Algorithms That Divide and Unite: Delocalization, Identity, and Collective Action in 'Microwork'

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1. Introduction

Marx posited that labour is "disciplined, united, organized by the very mechanism of the process of capitalist production" (1906: 836-37). The regimented nature of factory work and life in an industrial community provided the material basis for collective action and for the shared identity required to support it. But is this still true of the mechanisms of 21st-century informational capitalism? Castells notes that in informational capitalism, "[t]he work process is globally integrated, but labor tends to be locally fragmented" (Castells 2000: 18). The exploitation of global wage, skill, and regulatory differentials means that workers are often physically, temporally, and administratively detached and desynchronized from each other (Ashford et al. 2007). In the extreme case, coordination of workers' efforts is achieved algorithmically, that is, by automated data and rule based decision making (O'Reilly 2013), leaving no opportunity for human-to-human communication. Under such dispersal and disconnection, it would seem difficult for a common identity, let alone effective organization, to arise among workers.

Yet algorithms can also unite. Information and communication technologies (ICTs) have long been used to construct 'sites of resistance' that bring together people prevented from organizing via conventional means (Ho and Zaheer 2002). Sites or communities formed online can offer potent identification experiences that rival the degree of identification with conventional workplaces (Lehdonvirta and Räsänen 2011). ICTs are used as part of almost any campaign of political mobilization today,

at least in the industrialized countries (Karpf 2010, Wells 2014). To what extent, then, can dispersed informational labourers make use of ICTs to re-establish links, develop shared identities, and mobilize for collective action? In this chapter, we will examine both the dynamics of dispersal as well as the dynamics of unification in informational labour, and the technological, organizational, and identity processes that underlie them. These topics are examined via an empirical study of 'microwork', an extreme example of commodified and delocalized knowledge work. We study three different 'microwork platforms', or companies that provide microwork opportunities, and their workers.

Microwork refers to work consisting of the remote completion of small information processing tasks, such as transcribing a snippet of hand-written text, classifying an image, or categorizing the sentiment expressed in a comment (Lehdonvirta and Ernkvist 2011, Kittur et al. 2013). The oldest and most well known microwork platform is Amazon Mechanical Turk ('MTurk'), operated by Seattle-based e-commerce giant Amazon. A worker enters the site using their own or borrowed computer or mobile device, selects a task, completes it, is credited with the proceeds, and selects the next task. MTurk started as a way for Amazon to source workers for its own information processing needs, but evolved into an open marketplace where any U.S.-based employer can post digital tasks for the site's users to complete. At the time of writing, over 300,000 such tasks are listed. Each completed task earns the worker-user a small remuneration, typically ranging from a few cents to a dollar or two.

Two main theoretical claims are developed throughout the chapter. One is that we must distinguish between delocalized work that is subsequently *relocalized* elsewhere, and delocalized work that remains *dispersed*. Relocalization is exemplified by the offshoring of work to business process service centres, where the work is performed at least partially in the context of local institutions and social networks. Dispersal is exemplified by the outsourcing of work to a platform such as MTurk, where the work is detached from local institutions and workers are dispersed. Of note is that workers may remain geographically proximate to each other and to the employer, while a state of dispersal in the sense of social and institutional disconnectedness is achieved by organizational and technological means. Distinguishing between relocalized and dispersed work is important, because these

two modes of or outcomes from delocalization can have very different implications to the nature of the work and the institutions that regulate it.

The second theoretical point developed in this chapter is that the effectiveness of online self-organizing as a platform for collective action in the labour market depends on the topology of such 'virtual places', and how it matches with the contours of the market it is intended to influence. The algorithms and social processes that shape the memberships of online communities may leave such communities ill organized to exert collective influence on a particular employer or market segment. Boundaries of shared identities are particularly important in this regard.

The rest of the chapter is organized as follows. First, we will draw on previous literature to discuss the organizational and technological processes through which microwork platforms produce placelessness and dispersal. We argue that we must also understand what impacts these processes have on identity formation in order to understand their full implications to collective action. We will then introduce the empirical study, consisting mainly of participant observation and interviews of 30 microworkers. We first use the empirical study to examine microwork in everyday life and its consequences to organizational identity. We will then use the study to examine attempts to counter dispersal and reunite microworkers, both on the material level of bringing dispersed workers together in 'virtual places', as well as on the ideological level of developing occupational and class identities. In the final section, we will discuss the main findings in the context of some earlier work on service value chain restructuring and freelance knowledge workers, highlighting theoretical and policy implications.

