

# Embedded Reproduction in Platform Data Work

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## ABSTRACT

This paper focuses on the experiences of Latin American data workers from Venezuela who annotate data for machine learning algorithms through labor platforms. It introduces the notion of “embedded reproduction” or the relationship between embeddedness, the degree to which non-economic institutions and their social environment constrain socio-economic activity, and social reproduction, or the activities that nurture, maintain, and regenerate the workforce. The analysis of 38 interviews with platform workers suggests that they are situated in a deeply disembedded market due to the lack of regulations and insufficient environmental protections, giving free rein to platforms to set their rules to their detriment. This paper explores how this disembeddedness shapes social reproduction by studying three forms of resistance and social support received by workers: from family members, neighbors and local communities, and online groups. The support of these networks is primarily local, depends on high levels of trust, and is gendered. This paper concludes by arguing that platform data work is unsustainable from an embedded reproductive perspective since platform intermediation leads workers and local communities to carry out the social and economic risks associated with this form of gig work. Because the disembeddedness of platform labor affects—and is affected—by the degradation of environmental conditions, this paper invites a dialogue between the embeddedness framework with social reproduction as well as a consideration of the importance of nature and natural resources in the study of social environments.

## KEYWORDS

Embeddedness; social reproduction; artificial intelligence; platform; data work

## 1. Introduction

Machine learning (ML), a subset of artificial intelligence that centers on agents that can learn with experience, often in the form of vast amounts of data (Russell & Norvig, 2020), has driven recent technological developments, for example, in the areas of facial recognition and virtual assistance. Some of the steps in the development of ML algorithms, notably the construction of datasets and the verification of algorithmic outputs, require human labor in the form of data entry, annotation, and evaluation (Tubaro et al., 2020). This labor, or “data work,” is often outsourced by companies and research institutions to workers worldwide through labor platforms, hybrids of firms and markets that transact information, goods, and services between multiple actors (Casilli & Posada, 2019). This platform labor is highly commodified: workers

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are considered freelancers or independent contractors and are usually paid low wages per task, subject to algorithmic management, and constant surveillance (Woodcock & Graham, 2020). Although most of the requesters of outsourced data work come from advanced economies, workers come primarily from countries in the Global South (Graham et al., 2017) and carry out most of the social and economic risks associated with their work (Tubaro & Casilli, 2022).

In this paper, I explore how this highly commodified type of work shapes—and is maintained—by networks of people who provide and receive social support to and from workers. To address this research question, I will decenter the productive activity of data work and the socio-economic relationship between workers, platforms, and requesters, and I will instead focus on the local and online communities that allow workers to be ready for work. I will analyze these economic and social relationships through the lens of “embedded reproduction,” a concept that explores the relationship between the *reproduction* of society and the *embedddedness* of these social and economic phenomena within their environments. Embeddedness considers that the degree economic activity, in this case, labor transactions, are regulated through non-economic institutions (Polanyi, 2001), that include governments, communities, and families, who depend on their social environment. On the other hand, social reproduction accounts for the essential reproductive labor and institutional support that nurtures, regenerate, and maintain the workforce (Hester & Srnicek, 2017), and the importance of common goods and local organizations to mitigate the environmental damages of the disembedded economy.

This paper addresses the embedded reproduction of platform data work in Latin America by analyzing 38 semi-structured interviews with workers of three platforms, the nature of workers’ personal networks, and their access to forms of institutional support and shared resources. Most of these workers are located in Venezuela, a country experiencing a deep economic, political, and social crisis (ILO, 2011). The ongoing hyperinflation, at an average rate of around 50% and having depreciated the economy by 60% compared to 1999 (Singer, 2021), makes these platforms the only reliable source of income in US dollars for many workers in a moment where the COVID-19 pandemic has severely damaged the local labor market. Despite the socio-economic and health crisis, the infrastructure of the country, built primarily during previous periods of economic prosperity, has proven essential, albeit unreliable, to access the global market of data work. The social, economic, and health crisis in the country and the labor conditions of platform labor make this type of work highly disembedded.

In this paper, I will first conceptualize embedded reproduction through a review of the literature on embeddedness and social reproduction. Then, I will provide details on the empirical setting and methodology of the study. The findings will be divided into two parts: first, an account of the disembedded working conditions of platform workers, and then how family, neighbors, and online communities support workers in these conditions. The findings will focus on instances of domestic labor and economic support that allow workers to be ready for work, worker organization through social media and the management of common online resources, and the locally-managed shared natural resources that workers require for subsistence.

The qualitative analysis of these interviews suggests that workers are not an atomized workforce and, instead, depend on social support from these different groups. This support is highly gendered and relies on high levels of trust, notably in the case of relationships outside of family and households. In the latter cases, access to shared resources, both local and virtual, proved essential to increase income from platforms, have access to crucial public resources like water, and mitigate the effects of

environmental damage. Based on these findings, this paper concludes that societal reproduction in the conditions in which platforms thrive is unsustainable since it depends on a normative embeddedness that negatively affects the livelihoods of workers, create dependency, and contribute little to the long-term development of local communities. Based on these results, this paper invites expanding the scope of research on embeddedness in platform labor outside of socio-economic exchanges to account for embedded reproduction through the importance of networks and natural and common resources for the sustainable development of local communities and technologies worldwide.

