



Toward a Dynamic Theory of Global Production Networks

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abstract

Global production networks (GPN) are organizational platforms through which actors in different regional and national economies compete and cooperate for a greater share of value creation, transformation, and capture through geographically dispersed economic activity. Existing conceptual frameworks on global value chains (GVC) and what we term *GPN 1.0* tend to under-theorize the origins and dynamics of these organizational platforms and to overemphasize their governance typologies (e.g., modular, relational, and captive modes in GVC theory) or analytical categories (e.g., power and embeddedness in GPN 1.0). Building on this expanding literature, our article aims to contribute toward the reframing of existing GPN-GVC debates and the development of a more dynamic theory of global production networks that can better explain the emergence of different firm-specific activities, strategic network effects, and territorial outcomes in the global economy. It is part of a wider initiative—GPN 2.0 in short—that seeks to offer novel theoretical insights into why and how the organization and coordination of global production networks varies significantly within and across different industries, sectors, and economies. Taking an actor-centered focus toward theory development, we tackle a significant gap in existing work by systematically conceptualizing the *causal drivers* of global production networks in terms of their competitive dynamics (optimizing cost-capability ratios, market imperatives, and financial discipline) and risk environments. These capitalist dynamics are theorized as critical independent variables that shape the four main strategies adopted by economic actors in (re)configuring their global production networks and, ultimately, the developmental outcomes in different industries, regions, and countries.

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Since the early 1990s, global production has become much more organizationally fragmented and spatially dispersed, a process often associated with the economic globalization so eloquently analyzed in Dicken's (2011) *Global Shift*. Arguably, however, most commentators in the social sciences, including economic geographers, remain unable to provide a comprehensive and dynamic theory explaining *how* these globalization processes are actually organized. In its *World Investment Report 2013*, the United Nations Conference on Trade and Development (UNCTAD 2013) estimated that some 80 percent of international trade was now organized through global production networks coordinated by lead firms investing in cross-border productive assets and trading inputs and outputs with partners, suppliers, and customers worldwide. Empirically, there is now no doubt that *global production networks* (GPN)¹ and *global value chains* (GVC) are the most critical organizational platforms through which production in primary, manufacturing, and service sectors is coordinated and organized on a global basis. A 2010 World Bank report on the post-2008 world economy further claimed that "given that production processes in many industries have been fragmented and moved around on a global scale, GVCs have become the world economy's backbone and central nervous system" (Cattaneo Gereffi, and Staritz 2010, 7). As noted in Gereffi (2014), these cross-border production networks and value chains have recently received very significant empirical and policy attention in major international organizations, with a range of widely circulated reports produced between 2010 and 2013 (Cattaneo et al. 2010; Elms and Low 2013; OECD-WTO-UNCTAD 2013; UNCTAD 2013). To analysts in many such international organizations, global value chains and global production networks now constitute the long-term structural architecture of the global economy.

These rapid and profound developments within the global economy over the past two decades have posed significant challenges to theorization. For us, the most productive lines of enquiry within the critical social sciences during that time have shifted the analytical focus from trade in finished goods between national

¹ In this article, we use the acronym "GPN" to denote theory or literature, and "global production networks" to refer to the empirical phenomenon. The same distinction applies to "GVC" and "global value chains."

economies to the tightly coordinated global chains or networks of firms engaging in cross-border value activity in the production of these goods and services. Since its inception in the early 1990s, sustained academic research into global value chains and global production networks has gathered significant momentum and achieved wide circulation and analytical adoption (see comprehensive reviews in Bair 2008, 2009; Hess and Yeung 2006a; Coe, Dicken, and Hess 2008a; Coe 2009, 2012; Parrilli, Nadvi, and Yeung 2013). The two strands of research are closely related and connect across the cognate social science fields of economic geography, economic sociology, development studies, regional studies, international economics, and international business. In GVC research, leading scholars, such as Gereffi (1994) and Humphrey (1995), developed their pioneering work in the early-to-mid 1990s and were later joined by others (Bair and Gereffi, 2001; Gibbon 2001; Humphrey and Schmitz 2002; Sturgeon 2002; Gereffi, Humphrey, and Sturgeon 2005). Meanwhile, the GPN literature has been closely associated with the so-called Manchester school of economic geographers since the early 2000s (Dicken et al. 2001; Henderson et al. 2002; Coe et al. 2004, 2008a; Yeung 2009). These parallel strands of an increasingly vast literature, however, have arguably provided only limited theoretical development beyond the analysis of value chain governance structures (Gereffi 1994; Gereffi et al. 2005; Sturgeon 2009), relational network configurations (Dicken et al. 2001; Henderson et al. 2002; Yeung 2005), and industrial upgrading and the strategic coupling of clusters and regions (Humphrey and Schmitz 2002; Smith et al. 2002; Coe et al. 2004; Yeung 2009; MacKinnon 2012).

More specifically, the explanatory power of the two interrelated and evolving conceptual frameworks in GVC research—Gereffi's (1994) pioneering distinction between producer-driven and buyer-driven commodity chains and Gereffi et al.'s (2005) fivefold interfirm governance typology—has been limited by the authors' dyadic and static conception of industrial governance, their relative neglect of territorial organization, and their failure to theorize competitive dynamics and evolutionary processes in multicommodity or multi-industry production networks. As Dussel Peters (2008, 14) has argued, "most research on global commodity chains [GCC] approaches the GCC framework as a 'methodology' and not a 'theory'. The result of this is vast quantities of empirical work on particular chains and the experiences of particular firms and regions in them, and relatively little theoretical work attempting to account for these findings in a systematic and integrated way."² Building on elements of the GCC approach and other cognate approaches (e.g., actor-network theory and the varieties of capitalism approach), the initial GPN 1.0 framework in economic geography and international political economy emphasizes the complex firm networks and territorial institutions involved in all economic activity, and how these are structured both organizationally and geographically. Despite its aim "to provide a more generally applicable conceptualisation of the GPN" (Henderson et al. 2002, 444) and its influential role as a heuristic framework in economic-geographic research and the wider social sciences (Hess and Yeung 2006b; Coe, Hess, and Dicken 2008b; Coe 2009, 2012; Neilson, Pritchard, and Yeung 2014), GPN 1.0 in many ways remains an inadequately developed *theory* of global production networks. Though the initial GPN 1.0 has specified three interrelated "conceptual cat-

² One indication of this *theoretical deficit* in the GCC-GVC literature more generally is that, despite two well-known edited volumes explicating GCCs (Gereffi and Korzeniewicz 1994; Bair 2009), none of its key proponents has advanced further GCC-GVC theorization in a single book-length publication. Indeed in the GCC-GVC literature more broadly, the leading and most cited conceptual frameworks have tended to be developed in book chapters (Gereffi 1994, 2005) and journal articles (Humphrey and Schmitz 2002; Sturgeon 2002, 2009; Gereffi et al. 2005).

egories” of value, embeddedness, and power, it has not explicitly developed and specified the causal mechanisms linking these elements to the dynamic configurations of global production networks. This state of inadequate theory development in the GVC literature and the still nascent stage of GPN theorization in economic geography have led Hudson (2008), Sunley (2008), and Starosta (2010) to argue critically that existing conceptual approaches are not *explanatory* and *causal* enough to provide a coherent theory of global production networks.

32 In this article, we seek to contribute toward the reframing of the existing GPN-GVC debates (e.g., away from industry-level generalizations) and the development of a more dynamic theory of global production networks by focusing on the structural competitive dynamics and actor-specific strategies shaping these networks and their organizational configurations within and across different industries and localities. We define a global production network as *an organizational arrangement comprising interconnected economic and noneconomic actors coordinated by a global lead firm and producing goods or services across multiple geographic locations for worldwide markets*. These actors include different types of firms as well as nonfirm actors, such as the state, international organizations, labor groups, consumers, and civil society organizations, in diverse localities. Our choice of conceptual terminology vis-à-vis mostly industry- or commodity-oriented GVC approaches reflects our commitment to a theoretical approach that does justice to the multiactor and geographically complex contemporary global economy. Our analytical focus is clearly on the *actors* and their *organizational* relationships that constitute global production networks in different industries, with a lead firm being a central and necessary prerequisite, and on the *multiple locations* that are bound together by the economic relations between those actors.

Given the strong interest in global production networks in the academic literature and the international policy arena, we believe the epistemological context is now ripe to embark on a more ambitious round of theoretical innovation—which we term *GPN 2.0*—that seeks to break significant new conceptual ground and inform subsequent rounds of empirical research.³ It may also, we hope, represent a theoretical contribution and potential *export* from the field of economic geography to the wider social sciences (cf. Dicken 2004; Yeung and Lin 2003). In a nutshell, our conceptualization aims to explain why and how three *competitive dynamics*—optimizing cost-capability ratios, sustaining market development, and working with financial discipline—interact with firms and nonfirm actors under uncertain market conditions to produce four different *actor-specific strategies* for organizing global production networks: intrafirm coordination, interfirm control, interfirm partnership, and extrafirm bargaining. Each of these firm-level strategies is dependent on a unique combination of competitive dynamics. In short, competitive dynamics are the independent variables driving firm strategies, as dependent variables, which in turn lead to different network configurations and organizational outcomes. As these competitive dynamics are themselves geographically variegated within and across different global industries—a historic consequence of capitalist restructuring and global transformations—their causal outcomes on actor strategies and network organization are geographically specific.