2. Background: Dispersing workers into the cloud

2.1 Detaching work from social and institutional contexts

MTurk is the primary source of income for many people (Ipeirotis 2010, Ross et al. 2010), yet it lacks almost all of the signs and trappings of 'standard work'. There are no physical work sites, working hours, or other behavioral controls. There are no persistent duties or responsibilities, and no temporal commitments between the worker and the employer, beyond the seconds or minutes it takes to complete a task. There are no job titles, recognizable supervisors, clients, or colleagues, as all interactions necessary for the completion of a task are anonymized and mediated by

algorithms. The relationship consists almost entirely of market-based transactions mediated by a digital platform. In other words, work on MTurk is extremely detached in the sense elaborated by Ashford and colleagues (2007): administratively detached from organizations' formal membership structures; physically detached from sites of work and from colleagues and supervisors; and temporally detached and desynchronized from their daily and seasonal cycles and life courses. Other microwork platforms have different characteristics and sometimes lesser levels of detachment, as will be described later. But relative to standard work, detachment from physical, temporal, and administrative structures remains microwork's defining feature.

Previous literature suggests that this high level of disembeddedness in microwork is not coincidental. It is MTurk's aim to provide human labor as a flexible on-demand service accessible via the Internet: the labor equivalent of cloud computing. Irani (2013) locates the demand for this type of 'cloud labor' in the organizational and technological practices of the high-tech industry. High-tech firms compete against incumbents in different industries by using technology to automate and optimize processes in order to realize cost savings and performance improvements. Whenever possible, human workers are replaced with artificial intelligence, and business processes implemented as software. For example, whereas a traditional retail company would have inventory managers who spot duplicate entries in the product information provided by different suppliers, Amazon aimed to delegate this work to an algorithm. Such work turned out to be beyond the capabilities of current technology; engineers described the problem as 'insurmountable' (Harinarayan et al. 2007, cited in Irani 2013). But instead of giving up on the software-based model and going back to a human-centric business process, Amazon re-engineered human labor to be compatible with the software:

> "Amazon engineers instead developed a website through which people all over the world could check each product for duplicates, work simultaneously, and receive payment per product checked […] By developing [MTurk], Amazon retained its existing divisions of labor and organizational practices – the same structures into which they hoped to integrate artificial intelligence approaches – while integrating on-demand human workers." (Irani 2013: 4)

Microwork thus emerged as a stand-in to compensate for the shortfalls of artificial intelligence; in recognition of this, the tagline of the MTurk website is "artificial artificial intelligence". Many competing platforms have emerged since MTurk was first developed. A key feature of these platforms is that they provide employers with an 'API', or application programming interface: a codified interface through which the employer's software can issue inputs to and receive outputs from the workforce as if it was a software module. Software firms use these APIs to create such products as expense tracking apps (workers enter details from scanned invoices into a database), searchable porn sites (workers write descriptors for video clips), and calorie counting apps (workers name foods present in a photo). The APIs are also used by computer scientists to teach machine learning algorithms. To perform like a software module, labour needs to be available at any time from any place, and it needs to rapidly scale up to hundreds of thousands of work units when necessary. For this to be possible, it must work without human input. A buyer of MTurk labor interviewed by Irani explains this as follows:

> "You cannot spend time exchanging email. The time you spent looking at the email costs more than what you paid them. This has to function on autopilot as an algorithmic system […] integrated with your business processes." (Irani 2013: 8)

The above quote illustrates how demand for disembedded microwork stems from organizational and technical practices in the high-tech industry — but also of how this disembeddedness is achieved in practice. Same or similar work has been performed in the context of more conventional employment arrangements that are embedded in and interdependent on the work of physically proximate others. Specific efforts and technologies must be deployed to detach such work from the firm's physical, temporal, and administrative structures. In the case of microwork, this detachment is produced in large part through deskilling and codification: breaking tasks into small parts and formalizing them, making interdependencies so simple to manage as to no longer require workers to have strong ties to each other, to the employer, or to the end-client. This is achieved with the help of specialist consulting services and technologies provided by firms acting as 'transformers' of conventional work to microwork (Lehdonvirta and Ernkvist 2011). The use of APIs is emblematic

of the resulting work organization, insofar as it reduces interactions between employers and workers to sets of strictly pre-defined request-response pairs that can be transmitted over digital media. Deskilling and codification are not unique to microwork (Huws et al. 2009), but in microwork they are often taken to a more extreme degree than in conventional business process outsourcing.

Besides deskilling and codification, another process that is important in producing the detached quality of microwork can be termed 'legal engineering'. Microwork platforms frame the relationship between the worker and the employer as independent contracting, never as legally protected employment (Cherry 2010). Legally protected employment in a host country would create an attachment between the employer and the worker that is incompatible with the notion of rapidly scalable and downscalable 'artificial artificial intelligence'. This framing is enshrined in the marketplaces' standard contract terms that neither the worker ('contractor') nor the employer ('client') has power to negotiate. Some microwork platforms are moreover designed in such ways as not to trigger statutory definitions of employment, for example by preventing a worker from working continuously for a single client. Garry Mathiason, chairman of Littler Mendelson, discussed this in a presentation he gave at an industry conference in San Francisco on 23 October 2013. Littler Mendelson is a labor law firm that advises companies in the online staffing industry, including microwork platforms. According to Mathiason, clients have "built into the software tests and processes to help ensure that independent contractor status is achieved." In other words, specific efforts and technologies are deployed to detach microwork from national legal frameworks.

