

Digital Work and Virtual Production Networks: Rethinking Embeddedness

Abstract

Building on the Global Production Network (GPN) approach we use interview and survey data to conceptually map what we refer to as ‘Virtual Production Networks’ (VPNs). The VPN typology highlights the unique (dis)embeddedness of online outsourcing platforms. The extant GPN research has paid insufficient attention to the different manners in which production networks are embedded: societally, in social networks and territorially. Using labour within VPNs as an example, we show that these distinctions matter. In particular, we highlight that, although VPNs operate with a high level of societal disembodiedness, they remain embedded territorially and within social networks.

Key words

Embeddedness, digital labour, digital work, global production networks, GPN, online outsourcing, online labour markets.

Introduction

The spread of the internet to three and a half billion people has helped give rise to a diverse range of outsourcing practices and raises important questions for economic development (Graham et al., 2015). At the heart of the rise of internet facilitated outsourcing has been the development of global online outsourcing platforms which bring tens of millions of clients and workers together to exchange labour for money (Kuek et al., 2015). The World Bank estimates that the online outsourcing sector has annual revenues of \$4.8 billion in 2016, and that it will have revenues of between \$15-\$25 billion by 2020 (Kuek et al., 2015). Some commentators even suggest that within the next decade every one in three labour transactions will be mediated by such labour platforms (Standing, 2015).

According to the World Bank, online outsourcing represents ‘a new and innovative channel for socioeconomic development for developing country governments and

development practitioners' (Kuek et al., 2015: 1). yet, little academic research has considered what forms these emergent economic patterns, structures and activities are taking. This paper, therefore, attempts to sketch the nature of online outsourcing practices in relation to a selection of Sub-Saharan African (SSA) and South East Asian (SEA) countries¹. We draw upon 152 interviews with workers and stakeholders as well as a survey with 443 workers.

The Global Production Network (GPN) framework (Coe et al. 2004; Coe et al. 2008; Henderson et al. 2002) is used to centre our analysis, and we begin by highlighting the strengths and benefits of the GPN approach. In doing so we highlight that its strength as a heuristic framework is in large part due to its nuanced understanding of embeddedness, which combines insights from Polanyi and Granovetter amongst others (Hess, 2004). However, we also argue that, despite being a core conceptual category, insufficient attention has been paid to embeddedness, particularly the different meanings of societal, network and territorial embeddedness. We also suggest that while this oversight has in part lead to the GPN framework being criticized for lacking explanatory power (Yeung and Coe, 2015) the absence of serious consideration of embeddedness has gone largely unnoticed due to GPN research in practice being firm centric (Bair, 2008; Wright and Kaine, 2015) and thus ignoring of labour within production networks (Coe et al., 2008; Barrientos et al. 2011; Wright and Kaine, 2015).

We adopt the term Virtual Production Networks (VPNs) to differentiate the more fragmented, commodified, and societally disembedded nature of online outsourcing from that detailed within the extant GPN literature. We show that the societally disembeddness of online outsourcing does not mean that VPNs are immaterial or operating in some kind of ethereal alternative dimension (Graham, 2013). In fact, VPNs remain embedded territorially

¹ We conducted research in three Southeast Asian (The Philippines, Vietnam, Malaysia) and three Sub-Saharan African countries. The two regions were selected because they are the two low-income parts of the world most associated with the developmental potentials of digital work and digital outsourcing. A total of six countries were chosen for the study in order to attempt to understand the variety of outcomes within those regions.

and within social networks at regional, national and local spatial scales, and this enables the overcoming of a number of problems and contradictions created by commodification and societal disembeddedness.

Embeddedness and the absence of commodification

The Global Production Network (GPN) framework has been a key way of conceptualizing and understanding economic geographies (Coe et al. 2004, Henderson et al. 2002). It allows scholars to think through the assemblages of human and non-human actors that are engaged in transnational networks of economic production. GPNs thus include firms, labour power, regulations, and even algorithms (Barrientos et al. 2011, Mahutga 2012, Foster and Graham 2016).

A global production network (GPN) can be defined as the ‘interconnected nodes and links that extend spatially across national boundaries and, in so doing, integrates parts of disparate national and subnational territories’ (Coe et al. 2008: 4). The integration and influence of different territories is held to be achieved through the process of embeddedness. It is this consideration of embeddedness which represents a major theoretical contribution of the GPN framework and sets it apart from research undertaken by Global Commodity Chain (GCC) and Global Value Chain (GVC) scholars. The process of embeddedness in production networks is understood as taking three forms: *societal embeddedness*, *network embeddedness* and *territorial embeddedness*.

Societal embeddedness refers to the ways actors are influenced and shaped by their institutional, social and cultural context and heritage (Hess, 2004; Hess and Coe, 2006). Particular importance is placed upon state policies and legal frameworks and how a lead firm’s origin and heritage can shape the entire GPN. *Network embeddedness* refers to the architecture, durability and stability of connections between network members. This is seen as being ‘the product of a process of trust building between network agents’ (Henderson et

al., 2002: 453). *Territorial embeddedness* refers to how GPNs are anchored, due to their network embeddedness, in different places and thus embedded in the ‘economic activities and social dynamics which already exist in those places’ (Henderson et al., 2002: 452), such as training programs and tax advantages (Coe et al., 2008; Hess, 2004; Hess and Coe, 2006).

Thus understood GPNs are ‘much more than economic phenomena: they are also fundamentally social, cultural and political systems’ (Coe et al. 2008: 10). Practices, rules, laws, and norms all shape economic activities which are prescribed and performed within economic, social, and political networks (Henderson et al. 2002). The GPN framework deploys the concept of embeddedness to stress how production networks ‘constitute and are reconstituted by the economic, political, and economic arrangements of the places they inhabit’ (Hess and Coe, 2006: 1207). Particularly the ways in which GPNs are shaped by the influence of ‘supranational organizations, government agencies, trade unions, employer associations, non-governmental organizations and consumer groups’ (Hess and Coe, 2006: 1207).

GPN theory has, however, been criticized for lacking explanatory power (Yeung and Coe, 2015). We hold that one reason for this is that embeddedness (which according to Henderson et al. (2002) is a core conceptual category) has been inadequately elaborated in extant research.² Indeed, Coe et al. (2008) highlight that much of the GPN literature pays little attention to the institutional and geographical environments which form and shape GPNs. The conceptual distinctions between these three types of embeddedness have not been fully appreciated nor the potential this entails for shaping GPNs in diverse ways. This is because these different forms of embeddedness represent qualitatively different phenomena

² The same is also likely to be true for the other two core conceptual categories of *power* and *value*. Yeung and Coe (2015) provide an alternative solution, which they term ‘GPN 2.0’. Yet GPN 2.0 differs so drastically in conceptual terms, not least with regards to embeddedness, from ‘GPN 1.0’ that it represents more of a break with rather than elaboration of ‘GPN 1.0’.

and *do not* simply represent different routes to the same outcome (the influencing of production networks by social and spatial arrangements).

The distinctiveness of the three types of embeddedness utilized in GPN research derives from the conceptual origin of societal embeddedness being very different to that of network and territorial embeddedness. Initially the GPN framework only identified network and territorial embeddedness (Henderson et al., 2002).³ Hess (2004) introduced societal embeddedness in an attempt to rebalance what he considered an ‘overterritorialized’ understanding of embeddedness. The intellectual heritage of societal embeddedness lies in the work of Polanyi (1944). Polanyi focused upon societal level normative and cultural barriers to commodification (Bolton and Laaser, 2013; Block, 2001; Burawoy, 2010; Harvey, 2014; Kelleberg, 2009; Webster et al., 2008).

