Dr. Suyoung Kim

Platform Workers' Experiences of Time and Space

A Case Study of South Korea

Platform Workers' Experiences of Time and Space: A Case Study of South Korea

Suyoung Kim

The study aims to investigate how platform workers experience and deal with their time and space. It has been generally considered that the digital virtual world expands the time and space in which people live and work. While an analogue industrial worker works at a specific space (workplace) during certain working hours (9-to-6), digital platform economy blurs such time-space boundary. Therefore, in order to grasp the characteristics of platform labor, it is necessary to consider the structural change of time and space that the digital technology creates. Based on the classical theories of time-space and empirical interview cases of 30 platform workers, this paper examines the time-space reorganization through platform labor. The research findings show that platform workers experience the expansion and the reduction of space at the same time. Labor in the virtual world enlarges the working space beyond specific offline workplaces, while the radius of daily life tends to be reduced or isolated. In terms of time, platform labor causes the compression and the relaxation of time at the same time. In the timeless virtual world, workers are pressured to work at ultrahigh speed, but on the contrary, they tend to instinctively loosen the time rhythm at break as a reaction to relieve mental tension caused by working pressure. This study also reveals how platform workers try to readjust their time and space for the restoration of human bio-rhythms. Considering the temporal and spatial characteristics of platform labor, this article finally discusses what kinds of social policies need to be introduced.

Keywords: platform economy, virtual world, real world, time-space

1. Introduction

All humans live in a world woven with the dimensions of time and space, and human labor is also bound by these dimensions. Platform labor, however, significantly differs from traditional labor in its relationship with time and space since it is operating across both the analog real world and the digital virtual world. As platform labor has grown, various issues concerning platform workers have emerged as significant topics of discussion. Research on these issues include the employment status of platform workers (De Stefano, 2015; Collier et al., 2017), the problem of excessive work intensity and unstable working hours (Wood et al., 2019; Kim, 2017; Chae, 2021), the issue of low wages relative to working hours (Van Doorn, 2017; Berg et al., 2018/2020; Adams-Prassl, 2018/2020), and the exclusion from social security and other gaps in protection (Forde et al, 2017; Lee et al., 2020; Nam, 2021).
Such myriad issues surrounding platform labor are fundamentally rooted in the transition of labor's time-space dynamics. In traditional analog industrial economies, an employer would control workers' activities within a certain physical workplace, thus it was obvious that the employer had responsibility for worker's rights and safety. This clear demarcation of workspace allowed for the imposition of employer responsibility. In contrast, platform labor, characterized by its non-existence of spatially

fixed workplaces, complicates the enforcement of employer accountability and obligations for platform workers. Concerning time, analog labor typically involves defined working hours – such as 9 to 6, full-time, or part-time arrangements – allowing for contractual guarantees of working hours, holidays, and hourly wages. However, platform labor, which does not have fixed working hour contracts, struggles to ensure guaranteed working hours and minimum hourly wage. Furthermore, current social security systems primarily regard 'workplace workers' – those working fixed hours in permanent workplaces – as the standard employment, thus the social security systems inadvertently exclude platform workers out of their protections. As such, the various challenges faced by platform workers stem from the qualitative differences between the traditional labor's and platform labor's time-space foundations.

Indeed, recent studies of platform labor have also scrutinized its distinctive time-space characteristics. A key focus has been the immediacy of platform labor; Huws (2016), Huws et al. (2018), Chen & Ping (2020), and Park (2021), for example, shed light on how this immediacy leads platform workers to a fragmented and unstable perception of time. The sporadic and immediate tasks without fixed working hours lead to an erratic work schedule. On the spatial dimension, the ubiquity of platform labor has been highlighted as a defining feature. Studies by Zook (2019), Stevens & Sheamur (2020), Heiland (2021), and Altenried (2022) have explored this aspect. Altenried (2022), for example, illustrates how the connection to the digital world enables platform workers to operate from virtually anywhere, effectively transforming all spaces into potential workplaces. This "factorization" of space represents a significant shift in how work locations are perceived and utilized. These investigations into the time and space dimensions of platform labor are significant because they illuminate the underlying changes causing platform labor's observable issues.

Nonetheless, while the recent studies have begun to address the changes of time and space within platform labor, most studies remain theoretical, offering abstract estimations rather than concrete evidences. Of course, a handful empirical studies – such as those by Chen & Ping (2020), Steens & Shearmur (2020), Heiland (2021), or Park (2021) – have attempted to document actual changes in these dimensions. However, these investigations often focus on a single type of platform workers, like delivery apps drivers or domestic chore service workers, and tend to examine the changes of just one dimension, either time or space. Given the diversity of platform labor and the intertwined dynamics of time and space, analysis of a limited type of platform work and singular dimension falls short of capturing the full spectrum of time-space changes that various platform workers face.

With a keen awareness of these gaps in the literature, this study delves into how platform labor reconfigures the time-space complexes of individuals and society, drawing upon diverse examples of platform labor. The first section of this paper reviews the seminal discussions from social philosophy on the concepts of time and space in modern and late-modern societies. This section offers conceptual frameworks crucial for dissecting the time-space dynamics of platform labor. Building on this theoretical foundation, this study conducts in-depth interviews with 30 platform workers, aiming to uncover the nuanced ways in which time and space are perceived and experienced within the context of their work. This empirical analysis sheds light on the actual shifts in time-space dimensions as a result of platform labor and explores worker's adaptive responses to these changes. This paper concludes by proposing social policy interventions that take into account the unique time-space structure of platform labor.

2. Literature Review

2.1. Time-Space of Modern Industrial Capitalist Society

Through historical analysis, many renowned scholars have shed light on the nature of time and space, arguing that these dimensions are not fixed entities but social constructs continually shaped by human interactions (e.g. Thompson, 1967; Bourdieu, 1963/1979; Postone, 1993; Lefebvre, 1974/2011; Foucault, 1975/2020).