2.2 Production of placelessness and its limits

An important consequence of microwork's disembeddedness is 'placelessness', or a lack of embeddedness in particular spaces or territories. Microwork is a particularly extreme example of placeless work: it can, and indeed must, be performed without access to a physical work site, and could in principle be carried out from anywhere in the world with an Internet connection. Flecker and Schoenauer argue in this book (chapter X) that placelessness is not an inherent quality of any work; it must be actively produced by means of suitable organizational and technical arrangements, such as codification. In some cases, microwork's placelessness is simply a byproduct of the pursuit of extreme organizational

detachment, and of little consequence to the employer. In other cases, microwork's placelessness is produced intentionally, with a view to exploiting geographic differences in skills and labor costs, or the power that the ability to compress time and space selectively brings to its wielder.

Table 1. MTurk worker survey respondents by country of origin (Ross et al. 2009; N=573)

United States	57 %
India	32 %
Canada	3 %
Philippines	1 %
United Kingdom	1 %
Pakistan	0.5 %
Romania	0.5 %
(other)	5 %

It is important to note certain complications in the concept of placelessness. Even if microwork is 'placeless' in the sense of being disembedded, in practice it is still performed by workers who live somewhere in the world, not in the metaphorical 'cloud' of information technology. Table 1 shows MTurk workers' top countries of origin according to a 2009 survey conducted by Ross and colleagues (Ross et al. 2009). It shows that most workers by far come from the United States and India. Kingsley and colleagues have further surveyed where workers are located within these two countries, finding that workers are concentrated in certain areas rather than being distributed uniformly within the population (Kingsley, Gray and Suri 2014). In other words, the distribution of MTurk's workers is marked by strong geographic patterns, and is in this sense place-specific. In part this place-specificity is attributable to spatial differences in factors such as Internet penetration, skills, and labour costs. Work that is detached from its original places 'flows' into the most favourable places on the map, like melting water flows to the lowest point in the landscape. However, this explanation fails to address the most prominent geographic pattern in the data: that most work by far flows into United States and India, even though countries like United Kingdom and Philippines present comparable skill, cost, and access landscapes.

This geographic pattern is most likely attributable to the fact that Amazon's payment system is capable of processing payments to bank accounts in the United States and India only. Workers in other countries can be remunerated only via Amazon.com gift cards, which makes the work far less desirable. Historical participation data collated by Ross and colleagues (2010) supports this explanation. MTurk's workforce was initially dominated by U.S. workers. Participation from India shot up only after Amazon introduced payments to Indian bank accounts in 2009. In other words, microwork on MTurk is imperfectly delocalized, in that it relies on local payment infrastructures. More technological integration work and legal engineering would be required to make the platform closer to being truly 'placeless'. But for Amazon, this may not be necessary. It is crucial for the business model that labour is detached from local organizational and institutional structures, so that it may be sold as an on-demand 'cloud' service. Whether or not the work then flows to a different geographic location where suitable skills are available cheaper is less important. This sets microwork apart from offshoring.

2.3 Delocalization, collective action, and identity

To address the implications of this mode of work organization to organized labour and collective action, we must examine not only its material and organizational aspects, but the other leg on which collective action stands: shared identity. In modern society, work and occupation are seen as central components of identity; in terms of both how the individual sees themselves in relation to others, and in how others regard the individual (Tajfel and Turner 1986, Stryker and Burke 2000). Two conceptions of identity are particularly salient to work organization: organizational identity and occupational/class identity. The notion of organizational identity is frequently used in organization and management studies, where it draws from social identity theory and interactionist theories of identity. Workers 'identify' with their employers (Dutton et al. 1994, Riketta 2005), supervisor relationships (Sluss and Ashforth 2007), and teams (Riketta and van Dick 2005), in the sense of experiencing varying degrees of affinity or oneness with them. These identification experiences have various important individual and social consequences, including especially enhanced self-esteem, prosocial behavior at work, and solidarity with other group members (Van Knippenberg and van Schie 2000). Depending on the target of the identification, organizational identity can suppress as well as support collective

action; for example, team members might support each other in a dispute, or side with the employer that they strongly identify with.

In sociological and critical studies, it is more common to use notions of occupational and class identities as ways of conceptualizing shared identities in the context of work (Huws and Dahlmann 2010). The notion of a shared occupational identity holding individuals in the same trade together can be traced to Durkheim (1997), while the notion of class identity, or individuals becoming subjectively aware of their shared economic interests, originates from Marx (1906). Occupational and class identities are potentially capable of acting as bases for solidarity and collective action for broader segments of people than organizational identities. However, their social and material preconditions are also seen as more complex and demanding.