## 2. Theoretical Framework

This paper will study the support received by platform data workers using the theoretical lenses of embeddedness and social reproduction. The first, developed primarily in economic sociology and economic geography, accounts for the dependence of social phenomena on their environment, including the relationship between social actors, non-economic institutions, and nature. The second, developed in sociology and feminist scholarship, focuses on the reproductive dynamics of capitalism, accounting for the labor and institutional support required to nurture, regenerate, and maintain the workforce. Embedded reproduction, or the relationship between these frameworks, will be used to study the configurations of platform labor in Venezuela and how it conditions the support received by workers and their access to natural and common resources.

### 2.1. *Embeddedness*

The concept of embeddedness originates in Polanyi's book *The Great Transformation* Polanyi (2001), where he uses this term in two distinct ways. First, the term refers to the activities, objects, and subjects not created by markets but exchanged as commodities, namely labor, land, and money, which, in turn, become disembedded from their specific normative, cultural, and legal constraints accorded by society (Polanyi, 2001). Second, the author argues against the orthodox economic model of the market, based on individual transactions, affirming that it is instead "embedded and enmeshed in institutions, economic and non-economic" (Granovetter, 1986, p. 250). These institutional regulations link workers with the fabric of society and its particular defined functions (Beckert, 2003). These two different types of embeddedness, which Peck (2013) denominates hard-Polanyi and soft-Polanyi respectively, and Wood et al. (2018) call *normative* and *network* embeddedness, were developed separately within the fields of sociology and geography.

Research on *network* embeddedness was popularized in economic sociology by Granovetter, who argued that, beyond institutions, economic exchanges are embedded within personal networks of trust that stem from micro-level interactions (Granovetter, 1986). This structuralist approach to embeddedness stressed the importance of interpersonal networks of trust to assess the valuation of goods and improve productivity and innovation (Granovetter, 2005). This approach has been criticized, however, for over-individualizing market exchanges (Beckert, 2003) and thus ignoring Polanyi's conception of markets as "fully social institutions, reflecting a complex alchemy of politics, culture, and ideology" (Krippner, 2002, 782).

On the other hand, research on *normative* embeddedness has focused mainly on

the recent wave of commodification that characterizes neoliberalism (Burawoy, 2010). Burawoy builds on Polanyi’s definition of false commodities to explain that, due to their “fictitious” nature, by turning labor, land, money, and in his regard, knowledge, into market products, they lose their use-value, such as by destroying the productive capacity of labor (Burawoy, 2010, 310). In this context, commodified labor is no longer a human quality but a resource or input in the production process. Instead of being embedded in “the broader flows of cultural life and of living matter,” labor becomes “restructured together under the umbrella of constitutional rights and laws founded on principles of individual rights to private property guaranteed by the state” (Harvey, 2014, p. 58). This conception of labor fails to recognize that, beyond this individualized and marketized vision, it is embedded “in other social institutions, such as the family, education, politics, and the healthcare sector” and “intimately related to gender, race, age” and other intersecting identities (Kalleberg, 2009), all central to the study of social reproduction.

Both these concepts of embeddedness, *normative* and *network*, have been used to study the gig economy. For instance, Wood et al. (2018) argue that despite the intermediation of platforms, the outsourced and fragmented character of their labor—or the *normative* disembeddedness of labor from society—pushes workers to become spatially and temporally embedded in personal *networks* of trust that counter the alienation from their peers generated by platform labor. Furthermore, Tubaro (2021) argued that the existing relationships in platform labor occur not only between individuals and among several platform firms. This paper will continue to explore the configurations of *normative* and *network* embeddedness in platform data work, a highly commodified type of labor (Woodcock & Graham, 2020), with a particular emphasis on the effects of this embeddedness in local support. Because this analysis on embedded reproduction aims not to focus on the productive aspects of platform labor but instead on how embeddedness affects—and is conditioned by—social reproduction, this latter theoretical framework will complement this research.

## **2.2. Social Reproduction**

In simple terms, social reproduction recognizes that “human labor is at the heart of creating or reproducing society as a whole” (Bhattacharya, 2017, p. 2). In other words, it focuses on the activities necessary to “nurture future workers, regenerate the current workforce, and maintain those who cannot work” (Hester & Srnicek, 2017).

Marx introduces the concept of social reproduction when describing the productive and reproductive dynamics of capitalism. He argues that “whatever the form of the process of production in a society, it must be a continuous process [. . .]; therefore, as a connected whole, and as flowing on with incessant renewal, every social process of production is, at the same time, a process of reproduction” (Marx, 1978, p. 401). Thus, capital requires the constant reproduction of material goods, services, social systems, and structures to access and maintain production conditions and relations.