³ This theory article draws on a much larger manuscript project that focuses on the organization, dynamics, and strategies of global production networks and their causal relations with economic development (Coe and Yeung, forthcoming). While some recent book-length monographs on global value chains and global production networks have a strong empirical component (Gibbon and Ponte 2005; Lane and Probert 2009; Neilson and Pritchard 2009; Posthuma and Nathan 2011; Milberg and Winkler 2013), they do not have theory development as the central goal.

In this GPN conceptualization, geographically situated actors are likely to adopt and pursue different strategies even within the same global industry or regional/national economy, a phenomenon largely undertheorized in the existing GVC and GPN literature. This approach to GPN theory therefore allows for an actor-centered conceptualization of the causal mechanisms shaping the differentiated organization of global production networks in diverse industries and territories. Its theoretical foundations extend beyond the industry approach commonly found in the existing frameworks of value chain governance and the microlevel analysis of actor practices found in many studies of industrial upgrading and local development. When fully developed through collective conceptual efforts that will inevitably extend beyond a single article, GPN theory can ultimately provide a powerful framework for explaining patterns of uneven development—both between and within countries—in the contemporary global economy. In this article, we focus our theoretical efforts on explicating the three independent variables that shape four actor-specific strategies, leaving the ultimate dependent variable—uneven development—to future conceptual work.

Echoing Ponte and Sturgeon's (2014) recent call for *modular* theory-building in GVC-GPN research, this article is not intended as a rebuttal of, or competing alternative to, the existing GVC theory of industrial governance (Gereffi et al. 2005; Sturgeon 2009) or the GPN conception of value, power, and strategic coupling (Henderson et al. 2002; Coe et al. 2004; Yeung 2009). Rather, we build on these earlier conceptual perspectives and seek to *reframe* them into a more extensive theoretical apparatus for explaining the evolutionary dynamics of global production networks.⁴ As such, we hope to make three distinct contributions toward theory development in GPN 2.0 that are both necessary for conceptual advancement and useful for further empirical studies. First, our emphasis on the dynamic competitive drivers shaping actors in global production networks allows us to account for the *emergence* and *evolution* of these networks. Going beyond the narrow focus on already existing interfirm governance structures in the GVC typology, we take a crucial step (backward) in developing a dynamic theory of network formation so that we will eventually be able to move (forward) to analyze more effectively the diverse industrial and territorial outcomes of these capitalist processes.

Second, our conceptualization offers a more explicit set of *explanatory tools* for explaining network configurations and their differentiated outcomes in the global economy. By theorizing the competitive dynamics and risk environments of global production networks and by mapping actor-specific strategies onto these structural imperatives, we offer a coherent conceptualization of causal mechanisms—that is, structural dynamics as causality and firm-specific strategies as mechanisms—that extends beyond the existing GVC typology of industrial governance as interfirm organizational

⁴ In Gereffi et al. (2005), arguably the most influential GVC theory article measured in terms of citations on Google Scholar, theory development actually takes up no more than five pages (pp. 84–88). The rest of the article is devoted to several antecedents of their GVC theory (e.g., GCC work and transaction cost theory of industrial organization) and four sectoral case studies (i.e., bicycles, apparel, fresh vegetables, and electronics). In their desire for a parsimonious GVC theory “to be useful to policymakers,” Gereffi et al. (2005, 82; emphasis added) prefer to “to create the *simplest* framework that generates results relevant to real-world outcomes.” In doing so, they have knowingly and invariably underplayed the role of “history, institutions, geographic and social contexts, the evolving rules of the game, and path dependence matter; and many factors [that] will influence how firms and groups of firms are linked in the global economy.” Here, in devoting the entire length of a journal article to theory development, we will theorize at a relatively high level of abstraction and focus only on the core dynamics and major strategies. Where possible, we will draw on recent empirical studies in different global industries to illustrate briefly our theoretical arguments.

outcomes, and the GPN 1.0 conception of value, power, and embeddedness as framing categories and elements.

Third, our theorization of the causal role of *cost-capability*, *markets*, and *finance* as competitive dynamics within the broader *risk* environments in shaping firm strategies helps to specify and deepen the existing analytical scope of GPN 1.0. These dynamic variables are also mostly neglected or undertheorized in the GCC or GVC frameworks, which have focused primarily on industry-specific variables such as complexity and codifiability of interfirm transactions, technology and knowledge capabilities within the supply base, and so on. In what follows, the next two substantive sections will theorize the broader competitive dynamics confronting actors in global industries and analyze their firm-specific strategies in (re)configuring global production networks. In the concluding section, we will sketch a brief economic-geographic research agenda for future studies of territorial development in global production systems.

Competitive Dynamics and Risk Environments

34 What accounts for the historic origin and dynamic evolution of global production networks over time? This is a key question left mostly unanswered in existing GVC theories of industrial governance and the GPN 1.0 framework with its notions of territorial and network embeddedness. Here, we theorize the dynamic drivers of value activity in global production networks. We intentionally choose to focus on the capitalist dynamics that matter for *economic actors* in global production networks, eschewing the industry-level approach in earlier theorizations of GVC governance (Gereffi 1994; Gereffi et al. 2005) or the international focus in economic models of outsourcing (Antràs and Helpman 2004; Grossman and Rossi-Hansberg 2008). In GPN theory, capitalist dynamics are the *raison d'être* of global production networks, prompting actor-specific strategies in different regional and national economies. Our contribution in this section is to identify several such capitalist dynamics rather than to prioritize any single one; the latter is necessarily an empirical issue. In building a general theory of global production networks, the point here is that the origin and evolution of global production cannot be logically and realistically reduced to one dynamic condition.

In theorizing abstractly these capitalist imperatives within the general competitive context of time-space compression, we recognize three particularly crucial dynamic forces in the form of optimizing *cost-capability ratios* (e.g., labor, technology, know-how, and capital), sustaining *market development* (e.g., reach and access, dominance, time-to-market, customer behavior, and preferences), and working with *financial discipline* (e.g., access to finance, and investor and shareholder pressure). Couched in different combinations, these three dynamic forces are the necessary causal conditions for explaining actor-specific strategies in configuring these networks, which in turn produce diverse empirical outcomes. They are the independent variables for us to explain *why* global production networks are organized and governed in certain ways, with multifarious consequences for industrial change and territorial development. While the existing GCC/GVC literature has paid much attention to cost-reduction rationalities in governing buyer-driven commodity chains and the importance of technological leadership in producer-driven commodity chains, few studies have brought together these two considerations and integrated them in a dynamic concept such as the cost-capability ratio. Even fewer studies in this literature have placed sufficient explanatory emphasis on market development and financial discipline in their analyses of global production in different industries and sectors (for some exceptions, see Hamilton, Petrovic, and Senauer 2011; Gibbon 2002; Milberg 2008; Milberg and Winkler 2013).

Optimizing Cost-Capability Ratios

Since Gereffi and Korzeniewicz's (1994) seminal work, two decades of empirical research into the governance of global commodity/value chains have clearly confirmed the importance of cost-based competition in driving the globalization of production organized around spatially dispersed networks of lead firms and their global suppliers. The incessant competitive pressure in advanced capitalist economies to lower the prices of goods and services in end markets led many lead firms, mostly vertically integrated through to the late 1970s, to reconsider their cost structures. These structures were reflected in both direct and indirect costs: direct costs comprising material inputs, labor wages, fixed assets, and other production-related payments; and indirect costs relating to transaction costs with customers and suppliers, payments for goodwill and trademarks, investment in proprietary know-how, and costs associated with raising finance.⁵ Direct costs associated with production, particularly wages, became the most obvious arena for optimization. Internationalization to lower wage cost locations, through establishing direct subsidiaries or subcontracting to third party suppliers, opened an entirely new window of locational opportunity for vertically integrated lead firms from advanced industrialized economies.⁶ This focus on cost as the fundamental driver of global production, however, overlooks the other side of the same coin—the capabilities of the firm. In lieu of an explicit theory of the firm in existing GVC and GPN frameworks, it is useful to observe here that a firm necessarily incurs costs in acquiring and mobilizing resources to complete its productive activity. A resource-based view of the firm allows us to appreciate better its inherent role as a capable and strategic organizer of productive assets and value activities (Barney 2001; Teece 2009). In short, cost alone does not give us enough analytical purchase to define the firm as the key *actor* in a production network; cost must be theorized alongside capability to form a complete and actor-oriented view of the firm. A firm can therefore be thought of as a managerial device to optimize the accumulation and deployment of its available resources, defined as its core capability, at the lowest possible cost.