A growing amount of empirical research addresses identity in conventional business process outsourcing and IT outsourcing work (e.g., Huws and Dahlmann 2010, Barley and Kunda 2006, Rock and Pratt 2002), but very little research has been done in the context of such extremely delocalized work as microwork. Irani (2013) examined identity in microwork from the employer's perspective, showing how this mode of work organization invites the developers to see themselves as "innovators" who are a distinct breed from the "crowds" across the API. Our aim is to address the workers' experience. Are dispersed microworkers able to develop organizational, occupational, or class-based notions of shared identity? What technological or organizational resources do they draw on in the process? Are these shared identities enabling actual collective action? In the following empirical part of this chapter, we will address these questions, as well as provide more detail on the material circumstances and technological contexts in which the workers find themselves.

3. Research design: A tale of three platforms

Our overall research strategy consisted of successive rounds of data collection followed by qualitative analysis. The initial data consisted of field notes from participating in MTurk in the role of a worker and as an employer, of workers' discussions observed in one microworker online community, and of messages exchanged with workers within that community. This was followed by a second wave of data collection consisting of a series of interviews with managers of microwork platforms (N=4) and of microworkers themselves (N=30), and observing public

worker discussions in additional online communities indicated in the interviews. Interviewees were recruited through three different platforms that offer microwork to workers: MTurk, MobileWorks, and CloudFactory. The objective of this three-pronged recruitment strategy was to obtain a wide degree of variation in geographic context and sociodemographic background. MobileWorks ('MW') is a startup company based in the Silicon Valley. MW serves workers in various countries, but especially in the Philippines. CloudFactory ('CF') is a social enterprise based in Kathmandu, Nepal, and most of its workers come from that area.

MW and CF agreed to provide us with interview access to their managers and enabled us to contact their workers to solicit interviews. Amazon did not respond to requests, so we recruited MTurk worker interviewees through a major worker-run online community; these informants are likely to be more active users than is typical. Interviews were conducted face-to-face (two managers), via teleconferencing (two managers and two workers), and via text-based instant messaging (IM) channels also used by the workers in their peer communications (28 workers). A total of approximately 60 hours of interviews were conducted from 2012 to 2013. The analysis consisted of iterative coding to identify themes and concepts from the data, with particular sensitivity to themes potentially bearing on identity and collective action.

Table 2. Workers' sociodemographic characteristics

	Whole sample	U.S./MTurk	Philippines/MW	Nepal/CF
N	30	10	10	10
age	29.3 (s.d. 9.8)	37.6 (s.d. 11.8)	28.1 (s.d. 1.8)	22.0 (s.d. 2.8)
females	63 %	80 %	70 %	40 %
education	33 % student 23 % graduate	30 % graduate 10 % student	30 % graduate	90 % student 10 % graduate
household	43 % with parents 23 % with partner and kids	40 % with partner and kids 30 % with partner	30 % with parents 20 % with partner and kids	90 % with parents 10 % with partner and kids

The sociodemographic characteristics of sample are presented in Table 2. The country/platform subsamples have very different sociodemographic profiles. Our American workers are older, predominantly female and living with a partner; Filipino

workers are in their late twenties; and Nepalese workers are primarily college students living with their parents.

4. Dispersed work and death of organizational identities

The efforts and technologies deployed to produce placelessness at work also change the nature of the work (Flecker and Schoenauer, chapter X in this book). In this section, we examine what implications microwork's delocalized nature has to organizational identity. We begin by discussing how microwork relates to workers' socioeconomic circumstances, which allows us to understand how the implications can be socially contingent, including varying from one country to another.

4.1 Dispersed work in everyday life

Table 3 summarizes how microwork relates to the informants' socioeconomic circumstances. The Nepalese workers mainly depended on their parents for their subsistence and used microwork to earn additional income. The Filipino workers were 'precariots', by which we mean that they cobbled together their living from microwork or a combination of microwork and other irregular income sources. The American workers were a mix of precariots, housewives economically dependent on their spouses, and salary earners who did microwork as a hobby as much as to earn additional income. Overall, the majority of our interviewees were precariots to whom microwork earnings were economically important.

Table 3. Microworker types and income from microwork

	Whole sample	U.S./MTurk	Philippines/MW	Nepal/CF
type of microworker	50 % precariot 40 % dependant 10 % casual	40 % precariot 30 % dependant 30 % casual	100 % precariot	90 % dependant 10 % precariot
typical weekly microwork income	$74.84 (s.d. 64.05)	$79.00 (s.d. 61.87)	$125.00 (s.d. 85.05)	$41.43 (s.d. 34.95)
record weekly microwork income	$136.57 (s.d. 127.57)	$183.00 (s.d. 178.20)	$174.00 (s.d. 130.88)	$62.00 (s.d. 33.01)

Note: Type of microworker coded as follows: 'precariot' earns their primary income from microwork or a combination of microwork and other nonstandard jobs; 'dependant' depends on another for their subsistence and earns additional income from microwork; 'casual' has a stable standard job and earns additional income from microwork.

Besides the earnings, informants cited availability and flexibility as important advantages of microwork. Nepalese informants emphasized that there were few earnings opportunities available to them in the local market, so the availability of foreign microwork was welcomed. For American and Filipino workers who juggled several jobs and responsibilities, it was important that they could choose when and where to spend time on microwork. One American worker used her smartphone to perform microtasks during quiet periods at her regular face-to-face customer service job. She literally worked two jobs at the same time.