The relationship between embeddedness and commodification has been particularly useful in scholarship on the sociology of labour markets. Within this field of study, Polanyi’s work has been drawn upon to highlight the pendulum like process of de-commodification/re-commodification (See for example: Burawoy, 2010; Kelleberg, 2009; Webster et al., 2008). It is held that during the period 1940-1980, in advanced capitalist countries, labour was increasingly ‘de-commodified’ due to various institutional interventions which loosened the disciplinary power of labour market competition (Esping-Andersen, 1990; Greer, 2016). However, from the 1980s and continuing to this day labour market reformers have attempted to reverse this effect and reinstate labour market discipline. This process being termed ‘re-commodification’ (Offe, 1984). Greer (2016: 165) defines re-commodification as ‘any institutional change that reinstates the discipline of labour market competition on workers, whether in or out of work and whether through reforms to welfare states, industrial relations, or labour markets.... [And in doing so] it entails new forms of administrative control over

³ Although the embedding of GPNs in ‘institutional fabrics and cultural contexts of particular forms of capitalism’ is discussed (Henderson et al., 2002: 453).

workers and job seekers... the loosening of other labour market rules and new management techniques in the workplace’.

On the other hand, the intellectual heritage of network and territorial embeddedness lies in the work of Granovetter (1985) and the *new economic sociology* which followed his pioneering work (Bair, 2008; Hess; 2004). In this body of work embeddedness is not related to commodification but is instead concerned with how economic action is influenced by social structure. Essentially this form of embedding takes place through the generation of interpersonal networks of trust which are generated through micro-level interactions (Granovetter, 1985). Bair (2008) argues that network embeddedness logically leads to a territorial embeddedness as a focus upon micro-sociological interpersonal relations means there is ‘an implicit privileging of more local levels of analysis as these are contexts in which we can see the social structure which is at the explanatory core of the embeddedness paradigm [in new economic sociology]’ (Bair (2008: 347). However, this understanding of embeddedness is distinct from societal embeddedness which would be ‘indicted by Granovetter (1985) as an over-socialized account of human action, in which appeal is made to the influence of internalized norms or shared values rather than the effect of concrete networks of social relations’ (Bair, 2008: 360). But Granovetter can likewise be accused of an undersocialised view of embeddedness that underplays real effects of culture upon social networks (Zukin and DiMaggio, 1990). As Zukin and DiMaggio (1990: 17) point out ‘culture sets limits to economic rationality’. What is clear is that societal embeddedness describes a very different process to those of network and territorial embeddedness. More importantly, the claimed outcomes of the three types of embeddedness are also different. Societal embeddedness refers specifically to the degree to protective cultural barriers to *market* exchange exist, while network and territorial embeddedness refer to the embedding of

exchange within ‘dense and stable networks of relations, shared understandings, and political coalitions’ (Granovetter, 1985:43) generated through micro-level interactions.

Furthermore, the lack of attention to the different meanings and implications of embeddedness has gone unproblematized due to the dominant methodological approach in empirical work that uses the GPN framework. Despite theoretically distancing themselves from the GCC approach, GPN research has, in practice, tended to remain similarly firm-centric (Bair, 2008; Wright and Kaine, 2015). Therefore, when Hess and Coe (2006) write of societal embeddedness as being close to Polanyi’s original conception, they refer to the embeddedness of firms. As consequence a number of researchers have pointed out that the experiences of labour within GPNs has gone largely unresearched (Barrientos et al., 2011; Coe et al., 2008; Wright and Kaine, 2015). In fact, the absence of workers in GPN research is representative of a wider problem within Economic Geography (Coe et al., 2008; Herod, 1997). For example, in spite of the importance of labour regulation in the global electronics industry (Locke et al., 2013), Hess and Coe’s (2006) study of standards and embeddedness in mobile-telecommunications hardly features labour standards. The study of social upgrading by Barrientos et al. (2011) represents one of the few occasions in which GPN research has seriously considered labour, yet here too commodification is not analytically explored. This lack of attention to the commodification of labour perhaps partially derives from the wish of GPN scholars to critique the Global Commodity Chain (GCC) literature for underplaying the ability of states to ‘regulate what occurs in those links that touch down within its territorial borders’ (Bair, 2008: 355).

The problem of highly unregulated global production networks may be more severe when it comes to what we term virtual production networks (VPNs). Virtual production has much greater potential for fragmentation (Lehdonvirta, 2016) and Greene and Joseph (2015: 224) suggest that virtual production may be marked by extreme levels of commodification, as

it represents ‘experimental spaces where capital seeks freedom from contemporary limits: old strategies of accumulation are re-attempted in new spaces and new strategies are crafted through trial and error.’

The aim of this article is to empirically demonstrate the importance of interrogating the conceptual distinctions between the societal, network and territorial embeddedness. By elucidating, what we term, virtual production networks, and focusing on the labour within them, we show that while virtual product is embedded within networks and territories at various spatial scales, it is, nevertheless, simultaneously marked by high levels of societal disembodiedness. Doing so has important implications for wider GPN research which has tended to under-theorize embeddedness.

Methods

This paper draws upon two data sets. The first consists of 151 semi-structured interviews with workers and stakeholders. This includes 27 stakeholder interviews with government and NGO officials and representatives of the online outsourcing sector, and 125 worker interviews. These worker interviews consist of 45 from South East Asia (16 Filipinos, 8 Malaysians, 21 Vietnamese) and 81 from Sub-Saharan Africa (38 Kenyans and 23 Nigerians and 19 South Africans). Worker participants were recruited through listings on four of the largest online outsourcing platforms (explained below). Invited online workers were shortlisted based on a range of predefined sampling criteria, including types of work performed, feedback profiles, platform membership duration, hourly rates, gender, and location. The main sampling goal was to ensure varied representations of primarily low-skilled labour experiences in the countries of interest.

The second source of data comes from a survey of 436 SEA and SSA workers. These workers were recruited through the posting of an online survey as a job task on two of the

largest online outsourcing platforms. The survey lasted approximately 30 minutes and workers who had been active in the last two months and were from SEA or SSA were invited to complete the survey in return for \$3. Invites were targeted and filtered so as to only include workers who has completed at least five hours of paid work or had five or more reviews, workers were also filtered to avoid repeat respondents and invites were targeted with aim of achieving a spread of nationalities, gender and skills.

Findings and discussion

Online outsourcing platforms and the shaping of virtual production networks

Contact, contract and control costs have acted as barriers to traditional outsourcing which previously could only be overcome through sufficient scale (Carmel and Nicholson, 2005). Ellram et al. (2008) highlight the difficulty of sourcing and contracting services at the correct price and the expense of creating monitoring and management systems which can deal with the added complexity of offshored outsourcing. Online outsourcing platforms provide a novel means of reducing these costs through the efficient global allocation, pricing and coordination of work. This is based on the matching of clients looking to purchase labour power and workers seeking to sell labour power. The precise mechanisms by which this allocation and pricing is achieved differ according to platform. The thirteen international platforms used by our interview informants reflect three main approaches towards the allocation and pricing of work: double auctions, one side buyer/seller posted, and labour management platforms.⁴

The largest platforms were based on a double auction mechanism, with both buyers and sellers able to post tasks and make offers. These double auction platforms had the largest potential workforces. For example, Upwork (formed from a merger of Odesk and Elance in

⁴ We are indebted to Otto Kassi for helping us determine these three mechanisms.

2015), Freelancer.com and Guru.com all claimed to have over a million workers registered globally, while Peopleperhour claimed in excess of 80,000.

Perhaps the most well-known online outsourcing platform is Amazon's Mechanical Turk (MTurk) (which along with Fiverr) operates according to an alternative model whereby only one party – buyers (in the case of Mechanical Turk) and sellers (in the case of Fiverr) – were able to post tasks and prices. The reason for this 'take it or leave it' approach, modelled on e-commerce marketplaces such as Amazon and Ebay, was to cut down on 'frictions' such as the time spent searching, recruiting and negotiating with workers (Li, 2014). In 2011, MTurk had a workforce of over 500,000 but only workers in the US and India could be paid directly; workers in other countries had to transfer their earnings into Amazon vouchers (Lehdonvirta, 2016). For this reason around 90% of MTurk workers are from the US and India (Ross et al., 2009), and, therefore, it does not form part of our study.⁵

Even though platforms operating double auctions and one-side postings are often termed 'online labour markets' (Caraway, 2010), in reality these platforms are not simply labour markets and actually act as labour market intermediaries providing a range of functions. However, the term does serve to distinguish platforms that seek to model themselves closely on markets and marketplaces from those with a more traditional employment model. Online labour markets primarily extracted value from VPNs by charging workers service fees.