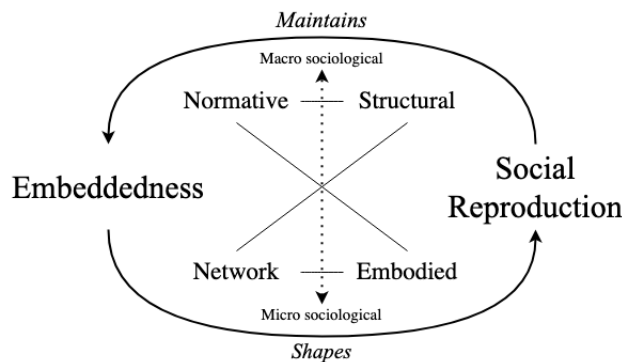
This initial Marxian notion of social reproduction was developed in the 20<sup>th</sup> century to explore the reproduction of inequalities in society from a *structural* perspective, including how “ideological state apparatuses” maintain the existing class divisions (Althusser, 1970) and how social structures legitimize—and reproduce—the structural dominance of particular classes over others through the economic, social, and cultural capital of their social actors (Bourdieu, 1979; Bourdieu & Passeron, 1970).

In recent decades, feminist scholarship has studied the “reproductive dynamics of

capitalism” in social reproduction (Bhattacharya, 2017) with a particular emphasis on *embodied* reproductive labor. This strand of scholarship focuses on forms of oppression and exploitation and the unrecognized labor of women and other social minorities. For example, it considers domestic work as one of the oldest forms of invisible labor carried in the private sphere and an essential aspect of social reproduction (Jarrett, 2014). While the conception of domestic labor recognizes that labor’s invisibility precedes capitalism’s development, it also highlights how the labor of women and oppressed communities becomes invisible in specific relations of production (Ferguson, 2020). Furthermore, this scholarship also expands the institutional view on social reproduction, centering on the crucial role of welfare in society, for example, though education, healthcare, social security, and other institutions essential in reproducing and maintaining the workforce (Hester & Srnicek, 2017).

Based on the significance of social reproduction for capitalism’s productive forces, in this paper, I will study how the *normative* disembeddedness in which outsourced data work takes place affects social reproduction, both through *embodied* labor and the renewal of social *structures*, by exploring the qualitative aspects of *network* embeddedness in the case of Latin American workers, their households, local, and online communities. To this end, **I propose the term “embedded reproduction” to account for the relationship between the degree to which non-economic institutions and their social environment constrain socio-economic activity, and how this embeddedness shapes — and is maintained — by the activities that nurture, maintain, and regenerate the workforce** (See Figure 1).

In platform labor, a focus on embedded reproduction means studying how the commodification of labor and subsequent reliance on networks of support condition and depend on the activities consisting of “caring directly for oneself and others [...], maintaining physical spaces and organizing resources as part of an indirect process of care for oneself and others [...], and species reproduction” (Hester & Srnicek, 2017). Centering on reproduction instead of production allows exploring how the development of artificial intelligence depends not only on the essential labor of workers in precarious conditions, but also on their social networks performing reproductive labor. With this framework, I also reiterate the importance of considering nature and common resources as fundamental aspects of social environments in embeddedness, and account for the conditions that shape social reproduction through resource availability and management, health conditions, and community organization, which are, in turn, affected by the disembedding of productive activities from environmental regulations.



**Figure 1.** **Embedded reproduction** explores the relationship between the reproduction of society and the degree to which non-economic institutions and their social environment constrain socio-economic activity.

**Table 1.** Studied platforms

<b>Platform</b>	<b>Primary Tasks</b>	<b>Applications</b>
<b>Tasksource</b>	2D/3D image classification	Self-driving vehicles
	2D/3D semantic segmentation	Internet of things
<b>Workerhub</b>	2D image, text & video classification	Content moderation
	2D semantic segmentation Text transcription	E-commerce
<b>Clickrating</b>	Data entry	Online search engine
	Algorithmic verification	

### 3. Research Design

#### 3.1. Empirical Setting

This paper will explore embedded reproduction in platform data work by focusing on the types of support received by Latin American workers primarily located in Venezuela. The research will focus on three main platforms here anonymized as Tasksource, Workerhub, and Clickrating. Table 1 describes the types of tasks available and the applications of this labor in the artificial intelligence market.

Contemporary data work companies and the platforms they operate are a subset of the gig economy, or “labor markets that are characterized by independent contracting that happens though, via, and on digital platforms” (Woodcock & Graham, 2020, p. 3). As independent contractors, workers bear more financial and social risks related to the economic activity of AI production than their employers (ILO, 2020; Tubaro & Casilli, 2022). Furthermore, while workers still operate remotely, they are subject to algorithmic surveillance and control. For instance, platforms monitor workers’ accuracy and the time they use to perform tasks (Wood et al., 2019). They also provide reputation and evaluation systems that reduce uncertainty from clients (Lehdonvirta et al., 2019), requiring workers to provide unpaid and unrecognized emotional labor to maintain and sustain their reputation scores (Gandini, 2018; Irani & Silberman, 2013). Their work arrangement also allows platforms to ban and terminate, or “deactivate,” the accounts of workers unilaterally, without explanation, and sometimes without recourse (Gray & Suri, 2019, p. 94).