Workers from all subsamples nevertheless indicated that suitable microtasks were not always available when they wanted to work. They expressed concerns about the need to be constantly on call in case suitable or well paying work turns up, uncertainty over the immediate future, and low overall earnings. The intensity of these issues varied according to the workers' socioeconomic circumstances. The Nepalese students expressed fewest concerns, not being dependent on microwork for their subsistence. American precariots expressed strong concerns, many feeling vulnerable about unexpected changes in earnings. Although our Filipino workers likewise cobbled together their income from several contingent sources, they expressed fewer concerns than the American precariots. There are several possible explanations for this, including lower living costs in the Philippines and more active contact from MW's managers towards the workers. It may also relate to the fact that contingent employment and microentrepreneurship are more common in the Philippines. In a global and historical context, 'standard' corporate employment is of course no standard at all, but a peculiar feature of affluent post-World War 2 economies (Ashford et al. 2007). Individuals, families, and communities in the Philippines may possess more coping strategies for microwork than America's postindustrial workforce.

4.2 Death of organizational identities

The concerns identified above are not uncommon in contingent service work, and speak more about microwork's contingent nature than its placelessness. But workers also brought up issues of identity, which can be traced specifically to aspects of placelessness. A particularly consistent finding was that microworkers did not experience identification with their detached and transitory employers, the firms that provided them work over the platform. Many MTurk workers had 'favorite'

employers, favored thanks to paying well, providing stimulating tasks, or generally dealing in a fair way. But this favor did not seem to amount to experiences of belonging or membership, perhaps because workers were well aware that the distant working relationship that they enjoyed could end without notice, and often did. Another potential focal point for identification is the platform that mediates between the worker and the employer. Informants did not seem to identify with the MTurk platform at all. Informants expressed more identification with the MW platform, and most of all with the CF platform. But relative to what might be expected of standard employees in a firm, microworkers' identification with the formal organizations closest to them seemed weak.

To some extent, this finding mirrors earlier research on contingent workers' identification with employers and intermediaries (e.g., Allan and Sienko 1998, McLean Parks et al. 1998, Rock and Pratt 2002). The lack of commitment from the employer causes the worker to reciprocate in kind. But to a large extent we can also trace this finding to microwork's placelessness. As part of the delocalization process, most tangible signs of organizational affiliation end up being erased: physical colocation, offices, employment contracts, working hours, titles, recognizable supervisors and coworkers, and even work clothes. This lack of tangible proof makes it difficult for the worker to maintain an identity based on organizational affiliation towards themselves, and importantly, towards others whom they interact with. One long-time MTurk worker expressed her frustration as follows:

> "It only bothers me when I'm told it's not 'real work'. If I were writing in an office it would be considered real, but since I do it at my desk at home my husband doesn't view it as 'real' – he sees it on the same level as playing mindless computer games" [F, 41].

In contrast to MTurk, the CF platform made efforts to furnish workers with some trappings of standard employment. Workers were given titles such as 'Data Entry Officer' and could say that they worked 'for' rather than 'through' the platform. Though payment was on a piece rate basis, CF attempted to provide the workers with a degree of regularity in earnings. Thanks to being recruited from the same university circles, many of the workers knew each other personally. There was also a degree of two-way communication between CF's managers and the workforce, which was

nonexistent on MTurk's much larger and more geographically dispersed market. Not surprisingly, workers identified more with CF than with MTurk.

Earlier findings on identification experiences in telework suggest that working remotely is in itself not necessarily deleterious to the formation of shared social identities, if the lack of tangible bases for identity formation is compensated for by means such as strong interpersonal relationships with others in the organization (Wiesenfeld et al. 1999, Thatcher and Zhu 2006). However, our findings show that there is a tension between placelessness and organizational identity: the means that are used to delocalize work — deskilling, codification, black boxing, algorithmic management — also undermine organizational identities. The more work is delocalized and dispersed, the fewer means are available for organizational identity formation. This has implications not only to workers' relationships with employers, but also to each other, as it deprives them of the uniting banner of shared organizational affiliation. The personal consequences vary between cultural and socioeconomic contexts, but the dispersal of work does seem to leave workers without a stable organizational identity.

5. The working class reunites online?

In this section, we move from the conceptual space of organizations and individuals to the space of labour markets and broader collective identities. We first examine how the relative bargaining powers of workers and employers are influenced by processes of delocalization and dispersion, through theoretical discussion and empirical observations. We then use our empirical observations to examine the idea that workers might use ICTs to counter dispersion and reorganize online, and assess the implications of such reorganization to shared identity and collective action.

5.1 Dispersion and bargaining power

Among other things, delocalization can allow employers to practice 'labour arbitrage', or to buy labour from where it is cheap. Indeed, some of the critical writing about microwork platforms focuses a great deal on the argument that by introducing foreign wage competition, these technologies diminish American wages and working conditions (Scholz 2013). But by the same token, microwork platforms allow workers in low-income countries to practice 'skills arbitrage', or to sell labour to where it is expensive. In a perfectly competitive market, the loss of welfare in America is offset

by an increase in welfare in Nepal and the Philippines. The effect of microwork platforms is symmetrical, in aggregate favouring neither the employer nor the worker, but simply widening each party's search horizon. In this model, delocalization evens out global income inequalities.