An alternative to the 'online labour market' approach is the 'labour management platform'. This type of online outsourcing platform specializes in particular services: lead generation, transcription, content creation, and data entry. Labour management platforms extract value from VPNs by charging clients who contract their services a fee and unlike the

⁵ However, it has been the focus of much extant research (see for example: Bergvall-Kåreborn and Howcroft, 2014; Irani, 2015; Lehdonvirta, 2016; Ross et al., 2009; Yin et al., 2016).

platforms above, labour management platforms offer assurances to their clients about the quality of the work and thus have tougher recruitment policies and quality control systems. Labour management platforms operate relatively small internal labour markets, with entry restricted through skill barriers, e.g. qualifications, and testing during recruitment. For example, managers at one of the established labour management platforms claimed that they had 295 Kenyan workers whereas the largest online labour market platform had 21,700 registered Kenyan workers. Only around 10% of applicants to these labour management platforms succeed in gaining entry (Perez, 2013). These platforms, unlike online labour markets, also provide specialized training programs for their workforces.

Labour management platforms regulate the allocation of work through administrative rules and use internal pricing mechanisms to determine pay rates. Managers at one platform explained how pay was algorithmically determined:

[It's] not a marketplace model... there'll be a pay out per task... for every single task that is then dynamically calculated according to the average target times that it should take... based on that, we have a base-payout, and then we begin to augment that up according to things like experience, things like accuracy, sometimes it's kind of gamification things like when they've gotten the row correct... difficulty rating, there's the skill score that we'll have for a particular task, right... all the different variables that go in.

Labour management platforms then resemble traditional business process outsourcing centres but differ from them in that the workforce is spatially distributed and workers' relationships with each other and the firm is mediated by the internet.

Table 1. demonstrates that the online outsourcing platform sector is dominated by US-based platforms. These platforms were being utilized to outsource and offshore a large range of digital services Rather than having a single job role, our informants undertook a number of more or less overlapping tasks. Important categories being: data entry; lead generation; administrative support; translation and transcription; internet marketing; content creation; and

online research.⁶ Other important but less common categories in our qualitative data were website and app design and programming and graphic design.

Table 1. Outsourcing platforms used by informants

Platform name	Headquarters	Founded	Type
Upwork (merger of oDesk and Elance)	California, US	2015	Double auction
oDesk	California, US	2002	Double auction
Elance	California, US	1999	Double auction
Freelancer.com	Australia	2009	Double auction
Guru.com	Pennsylvania, US	1998	Double auction
Peopleperhour	UK	2005	Double auction
Fiverr	Israel	2009	One side (seller) posted
Rev.com	California, US	2010	Labour management platform
MobileWorks	California, US	2011	Labour management platform
CloudFactory	Kathmandu, Nepal	2010	Labour management platform
Crowdsorce	Missouri, US	2012	Labour management platform
CrowdFlower	California, US	2007	Labour management platform
iWriter	Indiana, US	2011	Labour management platform

As suggested by the GPN literature, both our interview data and oDesk transaction data suggest that the vast majority of the labour was being purchased by firms based in high income countries. There were only occasional instances of workers being hired by Asian and African clients (See Figure 1.). As the CEO of a major platform explained:

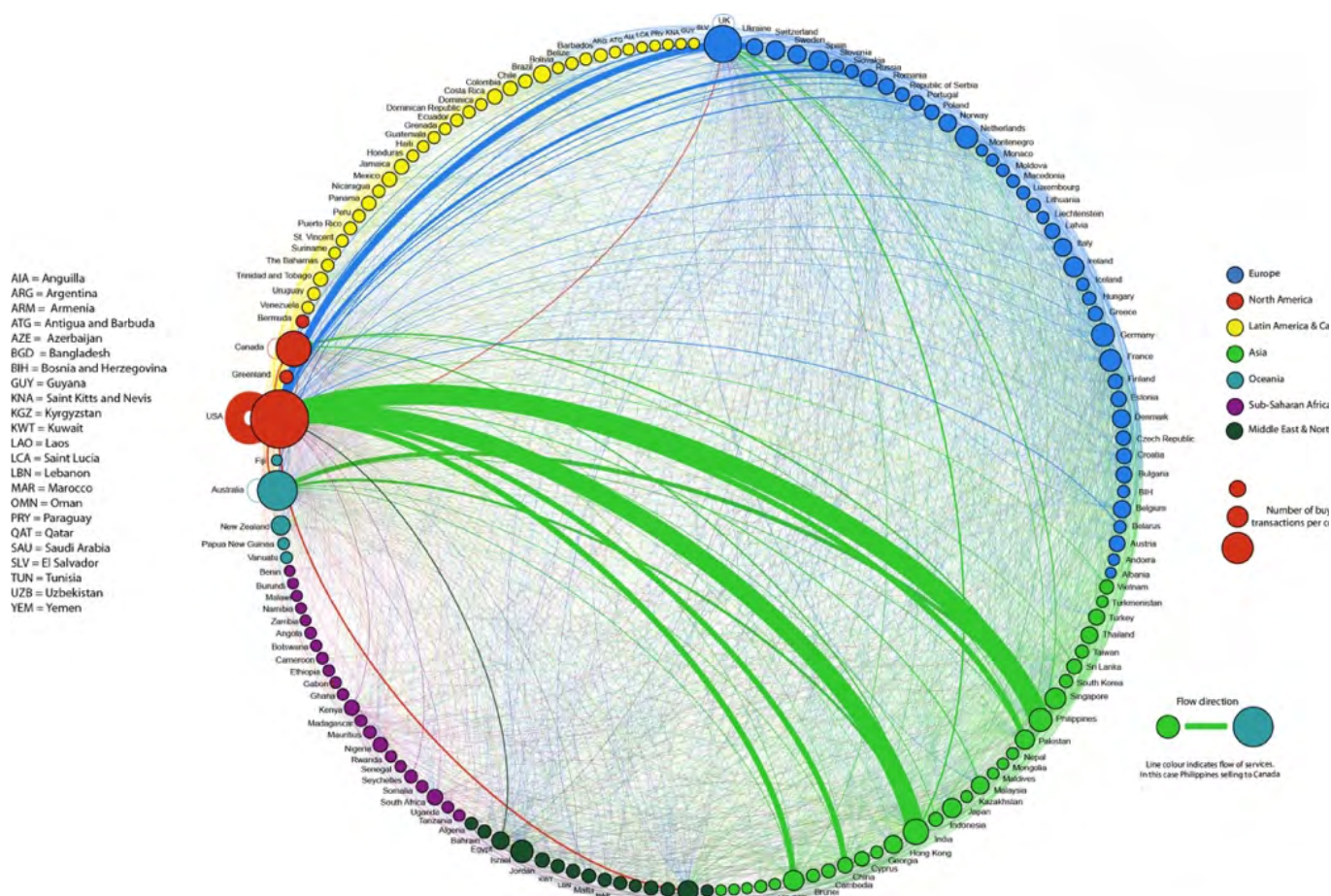
About 40% to 50% of the jobs by value come from the United States of America and then about 10% come from the United Kingdom and then 7% of the jobs are now coming from India

⁶ Each category of work being comprised of tasks described by approximately 25+% of our informants.

