li>• Information gathering ability</li> <li>• Ease of internal transmission of information</li> </ul>
Motivation to act, driven by GVC accountability	<ul style="list-style-type: none"> <li>• Degree of local responsiveness</li> <li>• Stakeholder pressure</li> <li>• Distance from externality</li> <li>• Authority responsiveness</li> <li>• Executive commitment</li> <li>• Sunk costs</li> </ul>
Capability to change, driven by GVC leadership	<ul style="list-style-type: none"> <li>• Firm-specific resources</li> <li>• Distance from externality</li> <li>• Personnel intensity</li> <li>• Subsidiary/affiliates-specific resources</li> <li>• Headquarters: subsidiary mandate</li> </ul>

whether it will be able to self-correct the externalities that the GVC generates, which reduces the need for public intervention. Firms will possess different levels of these three dimensions, but only when the levels on all three dimensions are sufficiently high is action likely to take place.

#### 4 | EXAMPLE OF A-M-C ANALYSIS: POTATO GROWERS AND THE FRITO-LAY GVC

To illustrate how A-M-C analysis can help us understand changes in a GVC to reduce negative externalities, we elaborate the following rather unusual case of the potato GVC. We highlight that GVCs are not only dominant in the manufacturing, industrial and services sectors, but that agriculture is now reorganizing its GVCs. *Future Food* has recently gained pre-eminence in *The Economist* (2021). We now refer to the potato growing and commercialization-to-the-end-user GVC. The change we focus on can be traced to the emergence of a new player with key support of a MNE with the awareness, motivation and capability to eliminate potatoes produced that are rejected for human consumption. Food for human consumption with waste (i.e., suboptimal use) is little considered in the context of GVCs, but it exemplifies a global problem that is widespread at the local supermarket level and on-farm (Bellù, 2018; Nature, 2019). Potatoes exemplify this problem, although it is a problem with all fresh fruit and vegetables, with 20–30% of all potatoes grown commercially not reaching the supermarket shelf because of malformations and visual defects. Supermarket defective potatoes are treated as a residual, and they frequently go to waste or, in some cases, to animal feed (Bellù, 2018; Campoy-Munoz et al., 2017; Nature, 2019).

While potato growers incorporate in their prices the effect of both human consumption and their alternative use as a by-product, their impact on third parties is not taken into consideration, nor are the consequences of food waste for overall society. If the discarded potatoes created a public health issue, the negative externalities would be more readily observable and governments would possibly regulate their disposal. Furthermore, the impact of the residual potatoes on third parties when they are not discarded (e.g., animal feed) is even more difficult to observe and to manage, which is likely to prevent regulation by governments. It is possible that the excessive production of potatoes influences the cost structure of animal feeding, which may expand meat production, at least at the margin, beyond the optimal level. Suboptimal use of potatoes grown for human consumption also negatively influences the cost structures of other agricultural products because it affects the cost of inputs that are used across many agricultural industries, such as the price of water, fertilizers and pest control chemicals (Bellù, 2018). Ultimately, because potatoes are discarded because they look unappealing to supermarket buyers, the social impact of producing potatoes well beyond the quantity consumed by humans is difficult to assess precisely, but it is substantial and it largely goes unnoticed.

This negative social impact might be mitigated by governments, but governments have little appetite for such matters. However, potato growers and their GVCs are better placed to know the extent of the problem and possible solutions. Importantly, the technology now exists in the seed potato industry that eliminates malformations in potatoes. An innovative Australian firm has developed a process that produces potato tubers for commercial use that grow potatoes free of malformations and do not carry disease into future generations, minimizing generations of potato waste. Further, this technology is free of genetic modification. Early in its establishment, Technico Pty Ltd entered the Chinese market with a bold market entry venture in part guaranteed by a contractual arrangement with a large MNE, PepsiCo Frito-Lay (Technico at <http://www.technituber.com.au/contactus.php>). This contractual arrangement eliminated most

of the Chinese market entry risk for the smart potato firm and it solved Frito-Lay's waste potato problem for its extensive Chinese potato crisp manufacturing enterprise.