Of course, labour markets are never perfectly competitive. In markets for undifferentiated or commodity labour, it is often the case that employers are more concentrated and workers more diffuse, such as in the case of a factory and its workforce. In such a market, the employer has more bargaining power. To improve their position, workers form unions that bargain on their collective behalf. If we introduce delocalized microwork into this picture, the consequences can be quite different from the perfectly competitive model. Two consequences are apparent. First, by breaking work down into microtasks and making it easy for large numbers of people to perform small bits of it, microwork platforms drastically increase the number of individuals and thus the degree of diffusion on the worker side. This effect is not unique to computer-mediated work; ordinary part-time work arrangements can have the same effect of increasing diffusion and thus decreasing bargaining power on the worker side. But the effect may be more extreme in microwork.

Second, microwork platforms can make it harder for workers to organize and bargain collectively to compensate for their relative diffusion. The platforms are good at reducing the experienced distance between employers and workers, but our findings suggest that they often do nothing to eliminate workers' distance to each other. The only sign of the existence of other workers in MTurk is the fact that tasks gradually disappear from the market. Any collaboration or coordination of workers' efforts is managed algorithmically, with no opportunity for human-to-human communication. An American employer on MTurk is brought into contact with numerous workers around the world, but at the same time, the workers around the world are not provided any means to come into contact with each other, and thus remain just as distant from each other as before. The employer can, if they wish, avoid bargaining with local, perhaps unionized workers, and instead opt to deal with de-local workers. These de-local workers may be physically distant from the employer, or they may be in the same neighbourhood — as we have seen, many MTurk workers live in the United States — but that no longer makes a difference, since the worker has been to a large extent disembedded from local institutions. Unable to contact each other, these workers cannot bargain collectively. Moreover,

even if such dispersed workers obtained the means to contact each other, it is not clear to what extent they could develop a shared identity to support the solidarity required in effective collective action, as discussed previously.

5.2 Workers reuniting in 'virtual places'

Algorithms divide workers, but algorithms can also unite them. All of our informants participated in an online community or group for microworkers, or maintained regular contact with other microworkers through online channels in a less structured manner. Different paths led to the emergence of these formations. One online community, founded by a worker in 2008, was a prominent gathering place for American MTurk workers. Our informants found the site by chance: through a search engine when looking for microworking tips, from an online article on microwork, and even due to it being mentioned as an answer option in a survey directed at microworkers. The MTurk platform itself made no mention of this site, but search engines, recommendation systems, and other algorithms directed workers to it. Over the years, various splinter groups had left the community to start new community sites, so that the original site's active membership was now measured in the hundreds, while other communities reported active memberships in the thousands. Workers who had met each other through these sites had also started more private chat channels consisting of a dozen or fewer active participants.

In contrast to MTurk, the MW and CF platforms provided official support for worker-to-worker communication. MW provided a built-in real-time text chat channel that workers could use to talk to each other and to any of the platform's managers who happened to be present. MW's Filipino workers also complemented this official chat with personal instant messaging software, through which they kept in touch with online workers working on different platforms, who were often friends and relatives. CF went furthest in facilitating worker-to-worker communication, as it asked workers to organize into virtual teams of five members. Each team was asked to use their own private Facebook group and even physical get-togethers to keep in touch. In this aspect, CF's workforce resembled a conventional team-based organization, except that the actual work was still strictly individual; the team structure was created for fostering identity and professional ethics. Unlike MW's Filipino workers, CF's Nepalese workers did not have personal networks of online laborers extending beyond the platform.

Table 4. Online self-organization among microworkers

	MTurk	MW	CF
Communication technologies used	online forum software, chat channels (IRC)	official web chat, instant messaging software	private Facebook groups, physical meetings
Social formations observed	community with formal membership hierarchy, informal communities and groups	informal networks	five-member teams with appointed team leader

The communication technologies that workers used and the social formations that these technologies supported are summarized in Table 3. These formations were for the most part maintained ostensibly for instrumental information exchange purposes. But as the excerpts below demonstrate, they also formed the material basis for identity-related purposes that in a conventional workplace could be met by workgroups or occupational networks. By providing a safe 'place' for workers to gather, they allowed workers to enact 'microworker' occupational identities that elsewhere might have been met with disbelief or derision. To the extent that these self-organized formations also allowed participants to discover and express their shared interests against unfair employers, it could be said that they also allowed workers to enact class identities.