Table 2. Upwork workforce globally and in countries studied⁷

Country	Potential workforce ⁸	Current potential workforce ⁹	Actual workforce ¹⁰
Global	1,775,500	255,800	95,100
Philippines	221,100	28,000	13,100
Malaysia	11,900	1,300	200
Vietnam	7,700	1,400	500
Kenya	21,700	2,200	800
Nigeria	7000	900	100
South Africa	10,200	1,600	400

Figure 1. The geographic network of sales



(Source: oDesk transaction data on projects carried out on the platform from 1 March to 31 August 2013).

⁷ As of 7 April 2016 not seasonally adjusted
⁸ Total worker profiles 7 April 2016
⁹ Checked profile in last 1 month
¹⁰ Active in last month and at least one hour billed or \$1 earned

The end-clients of some of our informants were major multinationals such as Facebook, Microsoft, Google, EBay, and Twitter. However, while GPNs tend to be oriented around the operations of MNCs, we found that MNC presence within virtual production networks to usually be mediated by smaller actors. For example, a large Silicon Valley firm could outsource some software testing, development or service to a subcontractor who could in turn outsource some of the work through an online outsourcing platform to workers in the Global South. A similar story existed for government contracts. A Kenyan worker, Abasi, explained:

Actually we did not get it directly from the government, we got it from someone who got it from someone who got it from the government.

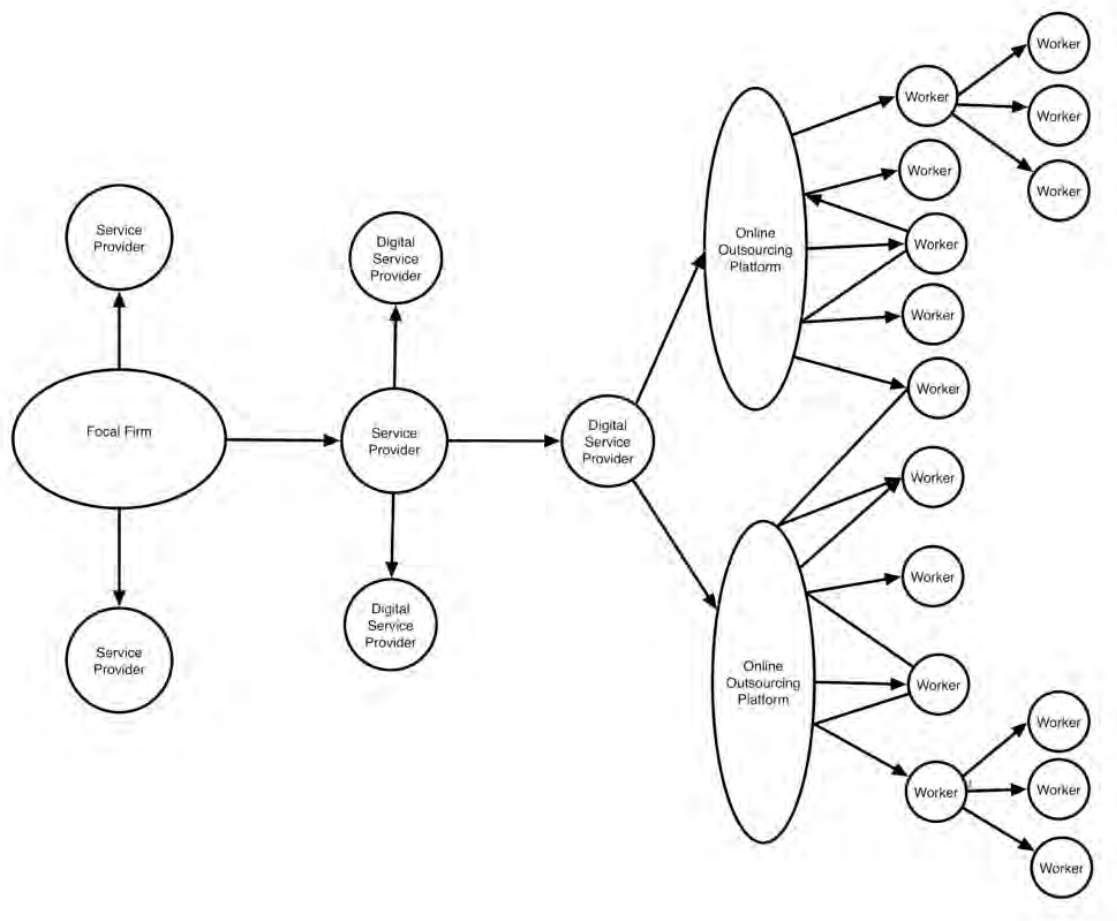
In fact, working for intermediaries was common, with many of the clients hiring our informants being small and medium sized enterprises. When end-clients contracted directly with informants, they tended to be small employers, self-employed, and even employees located in high income countries.

Online outsourcing platforms significantly reduce the costs of outsourcing and offshoring the types of work described above. In particular outsourcing platforms provide an architecture to cheaply identify and contact workers, and a standardized means to contract and pay them. Moreover, their transparent pricing mechanisms make contracting costs simple to calculate. As will be discussed further below, these platforms also seek to provide non-proximate mechanisms of control. This lowering of costs in turn opens up the possibility for small-scale operations to outsource and offshore digital tasks. For example, we found that one enterprising academic employed at a university in a high income country had outsourced the marking of his students' essays to a worker in Kenya.

A key feature of online outsourcing platforms then is that they represent the widening of access to offshored outsourcing opportunities which have previously largely been the preserve of MNCs. Small firms and individuals can also now engage in the outsourcing of

digital tasks. In fact, the low costs of using such platforms meant that platform workers sometimes utilized these same platforms as clients themselves in order to re-outsource elements of the work to other digital workers. A stylized account of VPN subcontracting is provided in Figure 2. This account illustrates how focal firms outsource certain tasks to medium-sized service providers, who in turn contract the digital elements to small specialist firms that then place them onto online outsourcing platforms. Finally, workers take up these tasks and either perform them themselves or outsource them via the platforms or local social networks (discussed below).

Figure 2. VPN subcontracting



On demand labour and societal disembeddedness

As mentioned above, a core conceptual category within the GPN framework is embeddedness of which there are three types: societal, network and territorial. This section examines the

degree to which labour in VPNs is (dis)embedded in the first of these three manners. An important feature of online labour market type platforms was the way they were engineered and framed so that labour could be purchased and dispensed with on demand. In fact, the CEO of one of the largest online labour markets explained his motivation for founding the company was the realization that:

As an entrepreneur I had this army of people I can hire on demand to do things for me... So I then thought to myself, why isn't there an eBay of jobs?

This quote is indicative of an aspiration to treat labour the same as the commodities bought and sold on digital marketplaces. Doing so requires that labour be just as easy to hire and sell as a phone or a book. Another major platform made clear to clients that they were free to end any worker's contract at any time without notice. The absence of protective regulations for labour, which would otherwise act as market rigidities and reduce competition, was a key to how such platforms were envisioned:

We don't get involved in telling people where to work or how to work or whatever, it's literally, "It's up to you, you can pick and choose whatever"... sort of like frictionless little marketplace, it really is up to you

(CEO of major online labour market)

Labour management platforms dispensed with an explicit focus on market mechanisms, and more closely resembled traditional employers but they also did not aim to provide stable employment. Rather they explicitly offered their clients an 'on-demand' workforce made up of 'online freelancers and contractors.' The construction of workers as online 'freelancers' and 'contractors' left them without legal labour rights and protections. Although task allocation and pay were controlled by algorithms this was not at the expense of competition.

As a manager of one of these platforms explained:

It's a completely open marketplace... within our system, we use an algorithm... which is basically learning what every worker is good at, what they like doing, and what they've earned the most at, and it picks those three factors.