Applying the A-M-C spectrum framework, it seems that Frito-Lay is fully aware of the problems created by the excessive production of potatoes globally, which would be difficult to observe and resolve by any domestic government or a firm with only limited knowledge of this GVC worldwide. Furthermore, as a large firm with pressure from informed stakeholders to reduce waste in their GVC, PepsiCo was sensitive to the need to reduce overproduction of potatoes and was motivated to act. Finally, with their leadership, organizational size, resources and influence across borders, it was able to make possible the emergence of this technology through its contractual arrangements with Technico Pty Ltd. With the full support of PepsiCo, potato suppliers to Frito-Lay have access to this technology. Resolution of potato overproduction in a particular market because of waste through malformation required an innovative technology from Australia, the production capability in China, and the worldwide demand and influence of the World's largest producer of potato crisps.

Were it that a firm such as PepsiCo Frito-Lay did not exist in this industry, the overproduction of potatoes might not be noticed. While overproduction can result from a mismatch of supply and demand, in this case there is no consumer demand for malformed potatoes, and their production creates negative externalities. This example illustrates a case where government regulatory policy is unlikely, although negative externalities are dealt with by a GVC member that is aware, motivated and capable of making an important change to how potatoes are grown. It also raises issues as to whether a regulatory policy response in one country (e.g., Australia where the technology was invented) may be effective to reduce waste in other countries. Table 2 below summarizes the three required features for firm action to take place when applied to the management of negative externalities in this example.

#### 4.1 | Other illustrative examples

Retail household furniture is a massive global industry, exemplified by firms such as IKEA. IKEA has an extensive and complex GVC which it orchestrates with upmost control and authority (Jonsson & Foss, 2011). The waste created by unwanted IKEA furniture mostly goes to local landfill with the negative externalities of this waste disposal distributed to the population of householders who pay for local authority waste collection and disposal in their taxation charges—IKEA does not incur the costs of disposal of their unwanted products. IKEA has showed a lack of local responsiveness to the unpriced consequences of its global strategy, although recently with increasing stakeholder pressure, IKEA has instituted a buy-back program of unwanted IKEA used furniture for resale through its As-Is retail department. IKEA, a large MNE, has demonstrated that it has the A-M-C bundle to attend to this negative externality, although the motivation has been imposed on it by third parties who have borne some of the unpriced costs. Global integration—local responsiveness tensions have come to the fore in IKEA to motivate it to apply its awareness of the costs it has imposed on local communities through unwanted waste furniture by applying its capability to remedy the negative externality.

In contrast to the cases of potato crisps (PepsiCo Frito-Lay) and furniture (IKEA), plastic containers for foodstuffs and other products in GVCs also generate negative externalities, a worldwide problem, but there is no strong lead firm with A-M-C to deal with the waste created. The costs of retrieving plastics for disposal and recycling are borne by communities at large, and sometimes very distant from where the purchase and the disposal happens. While there is

**TABLE 2** Awareness, motivation, and capability to address potato overproduction through malformation

A-M-C	GVC features	Propositions
Awareness	GVC integration	<p><i>More integrated GVCs with more exchanges of knowledge and information among their members across borders will be more aware of the (hidden) costs that they generate on third parties</i></p> <p>PepsiCo Frito-Lay GVC is strongly integrated worldwide, with the MNE being involved in many aspects of the value chain for potato chips from potato growing to product distribution. The hidden impact and social costs that potato overproduction through malformation from this GVC generate for third parties across different countries and industries are well known to Frito-Lay</p>
Motivation	GVC accountability	<p><i>GVCs with members who are more involved with stakeholders and who prioritize CSR will have greater motivation to attend to their externalities</i></p> <p>PepsiCo Frito-Lay is acutely sensitive to the external influences of its stakeholders, the social implications of its GVC and its reputation. When PepsiCo sees an opportunity to reduce waste associated with its GVC, it is likely to act on it, if it seems commercially viable, extending beyond its own organizational value chain</p>
Capability	GVC leadership	<p><i>Larger GVCs that span national borders, dominated by one strong member, may be more capable of having greater influence on the externalities that they create</i></p> <p>PepsiCo Frito-Lay is a large MNE with a GVC that spans across national borders worldwide and a market share above 50% in snacks worldwide. It operates in host countries that are psychically and institutionally dissimilar from its home country, with direct connections to technological firms, producers, and consumers around the world. It has the leadership and required resources to promote changes in the GVC that may not occur otherwise</p>

widespread awareness of these costs, the firms involved in the production and use of these containers are widely dispersed without a strong leader that could tilt the sector towards less wasteful processes. There is widespread awareness of the problem, but not the motivation and nor the capability to change the GVCs where plastic containers are used. Given the lack of any specific lead firm with high A-M-C, we might not expect firm-driven changes in these GVCs to address the problem of plastic waste.