Bourdieu (1963/1979: 8-29) examined how the advent of the modern era transformed the social norms of time. In agricultural societies, the production cycle of crops typically spanned a year, with the labor invested in spring and summer yielding results by autumn, thereby setting an annual rhythm to farmer's lives and livelihoods. The onset of modern capitalism introduced a dramatic shift in the previous natural yearly time concept. As industrial goods became the primary products of modern societies, the time concept of industrial workers started being adjusted to the factory production cycle. Their working time was subdivided time into increasingly smaller units, such as months, days, hours, minutes, and seconds, and they began receiving wages – payment for their participation in production - on an hourly, weekly, and monthly basis. The spatial dimensions of life underwent a clear division as well. Unlike farmhouses where work (farm) and rest spaces (house) were integrated, industrial society segregated space into workplaces for labor and homes for rest, making a distinct separation of labor and leisure spaces.

As industrial societies began to segment time according to the production cycles of industrial goods, the approach to labor management also transformed significantly. The historian Thompson (1967) chronicled the universalization of clocks and how 'clock time' became integral to the organization and control of industrial labor. In this context, the capitalist class adopted time measurement as a strategy to manage workforce more efficiently, forcing workers to cultivate a precise sense of time (Thompson, 1967: 80). Given that the paramount objective of capitalism is the maximization of profits, capitalists are driven to maximize output within a given timeframe while minimizing wages for less productive labor. Consequently, the ability to measure working hours, adhere to a daily schedule, and work efficiently within a structured time framework became prized virtues among workers.

Postone (1993: 289) highlights that the management of labor productivity under industrial capitalism does not merely aim to extend working hours. Instead, it progresses towards a more balanced distribution between labor and leisure. While augmenting workers' working hours can indeed boost production, excessively long hours may ultimately undermine productivity in the long-term. As capitalism matured, the focus shifted towards optimizing hourly productivity and refining working hours so as to sustain production without exploiting the workforce. This nuanced approach to maximizing efficiency laid the groundwork for development of 'Taylorism'. Introduced by Frederick W. Taylor (1912/2004), this scientific management technique involved analyzing workers' hours and motions to establish an efficient workload.

Henri Lefebvre (1974/2011: 86-88), a Marxist philosopher known for his theory of the production of space, posits that space is a social construct that evolves in line with the production modes of each era. He argues that a society's ideas and ideals tend to be materialized into physical forms. For instance, the Manors, comprising a church and a surrounding village, in western medieval society was shaped by Christian doctrines, symbolizing Christianity's focus on the afterlife. Conversely, in modern society, as capitalist ideology supplanted religious dominion, the cities became principal locales for

capitalist production. This shift, marked a departure from the church-centered medieval Manor to Cities restructured around workshops and factories, fundamentally altering the spatial structure of modern society. James Graham, a 19th-century British politician, notably described London, the first industrial city, as 'the workshop of the world' (Trinder, 2013: 1). This transformation was not limited to workshops alone. Stores, streets, and residential areas within cities also became spaces that reproduced and enacted capitalist ideologies. Lefebvre (1968/1996: 80-85, 158) further noted that modern cities, tailored for capitalist production, are systematically linked to the exploitation and alienation of workers. He advocated for the reclamation of urban workers' rights to the city as a means to address the inequalities and discriminations inherent in capitalism.

Foucault (1975/2020)'s analysis of the Panopticon as the pinnacle of modern surveillance system illustrates the methods of micro-power and spatial control that permeate from urban environment to the innermost areas of workplaces. Foucault posits that modern societal spaces – including workplaces, schools, mental hospitals, prisons and military institutions – are instrumental for the disciplines and correction of individuals. In his seminal work, <Discipline and Punishment, Surveyiller et Punir>, he references the Royal Saltworks (Saline Royale) at Arc-et-Senans as a prime example of workplace design aimed at monitoring and managing workers. Conceived by the celebrated architect Claude-Nicolas Ledoux in the 18th century, the factory's layout is semicircular, featuring a central administrative building flanked by production facilities along the semicircle's perimeter. Though the Royal Salt Factory is today appreciated for facilitating the movement of workers, its original design was predicated on controlling them, mimicking the Panoptic prison structure. This model allowed a single watchman positioned in a central tower to observe the inmates housed in the surrounding circular cells without being seen. Foucault points to the Royal Saltworks as a quintessential example of spatial design engineered to enable capitalists to efficiently oversee their workers. Like this, as the industrial society evolved, the time and space within which human operated were deliberately restructured to align with capitalist production demands. However, the late modern society, marked by rapid advancements in ICT and the rise of digital capitalism, has prompted a further reconfiguration of the time-space complex established by the modern industrial society.

2.2. Time-Space of Digital Capitalist Society

2.2.1. Time-Space Reorganization through Digital Technology

The discourse on the transformation of time and space in late modernity, driven by advancements in digital technology, has primarily been the domain of geographers, including notable scholars like Janelle (1969), Harvey (1989), and Cairncross (1997). Among these, Harvey (1989) emerges as the most frequently cited scholar in discussions about the temporal and spatial changes in late modern times. Harvey introduces the notion of 'time-space compression' to describe the dynamics of time and space in the postmodern era (Harvey, 1989: 240-241). He posits that the seeds of time-space compression were sown in the modern era, propelled by the advent of transportation and communication technologies, such as steam engines and telephones, which significantly diminished the distances and time spans constraining human activity, thereby broadening the scope of capital's reach and influence. However, Harvey emphasizes that the degree of time-space compression in the postmodern era is unprecedented when compared to its modern society. The emergence of digital technologies such as computers and the Internet has facilitated real-time communication and interaction across vast distances. According to Harvey, these innovations have dramatically reduced

the time necessary for the circulation of capital – from input through production to consumption – thereby accelerating the globalization of multinational corporations and financial markets. This, in turn, has integrated markets from diverse regions into a cohesive global network, significantly contributing to the time-space compression characteristic of late capitalist production (Harvey, 1989: 183).