In GPN theory, we develop the dynamic concept of the *cost-capability ratio* to describe this optimization process that allows different firms in global production networks to achieve greater firm-specific capabilities and value capture over time. We argue that while cost reduction is clearly an important capitalist dynamic compelling lead firms to engage in outsourcing and subcontracting to independent suppliers both at home and abroad, cost is a relative concept. It must be conceptualized in combination with the actor-specific capabilities of these lead firms and their suppliers in order to arrive at a complete picture of its causal influence on the formation and evolution of global production networks. The dynamics of optimizing the cost-capability ratio can help us understand why certain value activities are outsourced to independent suppliers by global lead firms and why the mix of these activities changes over time in specific global production networks. This optimization process is highly contingent on a firm's existing

⁵ Neoclassical economic models of international outsourcing tend to attribute causal effects to falling costs associated with improvements in communication and transportation technologies (Arndt and Kierzkowski 2001; Grossman and Rossi-Hansberg 2008) and specification of property rights (Antràs and Helpman 2004; Antràs and Chor 2013). In GPN theory, these cost improvements are conceptualized as *enabling* factors rather than causal conditions for the emergence of global production networks because they do not generally accrue to particular firms and actors.

⁶ This is the phenomenon first identified as the New International Division of Labor (NIDL) in the seminal work by Fröbel, Heinrichs, and Kreye (1980). Their analysis was based on detailed empirical work on the international relocation of German-owned textile and garment production over the period from 1960 to 1975 both within Europe and beyond to North Africa and Asia.

Table 1

A Matrix of Cost-Capability Ratios in Global Production Networks [Color table can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

Lead Firm		Cost	
Capability	Low		High
Low	C: Market follower with weak long-term survival prospect		D: Market follower facing immediate exit
High	A: Highly competitive industrial leader		B: Industrial leader but subject to serious competitive pressures

Supplier		Cost	
Capability	Low		High
Low	A: clear price taker with no or little bargaining power		D: No prospect of securing value activity in global production networks
High	B: Highly competitive and may evolve into a strategic partner or even a lead firm (A or B)		C: No prospect of securing value activity in global production networks, except those supplying highly specialized modules and components (e.g., <i>platform leaders</i>) and essential services

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resource endowment and strategic direction in current and/or new markets. The optimal cost-capability ratio also varies from one firm to another. Some firms can achieve optimal ratios through either cost reduction or building new capabilities, while others can accomplish improvements in both dimensions.

In Table 1, we present four stylized scenarios of cost-capability ratios confronting both lead firms and their suppliers (domestic and abroad). In general, a lead firm or a supplier is most competitive if it enjoys a low cost-capability ratio achieved through combining low costs with high capabilities (e.g., lead firm A or supplier B). High firm-specific capabilities in productivity, technology and know-how, and/or organizational routines require very substantial investments that tend to drive up overall costs. Market leaders in most globalized industries invest heavily in research and development (R&D), human resources, and marketing to sustain their cutting-edge products and/or services. A low cost-capability ratio is therefore much harder to achieve when all value activity, including manufacturing production, takes place in the home economy because labor-related direct production costs in advanced economies tend to be high. More recently, emerging lead firms from newly industrialized economies have begun to experience higher cost-capability ratios due to growing domestic costs and the inherent limits placed on their firm-specific capabilities (a function of their weaker national innovation systems). The successful establishment of a lead firm-specific global production network through the internationalization of value activity (e.g., manufacturing and R&D) will allow a lead firm (B) to reduce production costs or increase firm-specific capabilities and to move toward a more optimal ratio, characterized by lower overall costs and higher capabilities, which enables it to become a highly competitive industrial leader (A). With low production costs (e.g., economies of scale and stringent cost controls) and high capabilities (e.g., innovation in production and management), a supplier (B) of intermediate or final

products tends to be highly competitive and may be able to succeed in taking over production-related value activity outsourced by lead firms in global production networks. A highly competitive strategic partner (B) may even take on the role of becoming a global lead firm when it ventures successfully into market definition through new brand development and product innovation.

Overall, this dynamic concept of the cost-capability ratio can illuminate an important coevolutionary process in *successful* global production networks in which both lead firms and their partners and suppliers manage to reduce their cost-capability ratios over time. By optimizing their ratios through international production and outsourcing arrangements, lead firms may be able to maintain or regain their industrial leadership in end markets. By articulating into the global production networks of these lead firms and enhancing their own firm-specific capabilities, independent suppliers can also optimize their ratios over time. Through interfirm learning and deepening transactional relationships, these suppliers can evolve further to become the strategic partners of global lead firms (Yeung 2007, 2009; Appelbaum 2008; Sturgeon, Humphrey, and Gereffi 2011; Gereffi 2014). Cost reduction alone, therefore, cannot be the fundamental driver of evolving global production networks. Rather, both costs and firm-specific capabilities are relative and subject to change over time under global competition. Only by continuously optimizing cost-capability ratios can lead firms and their suppliers engage in the recursive process of sustaining or improving their competitive positions in the global economy.

Sustaining Market Development

The causal effects of the market imperative on the geographic dynamics of global production were recognized in Gereffi's (1994) original formulation of buyer-driven GCCs in labor-intensive industries such as apparel, footwear, and toys. In that formulation, market forces in advanced capitalist economies were embodied in the rise of large buyers—such as retailers, merchandisers, and their purchasing intermediaries—that in turn drove the internationalization of production and their overseas supplier networks. The nature of this market imperative, however, has not been adequately theorized in the subsequent GCC or GVC literature because much of its analytical focus tends to be placed on cost-saving practices of these large buyers and their implications for interfirm or value chain governance. In GPN theory, we argue that the dynamics of market development are not just about large buyers or producers bringing durable goods or services to mass consumers for their final consumption in preexisting or externally defined end markets. On the contrary, GPN theory conceptualizes the market imperative confronting firms as a negotiated outcome through which *both* producers and customers are actively involved in market creation—producers in seeking greater revenues and profits through market expansion and customers through creating different markets by becoming more demanding for better products/services at lower prices. The emergence and changing configuration of global production networks represents an organizational outcome of this iterative process of market development. The market is not an externally imposed structure in which producers and customers react and behave passively. Rather, through their actor-specific practices, these economic agents create and shape market structures (Fligstein 2001; Berndt and Boeckler 2009; Caliskan and Callon 2010). To understand the enduring dynamics of the market development process, we need to know as much about customers and their behavior as about producer strategies, across the full range of firms from merchandisers to manufacturers and distributors. Market creation entails developing new demand conditions and supplier capabilities that are mutually reinforcing and geographically mutable. GPN theory thus focuses on both producers and customers in their making of global production networks.

In general, a market for a product or service is measured in terms of the volume or size of demand, the rate of growth, and the nature of demand with respect to quality, standards, innovation, differentiation, and so on. Developing and sustaining *market reach* imposes strong competitive pressures on global lead firms, irrespective of their cost-capability ratios and producer roles in global production networks (e.g., buyers or manufacturers of goods or providers of services). Lead firms with high cost-capability ratios are more compelled to reconfigure their production networks in order to maintain and/or redefine their market position. As market makers, lead firms with low cost-capability ratios continue to develop access to new markets and benefit from their first-mover advantages in terms of market creation. Meanwhile, international suppliers of intermediate or finished goods/services are subject to the same competitive pressure because access to markets in advanced economies through lead firms brings potentially larger orders, upgrading opportunities, and, ultimately, better value capture.

38 Once a new market is created through firm-specific entrepreneurial innovations (e.g., new or recombinant technologies, products, or services), lead firms tend to seek *market domination* in order to capture as much value as possible from their proprietary products or services. This capitalist impulse toward market domination is evident even in the most globalized industries such as automobiles and electronics. Lead firms that succeed in optimizing their cost-capability ratios through reconfiguring their global production networks are likely to be dominant players with respect to market creation and domination in these industries. These markets are often characterized by oligopolistic competition among a few leading players (e.g., in automobiles and electronics). Increasing supplier capabilities also contribute to greater market concentration in the global supply base. From the perspective of both lead firms and their major suppliers, the dynamics of market dominance clearly provide a strong incentive to develop and (re)configure global production networks.