Most interview participants were Venezuelans, most living in Venezuela and two living as migrants in neighboring Colombia. Venezuela is a country experiencing a severe economic and political crisis. The country has experienced the highest levels of inflation globally in recent years, reporting around 3,000% rates in 2020 (Agence France-Presse, 2021). On top of this difficult context, the coronavirus pandemic has exacerbated this crisis by pushing more Venezuelans to unemployment and dependence on the informal economy for subsistence (Schmidt, 2019). In embeddedness terms, platform data work in Venezuela represents an extremely disembedded market. From an employment perspective, workers do not perceive the rights commonly associated with standard employment relations, and, from an institutional perspective, the political and economic crisis of the Venezuelan state combined with the COVID-19 pandemic has reduced its ability to offer protections and services to workers and their communities.

### 3.2. Data and Analysis

Because platforms serve as intermediaries between users in a market, it is difficult to establish the demographic characteristics of workers without accessing the companies' datasets. Moreover, this research has provided evidence of users with multiple accounts and families working under a single account, suggesting that even platforms ignore the true size of the worker population. Therefore, the workers of the three studied platforms constitute a hidden population, rendering sampling difficult. Previous attempts to measure the size of the platforms' workforce used online surveys through the platforms (Difallah et al., 2018; Ludec et al., 2019). However, this approach is only compatible with generalist platforms, such as Amazon's Mechanical Turk, that allow requesters (including researchers) to access the marketplace. Instead, the three platforms specialized in data work studied here restrain their marketplace to particular AI developers and maintaining a high level of secrecy about their operations.

Previous research on data work suggests that workers communicate mainly through social media and forums (Wood et al., 2018; Yin et al., 2016). Following these insights, I identified online groups of Latin American data workers of the three studied platforms on Facebook, Discord, WhatsApp, and Reddit. These groups are diverse, and their nature will be analyzed in depth below. For instance, Tasksource uses a private Discord channel as a forum moderated by company employees to share information and coordinate with their approximately 1,500 online members. Another open group for Workerhub and Clickrating exists on Facebook and comprises 1,100 registered users who discuss work in the platforms without the moderation of company employees.

Based on this information, I used opportunity sampling by approaching workers in eleven open groups. First, I asked moderators permission to post a call for participants. Then, I asked participants to sign an online form of consent that provided further information on the study and listed their rights as participants. A total of 38 workers participated in in-depth semi-structured interviews conducted in Spanish and collected virtually between February and August 2021. I asked these participants about their work for the platform(s), personal networks, and access to public services. I analyzed these qualitative data using thematic coding and analysis (Richards, 2015).

## 4. Findings and Discussion

### 4.1. Platform Disembeddedness

Much like (Wood et al., 2018) found in their research, the AI platform labor market is highly disembedded, showing a lack of economic and institutional constraints in its operations. The devalued currency and demanding access to goods and services in Venezuela since the beginning of the crisis have seen the emergence of an informal economy dependent on the US dollar. Many participants saw their salaries substantially reduced, while others, suffering from unemployment, experienced increasing difficulty finding jobs. For instance, Melba, a retired woman who used to work for *Petróleos de Venezuela* [Petroleum of Venezuela] (PDVSA), the state-owned oil company, lost most of her income to the devaluation of the country's currency:

Even though I receive a salary and a pension, and my husband as well, our paychecks don't cover anything. I wonder, how can people survive here in Venezuela when someone like me, with a [monthly] pension worth 1,800,000 bolívars [around 1 US dollar], can't buy half a dozen eggs? You can't buy a piece of cheese or bread. (Melba, Workerhub)

The hardships of the country’s economic, political, and social situation combined with the current pandemic make labor platforms one of the only sources of income available to workers. The ability to circumvent the geographical restrictions or the local labor market and earn income in US dollars was the main driver for many workers, like Wilmar, to start working online:

The economic crisis has pushed many Venezuelans like myself to find work alternatives online. Thank God that I have a computer and internet connection. Wages here have been very low in the past four years, and many of us had to look online for external sources of income and improve our living conditions a bit. (Wilmar, Tasksource and Workerhub)

Workers of the three platforms perform data entry, data annotation, and algorithmic verification (Tubaro et al., 2020), using different criteria to select particular tasks. The most important was the payment, ranging from 30 cents per 1,000 tasks to a few dollars per task depending on the platform, the complexity of the task, location, and other sometimes undisclosed factors. Regarding difficulty, classification tasks take a single click and are often paid less, while segmentation tasks can take around one hour depending on the complexity and size of the image and are paid accordingly. Workerhub users also reported ethical and social reasons related to their task choice. For example, workers like Alcides reported disliking tasks related to pornography due to working in a family context:

There are tasks where you have to classify pornographic images, and I avoid them because it’s not correct to work on that in public [...] I have little siblings at home, and we’ve had to hide the computers when some of us were working so they wouldn’t see those images. (Alcides, Workerhub)

Clickrating and Tasksource workers do not often have a choice and are instead assigned tasks. They have to pay attention to the system because tasks can appear at any time, including early morning hours, and disappear soon after. Once a task is identified, workers must pass a qualifying exam and, in Tasksource, receive training from company coaches and pass further tests. In all cases, these periods of evaluation and training are unpaid.