Contrasting with Harvey's perspective, Anthony Giddens (1990/1996:14) introduces the concept of 'time-space distanciation' to elucidate the temporal and spatial characteristics of late modern society. Giddens defines time-space distanciation as the separation of physical 'place' and 'time-space'. In pre-modern societies, people's understanding and interaction with time and space were predominantly anchored in the physical places where they existed. For instance, in an agricultural society, human life was largely confined to specific geographic places (land), profoundly influenced by the natural cycles of seasons and weather. However, the advent of modern transportation and communication technologies, the constraints of specific pales on human interactions began to dissolve. This development led to the disembedding of social organizations from place-based attributions, heralding a shift towards a more expansive understanding of human interaction beyond the sense of place. Giddens argued that in late modern society, advancements in ICT have broadened the scope of interaction between individuals even further, compared to the analog society of the modern era. This technological evolution facilitates a deeper distanciation of time and space, enabling human activities and perceptions to transcend local settings (places) and embrace a more globalized framework. To address the evolving nature of human interaction, Giddens(1984/1986: 164-165) proposed 'locale' as a nuanced alternative to the traditional notion of 'place', which implies a fixed geographical location. Locale refers to the settings of social interaction, yet it does not confine actors to any specific location. For example, whereas farmers in the past were bound to the specific land (places), contemporary workers, facilitated by digital technologies such as computers and the Internet, can perform their tasks in various settings (locales) – ranging from offices and cafes to their homes, or even across different cities and countries. This flexibility of lacales highlights the transition towards a more fluid domain of human interaction, transcending geographical limitations. Subsequent studies on the reorganization of time and space, spurred by digital capitalism, have further elaborated on these concepts offering comprehensive understanding of how technological advancements have reshaped our social landscape.

2.2.2. Temporal Reorganization of Digital Capitalist Society

Hassan (2003) particularly characterizes the digital capitalist society by what he terms 'network time'. Unlike the fixed clock hours that structured life in modern industrial societies, individuals – or netizens – engaging with the digital virtual world can tailor their activities without adherence to conventional clock time. In this virtual world, time is not dictated by the standard ticks of clock but is conceptualized as a continuous flow within a network. Contrary to the analog real-world, where time is divided into units like hours, days, weeks, and months, virtual world time is unending and seamless, akin to a Möbius strip, without clear segmentation. Hassan articulates that this notion of network time fundamentally disrupts both human time rhythm and the societal consensus on time itself. Workers engaged in constant network activity lose their grip on the traditional 24-hour day concept, rendering the term "24-hour worker" obsolete. Instead, Hassan suggests "network workers" as a more fitting designation, reflecting their adherence to network time (Hassan, 2003: 236). In addition, he asserts that in the networked world, control over the flow network time becomes more critical than adhering to objective time standards, such as clock time (Hassan, 2014: 11, 13). A significant issue arises

because capitalists, who created the network can manipulate the network time flow, understanding its intricacies. Conversely, workers in the networked world find themselves at a disadvantage, unable to control or even fully perceive the patterns of network time. Hassan believes that if workers in the networked world begin to acknowledge the detrimental effects of the velocity of contemporary network capitalists, they may be able to lay the groundwork for reclaiming temporal sovereignty of time.

Head(2005: 185) takes the analyses of labor control under digital capitalism a step further by introducing the concept of 'digital Taylorism'. This notion draws a parallel to the efficiency-driven practices of traditional Taylorism, where labor was modularized and optimized through time-motion studies, as exemplified by the factory conveyor belt system. Head(2005: 100-101) argues that, in the digital society, Taylorism has morphed into an even more pervasive form. He uses the call center system as an example this transformation. In the past, low partitions of call center offices were used to allow managers to oversee the work of counseling employees and their computer screens. But after digital innovation, the supervision of managers extended to digital realms. Call center workers' interactions, are now captured in the form of data and are meticulously analyzed by sophisticated computer systems that monitor digital metrics of response and waiting times. Through the example of the call center, Head illustrates how digital technology serves as a potent tool for enacting digital Taylorism, exerting pressure on workers to increase their efficiency and speed to unprecedented levels.

2.3. Spatial Reorganization of Digital Capitalist Society

Many scholars argue that digital advancements lead to the dissipation or functional diminution of physical space. In his seminal work "City of Bits" (1995/1999), Mitchell articulates a vision of virtual space that epitomizes common perceptions of the future of spatial organization. He envisages a realm where all activities are synchronized with the digital pulse. Mitchell posits that social functions traditionally tied to physical structures and locations would migrate into digital nexuses, exemplified by the transformation of tangible offices into virtual websites and physical addresses into Internet Protocol (IP) addresses (Mitchell, 1995/1999: 302). Furthermore, Mitchell anticipated the construction of virtual cities, destined to become epicenters of human political and economic endeavors, a prediction that aligns with contemporary discussions about the metaverse.

In her influential work on the "death of distance," Cairncross (1997) predicted that the digital capitalism era would lead to the gradual fading of physical space's influence and boundaries, causing a major shift in social systems. This vision aligns with Zygmunt Bauman's (1999/2009) concept of "Liquid Modernity," where he argues that the advent of digital technologies has significantly reduced the importance of real, physical spaces within society. Bauman further contends that capital, once anchored to tangible assets like buildings or factories, has now moved into the virtual realm, driven by the rapid evolution of information technology. This shift has led to the obsolescence of Fordist workplaces, where capital and labor converged, rendering traditional physical workplaces unnecessary. Consequently, workers find themselves liberated from the constraints of fixed locations (Bauman, 1999/2009: 187, 195).