The market imperative of global production networks, nevertheless, should not be defined entirely from the perspective of these producers of final goods or services (lead firms, suppliers, and so on). Customers can be just as critical in defining this market imperative. In general, *customer* refers to corporate users and individual consumers of goods and services in end markets. This simple distinction between intermediate and end markets points to substantially different *customer pressures* confronting producers. In intermediate markets, corporate customers tend to possess more specialized know-how and firm-specific demands for finished goods or services. On the other hand, end markets are fiercely competitive and fast moving precisely because of the extremely diverse nature of consumer demand and preferences. The market impulse of this diverse consumer behavior is transmitted to producers through their corporate and noncorporate clients. In addition to economic factors such as price and quality, consumers are now better informed and take into account other noneconomic considerations such as ethical and social responsibility and environmental impact in their consumption decisions. These diverse consumer preferences have increasingly become a defining feature of the market imperative in shaping how producers develop and organize their global production networks (see their causal impact on firm strategies in the next section).

What is missing in this consideration of sustaining market development, however, is the possibility of new markets and emerging consumers *beyond* the home markets of global lead firms. The rise of new markets in developing economies and the partial shift of end markets to the so-called Global South in the 2000s has unleashed a significant new market imperative that is different to the earlier *retail revolution* in advanced economies—the home markets for *most* global lead firms. It also creates a unique basis for the emergence of new global lead firms from these large developing markets and

economies that can capitalize on their home advantages as national firms with favorable access to domestic markets and production networks. Specifically, this new market imperative entails a massive increase in domestic consumption of finished goods and services; a demand structure skewed toward commodities, infrastructure, and light manufactured goods; and lower concern for product standards and quality levels. Since the 1990s, the rapid growth of the world's most populated economies—most notably China and India—has provided a low cost global supply base for lead firms from advanced economies. More importantly, it has also created new demand from literally billions of final consumers for goods and services previously destined for consumption only in advanced economies (Kaplinsky and Farooki 2011; Yang 2014). To capitalize on this new market imperative, global lead firms and their network partners and suppliers have recognized that the nature of this demand imperative is substantially different from that in advanced economies. Competitive success in tapping into this vast market, however, requires not just *tweaking* global products or services to fulfill this demand at lower costs, but rather a fundamentally new understanding of the nature of demand and a corresponding system of production networks. Some of the national firms or industrial groups in these large developing economies (e.g., Huawei from China and Tata from India) are particularly well placed to take advantage of their home markets and to emerge concomitantly as global lead firms in their respective industries (i.e., information and communications technology [ICT] solutions and automotive engineering).

Working with Financial Discipline

The dynamics of optimizing cost-capability ratios and sustaining market development in GPN theory have profound causal effects on economic actors in configuring their global production networks. But these interrelated cost and market effects do not form a complete explanation of the evolution of firm-specific strategies and global production networks. From being a relatively obscure consideration in the early GCC literature during the 1990s, *financial discipline* has come to the forefront of accounting for the evolutionary dynamics of these actors and networks in the 2010s (Gibbon 2002; Milberg 2008; Milberg and Winkler 2013). Just as production fragmentation and cross-border supplier networks since the 1980s have fascinated researchers interested in interfirm governance and industrial development, a parallel and, in retrospect, perhaps much more significant phenomenon has dramatically transformed many of the world's dominant economies, with the United States and the United Kingdom being at the forefront of change. This is the transformative imperative of financialization, defined by Davis (2009, 93) as a powerful process through which “[f]inancial considerations—market valuation—would drive choices about the boundaries and strategies of the firm. Firms would focus on doing one thing well, and that one thing was often determined by the stock market.” A complete GPN theory must take into account the causal role of finance in disciplining the organization of capitalist production in the global economy.

We argue that the pressures and opportunities associated with financialization impinge on lead firms and compel their strategic shift toward developing and expanding their global production networks. In tandem with optimizing cost-capability ratios and sustaining market development, the causal dynamics of financial discipline work through actor-specific strategies and responses that in turn produce different spatial and organizational configurations of these networks. Lead firms that succeed in meeting the demands of financial discipline through globalizing production tend to perform well in the financial markets in terms of stock prices and executive rewards, prompting a further shift in their strategic emphasis toward a finance-driven approach to corporate growth and governance (see empirical details in Krippner 2011; Milberg and Winkler 2013). In

this iterative sense, financialization works hand-in-hand with global production network formation and ongoing reconfiguration to sustain capitalist accumulation. While the powerful disciplining effects of financialization on lead firm strategies have been better known since the 2000s, it is important to recognize that the process started as early as the 1970s, particularly in the United States. As more savings and credit are channelled into financial markets and investment products through mutual funds and financial asset management, lead firms do not need to depend exclusively on banks and other lending institutions to finance their investment and production. They can now turn to capital markets to meet their investment requirements and to access finance on favorable terms, albeit with a catch—namely, that they have to fulfill the financial objectives of their investors, and these shareholders are singularly interested in higher and, often, short-term stock prices.

40 This growing alignment of interests between nonfinancial lead firms and their disparate shareholders is increasingly underpinned by corporate reengineering focusing on lead firms' *core competences*, the globalization of their production relations, and changing corporate governance norms. Since the 1980s, this financialization of nonfinancial lead firms has produced profound incentives for, and pressures on, corporate strategies and decisions. In terms of incentives, lead firms have begun to realize that more profits can be generated through short-term financial reengineering of their existing operations than through longer-term industrial investment in new plants, equipment, technology, and products. Corporate financial officers find more profit sources in portfolio income on financial assets. This financial transformation has put immense pressures on nonfinancial lead firms to optimize cost-capability ratios and to engage in global production. Divestment of high-cost manufacturing operations to increasingly capable international suppliers has allowed lead firms to increase their shareholder values and yet maintain their dominant market positions. These strategic partners and suppliers have shouldered the financial investment necessary to supply to global lead firms so that the latter could focus on extraction of financial value from their proprietary assets (e.g., branding, technology, and know-how) and financial assets (e.g., newly acquired or merged businesses).

As suppliers strive to reduce their cost-capability ratios and take on more value activity in lead firms' global production over time, they are inadvertently subject to the same ruthless financial discipline as their lead firm customers. To begin with, the sheer financial costs to suppliers increase exponentially when they upgrade from subcontractors to full package producers and contract manufacturers. Under the disguise of supply chain rationalization, lead firms driven by financial considerations are inclined to source from fewer, but larger, suppliers in order to achieve greater economies of scale and lower unit purchase prices. Lead firms also tend to adopt more aggressive price-reduction policies with these suppliers. In many global industries (e.g., apparel, electronics, and agrofood), the phenomenon of lead firms *passing on* financial exposure to their suppliers is pervasive. Moreover, financial pressures on international suppliers can be transmitted through trade finance, comprising a number of financial instruments whose role in spreading the cascading effects of financial shocks becomes much greater because of the heightened sensitivity of lead firms to financial volatility and the closely interconnected organization of their global production networks (see examples in Staritz, Gereffi, and Cattaneo 2011).

Managing Risks

In a global economy characterized by rapid technological shifts, massive production fragmentation and international outsourcing, and the rise of new markets and competitors, global lead firms and their suppliers are confronted with a greater sense of uncer-

Table 2

Different Forms of Risk in Global Production Networks

Form	Nature	Causal Effects on Actors	Recent Examples
Economic risk	Systemic shifts in markets—new technologies and innovations, changing demand, financial disruptions, exchange rate fluctuations, and so on	Loss of competitive position in cost and/or market leadership; reduction in financial returns and profitability; lower income and structural volatility to localities and regions	Decline of Canada's RIM (BlackBerry) and Finland's Nokia in smartphone devices, 2013
Product risk	Quality, safety, branding, and efficiency considerations	Negative views of goods or services by consumers and customers; greater demand for corporate social responsibility	The demise of Arthur Anderson LLP in 2002 because of its criminal involvement in the Enron fiasco Toyota's quality issues with its "sticky pedals" in the United States, 2009–11
Regulatory risk	Political, public-to-private governance, and changing standards and norms	Disruption or termination of global production, existing industrial practices and organizational arrangements	European Union's tough regulation of genetically modified organisms (GMOs) since 2003 and impact on GM crop growers (e.g., Monsanto's MON810 maize)
Labor risk	Struggles over working conditions and employment practices	Resistance and industrial action by employees; disruptions to global production and employment prospects; and potentially greater reputational risk	Strikes in Foxconn's plants in China, maker of Apple's iPhones, due to workers demanding for better terms and working conditions, 2012–13
Environmental risk	Natural hazards or human-made disasters	Accentuating the above four forms of risk and their causal effects	Japan's 2011 Fukushima earthquake and production stoppage in automobile manufacturing due to parts shortage

tainty and unpredictability. Managing these challenges successfully requires the entire spectrum of actors in global production network to develop a fuller understanding of changing *risk* circumstances and to create corresponding coping strategies and platforms. Much more so than the existing GVC or GPN literature, an enhanced GPN theory must internalize this causal importance of risk and its management in understanding the dynamics of actor-specific strategies in these networks. In this sense, global production networks are fundamentally an organizational architecture wherein economic actors can mitigate and manage different forms of risk inherent in the above three sets of competitive dynamics. Clearly the impact of risk on different firm and nonfirm actors varies. Due to substantial institutional variations, the geography of this impact is also highly variable in different locations and regions articulated into specific global production networks. Table 2 details that this risk can primarily take five forms: economic (e.g., shifting market or technological conditions), product (e.g., brand damage associated with quality and other issues), regulatory (e.g., shifting rule regimes), labor (e.g., struggles over wages and conditions), and environmental (e.g., pollution or natural disaster).

