The trouble with global production networks

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Abstract
Some sympathetic critics have recently found trouble with the latest iteration of the global production networks theory (GPN 2.0) developed in economic geography. I term these imminent critiques “GPN trouble” and address them in this Exchanges paper in relation to GPN 2.0’s conceptualization of value and risk and its perceived “missing” elements of the state, labour, and so on. Reiterating briefly its core tenet, I first demonstrate GPN 2.0’s modest role as a meso theory of industrial organization and economic development in an interconnected world economy. I argue that empirical analysis based on GPN 2.0 must open up the “black box” of production networks in order to evaluate the causal links between network dynamics and uneven development outcomes. Second, I show how understanding these causal links can provide better answers to the crucial question of “in what sense a GPN problem?” Addressing both issues appropriately will likely reduce the sort of “GPN trouble” one might encounter in future research on global economic restructuring during and after the Covid-19 pandemic.

Keywords
Global production networks, theory, GPN 2.0, industrial organization, uneven development

“GPN trouble”?
Lately, global production networks are in trouble! In the midst of the Covid-19 pandemic in 2020, most countries and people experienced unexpected and yet severe disruptions in global supply chains, from shortages in critical medical supplies to certain essential food products and even toilet paper. Given these unprecedented challenges, one would expect the global production networks (GPN) approach, developed primarily in economic geography since the early 2000s, to be particularly relevant for explaining the industrial-organizational

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dynamics underpinning these global supply chain disruptions and their consequences for everyday livelihood and uneven development outcomes.

This expected analytical utility of the GPN approach for explaining the ongoing restructuring of the global economy, however, has been questioned in the recent debates that have intensified since the late 2010s. Some sympathetic critics of the approach’s latest iteration in Coe and Yeung’s (2015) GPN 2.0 theory have pointed out its perceived relative lack of engagement with the state, finance, labour, the environment, and so on (see a full review elsewhere in Coe and Yeung, 2019). Others have lamented its “hegemonic” positionality as the GPN paradigm in economic geography (Phelps et al., 2018). Most recently, Bryson and Vanchan (2020: 531–532) even alleged that “In 2010, [Michael] Taylor argued that clusters had become a mesmerising mantra in economic geography. By 2020, the new mesmerising mantra has become the GPN approach”. And yet, they argued that this GPN 2.0 theory is unable to analyze the new kinds of value and risk revealed by the Covid-19 pandemic, such as non-price-based value (e.g. as in the secured availability of locally produced critical medical supplies) and extra-network risks (from microbes to national security and climate change).

In all fairness, some of these are legitimate epistemological and normative concerns that might justify their intellectual “trouble” with GPN 2.0. Using the moniker “GPN trouble” for these recent academic critiques, I focus on two main issues in this Exchanges paper and engage with these mostly immanent critiques in the spirit of what Barnes and Sheppard (2010) termed “engaged pluralism” – a belief that no theory is complete and explains everything. A caveat here is that space does not allow me to offer an in-depth treatment of these critiques and cover all allegedly “missing” elements, such as finance, the environment, and, more broadly, development. First, I believe part of this “GPN trouble” has much to do with some critics’ unrealistic expectation of GPN 2.0’s analytical reach. As a meso theory of industrial organization and economic development, GPN 2.0 in itself simply cannot cover all relevant dimensions of socio-economic change. It is therefore imperative to reiterate what GPN 2.0 really entails and how it should be “operationalized” in two stages.

Second, I take issue with some recent GPN-like or GPN-lite work that incorporates the state and labour. I find some of this work troubling because they do not convincingly answer the key question of “in what sense a GPN problem?” – the primary “litmus” test of a GPN study. Addressing both of these key issues through a more realistic understanding of GPN 2.0 and confronting the core question of whether a research problem is directly linked to global production networks will likely reduce the sort of “GPN trouble” one might encounter in future research on global economic restructuring during and after the Covid-19 pandemic.