Contrary to the view that real space will lose its significance in a digital capitalist society, some scholars argue for its continued, or even enhanced, importance. Graham & Marvin (1999) argue that virtual space and real-world cities maintain an inseparable relationship. They suggest that urban residents are likely to engage more deeply with virtual spaces—such as virtual shopping malls, virtual cafes, and virtual offices—thanks to robust urban infrastructure that supports these digital environments. Extending this discussion, Graham & Anwar (2018) observe that despite the rapid emergence of digital IT companies, the stratification of physical space persists even in modern society. Although digital work reduces spatial disparities by enabling work from anywhere, reality shows a persistent "analog space gap." This is evident in phenomena such as major IT companies clustering in Silicon Valley and the

outsourcing of online subcontracting tasks to workers in developing countries. Graham & Anwar highlight that while digital technology facilitates spatial connections, it also exacerbates inequalities in the production relationship between companies and workers. The ease of accessing cheaper labor overseas is a significant example of how digital connectivity can reinforce existing disparities.

Spatial sociologist Schroer (2006/2010) calls for a nuanced understanding of the relationship between virtual and real spaces. He suggests viewing these spaces as interconnected, much like the ocean and land, rather than as separate entities with distinct characteristics. In the digital world, represented by the 'net,' established spaces such as homepages can mirror real-world locations, while the real world can feature transient, nomadic spaces like pop-up stores. Schroer emphasizes the importance of exploring the interplay between the virtual and real worlds to identify emerging social spaces and power dynamics, rather than rigidly separating them (Schroer, 2006/2010: 311). In this context, Gordon & de Souza e Silva (2011) introduced the concept of "net locality," which blends the digital "net" with the analog "local." This concept reflects modern life, where people might engage with social media on their smartphones while simultaneously conversing with a friend sitting beside them. Thanks to advances in mobile information and communication technology, contemporary human activity spaces are evolving into new "sites" where virtual and real spaces seamlessly hybridize, creating complex landscapes of interaction and identity.

Social theorists examining changes in late modern society have delved deeply into how digital information and communication technology restructures existing notions of time and space. They recognize that this restructuring is central to how digital capitalism functions and have extensively analyzed its dimensions. While platform labor, the focus of this paper, is a pivotal production activity within digital capitalism, the theoretical frameworks discussed primarily address broader human activities in digital societies rather than specifically focusing on digital platform labor. This discrepancy highlights a limitation: the patterns of time-space reorganization described may not fully align with the specific time-space structures experienced by platform workers. Moreover, the discussions on digital time-space are often rooted in philosophical and theoretical interpretations, which can vary significantly among scholars. This diversity of viewpoints underscores the complexity of conceptualizing time and space in the digital era. However, social policy studies demand practical approaches that propose specific solutions based on a concrete understanding of current realities, moving beyond theoretical discourse. Additionally, existing theories tend to emphasize the one-sided impact of digital capitalism's structural characteristics on individuals and society. Yet, humans are not merely passive recipients of these structures; they are also agents capable of transforming and resisting imposed frameworks. In this vein, geographer Herod (1997) suggests that research should not only focus on the "geography of labor," where capital dictates labor dynamics, but also on the "labor geology," where workers themselves innovate and reshape their labor spaces in response to capitalist conditions. This perspective is crucial as it highlights the potential for workers to alter or subvert time and space to their advantage through 'spatial fixes.' This study, therefore, seeks to collect and analyze the actual experiences of platform workers to better understand how platform labor is configured in time and space and to identify effective responses. By investigating specific instances of platform labor, this research aims to determine the applicability of digital time-space theories to real-world scenarios and contribute to the discovery and theorization of new phenomena that current discourse may not have adequately captured.

3. Methodology

This study employs qualitative research methods, specifically in-depth interviews with platform workers, to examine the intricacies of how their time and space are structured through platform labor

and how they navigate and respond to these conditions. Unlike quantitative research, which focuses on collecting numerical data to address research questions, qualitative research is particularly well-suited to this study. It allows for an in-depth exploration of the actual experiences and perceptions of the subjects, providing insights into the meanings and contexts of their responses (Silverman, 2016; Kim, I., 2016).

This study involved in-depth interviews with 30 platform workers, classified into two main categories: 'web-based platform workers,' who take orders and work non-face-to-face through the Internet and computers, and 'location-based platform workers,' who physically travel to specific areas to complete their tasks (Schmidt, 2017; ILO, 2021). The location-based participants predominantly included workers from food delivery and chauffers' apps, while the web-based group consisted mainly of digital freelancers and content creators engaged in IT-related tasks (ex. illustration, design, typing, programing) or simple tasks (Kim et al., 2018; Jang, 2020). Participants were recruited through public announcements and snowball sampling methods.

Ethical standards were rigorously maintained; prior to the interviews, participants were informed of the study's purpose, assured of anonymity, and briefed on the handling of personal information. Informed consent was obtained from all participants. The interviews, lasting approximately 1 to 2 hours, were structured around a semi-structured questionnaire designed to elicit detailed information on the participants' experiences and perceptions of time and space in their work. Basic personal information of the participants is detailed in [Table 1], providing a demographic overview of the study group.

No	Code	Type of labor	use of multiple platforms	gender	age	length of work
1	LocalLabor1	Food delivery	X	M	33	3 months
2	LocalLabor2	Food delivery	X	M	39	1 year
3	LocalLabor3	Food delivery	X	M	35	2 years
4	LocalLabor4	Food delivery	X	M	26	1 year 6 months
5	LocalLabor5	Food delivery	X	M	24	2 years
6	LocalLabor6	Food delivery	X	M	39	2 years
7	LocalLabor7	Food delivery	X	M	52	10 months
8	LocalLabor8	Food delivery	X	M	38	9 months
9	LocalLabor9	Food delivery	X	M	26	9 months
10	LocalLabor10	Food delivery	X	M	27	4 years
11	LocalLabor11	Food delivery	X	M	26	1 year
12	LocalLabor12	Chauffeur	X	M	39	1 year
13	LocalLabor13	Chauffeur	O (2)	M	38	1 year 6 months
14	WebLabor1	Freelancer	O (2)	F	33	8 months