These risk forms require further theorization. First, risk is generally produced beyond the control or confines of individual actors and refers therefore to a common environment

confronting actors collectively. While an economic actor (e.g., a lead firm) can actively participate in the creation of the initial condition underpinning a particular form of risk (e.g., a new technology or an industrial pollutant), the translation of this initial condition into a risk requires the enrollment of other economic and noneconomic actors into the same global production network. For a lead firm's new technology to be market-transformative and *risky* to other lead firms in the same industry, it must be well supported by its strategic partners (e.g., contract manufacturers or service providers) and key customers. Similarly, for an environmental risk to be efficacious, the initial condition (e.g., industrial pollution by a lead firm) must be identified and taken up by one or more social actors (e.g., environmental groups). Identifying the causal effects of risk in global production networks thus requires both actor- and structural-level analyses.

42 Second, the qualitative nature and causal effects of risk play out differently in the context of global production networks such that we can term it *GPN risk*. While all five risk forms existed in the earlier era of vertically integrated mass production (Fordism), their nature and effects have a much broader geographic scope and faster temporal transmission in today's era of widely distributed global production networks. Geographically, these risks can spread across the entire range of geographically dispersed actors articulated into a particular global production network. For example, when a lead firm in one location is susceptible to rapid shifts in end-market demand in another location, its suppliers in yet more locations are also exposed to the same financial risk taken on between receiving orders and final payments from this lead firm. Because of their tightly interlocked network connections and the tendency of value chain actors to exhibit what Lee, Padmanabhan, and Whang (1997) call the *bullwhip effect* of information distortion and overamplification, market risk and supply chain insecurity can occur and be transmitted very quickly, and its negative ramifications for value activity can be very serious.⁷

Third, mitigating risk is not necessarily a zero sum process where the gain by one economic actor must entail the loss to another actor. In some circumstances (e.g., demand shift or technological change in market conditions), such a zero sum scenario is possible among different lead firms or their suppliers. But in many other cases (e.g., financial crisis or *race to the bottom* cost competition), most, if not all, economic actors can suffer from negative consequences of economic risk. Similarly, regulatory and environmental risks often affect all actors in the same industry. For example, post-9/11 counterterrorism measures in the United States require more stringent checks on cross-border movements of all goods (e.g., the mandatory inspection of all sea-borne containers by the U.S. Customs and Border Protection agency; see Gattorna 2013). This differential effect of risk under changing circumstances in turn explains why some risks are more causally efficacious in shaping firm-specific strategies because more value can be captured or losses minimized through the mitigation of these risks. It also underscores why national and international institutions, through their regulatory practices, can make a significant difference to global production—a conceptual lacuna in the existing GVC conception of industrial governance.

⁷ This GPN risk is particularly visible in the global electronics industry (see Yeung 2007; Sturgeon and Kawakami 2011). For example, a fire in SK Hynix's DRAM production plant in China's Wuxi on September 4, 2013, led to substantial disruption in the global supply chain of memory chips for electronics devices. Chip prices increased by 19 percent within days of the fire. With a third of the global market share in memory chips, SK Hynix from South Korea is the world's second largest producer, after Samsung Electronics. Its Wuxi plant produces about half of SK Hynix's total production (<http://blogs.wsj.com/digits/2013/09/09/chip-supply-concerns-linger-after-hynix-factory-fire>).

Strategies of (Re)configuring Global Production Networks

Theorized in the historic sequence of their evolving importance, the above capitalist dynamics collectively constitute the three-pronged causal explanation of *why* global production networks emerge and evolve. In turn, this GPN theory is incomplete without a nuanced consideration of the diverse and substantial risks associated with global production. As global lead firms engage more in international outsourcing, and as their foreign partners and suppliers actively develop their own firm-specific capabilities, these economic actors from drastically different territorial formations are confronted with an operating environment that is much less certain and predictable than their home economies and domestic markets. This theorization paves the way for future empirical studies of these networks and their formations because the relative importance and mutual interaction of these competitive dynamics varies across different networks and risk environments. Our approach becomes necessary and useful because existing GVC and GPN approaches have not adequately theorized these chain/network dynamics and their organizational variations beyond their primary focus on chain governance or network embeddedness.

In this section, we continue with our theory development and conceptualize *how* economic and noneconomic actors develop, organize, and govern their global production networks in order to respond effectively to the causal challenges inherent in these competitive dynamics. While the above three sets of competitive dynamics provide the structural properties of causality and emergence, the actor-specific strategies depicted in this section serve as the corresponding mechanisms for organizing production networks. These dynamics and strategies collectively coconstitute the *causal mechanisms* of global production networks, in turn explaining empirical economic development outcomes (e.g., firm growth, technological acquisition and innovation, industrial upgrading and sectoral transformation, and local and regional development).

While focusing almost exclusively on interfirm relationships as modes of industrial governance, the GVC literature does recognize that the dynamics of these relationships are not spontaneous, automatic, or even systematic. In their most recent work, Ponte and Sturgeon (2014, 200) argue that “these [governance] processes are ‘driven’ by the strategies and decisions of specific actors. The relevance of GVC governance is that it examines the concrete practices, power dynamics, and organizational forms that give character and structure to cross-border business networks.” In their bid to develop a broad-brush analytical tool for characterizing an entire global value chain or even a global industry, however, these concrete practices and power dynamics are frequently subsumed under different modes of chain governance. The strategic thrust behind these competitive dynamics and actor-specific practices becomes invisible or assumed, giving way to broader industry- and chain-level characterizations such as *modular*, *relational*, and *captive* interfirm relationships.

As a corrective to this top-down conceptualization of chain characteristics and governance practices, we rebuild the analytical causality in favor of the four types of *firm-level* strategy that explain the particular configurations of global production networks in specific historic and geographic contexts. Our approach thus improves on the existing GVC characterizations because we allow for the possibility of actors in the *same* global production networks exercising all four types of firm-level strategy. The precise combination of these strategies can only be ascertained through empirical investigations. To reiterate, chains and networks are merely organizational devices, providing different windows of opportunity for actor-specific learning, practice, and upgrading. Their empirical efficacy depends critically on the strategic choices made by different actors—

economic and noneconomic—who constitute and, in turn, are embedded in these chains and networks. Our theoretical focus on actors as the unit of analysis and their strategies in configuring networks also does not contradict the heterarchical conception of networks; the latter can be useful when networks become the unit of analysis for understanding market competition and industrial change (Yeung 1994; Dicken et al. 2001).

44 The key challenge for GPN theory, then, is to incorporate a broader consideration of firm-specific strategies (Mathews 2006). This is where *variability* becomes one of the most critical attributes of strategizing by actors in global production networks. By focusing on diverse firm actors, GPN theory can analyze the diversity of interests and strategies in the different functional segments associated with the same or different global value chains and global industries. Taking this initial step of differentiating firms on the basis of their roles and functions in a global production network, we identify in Table 3 a range of firm types, namely, lead firms, strategic partners, specialized suppliers (industry-specific or multi-industrial), generic suppliers, and customers. This approach to defining diverse firm-specific roles in the same or different networks and industries allows us to overcome one of the shortcomings in the existing GVC model of industrial governance, namely, that it often fails to explain how a model of dyadic interfirm exchange can translate beyond the interfirm nexus or even within the same value chain.⁸ In this section, four strategies are explicitly theorized in relation to the above three competitive dynamics.

Intrafirm Coordination

This strategy is particularly important because the existing GVC and outsourcing literature tends to focus exclusively on *interfirm* relationships. Despite the rich interdisciplinary literature on transnational corporations (Dicken 2011; UNCTAD 2013), we know surprisingly little about how firms in global production networks reorganize their internal value activity to meet the competitive challenges of the three structural dynamics identified above. In general, we can define intrafirm coordination as the internalization and consolidation of value activity within the lead firm, the strategic partner, and/or the supplier firm within and across national borders in order to achieve greater firm-specific efficiencies such as lower inventories and cost control, greater market responsiveness, and higher-quality products or services. To Kaplinsky and Morris (2001), this coordination goes beyond the firm's strategic repositioning in a global production network to incorporate its management and logistics of production, its integration of design and R&D into supply chains, and its monitoring of quality standards and production outcomes. Through greater attention to intrafirm coordination, a firm can identify and capture more value from its current bundles of firm-specific resources and organizational capabilities.