Once accepted to perform the task, algorithms constantly monitor workers. A technique used by all platforms consists of making workers annotate data that the client has previously labeled. If the worker does not annotate the data according to the client’s direction, the algorithm will ban the worker from the task. The platform may ask the worker to annotate the data again and, if the worker provides a different solution, the algorithm will ban them. Workers do not have any recourse against banning and are not told the reasons for this outcome. In more severe cases, the algorithm can suspend or terminate the worker’s account, and, like with instances of banning, no explanation is given. Workers who face expulsion from the platform will lose all accrued income. The following testimony is from Mario, a worker who was part of a special program run by Tasksource where he was paid per hour and expelled after voicing a complaint:

I had worked 17 hours, and then I worked one night for 8 or 7 hours and, the next day, they didn’t count those hours. [...] The next day, I contacted [the moderators]. The guy, instead of giving me an answer [...] told me, “wait for a solution,” and that was it. I didn’t insist. That was in the morning, at around 10 AM. In the evening, around 7 PM, I tried to log in again to see what they would say about payments, and they had kicked me out of the group. (Mario, Tasksource)

Workers are paid differently according to the platform. All platforms pay workers in



US dollars through digital wallets, such as PayPal for Workerhub and Clickrating and Airtm for Tasksource. Furthermore, Workerhub and Tasksource also pay workers in cryptocurrency, namely *Etherium* for the Workerhub, and a cryptocurrency managed by Airtm and tied to the US dollar for Tasksource called *AirUSD*. Many of these digital wallets ask workers to verify their identity by matching their national identification cards with a photograph of their faces, for example, using a third-party facial recognition technology from the United Kingdom in the case of Airtm. This technology, however, has had low accuracy for workers with darker skin, an issue widely documented in the computer science field (Buolamwini & Gebru, 2018; Gebru, 2020), such as in the case of Roberto, a Black worker:

I tried to verify my account. I sent a copy of my ID card and a selfie holding the ID. I had to wait for an entire month. On one occasion, I asked the moderators on Discord because they were threatening to close unverified accounts. My account wasn't verified, and I was scared because that's how I made money, and I was going to practically lose my job. (Roberto, Tasksource)

The dominant informal economy also means that the government does not perceive any taxes from any of the transactions of these informal markets. Aside from government aid in the form of a few dollars per month for specific individuals and a bag of groceries for most families that arrives once every few months, the presence of governmental institutions has been vastly reduced since the beginning of the political and economic crisis and even more since the pandemic. Only two of the workers had health insurance tied to their employment or that of a close family member with a government entity. None of the children and youth in their households were receiving in-person education except for a few who attended universities in urban centers. Aside from the public services mentioned above (e.g., electricity, drinking water), the availability and quality of other services such as waste disposal have also been impacted. In sum, the presence of public institutions in the lives of the interviewed workers has been reduced and, in many cases, has become non-existent.

That said, while the government's presence has been diminished by economic hardship and high levels of corruption, giving free rein to platforms to set their own rules of the online labor market, its actions have been fundamental in allowing platforms to operate in the country. Workers rely on infrastructures that predate the current crisis. For example, many utilize computers acquired for free or at a low cost through two government-sponsored programs. One program consisted of giving free laptops called "Canaima" (after a National Park) to school children and teachers that were either kept by families or sold and acquired in the informal market (see Figure 2).

The work arrangement of the platforms, where workers are considered independent contractors, coupled with the government's lack of constraints and reduced support, suggests that the labor market for outsourced data work is disembedded from a normative perspective and, therefore, highly commodified. For platforms, this disembeddedness means that there is no regulation from external parties except for the constraints derived from contracts with partners, such as third-party online wallets and clients. Therefore, platforms have almost total control over the internal market of data work. Furthermore, these platforms do not pay taxes in Venezuela, nor are they subject to existing regulations that could protect workers. For workers, contact with government institutions is minimal, receiving little support in terms of services, healthcare, and subsidies, except for access to some essential infrastructure. This context creates a dependency on the part of the workers, manifested in an over-reliance on the platform, high economic, social, and personal risks, and a high degree of power



**Figure 2.** Image of a Canaima featured in the Latin American online marketplace “Mercado Libre.”

from the platform to regulate its internal labor market.

#### *4.2. Types of Social Support*

The previous section described aspects of the labor process in Venezuelan platform data work to illustrate its degree of *normative* disembeddedness: labor is considered a commodity, workers have few rights, government intervention is minimal, and the ongoing economic and health crisis has reduced the role of institutions in providing support for workers.

This section will explore the network embeddedness of workers, describing the support received from (1) household and family members, (2) colleagues and online communities, and (3) neighbors and local communities, and discuss the implications of this support for social reproduction.

While many of the relationships and activities outlined here were described by data workers, they are not necessarily related exclusively to the outsourced data production market. Instead, following the focus on embedded reproduction, these findings illustrate how the disembeddedness described above shape these socially reproductive activities and also, since workers depend on them for survival, how they help maintain in part the global production of artificial intelligence.