		(Audio dubbing)				
15	WebLabor2	Freelancer (Translation)	X	F	28	3 years
16	WebLabor3	Freelancer (IT development)	X	M	39	3 years
17	WebLabor4	Freelancer (Design)	O (2)	F	26	2 years
18	WebLabor5	Freelancer (Counselling)	X	F	27	6 months
19	WebLabor6	Freelancer (Consulting)	O (3)	M	29	6 months
20	WebLabor7	Freelancer (IT development)	O (2)	M	34	4 years
21	WebLabor8	Freelancer (PPT creation)	O (2)	F	22	6 months
22	WebLabor9	Creator (content creation)	O (2)	F	23	4 years
23	WebLabor10	Creator (content creation)	O (2)	M	37	5 years
24	WebLabor11	Creator (content creation)	O (2)	M	29	2 years
25	WebLabor12	Creator (content creation)	X	M	29	3 years
26	WebLabor13	Creator (content creation)	X	M	26	2 years 4 months
27	WebLabor14	Creator (content creation)	X	M	25	2 years 6 months
28	WebLabor15	Creator (content creation)	X	M	29	2 years 6 months
29	WebLabor16	Creator (content creation)	O (2)	F	27	2 years
30	WebLabor17	Creator (content creation)	O (2)	F	24	5 years

To analyze the qualitative data gathered through in-depth interviews, this study employed deductive thematic analysis. This method involves deriving themes and codes from theoretical frameworks and then applying these to analyze and interpret the qualitative data (Boyatzis, 1998). Existing theories and research on time-space were utilized as the analytical framework to structure the interpretation of platform workers' actual experiences, with the aim of refining, augmenting, and concretizing abstract theoretical constructs. The process of deductive thematic analysis in this study unfolded in several

distinct stages:① The stage to develop the initial theme and code based on theory; ② The stage to review and modify the concept to apply the initial code to the raw material; ③ The stage to review established code; ④ The stage to apply the corresponding code to the original data; ⑤ The stage to interpret the study result to review and analyze the data (Boyatzis, 1998: 38-41).

4. Results

4.1. How Platform Work Reorganizes Space?

4.1.1. Web-Based Platform Workers

4.1.1.1. Expansion of Virtual Workspace

Digital information and communication technology has notably expanded human activities beyond physical spaces into virtual realms, as posited by scholars like Galloway (2004) and Choi (2005). Web-based platform workers are experiencing this expansion within their virtual labor spaces. The network environment facilitates communication and transactions with a broader audience than what could be achieved within physical regions. For instance, WebLabor2, who was formerly a secretary interacting with just three or four colleagues, has engaged with 2,500 customers in the past three years while working on the platform. Similarly, WebLabor17, a content creator, has amassed 50,000 subscribers. These interactions often transcend mere economic exchanges. Some web-based platform workers strive to cultivate friend-like social and emotional connections through ongoing interactions with their customers and subscribers. For example, WebLabor6, a job consultant on the platform, has created a group chat to foster a network among the individuals he has advised, thus expanding his social network through the platform.

Latour (1996) argued that as digital technology evolves, the significance of physical distance in human relationships diminishes, placing greater emphasis on the interactions between actors. This perspective is reflected in the activities of web-based platform workers who extend their relationships through comments, messages, group chats, and blogs, engaging at a scale and frequency unattainable in physical spaces.

"Previously, as a secretary, my interactions were limited to just a few team members. Now, in my current role, I have translated for over 2,500 people." (WebLabor2)

"I have over 50,000 subscribers. I maintain what I consider a 'one-to-many' relationship with my subscribers, though many of them feel it is more 'one-on-one.' They often share personal concerns in comments or direct messages. Engaging in these interactions, I have been able to build friendships and expand my personal network substantially." (WebLabor17)

"In my consulting work with job seekers, I strive to maintain a personal touch. I manage a separate group chat with 222 members where I share personal stories and professional advice. Additionally, I run a blog with about 400 subscribers, where I actively engage with and respond to as many inquiries as possible." (WebLabor6)

4.1.1.2. Reduction of Physical Workspace

Despite the vast expansion of workspace and human connections in the virtual realm, web-based platform workers in this study reported a significant reduction in their real-world workspaces and social interactions.

a. Home Becomes a Workplace

One of the key changes in organizing physical workspace is the shift of homes into workplaces. Platform labor allows workers to perform their tasks from home, eliminating the need for commuting. This transition is particularly common among web-based platform workers whose work is entirely facilitated through the internet. These workers emphasize the autonomy and flexibility of their work arrangements as major advantages. For example, WebLabor2 appreciates the lack of geographical constraints, while WebLabor10 values the freedom to work independently without the need to interact physically with coworkers.

"When I worked at a company, I faced many restrictions, and commuting drained me physically. Now, I can complete all my work comfortably at home. After work, I can switch immediately to studying or other personal activities. The best part is not worrying about where I work physically." (WebLabor2)

"Platform labor has become the ideal work environment for me. In my previous role in the animation industry, I often clashed with superiors and colleagues. I sought a position where I could excel independently, without the interpersonal tensions of a traditional workplace. That led me to platform labor, which has provided the freedom and autonomy I was looking for." (WebLabor10)

b. Disappearance of Rest Places

However, using the home as a workplace poses challenges. While it eliminates commuting and offers flexibility, it blurs the boundaries between work and leisure, potentially causing significant stress. As pointed out by WebLabor4, web-based platform workers lack the clear separation between rest and work spaces that analog industrial workers traditionally enjoyed. Their homes, originally sanctuaries for relaxation and personal activities, increasingly resemble extensions of the workplace. Reflecting this sentiment, WebLabor2 describes feeling stressed and fatigued as their home environment transforms into a company-like setting. This "feeling of home becoming a company" illustrates how work intrusion into personal life is a critical downside of home-based platform labor.

"I want my home to be a place of rest, but increasingly, it feels like an extension of the company. The overlap of work, personal life, and living space creates pervasive stress." (WebLabor2)

"The lack of clear separation between my rest and work areas sometimes reduces my efficiency. Self-care is essential, but it's challenging when relaxation and work happen in the same space. Managing these blurred lines is often difficult." (WebLabor4)

For WebLabor14, a content creator, his home has shifted from a private leisure space to an "uncomfortable work space." By using his living area for editing and recording tasks, the traditional separation between residential and professional spaces has significantly diminished. He describes an interesting reversal in his daily experience: instead of finding relaxation at home after work, he feels refreshed only when he leaves home. His home, now transformed into a content production site, no longer provides refuge from work-related stress.