Table 4 summarizes the causal interaction between the competitive dynamics and risk environment and the adoption of intrafirm coordination strategy by different actors, and their implications for the organizational configurations of global production networks.

⁸ For example, the reformulated theory of GVC governance (Gereffi et al. 2005) places its analytical emphasis on characterizing the governance of the *entire* value chain on the basis of discrete and dyadic (network) coordination relations between lead firms and their immediate (first-tier) suppliers. The transactional characteristics and firm capabilities shaping these discrete governance relations are also assumed to be applicable to the entire value chain and, by interference, the entire global industry. As pointed out critically by Bair (2008, 354), what characterizes this dyadic coordination relation in one part of the value chain (e.g., “relational governance” between a lead firm and its first-tier supplier in the automobile industry) may not necessarily be applicable to other interfirm relations further down the same chain (e.g., “captive governance” between the first-tier supplier and other tiers of suppliers).

Table 3

Firms as Actors in a Global Production Network

GPN Actors	Role	Value Activity	Examples in Manufacturing	Examples in Service Industries
Lead firms	Coordination and control	Product and market definition	Apple and Samsung (information and communications technology [ICT]); Toyota (automobiles)	HSBC (banking); Singapore Airlines (transport)
Strategic partners	Partial or complete solutions to lead firms	Codesign and development in manufacturing or advanced services	Hon Hai or Flextronics (ICT); ZF (automobiles)	IBM Banking (banking); Boeing or Airbus (transport)
Specialized suppliers (industry-specific)	Dedicated supplies to support lead firms and/or their partners	High value modules, components, or products	Intel (ICT); Delphi and Denso (automobiles)	Microsoft (ICT); Fidelity or Schroders (banking); Amadeus (transport)
Specialized suppliers (multi-industrial)	Critical supplies to lead firms or partners	Cross-industrial intermediate goods or services	DHL (ICT); Panasonic Automotive (automobiles)	DHL (banking); Panasonic Avionics (transport)
Generic suppliers	Arm's-length providers of supplies	Standardized and low value products or services	Plastics in ICT and automobile manufacturing	Cleaning in banking and transport services
Key customers	Transfer of value to lead firms	Intermediate or final consumption	Other lead firms or consumers	Other lead firms or consumers

Table 4

Firm-Specific Strategies and Organizational Outcomes in Global Production Networks

Strategy as Actor Practice	Competitive Dynamics			Risks	GPN Structure as Organizational Outcomes
	Cost-capability Ratio	Market Imperative	Financial Discipline		
Intrafirm coordination (e.g., pharmaceuticals and retail)	Low	High	Low	High	Domestic expansion and/or foreign direct investment and mergers and acquisitions; high level of network integration
Interfirm control (e.g., automobiles and information technology services)	High	Low	High	Medium	Outsourcing but dependent integration of suppliers
Interfirm partnership (e.g., electronics and logistics)	High	High	High	High	Outsourcing, joint development with partners and platform leaders
Extrafirm bargaining (e.g., resources and agrofood)	Medium	High	High	High	Differentiated integration into global production systems

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Firms with efficient internal cost control and high proprietary capabilities are likely to engage in intrafirm coordination to capitalize on their lower cost-capability ratios. Outsourcing to third-party suppliers is less necessary because it may not significantly lower the costs of producing goods or services, but instead may increase the firm's risk of capability reduction due to the potential leakage of highly proprietary knowledge or codifiable technology to those independent suppliers. In adopting intrafirm coordination, these firms are also more driven by the higher market imperative since product cycles stay dynamic, the industry remains unsaturated, and new market segments continue to emerge. Internalization through domestic expansion and/or internationalization provides the optimal organizational platform to create and capture value in this market condition. As most of these firms are not subject to intense financial discipline, they are not yet compelled to externalize their value activity to third-party suppliers or to generate large short-term financial returns for their shareholders. In terms of risk, intrafirm coordination is effective in helping firms navigate risky technological and/or market environments. It allows the firm to gain control of critical technological or marketing resources in the face of such environments. This strategy of intrafirm coordination is likely to produce highly integrated global production networks in which corporate headquarters exercise tight control over their subsidiaries and affiliates.

To illustrate briefly how intrafirm coordination works, we can look at the global retail industry. Leading transnational retailers such as Wal-Mart (United States), Carrefour (France), Metro (Germany), and Tesco (United Kingdom) all pursue intrafirm coordination with respect to their global store operations, which often number several thousands of stores across tens of countries. This strategy allows for greater value creation and capture. In their global operations, these giants tend to internalize most, if not all, their retail outlets, in order to achieve economies of scale in dealing with suppliers, brand and quality consistency, and efficiency in logistical support. This pattern of intrafirm coordination applies also to their increasing presence in new and emerging markets outside

their home countries. While we can generalize to a degree about the strategies of leading global retailers in *buyer-driven* global value chains, such an account would conceal significant *intraindustry variations* in their implementation of firm-specific coordination and organizational relationships with non-brand-name or generic suppliers in different markets.

For example, we can usefully compare Wal-Mart and Tesco. Building on its success and dominance in the home market—the United States—Wal-Mart is known for rolling out its *sui generis* business model at all costs. In this model, Wal-Mart insists on buying from generic suppliers offering the lowest price and establishing its own retail outlets, wherever possible in nonunionized locations. By pushing input and wage costs to the lowest level possible, Wal-Mart captures value through massive throughput and economies of scale in its retail sales, described by Abernathy et al. (1999, 3) as “lean retailing.” This intransigence has led to several high-profile exits from host markets, most notably Germany and South Korea, both in 2006 (Christopherson 2007). Tesco, on the other hand, comes from a much smaller home country, the United Kingdom. It does not have Wal-Mart’s large home market to cross-subsidize its global operations. Tesco thus adopts a much more flexible and communicative strategy toward its intrafirm coordination. Unlike Wal-Mart, it does not insist on replicating its home-base model in its foreign subsidiaries and joint ventures. In South Korea, for example, Tesco works with its strategic partner, Samsung, to penetrate into an otherwise difficult retail market characterized by highly competitive conditions, distinctive and demanding consumer preferences, and a strong local supply base (Coe and Lee 2006, 2013). Overall, these two contrasting examples help us understand why and how intrafirm coordination can be adopted as a key strategy to organize global production networks in the retail industry.

Meanwhile, these transnational retailers work closely with a large number of brand-name suppliers that are lead firms in their respective industries such as health care products (e.g., Johnson & Johnson and Unilever), food (e.g., Kraft Foods and Nestlé), and beverages (e.g., Coca-Cola and Diageo). To safeguard the quality and standards of their products, these brand-name producers themselves tend to engage in intrafirm coordination of their global production networks, establishing production facilities near major markets. This strategy also allows them to be responsive to market demand and consumption patterns. When the brand-name producers’ distribution channels articulate into the expanding networks of global retailers, these lead firm producers of consumer goods perform a crucial role as independent suppliers. Through technological platforms (e.g., real-time sales data interchange) and joint marketing activity (e.g., cross-firm promotion), their highly internalized production networks are integrated with those coordinated by global retailers. In these *interindustry* intersections of global production networks—a dynamic phenomenon not theorized in the existing GVC model of industrial governance—power relations are often balanced between brand-name suppliers and global retailers. Both groups also share the various risks inherent in their intertwined global production networks. A major product recall due to safety or quality defects, for example, will harm the brand-name supplier as much as the global retailer. Intrafirm coordination becomes an effective strategy for them to mitigate these GPN risks.

Interfirm Control

This strategy represents a highly managed externalization strategy through which a lead firm outsources a very significant portion of its value activity to independent suppliers and contractors, and exercises strong control over their production processes and product/service quality. This outsourcing applies to key components or services, complete modules or service packages, and systems and subsystems. The high levels of

explicit control of its suppliers and contractors are deemed necessary by a lead firm in order to gain collective competitiveness in its entire global production network. The GVC literature terms this a *captive* form of chain governance (Gereffi et al. 2005), but it tends to generalize at the level of the entire industry (e.g., automobiles or apparel).

48 In general, high cost-capability ratios tend to prompt firms to engage external suppliers in order to regain their cost advantage in different industries. In some cases, this process of externalization entails exiting lower value-added activities so that the firm can focus on building and sustaining its higher-order and more costly dynamic capabilities (Teece 2009). These evolutionary processes underpin why the concept of cost-capability ratios is useful in explaining network dynamics. Table 4 notes that external sourcing makes sense only when a lead firm suffers from higher costs in relation to its existing capabilities, and its suppliers enjoy substantial cost advantage through access to cheaper production inputs (e.g., labor, land, and material costs) and less-stringent regulatory regimes and institutional frameworks (e.g., labor standards and environmental constraints). Moreover, externalization may be feasible if the market for a product or service is generally mature and saturated. The lack of significant new market opportunities hinders a lead firm's desire to compete solely on the basis of its higher cost-capability ratio and to engage in intrafirm coordination with more capital investment. In addition, financial discipline tends to be high and induces firms to focus only on their *core competence*. This discipline imposes serious pressure on firms to extract greater financial returns from their current assets or investments in order to satisfy their shareholders. Finally, the risks associated with technological change and market shifts cannot be too high for outsourcing to take place because suppliers and contractors are less likely or willing to take on this risk. Without these external actors, a lead firm's outsourcing strategy will not work.