Taken together, this paper “exchanges” with both critics and users of GPN 2.0 in three sections to follow. It serves as a clarification, rather than a blanket defense, of GPN 2.0’s core purpose and remit. The next section reiterates concisely what GPN 2.0 can do – in more circumscribed ways than what some critics expect! The second and longer section then explains why taking this more delimited view of GPN 2.0 is important in assessing the analytical efficacy of recent GPN work on the state and labour. The concluding section points briefly to some future research agendas.

**What can the GPN approach do, really?**

Given that there are at least two conceptual “versions” of the GPN approach – GPN 1.0 since the early 2000s and GPN 2.0 since the mid 2010s, it is necessary to differentiate them in light of the kind of “GPN trouble” coined above. As someone involved in its theoretical
development since the beginning, my sense is that GPN 1.0 is conceptually much broader in that its analytical framing is less causal in explanatory claims and covers a wider range of “variables”, from the usual production network configurations including firms and non-firm actors to place-based institutions and social structures in relation to power and embeddedness. While Phelps et al. (2018: 240) described GPN 1.0 as “strongly imbued with political economy sensibilities, including in two of its three core concepts of value, power and embeddedness”, some subsequent geographical studies grounded in GPN 1.0 seem to point to the empirical difficulties in operationalizing its overarching conceptual framework. Perhaps because of this broad-ranging conceptual framing and tendency towards cross-sectional analysis of uneven development, GPN 1.0 has been critiqued as lacking in causal explanations (Sunley, 2009) and unidirectional in its assessment of development trajectories (Bair and Werner, 2011; MacKinnon, 2012).

Taking on these critiques, GPN 2.0 has become relatively “narrower” in the sense that it is developed as a meso theory of industrial organization and economic development in an interconnected world economy. Focusing on the “network box” and its underlying causal dynamics in different global industries, GPN 2.0 explains what constitutes a global production network, why various actors work with each other in such a network, how they organize it differently under variegated strategic circumstances, and what all these patterns and processes mean for the diverse trajectories of value capture and uneven development. In short, it entails a necessary two-stage analytical approach to geographical political economy – first, unpacking the nature and logic of cross-border production networks in specific industries or sectors and, second, examining their unequal consequences for localities and regions that are “plugged” into or strategically coupled with these networks. Some of these consequences can indeed be rather devastating for local and regional actors that may lead to their unplugging or decoupling from such networks. In fact, GPN 2.0 does not assume a priori that cross-border production networks are necessarily good for local development nor always expansionary and resilient. The key to understanding the geographical impact of these networks is to unpack their logics in dynamic evolutionary terms over time. GPN analysis should therefore necessitate at least some focus on what firms and their network partners do before one can meaningfully dissect the consequences of these unique industrial-organizational dynamics for uneven development outcomes (Yeung, 2018, forthcoming a).

More specifically and for it to be useful in the geographical analysis of uneven development, this two-stage conceptual approach compels us to ask the most fundamental question: “In what sense a GPN problem”? An explanatory approach taking on GPN 2.0 and answering such a crucial question requires not only the assumption of implicit links between network dynamics and uneven development outcomes, as often done in existing GPN-like/lite studies. Most importantly, the “litmus” test asks for the empirically grounded demonstration of explicit causal links between industrial-organizational change at the level of global production networks and the variegated geographical outcomes in labour, technology, capital formation, and social change in different localities and regions. And yet, there is a common tendency in the critical literature to attribute different manifestations of socio-spatial inequalities in global capitalism to the “network box” and, by implication, the failure of GPN 2.0 to account for such causal links. McGrath (2018), for example, argued that GPN 2.0 offers an impoverished understanding of development and fails to interrogate the border/ing practices of global production networks and the discursive constructions of gender and race in d/Development. Needless to say, this is a rather tall order for a modest theory of industrial organization and economic development – the recent GPN 2.0 is indeed in trouble and “nothing includes everything”!
Cognizant of the current infatuation in some quarters with such discursive thinking in analyzing geographically uneven development, I have argued elsewhere that it tends to focus perhaps too much on the discursive context of socio-spatial changes and underspecifies the causal mechanisms through which network dynamics are directly implicated in producing such changes (Yeung, 2019a, 2019b). But even granted the need for a more discursive approach to GPN research, there still begs the crucial question of in what sense are these socio-economic inequalities really problems directly related to and caused by something specific in/to global production networks? Are there historically- and/or geographically-specific political structures and social relations, as the “constituent outsides” of these firm-based production networks, that are complicit or even directly implicated in producing such “dark sides” to the strategic coupling of localities and regions with global production networks? What might these outcomes be if such production networks and their key actors are entirely domestically or locally based, i.e. the counterfactuality question? Would development outcomes be more equal and/or any different? So, in what sense is it a GPN problem?