"Earning full discussion board access was an important milestone in my turker identity." [F, 26]

"I get what social support I need for turking from chatting with other turkers online." [M, 32]

Shared microworker identities were enacted in these formations via various kinds of identity talk. On one hand, participants discussed how a microworker ought to conduct themselves: ways of navigating work platforms, completing tasks, coping with employers, dealing with friends and family, organizing one's daily life, and thinking about career and life plans as a microworker. On the other hand, participants discussed how a microworker ought not to conduct themselves, such as producing fraudulent product reviews or substandard work to an honest employer.

Disagreements about these rules had at least in one case led to a split in the community that resulted in the forming of a splinter group on a separate technical platform. An exception to all this was MW's official web chat, which our data suggests was used mostly for purposes related to the performance of the work only, rather than for identity talk. A likely reason is that MW's managers could access the chat. The other channels were pseudonymous and/or inaccessible to managers.

Above we referred to microworkers' online communities and other self-organized formations using a geographic metaphor, 'place'. It is common for online communities to be cast as 'virtual places' that exist outside physical geography (Steinkuehler and Williams 2006). Graham (2013) cautions against the use of such 'cyberspace' metaphors, for they can mask the fact that all human action still takes place somewhere in the physical world, where its effects are felt. Indeed, it would be wrong to say that microwork moves labour to the 'cloud', as this would mask the fact that the work is still performed by individuals in distinct locations in the world, with socioeconomic consequences varying by location. But bearing this in mind, the 'virtual place' metaphor is still useful for describing the workers' self-organized online communities, as it indicates that these formations are functioning as substitutes to offices, break rooms, and neighbourhoods as nexuses of organization and identity enactment. They are not places in the geographic sense, but they are experienced as places in the relational sense, in that workers can count on meeting their colleagues there.

5.3 Fragmented identities limited collective actions

To what extent, then, does collective action emerge from the 'virtual places' that facilitate organization and identity formation? MTurk workers were the only ones observed to be somewhat active in this regard. They often shared information about fair and unfair employers, or employers giving unclear instructions, posting tasks that are too demanding in relation to the pay, or paying late or not at all. They also admonished each other against accepting tasks that would result in hourly earnings below some given minimum wage. One MTurk community's leader attempted to offer employers privileged access to that community's workers, ostensibly of high quality, in exchange for excluding other workers from the project. This could be seen as an example of collective bargaining. However, it is hard to find evidence that any of these actions would have substantially altered the power balance between workers

and employers on the market. Probably the largest collective worker effort in the whole microwork market is Turkopticon, a database where MTurk workers can submit information on employers and check an employers' record before accepting a task. According to Irani and Silberman (2013), the Turkopticon browser plugin had been installed 7,000 times after four years of operation. Compared to the total number of registered workers, which according to Amazon is over 500,000, this is a relatively small number.

It may be that microworkers' virtual gathering places and the identities they sustain remain after all too fragmented and divided to offer a basis for very effective collective action. Workers in a factory all share the same employer, but workers in a virtual community may all be working for different employers, as membership is instead shaped by the vagaries of search engine algorithms and subcultural splits. Membership was moreover strikingly structured by geographic boundaries. On no site or channel did MTurk, MW, and CF workers meet each other. MTurk's Indian workers also did not make themselves known in the same online places as the North American workers. National identities and distinctions were in some cases strongly enacted, one North American worker explaining how fraudulent workers who submit gibberish in place of proper work hailed "especially from one particular country" [F, 40]. However helpful to self-esteem it is to enact national identities, organizing along such lines is unlikely to result in success in a transnational labour market.

Even when collective or regulatory power is successfully brought to bear on a microwork platform, the delocalized nature of the work means that the solution may be short-lived. In 2012, an MTurk worker filed an employment lawsuit in California against CrowdFlower, a 'transformer' company that acted as an intermediary between the MTurk platform and several end-clients. The suit obtained class action status, the class being MTurk workers who had done more than a minimal amount of work for CrowdFlower. The suit was settled in 2014 for $585,000,[1] which many workers in forum discussions considered a modest success. However, soon after the suit was filed, CrowdFlower stopped funneling work to MTurk. It now funnels work to over 50 other platforms instead. The fact that there are so many platforms today diminishes the effectiveness of organizing around any single platform.

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[1] http://wtf.tw/ref/otey.pdf

A handful of microworkers and supporters are continuing attempts to mobilize and organize digital precariots. For example, in 2014 Canadian MTurk worker Kristy Milland organized a campaign for workers to send demand letters to Amazon CEO Jeff Bezos (Harris 2014). Somewhat ironically, one of the ways in which Milland sought to mobilize workers was by hiring them via MTurk. In the absence of effective organization, becoming an employer is the most effective means that organizers like Milland have at their disposal.

6. Discussion: A variable geometry of individualized actors

What implications do the mechanisms of 21st-century informational capitalism have for labour organizing and the identities that underpin it? Insofar as those mechanisms seek to disembed and detach labour from local contexts in order to generate at each moment the most efficient production networks on the global level, the lessons learnt from microwork — an extreme example of such processes — must be instructive. Following Flecker and Schoenauer (chapter X of this book), it would be a mistake to understand microwork as inherently delocalized work. Instead, we saw that microwork platforms enrolled specific efforts and technologies to produce the material, social, and legal circumstances in which the work becomes relatively placeless. We saw that one net effect of these delocalization efforts was to make it more difficult for workers to know each other and develop shared identities, trust, and solidarity, weakening the workers' bargaining position in the market. Huws and Dahlmann (2010) found similar difficulties in identity formation in other spatially restructured informational work.