The commodification of labour was also related to the fragmentation of labour processes into tightly packaged tasks to be spatially and temporally distributed across the network through algorithmically enhanced arms-length market transactions. Accordingly, pay was highly focused upon specific tasks, leaving work-related activities (gaps in the workflow, selection, test and trial activities and training etc.) and social reproduction (rest breaks, sick leave, healthcare costs and the living and education costs of the next generation of workers) unremunerated. As a manager of labour management platform explained:

We take a lot of the benefits and approaches of crowdsourcing in terms of breaking the work out and to solve pieces so that we can then automate many of those tasks as possible and then send the remainder out to our workforce

Traditionally, the costs of replacing unwell workers acted as an incentive for employers to maintain a healthy workforce (Doogan, 2009; Hall and Soskice, 2001). Online outsourcing platforms undermine this incentive by reducing these costs through spatially and temporally fragmenting labour processes and providing clients access to a large supply of replaceable workers. While a handful of workers were earning enough to afford health insurance (in countries without a publicly-provided health service), the vast majority of workers were without any whatsoever. The ability of the state to compensate for this commodification through the provision of healthcare was limited because very few informants paid tax on their online earnings:

The government doesn't know about this online job; they just think it's not that creditable.

(David, Kenyan worker)

In fact, only 15% of our survey respondents suggested they had paid income tax on their online earnings in past year. The absence of social security not only represented a threat to workers' long-term health, but also put them at risk of losing their income if they became too sick to work. Moreover, time spent on work-related activities such as breaks, training, job searching, applying and waiting for work were unpaid, even though such activities were

inevitable consequences of the manner in which these platforms organized labour. Our survey respondents spent an average of 18 hours every seven days browsing, applying and reading about jobs alone. Moreover, the vast majority of our interview informants spoke of the skills they had developed in order to effectively compete for more tasks. Learning new skills was essential in this highly competitive environment and 92% of our survey respondents agreed that they had acquired new skills. However, these skills were almost always self-taught using online resources, and entirely unremunerated.

Workers widely perceived the platforms to be highly competitive; seeing themselves as competing globally against workers whose cost of living was presumed to be lower than their own. In fact, global competition was central to the operation of online outsourcing:

There are 7.1 billion people on the planet, there are 2.4 billion people on the internet... They're what I call 'PHDs', poor, hungry, driven... They're willing to work on any sort of job, right, a lot harder than maybe you or I are, for less money...it's highly competitive and it changes dramatically as the internet gets turned on in various countries... And those [unskilled] rates are going down because the more [workers there are], when you're talking about unskilled jobs there's almost no floor as to where those actual prices go.

(CEO of major online labour market platform)

This competition heightened the sense amongst our interview informants that they were easily replaceable and had to maintain a high standard of work. The fear of being discarded was also evident amongst our interview sample with 45% feeling they were easily replaceable and just 28% disagreeing. This perceived competition also influenced what pay rates workers were willing to accept. The effect was heightened by online labour market platforms being engineered so that workers can view other workers' rates and bids. Consequently, many workers said they had reduced their rate, at least initially, as a result of global competition. For example, when asked about his pay rate, Filipino worker Bayani explained:

It's too low actually... The competition... It has worsened, because there are many people in India competing with us, so we have to lower our rates.

Extant GPN research emphasizes the ways in which production is influenced and shaped by institutional, social and cultural practices and the heritage of actors – especially the focal firm (Coe et al., 2008; Henderson et al., 2002; Hess, 2004; Hess and Coe, 2006). These practices may entail regulations which act to decommodify and thus societally embed labour as it circulates through production networks. However, if this embedding were taking place in VPNS, we would have expected workers to have inherited labour rights either from the lead firms’ or workers’ places of origin, even if such rights were not provided directly by the outsourcing platforms. What we found instead was highly commodified labour in as much as there was very little shielding from the external labour market. As our interviewee at the Nigerian Ministry of Communication Technology, responsible for the Nigerian government’s “Microwork for Job Creation” initiative, explained, pay was not something that needed regulating as it was a:

function of supply and demand in the market... we let the free market dictate.

Similarly, the CEO of one of the leading online labour market platforms explained:

it’s almost like a frictionless marketplace; we abstract away nationalities and cultural biases and social biases really.

Irani (2015) draws attention to the ways in which online outsourcing platforms attract investment by presenting themselves as technology companies. Our research supports this finding; but we suggest that by framing themselves as technology firms which only act as intermediaries between clients and workers, online outsourcing platforms are able to disembed themselves from labour regulations (in a similar manner to how online content providers (such as YouTube) discursively frame themselves to avoid regulation (Gillespie, 2010)). With platform management describing their firms in the following ways:

Every industry is waking up to discover it’s now a software business... I don’t think of us as an outsourcing business because... what we do is connect two entrepreneurs, we connect a small business entrepreneur in the West with a small business entrepreneur in the development world and they just work it out amongst themselves to get something done.

(CEO, major online labour market platform)

Network disembeddedness and spatial barriers to trust

Following Granovetter (1985), the building of trust relationships is seen in the GPN literature as playing a key role in embedding networks in personal relations, shared understandings and political coalitions (Henderson et al., 2002; Hess, 2004; Hess and Coe, 2006). The role of trust is especially important with regards to labour. This is because of a bilateral asymmetry whereby both clients and workers have information about their own 'quality' that the other needs, and they generally prefer to learn about one another from personal sources and communication which they trust (Granovetter, 2005). Granovetter (1974) thus finds that large numbers of workers find traditional jobs through personal contacts. However, the use of online outsourcing platforms heighten questions regarding the operation of trust due to their non-proximate nature (Giddens, 1990). A CEO involved in the founding of two online outsourcing platforms has explained:

The thing that makes work-from-home tough for businesses is that it's really hard to manage workers who are far away (Perez, 2013).

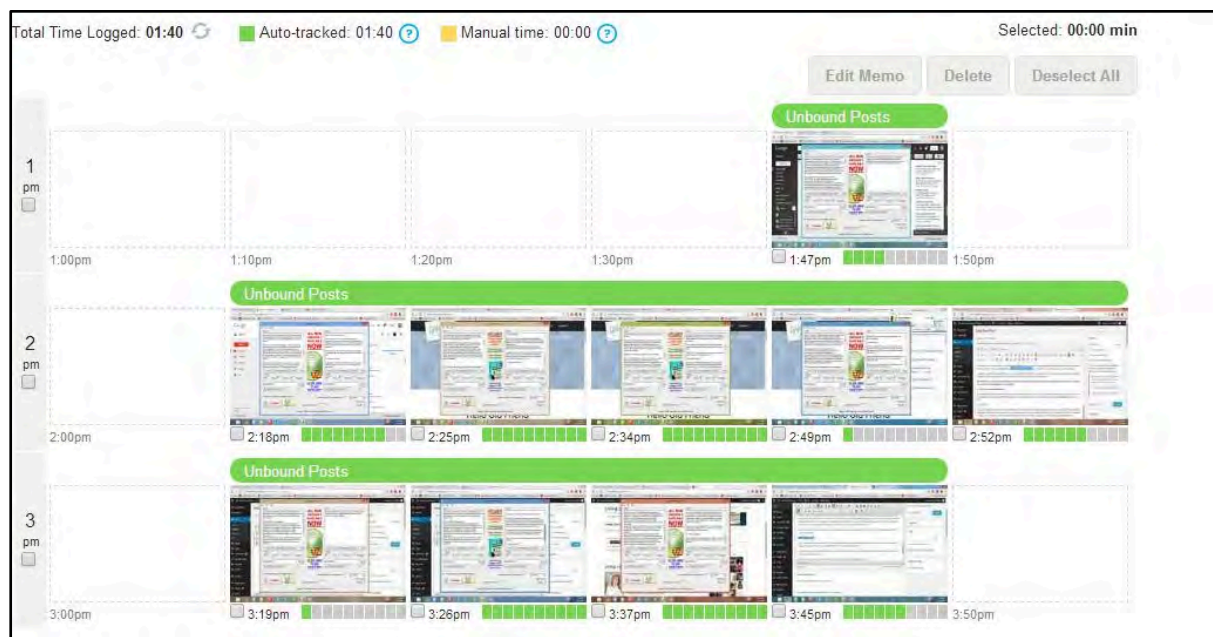
This is due to the difficulty that non-proximity places on interaction. Moreover, labour contracts are, by their nature, indeterminate and imprecise in terms of how much and exactly what work they entail. It is not possible, even for the most routine tasks, to prescribe every element and moment of the labour process. Purchasers of labour are not buying a finished item as is the case with other commodities; they are only procuring labour power, that is someone's ability to work. Thus trust – and its absence – has also long been identified as a defining feature of labour relations (Fox, 1974).