##### *4.2.1. Support from Household and Family Members*

Previous research has suggested that gig workers rely heavily on social networks for different types of support. For example, there is evidence of support emerging from households (Drahokoupil & Piasna, 2019) and online groups (Yin et al., 2016) for digital workers. Data from this research suggest that data workers from Venezuela

rely heavily on their personal networks to make up for the market's difficulties and the lack of protection from institutions. These networks are primarily local, and the forms of support received follow traditional gendered divisions.

None of the participants lived independently, and all of them shared their households with other family members, often living in properties acquired through inheritance. In most cases, workers reported that the income received from the platforms constituted the majority or, in many cases, the entirety of their households' income. The economic crisis has pushed other family members to find work in the informal economy, often selling food or taking up casual jobs. Several families chose to work together for the platform after losing their jobs due to the pandemic. For example, in one family comprised of two parents, María and Rogelio, and four children (two of whom are adults), all but the youngest worked for Workerhub using two computers at different alternating times. María explains their shared workload as follows:

Those who are working, let's say "full time," are my husband and I. When we are resting, [our children] work. They just fill in. I would tell them: "we'll rest" or "I don't feel well," or my husband would tell them, "It hurts from sitting so long." So we stop working, and they work for a while. I can't have my kids working full time, no. It's on us to work. They just fill in. For example, at noon, when we're cooking lunch, they work from the computer. We start working again at around 2:00 or 3:00 PM. They stop, and we keep working. (María, Workerhub)

In most cases, workers relied on the domestic support of household members who do not work for the platform. Most of these were women who would perform domestic duties such as cleaning, cooking, and grocery shopping. In most cases, all household members shared some of these duties, although to a lesser extent than female members who are not platform workers:

On my days off, I buy groceries. My wife is the one who does laundry and cooks. Sometimes when I'm not busy, I cook, especially for lunch. My mom cooks for breakfast and dinner because she likes to keep herself busy. My aunt does cleaning, or sometimes they divide tasks with my wife and mom when I'm busy. (Eduardo, Clickrating)

Right now, my mother-in-law supports us. Monday to Friday, she takes care of our house, she takes care of my children, she cooks lunch, dinner, breakfast. She bathes the kids. All of that. (Wilmar, Tasksource and Workerhub)

My aunt does most of the tasks. Because this is her house, she knows how to clean it. Sometimes I help her with cooking and cleaning, but she does most of it. Most of the time, she cooks. [...] If she asks, I help her, but she knows that most of the time, I'm [working] online. (Olivia, Tasksource and Workerhub)

Young participants also reported preferring to live with other family members, usually their parents, to share the costs such as food and public services. Family members also support each other in case of illness in a context where health insurance is rare:

Last year, [...] I got malaria, a very bad case. My aunt, who's always been like a mother to me, took care of me and brought me to her house. I was treated at her house. It was better with her because, in my father's house, I used to do the majority of chores that she does here: cleaning, cooking, grocery shopping, that's the kind of things I used to do there. My dad helped but, you know, I was the "woman of the house" because I was the eldest [daughter]. When I came here, everything was calm; the emotional burden was less. After six months of treatment, I got cured of malaria, and I decided to stay here. (Olivia, Tasksource and Workerhub)

Besides the emotional and domestic support, family and household members also

provide economic support. Notably, those living abroad contribute with remittance and those situated nearby provide access to resources necessary for work and affordable housing:

After my mother went to Spain to try to find a job and send us money, I couldn't return to my grandmother's house because she didn't have internet. I was studying at the time, and I couldn't be in a place without the internet. [...] So, I talked to my girlfriend, we were dating only for a few months, but I didn't have a choice. The only solution was to move [...] to her house, which is where I live right now. (Jerónimo, Clickrating)

The experiences of workers demonstrate that they are not alone and can work online annotating data for artificial intelligence thanks to the domestic, emotional, and economic support of family and household members. This support becomes more pronounced in cases of extreme disembeddedness, both when the piece-wage regime foments dependency and when government support (e.g., in healthcare) becomes reduced. Furthermore, the findings confirm once more that social reproduction is gendered and carried out primarily by women and, to a certain extent, children. This division of domestic labor signals the continuation of historical exploitative working regimes related to piece work central to the work of Boris (1994) and studied in relation to platform data work by Dubal (2020) and Gray & Suri (2019).

#### *4.2.2. Support from Colleagues and Online Communities*

Because of the use of opportunity sampling to reach out to participants through social media, most workers of this study were associated with a social media group or forum. Participants who were not associated with a social media group, mostly contacted through snowball sampling, reported relying on a family member to access information shared on these groups.

Workers of all platforms have created open groups on Facebook, WhatsApp, Telegram, and Discord to discuss with their peers. These groups range from large ones with around 12,000 members to smaller ones with a few dozen. The larger groups are usually open, have fewer restrictions, and are often hosted on Facebook and Discord. Several moderators watch over members' posts. Because of the possibility of creating several communication channels, groups on Discord tend to receive a higher engagement, allowing a wide diversity of topics to be discussed among the members.