However, this absence of A-M-C is not simply a question of atomistic market structure, as in the case of plastic containers. The auto industry, through the new firm Tesla, has demonstrated the awareness, the motivation and the capability to alter the institutionalized practices in the auto industry to fundamentally change it to align with community expectations on exhaust emissions pollution. Tesla today is valued at more than the combined value of several of the major, traditional global auto firms. Our model assists in understanding why no existing member within the auto industry has attempted to do what Tesla is doing in this industry. The absence of a lead firm from among the established auto manufacturers had resulted in no new

GVCs in this sector. It was a new firm that revolutionized this sector. Many negative externalities attributed to existing auto GVCs might thus be addressed with new GVCs.

## 5 | DISCUSSION

We asked the question: Under what conditions is a GVC lead firm more likely to adapt its GVC to deal with negative externalities at global scale? To address this question, we advanced internalization theory (Buckley & Casson, 1976; Coase, 1937) towards the activities within a GVC that happen outside individual member firms. Within this context, we also drew upon the global integration–local responsiveness framework of Fayerweather (1969) and Bartlett and Ghoshal (1989) to recognize that firms with activities across borders in GVCs experience tensions between their responsibilities to the local contexts in which they have GVC activity contracted and the broader global environment, and within their own global integration requirements that are necessary for their sustained international competitiveness. We also recognize that lead firms in GVCs have the wherewithal to accommodate these tensions, as they are knowledgeable beyond local contexts and have organizational structures best able to effect the responses needed to resolve the tensions between local responsiveness and global integration.

Our framework points to the need for having a strong constituency within the GVC (namely the lead firm) that can influence the activities of other members worldwide and effectively change the configuration of the GVC. The constellation of supplier firms in the GVC has agency over their localized production. At all stages in the value chain, through value creation in the network of trade in tasks, external effects are likely and third party costs will arise, though they may not be reflected in the decisions and prices set by the GVC members. The lead firm may be remote in time and space from the locus of the externality and it is possible that it may therefore not be aware of its influence on third parties. This applies to both positive and negative externalities. Only when decisive action is taken towards changing the way that the GVC as a whole operates globally will the negative externalities be addressed. This distinction between GVCs with and without one dominant member with specific features is therefore critical for understanding when the GVC may be expected to deal with negative externalities without the need for government intervention.

Applying the awareness–motivation–capability (A-M-C) model, we proposed that GVCs that have a lead firm with high levels on the spectrum of A-M-C are more likely to take into consideration third party costs in their decisions. Pepsi-Co Frito-Lay exemplifies this firm with its full A-M-C bundle. Alternatively, without a GVC lead firm with high levels of A-M-C, it is unlikely that the GVC's configuration may change to deal with them, and public policy may be necessary. The former firms will be more receptive to adapting their value creation activities, even beyond their own organizational boundaries, modifying the GVC where possible to attend to the external effects that they create in other locations. We further suggest that this adaptation might involve the emergence of new members who are able to economize on previously overlooked social costs, such as the new Australian technology firm that produces new potato seeds to reduce malformed potato waste and trains farmers on how they need to grow them, and Tesla as a new firm in the auto sector that has not been constrained by existing dominant praxis in this sector. In contrast, lead firms with low A-M-C outcomes will likely adopt an inertial position maintaining GVC architectural status quo, with external costs switched to third parties, which remain unaccounted for by market mechanisms. Until Tesla entered the auto sector, the existing auto manufacturers were not motivated to attend to the auto CO<sub>2</sub> emissions problem—a complete bundle of A, M and C has been essential for change in this sector.

While the analysis of the A-M-C bundle of the firms in a GVC can help us understand when they will take the necessary action to deal with negative externalities, this is only the initial step. There is still much to do in this area, including formal modeling of its three key components and their impact on strategy. For instance, a firm may have adequate awareness and motivation, but not the capability to engage the GVC to address the problem. Can it still have a role in changing the GVC? The components of A-M-C possibly influence each other through time, such that awareness may lead to subsequent investment in capabilities. Furthermore, the position held in the value chain matters. While we have highlighted the role of the lead firm, small members in the value chain also may be critical in identifying and being responsive to local third parties. Globally integrated but locally responsive firms are better placed to have the necessary A-M-C bundles to attend to the negative externalities created in GVCs but this remains a question to be investigated empirically. While distance complicates the externality problem in GVCs, it does not absolve the participant members from the problem, but there is variation in the ability of these members to attend to the externality. We recognize this variation through our application of the A-M-C model with the lead firm in the chain more likely to attend to those negative external effects that cannot readily be attributable to a particular member and who has a low A-M-C.