This seemingly tough two-stage explanatory work in GPN analysis can therefore be rather elusive because of its heavy demand for detail empirical knowledge of global production networks in different industries and sectors impinging on and/or originating from these localities and regions in an interconnected world economy. I have experienced this first-hand during the past several years. With much novel empirical data on the global electronics industry, I am only able to complete just the first stage in an entire monograph (Yeung, forthcoming b; but see also Yeung, 2016)! Still, I believe this detailed knowledge of network dynamics is crucial, irrespective of one’s research focus on production networks at the industry level or uneven development outcomes in specific territories and localities. Indeed, I would go further to argue that a GPN-lite study focusing solely on such development outcomes on the ground, such as livelihood and gender or racial relations, needs not be couched as a GPN study or in terms of GPN 2.0. The absence of network dynamics does not automatically constitute an analytical problem insofar as such grounded studies eschew claims of causal links between global production networks and socio-spatial outcomes. Ultimately though, this detailed empirical knowledge of broader network dynamics can be useful to the formulation of relevant political initiatives (state and policy) and social interventions (reproduction and livelihood) to address the real-world trouble with global production networks in most cases (e.g. during the Covid-19 pandemic).

### In what sense a problem of global production networks? (Re)assessing GPN 2.0 in the GPN approach

With the above clarification and delimitation of GPN 2.0, I can proceed to exchange further with critics and users of GPN 2.0 within the broader GPN approach in geography. But let me first mention briefly the epistemological context. By the late 2010s, GPN 2.0 and the broader GPN approach had become more intertwined with the much larger global value chains (GVC) literature beyond geography. Associated with sociologist Gereffi (1994, 2018) and many other scholars (see reviews in Neilson et al., 2014; Ponte et al., 2019; Kano et al., 2020), this GVC literature has gained significant influence in the social sciences and major international organizations (United Nations Conference on Trade and Development, 2013, 2020; World Bank, 2020; World Trade Organization, 2019). The broad appeal of the GPN approach in human geography might be partly explained by its analytical proximity to and
yet theoretical advancement over the GVC framework focusing primarily on value chain governance and upgrading.

Nevertheless, I think Bryson and Vanchan’s (2020: 532) latest claim that the GPN approach has become the new mesmerising mantra in economic geography has missed out on the wide range of highly influential approaches in the subfield, such as evolutionary economic geography, innovation systems, financial geographies, geographical political economy, institutional approach, and so on. In Clark et al.’s (2018) authoritative The New Oxford Handbook of Economic Geography, the GPN approach is discussed “only” in one chapter (Yeung, 2018), whereas financial geographies, for instance, are addressed in at least seven chapters. I am not sure what kind of mesmerising mantra the GPN approach really is; it does not even have any appending word or words such as “geographies” or “economic geography”! Those approaches with such appending words, including “relational economic geography” in which I have some “investment” (Yeung, 2005), are indeed more likely to serve as such flag bearers or mantras in geography.