For example, a Discord group for Workerhub with over 600 members has a channel for each of the tasks on the platform, in addition to channels for payments and entertainment, gaming, and other topics not related to work. Meanwhile, Facebook groups, a platform that only allows a single "wall" or channel for posts, restrains the topics allowed by moderators. In the case of Tasksource, open Facebook channels were vital for workers voicing criticism for the platform's closure of its pay-per-hour program and the progressive reduction of bonifications. Workers also reposted content that was taken down by the moderators of the Discord channel managed by the platform. Facebook users even proposed going on strike to improve their working conditions "because in the Philippines it worked, and they earn more than in Venezuela," according to a user. However, these calls for action did not materialize because of the reported high levels of dependency on the platform.

Workers of Clickrating, which restrains newcomers due to system that matches task availability with reputation, prefer being part of smaller private groups on Discord, WhatsApp, and Telegram. These groups have a reduced membership, rarely surpassing a hundred members, and are not free to access. Workers have to pay a monthly sub-

scription to the administrator(s) ranging from 3 to 5 US dollars and provide identity documents and information, such as their home addresses. Eduardo, an interviewed member of one of these restrained groups, justifies these measures by arguing that it allows for high levels of trust among members:

In our group, they ask you for all your contact information, even a copy of your ID or passport, ID number, a link to your social media profile on Facebook, Twitter, or Instagram, and the complete address where you live. All this information is verified with your ID number through the CNE, which is the National Electoral Council here. You can verify this information because the webpage will tell you your address, everything. The [administrators] verify all of this and even ask for reference numbers, like telephone numbers of referees, in case something happens. (Eduardo, Clickrating)

Ensuring high levels of trust is fundamental for workers who want to find reliable currency traders because, as mentioned above, platforms pay them in US dollars or cryptocurrency. Once platforms transfer wages into online wallets such as PayPal, Airtm, Payeer, or Binance, workers rely on “buyers” of dollars and cryptocurrency. These are local intermediaries who exchange these virtual currencies into bolívares and transfer them into local bank accounts. The hyperinflation makes the exchange rate fluctuate during the day, meaning that the currency loses its value so fast that workers have to check current values many times per day on social media and spend the money before it loses its value. Usually, transactions are made electronically because the hyperinflation also produced a shortage of banknotes. In this context, workers do not report any savings except on rare occasions and only in virtual currency.

While currency traders are present in both free and subscription groups, the groups with fees have policies to prevent fraud. Eduardo stated how these groups even operate in person:

Almost a year ago, someone was selling Clickrating accounts, 10 accounts for \$100. A colleague bought the accounts, transferred the money through PayPal, but didn't receive the accounts. Thank God that the group had all the information [of the seller]. They located the person. We all thought it was a scam, but it turns out that the seller had lost access to electricity, so she couldn't transfer the accounts. The money was returned, and, thank God, nothing else happened. Scams happen all the time, especially in public groups. Because private groups are protected by administrators who have all your contact information, if a seller does not respond after a payment, they take care of that. They also ensure that only trusted sellers, who are well known in the market, can be in the group. They ask for a lot of references from people who have already done business with them. (Eduardo, Clickrating)

The small Clickrating groups with paid membership also provide bots that alert workers when a task will be available. Because tasks can arrive any time of the day and last until the data has been labeled, these bots allow workers to access the tasks before they become depleted, as explained by José:

On Clickrating, to know when a task becomes available, you have to be alert at all times because tasks don't last very long. There is a bot on Discord that tells me when to access tasks. As soon as a task is available, the bot tells me, sends me a link, and I can access the task. There are even tasks that only last for a few seconds, and these are only possible to access with a bot. Telegram also has bots. (José, Clickrating)

Another use of these smaller closed groups is to share guides about the tasks that explain the instructions in Spanish and provide tips to augment productivity and reduce time spent working on the project. These guides are fundamental in a context where most of the interviewed participants have limited knowledge of the English lan-

guage, which is used to write the task instructions. The guides explain the instructions in detail and provide tips and answers to the requesters' queries.

Workers' reliance on members and online social groups suggests that, while working in a highly commodified and disembedded setting from an institutional perspective, workers are embedded in networks of trust, similar to other workers in the gig economy (Qadri, 2020; Wood et al., 2018; Yin et al., 2016). These groups provide crucial information, allow workers to criticize the platform and circumvent their censorship, identify tasks, interpret requesters' instructions, and create networks of trust for currency exchange and connect with peers. As mentioned above, these groups do not exclusively operate online, reach high levels of organization as established and semi-formal professional organizations, and manage common resources such as guides and bots. These findings confirm previous research that suggests that disembedded workers from a normative perspective are embedded in networks of trust (Casilli et al., 2019; Drahoukupil & Piasna, 2019; Wood et al., 2018).