This theorization of the causal role of market, financial discipline, and risk in engendering interfirm control strategy allows us to provide a more nuanced analysis of the role of different actors (lead firms, strategic partners, suppliers, and so on) and their power relations in evolving global production networks. Our approach deepens the existing GVC analysis of the *captive form* of governance. More importantly, it transcends the identification of this governance form and provides a crucial explanation of *why* these actors are causally shaped by dynamic imperatives that go well beyond industry-specific transactional and technological conditions. Despite its explicit desire to control and lock in suppliers, for example, a lead firm may also be keen to develop supplier capabilities because of the potential for improving collective efficiency at the level of the global production network. In the global automobile industry, for instance, the strategy of interfirm control is frequently deployed by global lead firms, defined as brand-name assemblers, to ensure cost competitiveness, rapid time-to-market, and quality consistency.⁹ Lead firms in this industry not only outsource significant levels of component, module, and subsystem manufacturing to independent auto suppliers, but the lead firms also increasingly pressure these suppliers to establish production and supply facilities near to lead firms' final assembly plants in different locations. These first-tier suppliers,

⁹ In the GVC literature, these brand-name assemblers are commonly known as *producers* because of their capability of producing an entire automobile. However, in today's highly globalized automobile industry, all producers require very substantial inputs from external and multiple tiers of suppliers. These lead firms are really assemblers of different components, modules, and sub-systems into a finished product. In terms of value activity, their R&D, marketing, distribution and sales are often as significant as their assembly facilities in different geographic locations.

in turn, compel second- or third-tier suppliers to follow suit or to make the appropriate locational adjustments (Sturgeon, Van Biesebroeck, and Gereffi 2008).

This brief case of interfirm control in the automobile industry, nevertheless, conceals substantial *intraindustry* variations in the national origins and corporate cultures of different lead firm assemblers. Lead firms from the United States, for example, are much more dependent on market-based price mechanisms for controlling their different tiers of suppliers who have often become *captive* to these American assemblers. Japanese automobile firms, on the other hand, are more likely to coinvest in their suppliers and develop closer interlocking relationships in these production networks that approximate the *relational* interfirm partnerships to be explained in the next section. The presence of dense business networks (i.e., *keiretsu* or groups) and industry associations in Japan also reinforces the promulgation of common standards and dispute resolution between lead firm assemblers and their tiers of suppliers. In terms of network configurations, lead firms from different national origins may also develop production platforms in the same geographic location but with drastically different market orientation. This market difference can seriously alter their relationships with local suppliers, rendering industry-level generalizations misleading and problematical. In China, for example, some American and European assemblers are more likely to engage in localization through local design, engineering, and regional headquarters facilities (Liu and Dicken 2006; Van Biesebroeck and Sturgeon 2010). Partly due to their relationship-based corporate cultures, Japanese and South Korean automakers are much more cautious in taking this localization approach for fear of losing control over their local suppliers and thus risking poor product quality and brand damage. In short, the strategy of interfirm control can help lead firms cope with intense competitive pressures, but its operationalization in the same global industry can vary substantially in relation to firm-specific and country-of-origin attributes.

Interfirm Partnership

Not all interfirm relationships are characterized by lead firms tightly controlling their suppliers and contractors. In the above example of Japanese and South Korean automobile assemblers, cooperative relationships can also be formed between lead firms and their strategic partners and specialized suppliers. In Gereffi et al. (2005, 86), this cooperative form of industrial governance is known as “relational” or “modular” chains. But our conception goes beyond these broad governance relationships within the same industry, as firms may also enter into *interindustry* partnership relationships with other firms, most notably with advanced producer service firms providing financial, legal, accountancy, information technology, management consultancy, advertising, and logistics services, among others. The level of interdependency in these relations, however, is not as intense as with firms in the same sector—producer service firms tend to be multi-industry players.

Taking a network rather than an industry approach, we describe this cooperative strategy as interfirm partnership, defined as the collaboration, coevolution, and joint development of a lead firm and its strategic partner(s) or key suppliers in the *same* global production network in order to compete against other lead firms and their network partners. While differential cost-capability ratios can partially account for the externalization of production of goods or services from a lead firm (high ratio) to its strategic partner (low ratio) and independent suppliers (low ratios), it is the *simultaneous presence* of the other three competitive pressures—high-market imperative, high-financial discipline, and high-risk environment—that turns this externalization strategy from strong interfirm control into cooperative partnership (see Table 4). The market

imperative is clearly very significant for all firms in a cooperative global production network. The prospect of an expanding and unsaturated market assures a lead firm and its partners and suppliers that they can collectively benefit from their cooperative value creation process. Even though the capture of this value is unlikely to be evenly distributed among these network actors, partnership provides a more mutually beneficial competitive strategy for them to thrive in the global marketplace. The risk environment in which all cooperative partners operate tends to be high. These risks range from market volatility to technological shifts and supply chain disruptions. To reduce their exposure to these risks and to capitalize quickly on rapid market changes, the lead firm and its partners enter into cooperative arrangements underpinned by finely organized divisions of labor and mutual dependency.

50 To understand fully the peculiar configurations of a cooperative global production network, we need to analyze how each of these firm actors adopts the strategy of interfirm partnership. Because of the cooperative nature of their interfirm divisions of labor, the power relations among these actors are not as hierarchical as in the case of a lead firm pursuing an interfirm control strategy. As argued by Whitford (2005, 17; emphasis in original), “[n]eeding to improve interfirm cooperation and information transfer, OEMs [lead firms] give more business to fewer suppliers, and forge closer relationships with a core strategic group that they hope to align with their own goals. Importantly, these key suppliers are *not* envisioned as mere satellites orbiting a dominant but benevolent patron, dependent and beholden.” While a lead firm in an interfirm partnership retains its effective control over market and production definition (e.g., through marketing and R&D capabilities), it cannot fulfill market demand without the cost-effective production support from its strategic partners and the provision of platform-leading components or modules by its specialized suppliers.

To cite a brief example, the world of global electronics is characterized by an increasing separation between the design and manufacturing of cutting-edge electronics products due to immense pressures from the above-mentioned competitive dynamics (Yeung 2007). Firm-level specialization in the electronics division of labor is rendered particularly effective by the strategy of interfirm partnership. The case of Apple Inc.’s iconic iPhone brings together several intersecting global production networks comprising one of the world’s leading brand-name lead firms (Apple); its manufacturing partner and the world’s largest provider of electronics manufacturing services (Hon Hai Precision from Taiwan); and three specialized suppliers that are the world’s leading integrated semiconductor manufacturer (Samsung from South Korea), a leading fabless smartphone chip design firm (Qualcomm from the United States), and a top semiconductor foundry (TSMC from Taiwan). In this intersection of multiple production networks across several segments in the ICT sector, we witness the significance of interfirm partnerships in creating the unprecedented market success of one major consumer product.

Extrafirm Bargaining

The role of nonfirm actors, such as the state, international organizations, labor groups, consumers, and civil society organizations, has so far been assumed in this article as generally supportive and cooperative. The existing GVC frameworks also offer little explanatory power to these nonfirm actors in shaping interfirm governance; they are often seen as outside the analytical parameters of industry-specific value chains. A growing body of empirical evidence suggests, however, that they have significant influence on global production network dynamics. For example, ethical and fair trade initiatives in developed countries, strongly advocated by the state and civil society organizations, are generally seen as effective in influencing sourcing strategies of certain

kinds of lead firms such as major retailers and their domestic and foreign suppliers in the agrofood and apparel industries (Freidberg 2004; Hughes, Wrigley, and Buttle 2008; Barnett et al. 2011). In other industries, such as electronics and automobiles, these initiatives have much less purchase in shaping how lead firms configure their global production networks. Instead, we are witnessing the growing importance of what Bütte and Mattli (2011) term the *new global rulers* through the privatization of regulation. These nonstate global setters of standards and norms in global industries play an increasingly vital role in the governance of inter and extrafirm relations. For example, the influence of the credit rating agencies extends far beyond that of financial institutions such as banks, affecting global lead firms and their strategic partners seeking funding in different capital markets. Private associations and consortiums in high-tech industries are also highly crucial in setting new industrial standards and technological parameters that profoundly influence the value activities of lead firms, their strategic partners, and customers.