Our postulation has implications for the theory of the MNE and for the theory of the firm more generally. Our approach extends the dynamic aspect of internalization theory to transactions that occur outside organizational boundaries, but within the GVC. It suggests that industry evolution and economic development may be driven by the successive creation of externalities from GVCs and the actions of other, including new, firms to internalize markets within the GVC that contribute to eliminate negative externalities. This follows Penrose's (1959) notion of firms expanding by entering interstices left by other firms that grow on paths dictated by their internal excess resources, particularly managerial resources. In this sense, GVCs evolve and social welfare is enhanced by successive steps in the restructuring of the activities of the GVC, often through the emergence of new members. This process happens outside organizational boundaries, but it is driven by interconnected firms across boundaries and industries. Our A-M-C analysis helps us understand when these externalities are likely to be addressed by the GVC members on their own, having an impact on other members within the GVC, even in the absence of public intervention.

However, this does not imply that public policy is not necessary or effective for dealing with externalities. In addition to direct involvement and regulation of GVCs activities, it is important to note that governments can influence the three drivers of self-directed firm-specific action of GVCs to address the social costs that their activities may have on third parties. A combination of policy and firm-government collaboration may increase the GVC awareness of the consequences of GVC activities that may go unnoticed. Similarly, governments can influence whether some members within a given GVC may be motivated (or induced) to take an active leadership position in the activities that fall outside their direct control, but still have a significant impact in third parties that are affected by the GVC. In this sense, it is necessary to expand the theory of firm beyond the precise set of transactions that are internalized within organizational boundaries. By so doing, we may understand better how firms also influence transactions that occur in other stages of the GVC that may have important effects in value creation and destruction across countries for society as a whole.

It is well-established that public policy at international, national, regional and local levels should be designed to mitigate and, where possible, correct negative externalities from GVCs (Buckley, 2018b). While the dynamics of GVCs may be addressed directly in public policy, our

framework contributes to understand when they will try to address externalities on their own. Changes in GVCs, notably entry and exit by member firms, have profound effects on the national economies involved, and also on those excluded. Policies to encourage participation by local firms including training, education, and fostering entrepreneurship are widespread. More subtle policies require an understanding of the dynamics of existing value chains and the ability to forecast future developments.

Moreover, we posit that many market imperfections are subsequently corrected by private agencies responding to market signals. Our novel framework highlights awareness, motivation and capability to take action as the key features enabling private actors (both MNEs and SMEs) to respond to market signals and to internalize within the GVC those externalities that may be detected and dealt with by the member firms on their own. In these circumstances, the role of government is somewhat similar to private agencies—to be aware of continuing and endemic distortions, to be motivated to respond to problems generated or experienced outside country borders, and to amass the capability to enact and enforce policy decisions. All of these stages—integrating policy, governing the situation, and acting with sufficient resources—pose challenges for effective government policies on GVCs.

The dynamics of GVCs call for agile policies and enforcement in responsible bodies. There is also a requirement for a division of labor among the various levels of policy making that is difficult to achieve in practice. The role of private standards in GVCs is emphasized by Heron, Prado and West (2018, p. 30) in their analysis of GVCs in soy: “private standards have emerged as the key analytical framework for understanding the governance and regulation of ... GVCs.” Private standards are an example of flexible mechanisms by which private agents adjust to external public pressure. Heron et al. (2018, pp. 30, 36) also point to the importance of “bilateral oligopolies” in the soy value chain. These are precisely the imperfections that give rise to opportunities for internalization within the GVC of certain activities, which often lead to the creation of new types of firms within a redesigned GVC. This is particularly important when the activities in GVCs are bound together by assignments of different duration (Buckley et al., 2019).