#### *4.2.3. Support from Neighbors and Local Communities*

The support received from members of local communities like neighbors is related primarily to access to public services and natural resources. In Venezuela, the quality of public services in the country has diminished considerably while still being mainly dependent on public funds. None of the interviewees paid directly for electricity, water, sewage maintenance, and garbage disposal services. However, their access was severely constrained. For instance, electricity and drinking water were frequently inaccessible:

Internet is intermittent, and water too. We can lose access at any time, sometimes for two or three days, without being alerted. [...] We can lose access in the morning, at night, same with electricity. Some power outages are severe, especially when they last a few seconds, because they can damage your appliances. Anyway, here everything is intermittent. (Alfredo, Workerhub)

Most of the interviewed workers had access to water a few days per week, and, in many cases, it was polluted. Many had to rely on community-managed water pumps for access and water tanks for storage.:

We have water from a well, but it's not drinking water. [...] The water comes from the sea through a pump that supplies wells in the neighborhood. [...] It's the property of the neighborhood itself: every house block has a well, and we designate someone to operate the pump every day to fill them. [...] We choose this person as a community; all families have a say. It's not someone who works for us, but a member of the community, a neighbor who every morning comes to your well and fills it with the pump. Sometimes we forget to open the well, and the neighbor will yell to us to open the well so we don't waste the water. (Lucas, Workerhub)

Moreover, while participants in large cities reported access to garbage collection services, most of the participants located in suburban or rural areas disposed of their garbage in local landfills:

We have a space that you can call a landfill. A sort of improvised landfill where people from the community go and throw their garbage. Every few months, we get a truck to pick up the garbage and clear the landfill. But this isn't a service, like a recurrent pickup service. There's no truck that picks up our garbage every week in the community where I live. (Enrique, Workerhub)

When workers opted to handle their waste privately, they had to burn it within their properties, reporting high pollution levels in the air, water, and soil product of

the lack of higher quality public services and mismanagement of local resources. For instance, Angélica, a worker who lived close to a PDVSA oil extraction site, reported oil spillage and fires in the vicinity of her community on top of fumes produced by private garbage incineration:

People have to burn their garbage from home. It's normal seeing people burning their garbage. In my case, I avoid it because my son has asthma; even I am allergic, I can't. The smell of smoke makes me sick, same as my son with asthma. In my case, I am against burning garbage, but then I have to accumulate garbage in my backyard. [...] Paying a truck that picks up your garbage costs \$20, and it's not affordable. Of course, keeping your garbage attracts animals, lots of scorpions, snakes, spiders, rats. That becomes normal. (Angélica, Workerhub)

These findings suggest that, in cases where disembodiedness is also provoked by a lack of institutional support to provide public services and natural resources, local communities become fundamental to maintain minimum living standards, notably through the joint management of shared resources like water. In the case of Angélica, it also demonstrates that environmental damage also has a negative effect on social reproduction. Thus, network and normative embeddedness should not be thought of exclusively in terms of relationships between social actors and institutions but also their place within nature. Polanyi's work spoke of the dangers of the commodification of land, "another name for nature" (Polanyi, 1945, 76). "Turning land into a commodity destroys the community which lives on and from it" (Burawoy, 2010), foretelling a negative cycle for social reproduction in which the exploitation that manifests through disembodiedness physically, socially, and psychologically harms the same laborers required for production. This shows how artificial intelligence's demand for cheap labor is not sustainable in the long run. The gains in technological innovation come at the cost of losses in social and environmental protection.

## 5. Conclusion

In this paper, I examined embedded reproduction in outsourced Latin American data work used to collect and annotate data for machine learning and verifying algorithmic outputs. The internal labor markets of these gig economy platforms are highly unconstrained and deregulated. Here, workers are considered "users," earning extremely low piece wages (comparatively to the income of their employers) and lacking access to social and economic protections. Most participants are located in Venezuela, where the social, political, and economic situation, exacerbated by the COVID-19 pandemic, has reduced working opportunities locally and diminished welfare from the government.

This configuration of the internal labor market of the platform suggests a high degree of disembodiedness in terms of labor commodification. Subsequently, data workers depend on their personal networks and local and online communities to reduce the social and economic risks associated with their work and manage common resources essential to maintain adequate living standards. In sum, workers are embedded from a *network* standpoint but also disembodied from a *normative* perspective. The latter accounts for the importance of sustainability in the livelihoods of workers because a disembodied economy leads in part to the degradation of ecosystems with repercussions for workers' health and living conditions.

These varying degrees of embeddedness shape — and are influenced by — social reproduction both from the perspective of *embodied* labor necessary for the sustenance

of life and the role of *social structures* and *systems* to condition society. Both gendered labor at home, and the management of local and online communities over common resources, are fundamental for data workers to ultimately perform tasks for the platform. As such, this article has explored the fundamental support received from household and family members, colleagues and online communities, and neighbors and local communities.

The embedded reproduction framework used in this article expands the current discussion on *normative* and *network* embeddedness in the gig economy by exploring its links with *embodied* and *structural* social reproduction. This relationship stems from the importance of labor in the economy and, in this case, in the development of artificial intelligence. This labor is only possible because of the institutions and social networks that resist it in a highly commodified market and where power differentials are exacerbated and working conditions keep degrading, demonstrating the unsustainability of this type of work. The article also explored how the economy, society, and the environment are interconnected and how these connections exist locally and globally. The case of data work studied here provides only a glimpse of the intricate and complex social and economic context in which artificial intelligence systems are developed and distributed. It also explored how, instead of commodification being the product of deregulation, it is a deliberate attempt at increasing the economic gains of a few market actors at the expense of thousands of workers and their communities.

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