The importance of trying to develop long-term high trust relationships with clients was widely recognized by our informants. There were also impressive examples of high trust relationships, including long-term relationships (some lasting years), standard employment

relationships, personal communication via other mediums, the granting of advances and giving of gifts. On average the longest our survey respondents had worked for continuously for a client was 7 months while some of interview informants had continuous relationships lasting years. The development of high trust relationships enabled some workers and clients to take their relationships outside of the online platforms that originally mediated them. In these cases, other internet based communication technologies were used to bypass the platform, and thus avoid the associated fees. This ultimately means that there is an incentive for platforms to facilitate low trust rather than high trust relations. Additionally, the fragmented and tightly task-based focusing of pay to tasks meant that short-term unstable connections tended to be far more common than long-term ones. This led to a prevalence of low trust relationships.

According to Fox (1974), low trust relationships are based on a high level of definition, documentation and formalization of activities. In the absence of trust, the only way to ensure that labour is carried out as wanted is through ‘systems of control’ (Granovetter, 2005). Online outsourcing platforms provide clients with an array of monitoring and disciplining mechanisms, the principal one being rating systems that record worker performance. Ratings from previous clients are aggregated and made easily accessible. This is combined with information on previous hours and earnings to enable the reputational filtering of workers. Some of the platforms also enable the standardized testing of workers’ skills. In addition, labour management platforms utilized managerial and algorithmic quality controls to test the standard of work being carried out. The largest platforms enable clients to view screenshots of workstations, and mouse and keyboard movement records. Monitoring mechanisms included worker ratings and hiring history of clients, mechanisms for raising grievances and settling disputes. Perhaps most importantly, they provided an escrow facility to afford financial security.

Figure 3. Example of Online Outsourcing Platforms' labour process monitoring



(Source: hubstaff.com)

These monitoring and disciplining mechanisms suggests that online outsourcing platforms do not seek to provide an architecture for the generation of trust on the basis of thick, strong, stable and durable ties which would have restricted competition and thus the commodification of labour. As Nicole, a Filipino worker, summed up:

[My] online job is not that secure, because unlike with actually working physically in an office, [where] you get to sign a contract, you get to see your bosses, they get to see what kind of work you actually do... [Online] work varies from one thing to another. And the fact that you don't have an actual binding agreement with your employer other than you rely on [the platform] to treat you and somewhat like negotiate whatever disagreement you may have with your employer. Yes, you kind of feel that it's not secure.

Nevertheless, network embeddedness did develop outside of the platforms infrastructure. A contradiction at the heart of VPNs was that while the work is often considered to be 'online', in reality it is always located, grounded, and carried out in a physical/material place (Graham 2013). As Doogan (2009) points out, it does not follow that because information circulates immaterially that the production and consumption of that information is also immaterial. The work being done by our informants required they have

access to computers with a stable connection to the internet and electricity supply. The fixity of workers thus enabled VPNs to be embedded territorially and through social networks.

Embedding virtual production in social networks

The only effective system of control in this non-proximate low trust environment was provided by reputational systems. Maintaining a high rating on the platforms was seen to be crucial by all of our informants, with those lacking a high rating struggling to get work. The weight placed upon reputation meant that work flowed to those workers who had accumulated a large amount of previous work and good reviews. In fact, these workers were in such demand that they often could not satisfy it on their own. This method of control (reputational systems) then had the potential to leave demand unmet. As mentioned above, the platforms facilitate a potential (unofficial) solution by providing workers with a means to re-outsource the work themselves. But doing so relies upon the embedding of the production network within social networks.

Lead workers would place work back on the platform in order to hire secondary workers who lacked their own reputational credentials. The lead worker would then provide their secondary workers with instructions for how the task was to be undertaken. Nigerian worker Abaeze provides an illustrative description of this process:

It's just like a chain. He employs us as his freelancers. We do most of the calls for him... [He has] a very good profile... [he] just appl[ies] for multiple jobs... and get[s] jobs because... he has a very good account.

During re-outsourcing, the lead worker might further fragment the task to enable more workers to simultaneously work on it, and thus increase the speed at which it could be completed. This additional fragmentation made the lead worker responsible for checking quality. David, a Kenyan worker, explained particularly clearly the process he used to do this:

When I'm given a transcription of one hour, I always split the audio into 20-20-20, and then I post on the platform... Then I proofread, I combine, I send it to my employer.

Sixteen percent of our survey respondents had re-outsourced their work in this way. However, ensuring the quality of the work could be very labour-intensive and time consuming. Not only was this process extremely arduous for the lead worker but it also represented a significant reputational risk which constituted an existential threat to their online work.

A further consequence of undertaking this re-outsourcing in such a low trust environment was the fear that secondary workers would try to cut them out by contacting the client directly.

The additional costs and risk of re-outsourcing could be reduced through utilizing local social networks, family, friends and local colleagues, to increase trust. For example, Hani, a Malaysian worker, explained how she would not risk outsourcing to platform workers she did not know but would trust her friend:

There's a pool of people who are just ready to work for any amount you set. You just don't do anything ... the work is done is for you... [But] I think as long as I can finish my own work I would do it by myself. I don't trust other people. I trusted this specific friend, because I know her personally.

Kenyan worker, James, elucidated how the trust generated from existing social networks could benefit recruitment:

If you outsource it [using a platform], you have to advertise it. Then, it will take you a while to get the person. You have to also do interviews. You can't just get a random person from outside. I decided to get those guys that I know. I know there wouldn't be any complications... [such as] interviews, questions, timing. It was immediate work. I prefer just calling a few friends, and they did the work.'

Seventeen percent of survey respondents had re-outsourced to workers in their local area and 26% to friends and family. However, even using existing social networks did not guarantee that secondary workers¹¹ would do a good job, as they may well lack the necessary skills to undertake more difficult tasks.

¹¹ This was not necessarily a hierarchical relationship, with some cases being horizontal and cooperative – especially when involving family members.

Social networks played another important role in that online outsourcing platforms are based upon a competitive market. As illustrated by Table 3., this involves maintaining a strong supply of workers. Yet the high level of global competition meant that it was very difficult for workers to initially find work. Moreover, few of our informants suggested that they were recruited by the platforms themselves. In this context, a common theme of our interviews was the active role of social networks in platform recruitment. The importance of social networks for labour recruitment is underlined by our survey results in which 55% of respondents reported that they signed up to their first online outsourcing platform due to having heard about it from friends or family members. Additionally, 71% responded that they had been told about online work opportunities by friends and 58% reported that they themselves shared online work opportunities with their friends and family. Our interviews elucidated the manner in which workers introduced their friends and family members to the work, teaching them how to use the platforms successfully and undertake tasks. Importantly, they convinced them it was possible to make money, that the platforms were not a scam, and not to give up.

Table 3. Labour oversupply on Upwork in countries studied¹²

Country	Potential workforce¹³	Successful workers¹⁴	Oversupply¹⁵
Global	1,775,500	198,900	1,576,600
Philippines	221,100	32,800	188,300
Malaysia	11,900	500	11,400
Vietnam	7,700	1000	6,700
Kenya	21,700	1,500	20,200
Nigeria	7000	200	6800
South Africa	10,200	800	9400

These two examples illustrate how even when formal economic institutions provide little support for durable stable personal connections, the benefits for exchange of trust mean that

¹² As of 7 April 2016 not seasonally adjusted

¹³ Total work profiles 7 April 2016

¹⁴ At least one hour billed or \$1 earned

¹⁵ Potential workforce minus successful workers

actors will, nevertheless, find novel ways to embedded exchanges within social networks.