These findings stand in slight contrast to some earlier work on ICT-enabled outsourcing in the context of service value chain restructuring (Davis-Blake and Broschak 2009, Flecker and Meil 2010). In these studies, the focus has been on issues of trust, power, and identity between geographically distinct work sites constituting different parts of the value chain. Conflicts and contestations can arise between sites, and management can exploit these. But within sites, workers are still in close contact and often from similar backgrounds, factors that are conducive to shared identity formation. In microwork-style outsourcing, there are no work sites — time-space compression happens on the individual level. This organizational difference reflects a material difference in the form of Internet access: office broadband versus domestic

or mobile broadband. While individual access allows more flexibility for the worker, it also leaves them more vulnerable to being singled out and isolated by means of suitable work organization. It is therefore important to make a theoretical distinction between work that is delocalized and subsequently partially relocalized elsewhere, and work that is delocalized and subsequently remains dispersed. Many MTurk workers live in the United States, including in its West Coast high-tech hubs. Work that is socially and organizationally dispersed does not necessarily have to move anywhere in geographic terms. What is being erased is the sense of place as a relational concept, as a nexus of political organization and regulation. A potentially simple way to distinguish between relocalization and dispersal empirically is to ask whether the company decided where the work should be relocated to.[2]

Previous studies of the experiences of dispersed freelance knowledge workers and teleworkers working from their homes and Internet cafés have focused on relatively elite workers performing highly specialized labour such as software development and web design (Barley and Kunda 2006, Kunda et al. 2002). These technology professionals were among the first to obtain personal access to the Internet, and therefore among the first to whom delocalized work arrangements were created. Today, domestic and mobile broadband penetration around the world is starting to reach a point where a dispersed mode of work could potentially be applied to millions of undifferentiated service workers. An obvious difference between these groups is that highly specialized workers possess a degree of bargaining power by virtue of their limited numbers, whereas undifferentiated workers currently have few means beyond national regulation and collective bargaining to defend the returns to their labour. Losing the geographic nexus is of little economic consequence to the early elite adopters of dispersed work, but our findings from microwork suggest that it could be very consequential if there was to be mass adoption. This is an important implication to policy makers who have embraced domestic Internet access and personal online work as a means towards economic and social development (World Bank 2012, World Bank 2013, Raja et al. 2013).

We saw that ICTs are also being used to reconnect workers, counter organizational dispersal, and build 'virtual places' or online substitutes to the missing geographic nexus. In these places, workers enact shared occupational identities and

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[2] I am indebted to Jörg Flecker for this observation.

even class identities in the sense of expressing shared interests against unfair employers. However, the actual collective actions that stemmed from these places were modest in scale and it was difficult to find evidence of effectiveness. This relative failure to perform effective collective bargaining can be traced to the topology of the workers' online formations and identities. Conventional unions are usually organized around specific skill sets or employers, with the aim of obtaining market power by regulating the supply of labour in that particular market segment (Streeck 2005). In contrast, workers' online formations are not necessarily organized around any particular market segment. Their membership composition is more arbitrary and incidental, shaped as it is by search engine and recommendation algorithms, personal social networks, and subcultural splits within the worker communities. This leaves the groups in a weak bargaining position against any specific employer or industry. The most systematic basis of organizing seemed to be national identity. But as traditional unions have experienced, organizing along national boundaries may not be effective in a delocalized labour market.

Finally, a more fundamental issue in organizing dispersed workers is that such workers can come from very different socioeconomic circumstances, and may thus have rather divergent interests. For example, we saw that American workers expressed more concerns about pay than Filipino workers, and Nepalese student workers who only worked to earn pocket money expressed few concerns at all. Many of the workers now used by CrowdFlower may not see themselves as 'workers' at all: many are online shoppers earning discount tokens by completing a few simple tasks, or online gamers collecting virtual currency, with little interest in labour struggles. Moreover, microwork platforms and other online labour markets have also produced what could be called a dispersion of employment: many of the employers buying informational labour through these markets are small startup companies and individuals, such as researchers and graduate students. One moment they are hiring, the next moment they may be acting as workers themselves.

Given the dispersion of roles and identities in the microwork labour market, it is not clear to what extent it makes sense to continue to approach these markets using a binary model, where workers and capitalists struggle over the allocation of returns to their respective factors of production. In analyses of dispersed work, we might instead draw on Castells (1996), who suggests that in the informational sector, the binary conflict between capital and labour is replaced by a 'network economy': a

'variable geometry' of individualized actors, constantly included and excluded on the basis of their ability to contribute. Instead of a binary conflict, it features complex and variable patterns of differentiation, collaboration, and exploitation, which must each be analyzed separately.

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