Finally, we have demonstrated that we can use the theoretical tools in the international business field to address the weighty issues that confound policy makers and firms alike. The impacts of activities outside of firms, but within GVCs, that produce deleterious effects on other firms and society at large have become grand challenges for many stakeholders. These grand challenges have captured attention worldwide, and while well-recognized, they often go unattended because of governance intractability arising from interorganizational and inter-jurisdictional complexities. The combination of the long-standing internalization theory and the global integration–local responsiveness framework offer theoretically applicable and practical application in the context of GVC externalities. Their application together with the A-M-C theoretical framework highlights their efficacy. Further development beyond our application is possible, and one prescient application is likely to be a more closely aligned government policy—corporate strategy nexus that better addresses the private sector—public sector interaction to unite economic efficiency and corporate social responsibility imperatives. The transnational externality problem exemplifies the need for these developments.

## 6 | GVC LEAD FIRM EXTERNALITY MANAGEMENT

Our focus is private mechanisms to address negative externalities. Pietrobelli et al. (2021) examine the justification for public interventions to address externalities in GVCs. They argue that policy

interventions are justified when GVCs interfere with the attainment of policy goals, a wider interpretation than usually given by economists. While public policy can be designed to deal with negative externalities, this can be problematic in the case of externalities created by GVCs. First, there is externalities measurement. The measurement of all costs and benefits within GVCs is more difficult when they occur across national borders. Because regulation to deal with externalities relies on proper measurement of all costs and benefits, this solution is less effective for managing GVC externalities. The involvement of the GVC membership in identifying and measuring negative externalities may be most relevant, particularly when the membership is more strongly integrated and hence are possibly more knowledgeable of activity in the chain beyond their own.

Second, when externalities extend beyond national borders, individual national government effectiveness to force global change will be limited by their scope of influence and the necessary involvement of other governments, who may be reluctant to act. The difficulty of achieving global action to deal with climate change is a prominent example for how challenging it is to achieve cross-national agreements to reduce emissions. In contrast, many large firms that dominate specific GVCs have committed to reduce their carbon footprint within their own GVCs, arguably driven by a high level of A-M-C in their role to address climate change. Third, while public policy can be effective in reducing negative externalities, the reaction speed will likely be slower when coordination across national governments is necessary, as it is for climate change, waste management and ocean pollution, for example. Certain types of externalities, particularly those that ensue from GVCs, may not be dealt with sufficient speed for effective action. The damage to the environment may be irreversible by the time coordinated public policy across governments can have an impact on reducing social costs. Hence, we would expect that timely action may occur when it is the GVC on its own initiative that attempts to reduce the social costs that they contribute in generating.

Finally, the Law relevant to GVCs and “the externalities of transnational production” remain underdeveloped as the appropriate Private International Law “needs to be made more reflexive of and sensitive to changes in production also beyond the reality of GVCs” (Salminen & Rajavuori, 2021, p. 18). In exercising the Law when cases of externalities arise in GVCs, the dilemma arises with “incongruences between the current PIL (Private International Law) framework, which is focussed on individual entities, and GVCs as centrally coordinated collective production units” (Salminen & Rajavuori, 2021, p. 17). These authors advocate that the Law needs to evolve to fully recognize the operating logic of GVCs, and even be more forward looking, to respond to newer challenges such as the platform economy and to the circular economies. That is, as the organization of international production continues to evolve, the externality problem will transmute and the Law must adapt.

Given the complexities of GVCs across organizational, industrial and geographical boundaries, negative externalities are unlikely to be managed in an effective and timely manner through public policy only, nor can they always be fully resolved by GVCs on their own. Some combination of public policy and firm action will likely be necessary. However, for this collaboration between governments and private organizations to be effective, it is important to recognize when and why MNEs may be more likely to take voluntary action to attend to the negative externalities that are generated in their GVCs. The analysis of awareness–motivation–capability assists in the identification of when and why GVCs are likely to take this action.

We advocate the GVC as a unit of analysis to clarify the role of public policy. The A-M-C model provides a tractable framework to identify the scenarios under which (1) government intervention may be relatively less effective and slow and where firms in the value chain, wherever they are located, attend to externalities by themselves; (2) it is best left to governments to

address GVC-induced externalities by public intervention; and (3) where government-firm partnerships are required to rectify the external effects of GVCs. Scenario (1) occurs when the GVC is towards the high end of the A-M-C spectrum. We would expect that the self-correction of externalities will occur through the entry and exit of new firms in the GVC, firms who are more aware and prepared to deal with the effects of the GVC outside its boundaries. The changing architecture of GVCs through self-correction thus acts positively, possibly to eliminate externalities. Scenario (2) is likely to arise when A-M-C resources in the value chain are deficient. Governments must then act to regulate or to intervene directly, because private initiative is unlikely to occur. Scenario (3) may require government involvement to incentivize the improvement of the A-M-C of existing members or to promote new types of members that may contribute to increase the A-M-C of the lead firm with regard to the GVC externalities in question. This may include state-owned or state-directed firms, and it includes privately owned firms.