"The biggest drawback of this job is the lack of boundaries between work and personal life. Normally, you unwind when you come home from work. But in our case, we have to edit or prepare recordings at home. So, it's unclear whether my home is a place to relax or a workplace. Sometimes, I feel more comfortable and relaxed outside than at home. Now, my house feels uncomfortable." (WebLabor14)

4.1.1.3. Gap between Virtual and Physical Workplaces

As web-based platform workers increasingly confine themselves to their homes, their "locale" — the time and space where they engage economically and socially — expands significantly through the digital platform. However, this phenomenon of expanded virtual labor space alongside reduced real-world labor space exemplifies what Giddens (1990/1996) defines as "time-space distanciation ". A major issue arising from this spatial change is a discrepancy between virtual workplace and physical workplace. While these workers may expand their networks in the virtual world, their reality is marked by solitude. For instance, one popular creator, self-identified as "Darakbang" (meaning 'The Attic'), expressed feeling trapped, as if confined to an attic. This sentiment is echoed in a description by The Guardian, which metaphorically labeled platform workers as "lone wolves" (Guardian, 2016.02.04), highlighting their isolation. Similarly, WebLabor2 described feeling "lonely and alone". They lack coworkers with whom to share tasks, bear sole responsibility for their work, and experience diminished social interactions and physical space.

"I often feel like I'm struggling alone in my own world. The fact that I watch and film videos by myself intensifies the feeling of being trapped." (WebLabor17)

"This job can be incredibly lonely. There are moments during work when I realize just how solitary it really is. Unlike traditional jobs where there's stress from bosses and colleagues, which at least signifies some form of relationship, here, the absence of work relationships is stark." (WebLabor2)

"I work alone at home. I'm sure many others do too. I find myself stuck at home, needing to work continuously. Meeting people just means losing precious work time." (WebLabor12)

"It's been a long time since I met my friends. I rarely go out unless it perfectly aligns with my schedule, like if friends come to my neighborhood for a quick coffee break." (WebLabor15)

Working alone without colleagues significantly depresses platform workers. The gap between their online and offline worlds causes cognitive dissonance. Although they interact with many people online, they feel a sense of disconnection once they disconnect offline. As WebLabor17 puts it, "I'm

trapped and rotting in the platform world," highlighting the depth of their despair. This severe sense of isolation and depression, described by Kim et al. (2021) as a new type of emotional industrial accident, is directly attributable to the platform work environment.

"I'm usually very outgoing, but I've developed a depression that's completely out of character for me. It feels like everyone else is actively living their lives, while I'm just rotting away here. This feeling of being trapped in a platform world is overwhelming." (WebLabor17)

"I have hundreds of thousands of subscribers, and my channel's comments increase every day. On screen, I'm very energetic, always starting with 'Oh, hello everyone~' But when I turn it off, I'm just alone at home. In the digital world, I am connected with a vast audience, engaging widely with people. Yet, despite this extensive online interaction, I feel a deep sense of separation because I rarely meet anyone in person." (WebLabor12)

4.1.2. Location-Based Platform Workers

4.1.2.1. Expansion of Physical Workspace

a. Everywhere Becomes a Workplace

Similar to web-based platform workers, location-based platform workers such as food delivery drivers or chauffeurs can now perform their jobs without needing to commute to physical workplaces. Traditionally, these workers would have to belong to certain workplaces like a restaurant or a chauffeur service centre and wait there until orders were received. Now, with the advent of mobile platform apps, they can begin working immediately by simply activating the app, eliminating the need to physically belong to an agency office. LocalLabor12, a chauffeur driver, described this new flexibility: "You can start and finish work anywhere just by pressing the commute button on the app, without the need for physical commuting."

"I usually receive calls at home. The app works similar to clocking in at a traditional job; there's a button that asks, 'Do you want to accept the call?' Once I accept, I press the button and immediately start working." (LocalLabor12)

LocalLabor6, who previously worked exclusively for various restaurants like a Chinese restaurant or a pizza shop, noted a significant change in his work dynamics. He explained that with the app, 'everywhere can be a workplace', allowing location-based platform workers to operate across diverse urban spaces, including shops, streets, parks, and convenience stores.

"I used to work at a Chinese restaurant, delivering orders and performing other tasks during downtime. However, this platform work turns the street into my workplace as soon as I turn on the app. I ride my motorcycle around, responding to one call after another. I eat at convenience stores, and parks serve as my restroom stops – I'm essentially working on the streets." (LocalLabor6)

This mobility illustrates Tronti's observation (1962/2013) that as capitalism evolves, it's not just traditional spaces like factories and offices that are transformed; all social spaces become part of the 'social factory' where capitalist production takes place. Essentially, for location-based platform workers, the entire city has become a vast workplace. As city streets themselves have expanded to become workplaces, location-based platform workers are no longer tied to a single store or restaurant. This autonomy allows them to receive a significantly higher volume of orders. Workers report that by moving freely throughout the city, they can handle dozens to hundreds of orders a day. Consequently, they have the potential to earn substantially more money than they did when attached to a single business.