Now, let me respond further to some of the critics of GPN 2.0 vis-à-vis their claims on its (mis)treatment of value/risk, the state, and labour. In their assessments, some scholars seem to have given GPN 2.0 too much analytical (over)reach and coverage, only then to render it as “unproductive”, “impoverished”, “mesmerising”, and “losing touch”. They are also unable to answer fully the substantive difference such network dynamics make to their analytical outcomes. As one such example, Bryson and Vanchan’s (2020: 536) recent claim that GPN 2.0 has been too “hagiographic” and has not offered sufficiently critical analysis of value and risk offers a rather limited reading of GPN 2.0’s treatment of value and risk. Since Henderson et al.’s (2002) initial work on GPN 1.0, most GPN scholars understand value as more than a price-based calculation to denote residual economic surpluses from material and intangible transformations in the complex process of value creation, enhancement, and capture. Extending this earlier understanding, value in GPN 2.0 is not just about profit, but more significantly also about surpluses in skills, technologies, and livelihoods embedded in ongoing social relations of production that are explicitly associated with economic activities organized through global production networks. Grabher and van Tuilj’s (2020) recent Exchanges paper in this journal further shows that in a world of digital platforms, such a conception of value goes well beyond the ownership of tangible assets in global production networks to embrace use value through controlling and granting access to (in)angible network resources.

Meanwhile, GPN 2.0’s theoretical framing has already conceptualized explicitly five different forms of risk: economic, product, regulatory, labour, and environmental. But it clearly did not (and perhaps needed not) predict the Covid-19 pandemic and its associated disruptions in global production networks! In the context of this once-a-century global disaster, regulatory risk in uneven political interventions and environmental risk associated with the pandemic as a natural hazard-cum-human-made disaster should come to the forefront of any GPN analysis of global supply chain disruptions and extra-firm bargaining relationships. Whether such risk in global production networks should go conceptually all the way “down” to the microbial scale – again, in what sense a GPN problem? – is entirely debatable. But its causal impact on global production networks and the “dark sides” of network articulation manifested in different localities and regions have already been debated in some recent work (Ibert et al., 2019; Phelps et al., 2018; Yeung, 2015).

What about the perceived “missing” elements that have become their trouble with GPN 2.0, such as the state, finance, labour, the environment, and so on? By way of illustration, let me focus on just two elements – the state and labour. The state has recently been in vogue in economic geography (including a recent call for theme issue papers in this journal), partly
due to the rise of so-called “state capitalism” in Western democracies since the 2008/2009 global financial crisis and the urgent demand for strong and capable state leadership in steering economy and society during (and after?) the current Covid-19 pandemic. Of course, such an institutionalized form of state capitalism has been around and put into practice in certain Asian and Latin American countries since the 1960s, with drastically different developmental outcomes (e.g. Japan, South Korea, Taiwan, India, the Philippines, and Brazil; see Kohli, 2004; Haggard, 2018; Yeung, 2016). Not surprisingly, some critics of GPN 2.0 have lamented its (mostly) “missing” analysis of the state. While many GPN scholars have already recognized the state’s differentiated roles in global production networks (Horner, 2017; Lim, 2018; Smith, 2015; Werner, 2020; Yeung, 2014), this GPN trouble needs further unpacking and clarification here.

To begin, the state is a constitutive part, but not necessarily the central driver, of global production networks – global lead firms are, in conjunction with their strategic partners, key suppliers, and major customers in different national jurisdictions. The state can undoubtedly influence these lead firms through specific policy interventions such as strategic industrial policy or trade restrictions, but the state does not directly “do” production networks, except in a small number of cases of sovereign wealth funds (e.g. Singapore; see Yeung, 2011), state-owned enterprises (e.g. Saudi Aramco), and private firms with alleged state links (e.g. Huawei). Bringing the state into a full-blown GPN analysis thus requires us to be attentive to both the state as a political institution for collective action and national security and the state as an economic actor in its own right. It compels us to specify much more explicitly the ways in which the state is complicit in disrupting or reshaping the competitive logics of global production networks and its ramifications for network dynamics and development outcomes.