The organization of international production into GVCs has provided firms from countries throughout the World with opportunity to join the benefits of participation, with the employment effects in particular bringing needed economic development activity. Governments of all countries, advanced, emerging, and developing, institute policy to assist in attracting GVC participation to their economies, and these policy initiatives can result in externality effects that are multilayered. Reduced standards of environmental protection and human rights can result from industry support as the primary goal is attracting workload and employment creation. The positive employment effects will sometimes be accompanied by negative human rights and environmental effects as has been evidenced in the sweat shops of the World. Further, and for example, the Glasgow COP26 initiative aimed at multilateral efforts to address climate change has unfortunately provided nonsignatory countries with the option of lesser stringent emissions regulations which could result in the relocation of particular GVC activities to those countries. The positive externality effects of the COP26 initiative that are introduced in the signatory countries, and which impact GVCs in their jurisdictions, could create negative externalities in noncompliant countries as local firms in GVCs in these countries encounter more relaxed environmental mandates. These firms could attract GVC activity away from GVC partners in compliant countries, and these negative externalities will have both local consequences, but also global consequences.

The A-M-C approach assists in explaining that awareness of the consequences of not adopting the COP26 mandates is likely acknowledged by all parties, whereas the motivation and possibly the capability to attend to the carbon emissions concern has faltered. Transnational solutions to this problem would seem to require more extensive efforts at motivating the reluctant parties to conform, and if this is successfully, the capability to respond is likely to follow as this capability will be demonstrable from the compliant countries. If compliant countries, and firms domiciled in them, have the capability to respond, access to the capability is not the concern, although this may require substantial industry restructuring. Motivation is likely the obstacle, and public policy can address motivation in firms, for firms throughout the GVC. Decisions on firm strategy and its implementation must be left for firms, but public policy certainly has a role in conditioning the environment in which firms operate and in which these decisions are taken.

There has been discussion about the extent to which GVCs restrict the policy space for government action (Baldwin, 2012; Gereffi, 2019; OECD, 2013; UNCTAD, 2013). Our framework suggests that A-M-C of firms throughout GVCs both constrains policy needs (where a high A-M-C bundle enables self-correction), but provides pointers for the need for government action under conditions of a low A-M-C in a given GVC. Such government policies include the need to encourage and create new members to enter the GVC by supporting innovative and technology-intensive firms, thus increasing the need for industrial policies that promote the

emergence of new types of members that can change the GVC's architecture. Far from denying the requirement for policy intervention, our framework points to the context in which it is most essential. Governments have a vital role to incentivize (and possibly to create) new members that contribute to increase A-M-C that can correct the whole of the GVC by eliminating negative externalities. This line of argument suggests a focus on the interdependence of private and public interests (Mahoney et al., 2009).

## 7 | CONCLUSION

We propose that a lead firm is more likely to adapt its GVC to deal with negative externalities at global scale when it possesses the awareness, the motivation, and the capability to attend to these negative effects that arise in its GVC. Many GVCs will generate and self-correct imperfections by changes of strategy or recruitment of new members. Dynamic changes in GVCs pose problems for regulatory authorities in incidence, impact, and severity, but identifying A-M-C bundles will give an early warning to policymakers of problems, and potential problems. The agency of GVC members is crucial in self-correction via awareness, motivation to act, and the capability to implement the necessary changes. Residual effects are the key target area for policy. Encouraging openness and transparency in GVCs is a sine qua non of fairness, and authorities at all levels should encourage these attributes in firms as they prevent negative externalities from arising, and if these negative externalities do arise, firms, large and small, with high A-M-C bundles are more likely to internalize emerging externalities. Confronting and arresting negative externalities is a key strategy issue for A-M-C informed international firms in our global social and environment-conscious era. A judicious mixture of encouragement through procompetitive legislation and remedial action through taxes and information provision provides a sound basis for rational firm strategy and legislative action.

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