"I used to be an office secretary, but now, as a delivery worker, I earn about 5 million won, which far exceeds what I made before. I think I handle around 20 deliveries per day on average."
(LocalLabor11)

"Even those who don't receive calls frequently handle between 250 to 300 deliveries. For those who are really active, maybe around 400 to 450 deliveries. Some of my colleagues manage to earn about 300,000 won a day by delivering 100 orders." (LocalLabor5)

Both web-based and location-based platform workers are experiencing an expansion of their workspaces through digital platforms such as websites and mobile apps. However, the nature of this expansion differs significantly between the two. Web-based platform workers see their workspaces extend into the virtual world, while their physical workplaces are reduced. online. In contrast, location-based platform workers experience a physical expansion of their work environments in the real world with city streets and urban spaces becoming their new workplaces.

b. Dispersion of Rest Places

For location-based platform workers, urban spaces serve dual purposes: they are both workplaces and rest areas. Public spaces such as convenience stores, parks, and banks, which are frequently accessible, often function as makeshift rest spots for these workers who spend much of their time on city streets. For instance, LocalLabor3 refers to convenience stores—where workers can linger after buying just a single drink—as 'hideouts' for app workers. Similarly, LocalLabor12, a chauffeur driver, mentioned roaming areas like Gangnam and Jongno districts as a way to relax while waiting for the next calls. However, these streets do not offer a stable or adequate resting environment. The workers' rest periods are often as precarious and fleeting as "pigeons sitting on an electric wire."

Most of the time, I just relax on the street. If it's really cold, I might go to a convenience store for a cup of coffee, go to a bank, or just find sunny spots to get some sunshine. (LocalLabor7)

When you're waiting, you can rest at a convenience store or outside. The convenience store is like our hideout. If I order a drink, I can stay there as long as I want. (LocalLabor3)

When you look at a map of the area, people waiting are marked like little red bean sprout heads. This indicates that there are drivers nearby. If you actually visit these spots, you'll find them sitting close together, reminiscent of pigeons sitting on an electric wire. (LocalLabor12)

4.1.2.2. Overlap of Virtual and Physical Workspaces

a. The Importance of Physical Place

A distinctive aspect of location-based platform labor is its integration of the virtual and real worlds. While web-based platform workers experience a clear separation between the physical space they occupy and the virtual space where their economic activities occur, for location-based platform workers, physical location remains crucial to their labor. Mobile apps theoretically allow these workers to accept orders from afar, significantly expanding their potential labor space beyond traditional confines such as a single restaurant or office. However, in practice, location-based workers must physically move to the site of each order. This geographic limitation means that, for example, workers residing in Gyeonggi province cannot accept orders from Seoul city, despite the proximity. Consequently, unlike web-based platform workers who can engage with clients from different cities or even countries, location-based platforms such as delivery and chauffeur services are often organized within specific local areas, such as districts (구, 區) or villages (동, 洞).

The labor space of app workers is closely tied to the physical locations they inhabit. This is primarily because delivering to unfamiliar places is not only challenging but also time-consuming (LocalLabor7). Similarly, while chauffeur driving over long distances can be lucrative, it becomes less advantageous due to the additional costs incurred for transportation and accommodation on the return journey (LocalLabor13). This reintroduces the concept of "distance as cost" (LocalLabor10), underscoring that physical space and distance continue to be critical factors for location-based platform workers. Consequently, the notion of the "remotization" of time and space, as defined by Giddens (1990/1996), does not extensively apply to location-based platform labor.

Receiving automatic calls to go to unfamiliar places can be quite uncomfortable. I tend to avoid accepting orders if I'm not sure about the route or if the location feels awkward and unfamiliar. Deliveries are expected to be completed within 10 to 20 minutes, so getting lost can really be a disaster. For instance, the day before yesterday, I spent 50 minutes on a round trip because the delivery destination was difficult to find. (LocalLabor7)

I used to handle long distance deliveries, but after accounting for transportation fees and commissions, there's not much profit left for a chauffeur. Now, I avoid going to the metropolitan areas where transportation is inconvenient. If service stops late at night, I can't get a work there. On occasions when I'm stuck until transportation resumes, I end up waiting for the first train and have to spend the night in a sauna or an internet cafe (PC room). (LocalLabor13)

As the distance increases, the risk factors increase proportionally. As distance increases, so does the cost. (LocalLabor10)

b. The Creation of Net-Locality

Location-based platform labor exemplifies "net-locality," a concept where physical presence and digital technology's virtual spaces converge and overlap (Gordon & de Souza e Silva, 2011). App workers continuously engage with their mobile apps to receive calls, indicating that their work is not confined to a single physical location. Whether they are driving on the road or resting at a convenience store, their attention remains tethered to the mobile app. This constant connection blurs the lines between virtual net space and real local space to the extent that workers can no longer epistemologically distinguish between the two.

Delivery drivers operate like this: I'm constantly driving while looking at my phone, every second. We have to keep our eyes on our phones all day long. Even when I take a break in a convenience store, I find myself in the same position, crouched down and staring at the phone. (LocalLabor1)

You have to ride a motorcycle with one hand while continuously checking your phone with the other. It's essentially a call competition. Restaurants in a particular area send out calls to multiple drivers, and you need to accept at least three of these calls to earn a decent amount. (LocalLabor6)

I have to be faster than others when I catch a call, so I have to keep an eye on my phone like a child. It's a job where you simply can't afford to take your eyes or hands off your phone. (LocalLabor12)

4.2. How Platform Work Reorganizes Time?

4.2.1. Flexibility in Time Usage

One of the primary benefits of platform labor is the flexibility it affords workers in terms of working hours. Unlike traditional workplace employees who adhere to fixed schedules, platform workers enjoy the freedom to access the platform and begin or end their work at their convenience. As the following interview excerpts illustrate, platform workers view the ability to adjust their work and leisure time according to their personal schedules, free from the constraints of standard office hours, as a significant advantage.