Let me cite a brief recent example of this politics of global production networks in high tech industries. In May 2020 and in the name of national security, the Trump Administration in the United States imposed tough export restrictions on China’s Huawei in order to cripple its global supply chain for the semiconductor chips that go into Huawei’s 5 G base stations for telecommunications networks, with all the intended and unintended consequences for geopolitical conflicts, trade tensions, technological shifts, and, ultimately, uneven development. As one can imagine, crippling Huawei’s semiconductor supply chain will not only hurt American suppliers of advanced chips (e.g. Intel), semiconductor design software (e.g. Cadence), and semiconductor manufacturing equipment (e.g. Applied Materials) – all part and parcel of Huawei’s global production network for 5 G base stations, but also impact negatively upon many end markets for its telecommunications equipment, including possibly rural villages in the Global South that might previously have access to 5 G technology via Huawei’s lower cost base stations.

There is also a thorny issue with Huawei’s existing ownership of up to 35 percent in all 5 G-related patents and 20 percent in 5 G-standards essential patents. Huawei can retaliate by placing severe restrictions on the licensing of these patents to third parties, making it much more difficult and/or costly for other competing technology suppliers of 5 G networks, such as Ericsson, Nokia, and Samsung, when these global production networks exclude Huawei (and other suppliers from China). This example shows that all kinds of political questions need to be asked, including but not limited to how US export restrictions on Huawei is tied to its domestic political interests in curbing China’s high tech ambition and the broader geopolitical dynamics in such great power conflicts. But these questions of the state and international relations are really a problem of global production networks only when we can explicitly demonstrate how Huawei’s production network dynamics matter in the origin and propagation of these political contestations and the consequences of different
state policy interventions, from the US, the UK, and the European Union to China and other developing countries. In that sense, the state can become part of the problem with Huawei’s global production network and vice versa. The GPN “litmus” test is passed.

Second, the role and influence of the state in these lead firms and their network partners within and outside the home/host country can be highly variegated due to very different domestic political circumstances and interest group pressures. Evans (1995) work has shown clearly how such embedded autonomy in society can be achieved by the state in a relatively homogenous and authoritarian domestic political economy. This embedded autonomy is necessary to the state’s bureaucratic coherence and policy efficacy. But recent international political economy work on East Asian industrial transformation has illustrated how the state’s domestic embedded autonomy is much harder to maintain in an interconnected world of global production networks (Hamilton-Hart et al., 2021; Yeung, 2016). In short, the mere (re)insertion of the state into GPN 2.0 as an “essential outsider” is insufficient analytically; a fuller state-relevant analysis of global production networks must take into account both domestic politics and the international political economy of these cross-border production networks. To cite one good example, Peck’s (2017) work on the US has demonstrated exceedingly well how the “simple” global outsourcing of manufacturing and service work goes far beyond offshoring, defined as a locational shift of domestic employment, and involves complex political contestations among the different factions of the American state and neoliberal capitalism.

Labour, as an analytical category, has been central to economic geography for decades going back to the highly influential debates on the spatial divisions of labour in production (Massey, 1979, 1984). Early GPN analyses since the 2000s have consistently examined social upgrading vis-à-vis worker skills and employment conditions in many developing economies. However, I am mindful of Andrew Herod’s work in labour geography, particularly his classic study of the 1998 dispute between General Motors and United Auto Workers’ local chapters in Michigan. Predating even the broader GPN approach emerged in the early 2000s, this work was understandably not couched in terms of social upgrading, but it did focus on workers’ struggles over unreasonable changes in work rules and job classifications that threatened their job security and shop-floor work practices. Herod (2000) demonstrated evidently how GM’s just-in-time organization of its global production network had ironically weakened its bargaining power in relation to organized labour. When thousands of UAW Local 659 walked off the job at GM’s metal stamping plant in Flint, Michigan, in June 1998, this industrial action eventually triggered a “chain” reaction reverberating throughout GM’s entire global production network that led to significant revenue and profit losses and management’s subsequent compromise with UAW’s demand. This “local” dispute in Flint, transmitted through GM’s global production network, even impacted adversely upon its far-flung electronics component subsidiary, Delco, in my home “town” Singapore!