Although, this network embeddedness did little to contribute to societal embeddedness it did provide a spatial anchoring for the network which enabled the territorial embedding of labour.

Territorial embedding

Territorial embedding refers to how network embeddedness leads to the anchoring of production networks in places where they interact with 'economic activities and social dynamics which already exist in those places' (Henderson et al., 2002: 452). An important theme of our interviews was the manner in which online outsourcing was subsidized by other sectors. Without this support, the social reproduction of labour would have been uncatered for. National educational sectors, for instance, supported online outsourcing by providing an IT competent workforce. In fact, nearly all of our informants had been to university. That this was representative of the workforce was supported by the fact that 78% of our survey respondents had a Bachelor degree or higher. It was crucial, given the absence of formal skill formation, that workers were able to teach themselves many of the additional skills needed for the work. Students often utilized university connectivity to do their work while workers with additional local employment often used their employer's office and internet connection. Online work was sometimes further subsidized by local employers providing them with health insurance. But more commonly virtual production was being subsidized by the reproductive sphere.

Most of our informants tended to work from home, vastly reducing the time and cost of undertaking paid work. Travel time and cost savings compensated for the lack of remuneration for other work-related activities, such as breaks, gaps in the work flow and job searching. Not only did working from home make it easier for workers to undertake both paid and reproductive work from home by freeing up time, it also made it possible to combine

these activities in the home. For example, childcare could more easily be undertaken at the same time as paid work. Moreover, this support was doubled for young workers who lived with relatives, as they were not only provided with a free place to live but also with a workplace.

Territorial embedding also played an important role in adding trust. The low trust relations which predominated online outsourcing were seemingly made possible by the platforms' provision of effective non-proximate labour control mechanisms. However, informants explained the ease with which surveillance could be circumvented. For example, some workers had managed to work out when screen shots were likely to be taken, and how many could be reviewed and removed. Other workers attached an additional screen to their computer to use without fear of monitoring. Labour management platforms operated more effective quality controls; nevertheless, these were somewhat undermined by workers buying and selling their accounts. Nonetheless labour process surveillance did not loom large in the daily experience of our informants. In the absence of more nuanced mechanisms of control and monitoring, the territorial embedding of VPNs again played an important role by providing an unsophisticated way for clients and workers to decide who to trust, with both implicit and explicit prejudices based on nationality widely experienced and perceived. A common experience was:

some people judge based on your nationality... some people assume Kenyans don't speak English or something like that. Or maybe don't have skills in a particular area so you have to really prove yourself on that end.

(Sharon, Kenyan worker)

Workers also made use of discrimination when choosing clients, often following a bad experience with one client from a particular region. Emmanuel, a Nigerian worker, commented:

That was a terrible experience with Indians. Then I was like, I even vowed that I will never work with an Indian person again, even if it's not online work. I'm never working with Indians again.

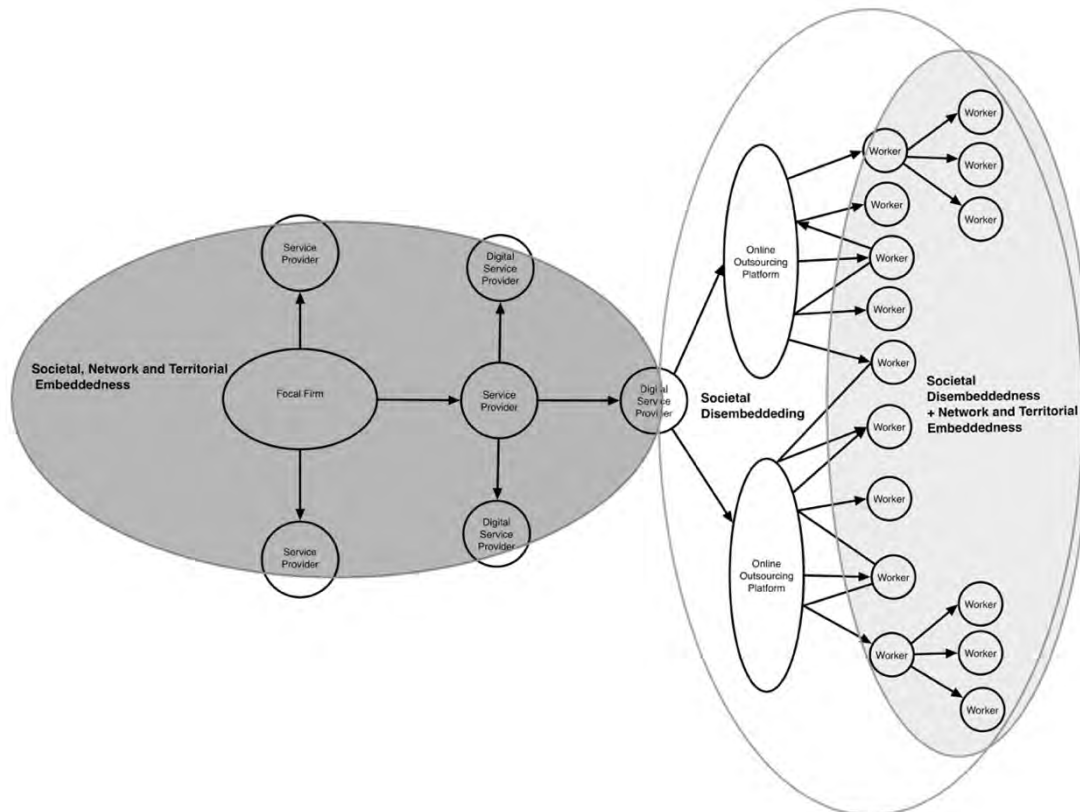
Conclusions

We have detailed how VPNs are shaped by online outsourcing platforms. These platforms represent a unique feature of VPNs and act to societally disembed labour. Yet this does not mean that VPNs exist in some kind of immaterial dimension: separated from the economic, social, and political geographies underlying them (Graham, 2013). Rather we find a more nuanced situation in which labour within VPNs is embedded in social networks and territories even while being disembedded from cultural and legal norms which would limit its commodification. We have thus demonstrated the important qualitative differences between societal embeddedness and network and territorial embeddedness. Moreover, we have shown that they are not mutually exclusive. While a production network might be disembedded from norms and laws, it may remain embedded in social networks and specific geographies at various spatial scales. In fact, these latter forms of embeddedness may be necessary to overcome problems, such as barriers to reproduction and trust, created by the process of societal disembedding. The different ways which VPNs are embedded is illustrated on Figure 4.

This paper has highlighted the need to place commodification at the heart of societal embeddedness (Block, 2001; Bolton and Laaser, 2013; Burawoy, 2010; Harvey, 2014; Kelleberg, 2009; Webster et al., 2008). That this is not widely recognized in the GPN literature is a weakness which leaves it silent on the current deepening third wave of marketization (Burawoy, 2010). We have also demonstrated the importance of GPN research paying close attention to embedding process. We worry that many researchers would simply have taken the network and territorial embeddedness of VPNs to mean that they are

‘embedded’ without commenting on the absence of societal embeddedness and the consequences this has for the commodification of labour within the production network.

Figure 4. VPN societal, network and territorial (dis)embeddedness



We have highlighted the importance of taking embeddedness seriously through an investigation of production networks which we term Virtual Production Networks (VPNs). We distinguish between GPNs and VPNs because the level of commodification and societal disembeddedness may be particular to virtual production. Virtual production currently represents an experimental space in which capital can push boundaries and try out new strategies (Greene and Joseph, 2015). More research is needed to specifically investigate the commodification and disembeddedness of labour in traditional GPNs to determine in which manners GPNs are truly embedded. This article ultimately represents an elaboration of the GPN framework. We suspect that the societal disembeddedness and commodification of

labour within VPNs will have many negative implications for workers, and future research is necessary to investigate what these are how they can be reduced.