In practice, this highly diverse group of nonfirm actors is often driven by a large number of possible rationalities that go beyond any simple classification. The strategy of extrafirm bargaining is critical because it provides the crucial analytical nexus for understanding how economic processes, embodied in firms, intersect with noneconomic issues (e.g., political reforms, social justice and security, environmental sustainability, and so on). As such, we define the strategy as a contested two-way process of negotiation and accommodation between firms and nonfirm actors in order to reach a mutually satisfactory outcome in the creation and capture of value through global production networks. We argue that this concept of extrafirm bargaining enriches GPN theory because actor-specific interaction in these networks represents more than a set of power relations *along* the interfirm value chains in the same industry or sector, as commonly conceived in the GVC literature. It sheds crucial light on the institutional underpinning of the strategic coupling of regional economies with global production networks in the GPN 1.0 framework (Coe et al. 2004; Yeung 2009).

Firm and nonfirm actors pursue extrafirm bargaining strategies to achieve three inter-related objectives: (1) market power, (2) proprietary rights, and (3) social and political legitimacy. These broader objectives are over and above the cost-specific gains derived from bargaining with state and nonstate institutions (e.g., maximizing financial returns through tax concessions, externalizing the costs of labor training to state agencies, avoiding environmental costs through lower regulatory enforcement). The first objective stipulates that global lead firms shaped by a strong market imperative are likely to be more interested in gaining *market power* from extrafirm bargaining relations with state actors who, for the most part, remain the key regulators of uneven market access even in an interconnected world economy. As Table 4 describes, the tensions confronting global lead firms and nation-states should be understood as differentiated integration into global production networks. For lead firms, high competitive pressures generate dual tendencies, namely, to globalize operations in order to achieve greater efficiencies while also localizing operations in order to ensure a certain degree of autonomy and responsiveness. For nation-states, conditions of accelerating globalization have been associated with far-reaching forms of institutional and functional reorganization, as “the pressures towards certain kinds of putative supranational organization at one extreme are counterpoised against a pressure toward greater degrees of local political autonomy at the other” (Dicken 1994, 122). The bargaining relationships between global lead firms and domestic state institutions for market access are therefore situated within these complex global-local tensions. These intense bargaining relationships are particularly evident in industries subject to strong state regulation such as resource extraction, automobiles,

petrochemicals, retail, telecommunications, and finance. Network outcomes in these industries are often mediated by (geo)political imperatives (Glassman 2011; Smith 2014; Yeung 2014).

52 The second motive prompting firms to adopt an extrafirm bargaining strategy is related to the quest for *proprietary rights* in the context of technological and market innovation. This bargaining process is prominent in industrial segments characterized by high levels of financial discipline and high risk of technological or market shifts (e.g., digital media and biotechnology). In this competitive environment, domestic firms tend to seek strong regulatory regimes and codification of standards in order to protect their firm-specific R&D investments and intangible assets (e.g., brand names, patents, and trademarks). These lead firms enter into robust negotiations with relevant domestic nonfirm actors such as state authorities, standards organizations, and industry associations. As local firms acquire or develop greater technological and market capabilities, they may bargain with home institutions for preferential access to resources and fiscal incentives given to foreign lead firms. Over time, successful technological and market innovations are underpinned by strong extrafirm bargaining between lead firms and nonfirm actors in different geographic locations. The rapid growth of industrial and technological capabilities in Taiwan's ICT sector is a clear example of extrafirm bargaining between global lead firms and nonfirm actors such as state institutions and business associations (Amsden and Chu 2003; Breznitz 2007; cf. Yeung 2009, 2014). In many other industries (e.g., agrofood and apparel), state institutions and international organizations also seek to establish conventions, regulations, and standards as extrafirm actors in governing bargaining and negotiation relations in global production networks. As defined by Ponte, Gibbon, and Vestergaard (2011, 1), this extrafirm governance refers to "the shaping of the conduct of others through network forms of organization involving a wide range of non-state actors but also government, mainly through exchange and negotiation rather than through traditional state-led regulation."

Third, the *noneconomic goals* of firms and nonfirm actors can be a powerful imperative for pursuing extrafirm bargaining strategies. Even though all capitalist firms seek to create and capture value through their profit-oriented activity, not all of them view profit making as their only *raison d'être*. In fact, a number of today's global lead firms have social and political goals embedded in their corporate mantra. One specific way for these firms to attain these noneconomic goals is to gain broad social and political legitimacy through developing sustainable extrafirm relations with nonfirm actors. This strategy is particularly relevant to firms with multinational operations. Confronted with a much more diverse global economy constituted by different political-economic systems and sociocultural practices, many transnational corporations realize that their economic goals cannot be achieved unless they are legitimized as a responsible actor in different markets and territories. While private and voluntary in nature, the Roundtable on Sustainable Palm Oil, for instance, is an international organization and certification scheme established through the participation of multiple stakeholders such as firms, advocacy groups, and local communities. Under certain circumstances, notably where there is active local participation and a strong collective sense of ownership, actors in local communities in the Global South can benefit from these governance initiatives in the sense that their value activities are not driven entirely by the capitalist imperative of global lead firms located elsewhere. In short, the extrafirm bargaining relations between firms and state actors are significantly dependent on firm-specific interests and pressures as well as the institutional capacity and priorities of these state actors.

Conclusion

As an initial contribution toward a more dynamic theory of global production networks, this article has theorized three critical competitive dynamics and their risk environment, and connected their structural properties with actor-specific strategies to arrive at the causal mechanisms of global production network formation and operation. Reframing and going beyond the conventional wisdoms of GVC frameworks and the disparate conceptual categories in GPN 1.0, our conceptualization of global production networks has explained why and how firms adopt diverse strategies to cope with different sets of competitive dynamics and risk environments. By mapping these structural dynamics and risks onto four actor-level strategic choices, we have demonstrated that not only are there different possible trajectories to competitive success within and across global industries, but also this multiplicity in strategic choices and network configurations defies the parsimonious typologies commonly found in the GVC literature. A more dynamic GPN theory not only accounts for the origins of these networks but also specifies their changing configurations over time. While for analytical purposes we have necessarily theorized these four strategies in isolation, the reality for many firms in global production networks is that they are usually actively combining two or more such strategies across their various operations and activities.

At face value, this theoretical mapping may appear to be generic and categorical. However, we explicitly conceptualize the importance of *variability* in understanding how firms, originating from different home economies and endowed with different ownership structures and corporate cultures, might respond differently to these competitive dynamics and risks, thereby pursuing contrasting firm-specific strategies in configuring their global production networks. The variable strategic choices made by intentional actors offer strong support for our nuanced analysis of a highly complex and interdependent global economy characterized by a diverse range of firms and nonfirm actors operating at different geographic scales, from the global to the local. They shed critical analytical light on the much-discussed governance modes in global value chains and global production networks. Linking actors, dynamics, strategies, and the organizational modes of global production networks into one coherent explanation, our theoretical reframing helps to identify the explanatory mechanisms to inform future studies of the effects of these networks on the ultimate dependent variable—development outcomes (UNCTAD 2013). It also provides, we hope, an effective response to Sunley's (2008, 20) challenge that network thinking in economic geography should “develop theory that is more problem driven and focused on identifying causal economic mechanisms and processes.”

Looking forward, we envisage some critical questions for a research agenda under the general rubric of *GPN 2.0*. In particular, more theoretical work is needed to explain how and why the diverse actors and varied strategies profiled above shape developmental outcomes at different geographic scales. While the notion of *strategic coupling* in GPN 1.0 (after Coe et al. 2004) has provided a useful conceptual tool linking industrial upgrading and territorial transformations in regional and national economies with the dynamic configurations of global production networks, these (de/re)coupling processes can have profound and yet contrasting implications for their developmental trajectories. What our article has provided for is a set of causal mechanisms that can explain the specificities in coupling, decoupling, and recoupling. The peculiar combination of territorial outcomes arising from these processes remains an empirical question (Neilson and Pritchard 2009; Bair and Werner 2011; MacKinnon 2012; Bair et al. 2013; Horner 2013). For example, how might we explain the impact of intrafirm coordination on regional development? There are clearly sectoral- and firm-specific differences. In sectoral terms,

such a strategy for configuring global production networks might be less positive for territorial development in the global retail industry compared to regional economies hosting lead firms in the global high-tech industries. This sectoral approach to territorial development, however, also needs to be cognizant of substantial firm-specific differences in the world of global production. Coupling processes and their development outcomes can be much differentiated by types of firm (origin, ownership, capabilities, and resources) and their pursuit of intrafirm coordination mechanisms. These differences are likely to be even more accentuated in the case of interfirm control or partnership strategies (Yeung 2009; Coe and Hess 2011). In short, our efforts in this theory article can provide the causal mechanisms to bridge such an analytical impasse in the coupling/decoupling literature in GPN-GVC studies. It initiates a more dynamic approach to theorizing global production networks as a dominant organizational platform through which actors in different regional and national economies compete and cooperate for a greater share of value capture in global production.

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