To my limited knowledge on the literature incorporating labour and global production networks, Herod’s (2000) GM study is one of the best GPN-like analyses of the complex relationships between firm dynamics and labour contestations. And yet his work had pre-dated presumably the more sophisticated treatment of just-in-time production systems/networks in the subsequent GPN literature. Geographers facing the conundrum of bringing labour back in their analyses premised on GPN 2.0 can take a leaf out of Herod’s exemplary work (see also Herod, 2018). Instead of focusing narrowly on the labour side of the equation (e.g. economic and social upgrading at the local scale) and leaving global production networks as a “black box” out there, it is imperative to examine both network dynamics and labour struggles in order to arrive at a more complete analysis of labour’s co-constitutive
role in the industrial-organization of global production networks and its concomitant embodiment of value creation, enhancement, and capture through these networks (see also work on labour regimes and global production networks).

If we were to consider capital as represented by global production networks, then labour outcomes such as social upgrading cannot simply be “read off” from the position of workers in production systems just because they are in global industries or sectors characterized by the extensive presence of cross-border production networks. Global production networks are simply too important to be left merely as the background context such that the analytical focus is all about on-the-ground labour manoeuvring and social conditioning. A fuller examination of capital-labour or global production networks-worker relations is critical. In short, such GPN 2.0-inspired studies of labour conditions and process outcomes must demonstrate in what sense global production networks are the problem to the actually existing exploitation and malaises of workers in these production systems. Will these socio-spatial outcomes be any different in a purely domestic production system? How and why? The analytical key here remains in demonstrating how changing dynamics in production systems are causally linked to uneven outcomes in work conditions and labour rights.

Making GPN 2.0 work (better) in the next global shift?

In retrospect, the trouble with global production networks in both the real world and the epistemic community might have perhaps come at the right time. Decades of unfettered globalization of production has led to a far more interdependent world economy characterized by extensive cross-border production networks. But the global pandemic has exposed the inherent vulnerability and weak resilience in these “global” production networks, particularly in the life-and-death situations of critical medical supplies and essential food provision. The post-pandemic world economy will likely undergo another global shift towards less globalized production – through the massive restructuring of global production networks in search for more diversified production bases, supply stability, and network resilience. And yet, this remaking of the global economy throughout the 2020s will not occur in a vacuum devoid of political manoeuvres, social conflicts, and environmental challenges. Rather, the domestic pressure for greater supply chain resilience and localization will go in tandem with the wider geopolitical conflicts in which the decoupling of major economic powers and the incessant trade tensions in the international political economy may trump the competitive logics of global production networks driven by cost minimization, market access, and shareholder pressure theorized in GPN 2.0.

Somewhat paradoxically, making good sense of this transformative restructuring process in order to make global production networks more stable and less risky in the post-Covid-19 world economy will demand greater analytical resilience in GPN 2.0 and the broader GPN approach discussed in this Exchanges paper. The next iteration of GPN theory must incorporate not only new network dynamics arising from ongoing technological shifts and digital disruptions in the production domain, but also potentially very different geographies of work and livelihood in the social arena. Most importantly, it must demonstrate explicitly how and why these network dynamics matter in their interaction with the changing geographies of everyday socio-economic life. Identified through careful conceptual and empirical work, this “network problem” can and must be fixed to produce a fairer and more just world. As a meso theory of industrial organization and economic development, GPN 2.0 and its future (re)conceptualizations must continue to offer relevant insights into such industrial change for anyone interested in mapping these network transformations onto
diverse socio-economic outcomes in different geographical settings. In that sense, there might be a solution to “GPN trouble”.

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