References

- Bair J (2008) Analyzing Economic Organization: Embedded Networks and Global Chains Compared. *Economy and Society* 37(3): 339-364
- Barrientos, S., Gereffi, G. & Rossi, A. (2011) Economic and Social Upgrading in Global Production Networks: A New Paradigm for a Changing World. *International Labour Review*, 150(3-4): 319–340.
- Bergvall-Kåreborn, B. and Howcroft, D. (2014), Amazon Mechanical Turk and the commodification of labour. *New Technology, Work and Employment* 29: 213–223.
- Block, F. (2001) Introduction. In Polanyi K *The Great Transformation: The Political and Economic Origins of Our Time* 2nd edition. Boston: Beacon Press.
- Bolton, S.C and Laaser K (2013) Work, employment and society through the lens of moral economy. *Work, Employment and Society* 27(3):508–525.
- Burawoy M (2010) From Polanyi to Pollyanna: The False Optimism of Global Labour Studies. *Global Labour Journal* 1(2): 301-314.
- Caraway B (2010) Online labour markets: an inquiry into oDesk providers. *Work Organisation, Labour & Globalisation* 4(2): 111-125.
- Carmel E and Nicholson B (2005) Small Firms and Offshore Software Outsourcing: High Transaction Costs and Their Mitigation. *Journal of Global Information Management* 13(3): 33-54.
- Coe, N. M., Dicken, P., and Hess, M. 2008. Global production networks: Realizing the potential. *Journal of Economic Geography* 8:271–295.
- Coe, N.M., Hess, M., Yeung, HW-C, Dicken, P, Henderson J (2004) ‘Globalizing’ regional development: a global production networks perspective. *Transactions of the Institute of British Geographers* 29:468–484
- Doogan, K. (2009) *New Capitalism? The Transformation of Work*. Cambridge: Polity.
- Esping-Andersen, G. (1990) *The Three Worlds of Welfare Capitalism*. Cambridge: Polity Press
- Fox, A. (1974) *Beyond Contract: Work, Power and Trust Relations*. London: Faber and Faber.
- Foster, C. and Graham, M. 2016. Reconsidering the Role of the Digital in Global Production Networks. *Global Networks*. (In press)
- Giddens, A. (1990) *The Consequences of modernity*. Cambridge: Polity Press.

- Graham, M. (2013) Geography/internet: Ethereal Alternate Dimensions of Cyberspace or Grounded Augmented Realities? *The Geographical Journal* 179 (2): 177–82.
- Graham, M., De Sabbata, S., Zook, M. 2015. Towards a study of information geographies: (im)mutable augmentations and a mapping of the geographies of information *Geo: Geography and Environment*. 2(1) 88-105.
- Granovetter, M. (1974) *Getting a Job: A Study of Contacts and Careers*. Chicago: University of Chicago Press.
- Granovetter, M. (1985) Economic Action and Social Structure: The Problem of Embeddedness. *Readings in Economic Sociology*, 91(3), pp. 63–68.
- Granovetter, M. (2005) The Impact of Social Structure on Economic Outcomes. *Journal of Economic Perspectives*, 19(1): 33-50.
- Gillespie, T. (2010) The politics of ‘platforms.’ *New Media & Society*, 12(3): 347-364.
- Greene, D. and Joseph, D. (2015) The Digital Fix. *TripleC* 13(2): 223-247
- Greer, I. (2016) *Welfare reform, precarity and the re-commodification of labour*. *Work Employment & Society*, 30(1): 162-173.
- Hall P.A and Soskice D (Eds.) (2001) *Varieties of Capitalism*. Oxford: Oxford University Press.
- Harvey, D. (2014) *The Seventeen Contradictions and the End of Capitalism*. London: Profile Books.
- Henderson, J., Dicken, P., Hess, M., Coe, N. M., and Yeung, H. W. C. (2002) Global production networks and the analysis of economic development. *Review of International Political Economy* 9:436–464.
- Herod A (1997) From A Geography of Labour To A Labour Geography: Labour’s Spatial Fix and The Geography of Capitalism. *Antipode* 29(1): 1-31.
- Hess, M. (2004) “Spatial” Relationships? Towards a Reconceptualization of Embeddedness. *Progress in Human Geography*, 28(2), 165–186.
- Hess, M. and Coe, N.M. (2006) Making connections: global production networks, standards and embeddedness in the mobile telecommunications industry. *Environment and Planning A* 38:1205–1227.
- Irani L (2015) Difference and Dependence among Digital Workers: The Case of Amazon Mechanical Turk. *South Atlantic Quarterly* 114(1):225-234.
- Kelleberg, A. (2009) Precarious Work, Insecure Workers: Employment Relations in Transition. *American Sociological Review* 74(1): 1-22.
- Kuek, S.C., Paradi-Guilford, C.M., Fayomi, T, Imaizumi S, Ipeirotis P (2015). *The global opportunity in online outsourcing*. Washington, D.C. : World Bank Group.

<http://documents.worldbank.org/curated/en/2015/06/24702763/global-opportunity-online-outsourcing>

Lehdonvirta, V. (2016) Algorithms That Divide and Unite: Delocalization, Identity, and Collective Action in 'Microwork.' in Flecker, J. (ed.) *Space, place and global digital work*. London: Palgrave-Macmillan.

Li, C. (2014) Fiverr and the future of work: A spotlight on the budget online marketplace for creative services. *Tech.EU* <http://tech.eu/features/3393/fiverr-profile/>

Locke, R. (2013) *The Promise & Limits of Private Power*. Cambridge: Cambridge University Press.

Mahutga, M.C. (2012) When Do Value Chains Go Global? A Theory of the Spatialization of Global Value Chains. *Global Networks*, 12(1), pp. 1–21.

Offe C (1984) *The Contradictions of the Welfare State*. London: Hutchinson.

Perez, S. (2013) Founded By Early oDesk Employees, Freelancer Marketplace Rev.com Raises \$4.5 Million Series A. *Techcrunch.com*. <http://techcrunch.com/2013/03/26/founded-by-early-odesk-employees-freelancer-marketplace-rev-com-raises-4-5-million-series-a/>

Polanyi, K. (1944) *The Great Transformation: The Political and Economic Origins of Our Time*. New York: Farrar & Rinehart; and (2001) Boston: Beacon Press.

Ross, J., Zaldivar, A., Irani, L., and Tomlinson, B. (2009) Who are the turkers? Worker demographics in Amazon Mechanical Turk. Social Code Report 2009-01. <http://www.international.ucla.edu/media/files/SocialCode-2009-01.pdf>

Standing G (2010) *Work After Globalisation: Building Occupational Citizenship*. Cheltenham: Edward Elgar Publishing.

Standing, G. (2015) Taskers: The Precariat in the On-Demand Economy (Part One). *Working-Class Perspectives*. <https://workingclassstudies.wordpress.com/2015/02/16/taskers-the-precariat-in-the-on-demand-economy-part-one/>

Webster, E., Lambert R and Bezuidenhout, A (2008) *Grounding globalization: labour in the age of insecurity*. Oxford: Blackwell.

Wright, C.F. and Kaine, S. (2015) Supply chains, production networks and the employment relationship. *Journal of Industrial Relations* 57(4): 483-501.

Yeung H.W and Coe N.M (2015) Towards a Dynamic Theory of Global Production Networks. *Economic Geography* 9(1): 29-58

Yin, M., Gray, M., Siddharth S, Vaughan JW (2016) The Communication Network Within the Crowd *ACM* 978-1-4503-4143-1/16/04. <http://www.jennwv.com/papers/mturknetwork.pdf>

Zukin, S., and DiMaggio, P. (1990) Introduction. In Zukin, S., and DiMaggio, P. (Eds) *Structures of Capital: The Social Organization of the Economy*. Cambridge: Cambridge University Press.