Before, I would wake up at 7 a.m., spend an hour getting ready, and then take an hour-long subway ride. But now, without a commute, I have the freedom to travel or adjust my schedule more flexibly. I tend to sleep during the morning and stay up late at night, which gives me the freedom to watch movies, read books, and even take a nap when everyone else is at work. (WebLabor1)

In my previous role as a secretary, I spent a lot of time confined to the office, which fueled my desire for a more flexible job. Now, with this job, I can control my workload and enjoy significant flexibility. I start working when I receive a translation request, and once I'm done, I immediately switch to personal studies or leisure activities. (WebLabor2)

4.2.2. Maximization of Hourly Labor Intensity
4.2.2.1. The Birth of Nanosecond Culture

Although platform labor is characterized by flexibility in working hours, this does not necessarily mean a reduction in working hours and work intensity. Platform workers interviewed for this study reported that while their recorded working hours might appear reduced, they actually experience less downtime due to the need to work intermittently and continuously. Rifkin (1987) predicted that with the advent of the information age, human time would be organized around 'computime' – dictated by computers, not traditional clocks. This shift has led to the 'nanosecond culture', where human activities proceed at ultra-high speeds that match computer operations rather than human capabilities. This culture forces workers to operate at a pace dictated by technology, significantly accelerating work processes beyond human comfort levels. A vivid illustration of this phenomenon is seen in the experiences of delivery app and chauffeur service workers. According to interviewees, job notifications on their apps can appear and vanish within milliseconds, compelling location-based platform workers to remain in a state of high alert to respond instantaneously. To compete effectively for these fleeting opportunities, workers feel pressured to develop almost superhuman reflexes (LocalLabor13, LocalLabor1) or invest in high-performance smartphones that can keep up with the speed of computime (LocalLabor12).

Should I say literally "Soonsak (순삭, a shortened term for 'disappear immediately')? If the call passes by, we can't even see it and the matching is over. I catch the call pretty quickly, but I always have to wait so that I can press it as soon as it appears. So, I switched to a better functioning phone. I keep it on the screen where the calls are best captured and just place my hand over it or something like that. (LocalLabor12)

The call just disappears as soon as I feel the vibration. It's too late to catch it after the vibration has occurred. As soon as you feel the vibration, you need superhuman reflexes because the 'allocation is complete' appears. (LocalLabor13)

The call disappears very quickly. You need to click it twice in rapid succession. To catch it promptly, you must have sharp dynamic vision and quick reflexes. (LocalLabor1)

Because the call disappears so quickly – when it's up for one second, and not even 2 to 3 seconds, it's considered very long-lasting. In many cases, it disappears within 0.001 seconds. (LocalLabor2)

The concept of 'computime' similarly affects web-based workers, as they operate on virtual platforms where time is nebulous, receiving orders or requests around the clock. Consequently, these workers must remain on standby 24 hours a day. Although they do not work continuously without breaks, they are often required to monitor the platform even during their downtime, as WebLabor4 metaphorically described it as having "one hand dipped" in work. This constant vigilance blurs traditional boundaries of work hours, making it difficult for workers like WebLabor17 to relate to conventional work schedules, such as the typical 9-to-5 workday or specific commuting times. As they navigate the 'infinite network time' of their platforms, web-based platform workers find themselves perpetually available.

Of course, being able to manage your own time is an advantage, but it feels like I'm consulting 24 hours a day. It's as if I'm constantly engaged, with one hand always immersed in the work. (WebLabor4)

I'm not engaged every single moment of the day, but it feels like I'm always working. It's very ambiguous and awkward to try to fit what I do into regular working hours. The weeks are extremely hectic. Honestly, it feels like the only time I'm not working is when I'm sleeping. (WebLabor17)

I work sporadically throughout the day to accommodate the customer's convenience. If there's a consulting session scheduled for 8, it feels like I can't truly relax until then. Even during my supposed breaks, I feel compelled to prepare, and I often actually do. That's what's exhausting. (WebLabor5)

It feels like my time is being sliced into fine pieces. Even when I'm supposed to be resting, I find myself working sporadically. I don't have many days off. From morning to evening, I'm bound by the demands of the job. (WebLabor9)

Platform workers perceive their own time as rapidly passing at high speed within the nanosecond culture. Engaging hurriedly with tasks on the platform, they often find that time seems to pass in the blink of an eye.

Ever since I started this job, where I quickly deliver, catch calls, and deliver again, time seems to fly by. Days, weeks, and months pass so quickly. (LocalLabor1)

I really don't notice how the day goes by. Currently, the base fee per case is 3,300 won, and there's an additional night surcharge of 300 won starting from midnight. It's important to work intensively to earn more. And just like that, the day is over. I find myself thinking, 'Oh, it's already over. Time flies so fast'. (LocalLabor2)

4.2.2.2. Work Time Pressure due to Digital Taylorism

High-speed labor is exacerbated by the digital Taylorism practiced by platform companies. In traditional industrial societies, employers or managers would oversee workers' tasks directly within the workplace. However, with the advent of digital platforms, physical workplaces have largely vanished, and platform companies now remotely manage workers' activities using AI and algorithms. It is well documented that these companies employ software technologies to monitor and evaluate workers' performance in real time (Adams-Prassl, 2019; Gerber & Krzywdzinski, 2019; Wood, et al., 2019). For instance, the freelancer market platform where WebLabor8 is engaged manipulates freelancers' labor by altering their visibility on the platform based on their responsiveness to customer inquiries. This system pressures workers like WebLabor8, who mentioned that receiving an inquiry note even at dawn compels an immediate response to maintain their platform exposure and potential job opportunities. Consequently, platform workers are forced to remain constantly vigilant and adapt their working hours to the demands of platform algorithms, intensifying their labor.

Every response I make to a customer's note is scored. They've quantified how quickly I respond to customers and created a metric called the communication score. Receiving inquiries at dawn makes it

difficult to address them one by one. However, I must respond promptly because if my communication score drops, my visibility also decreases. (WebLabor8)

I constantly monitor the indicators that update in real-time. They're calculated immediately in numerical terms, so even though I try not to be governed by them, it's inevitable. It feels like the platform is conditioning me. As a result, I end up dedicating more time to work. (WebLabor12)

The experiences of location-based platform workers reflect a similar dynamic of indirect control by platform companies, despite the nominal autonomy these workers supposedly have. For instance, LocalLabor12, who works with a chauffeur driving app, explained how the app offers a 'preferential distribution ticket' as a reward for receiving more than a certain number of calls during the day. This ticket allows his calls to appear slightly faster than those of other drivers, subtly influencing his working hours. Given that nighttime tends to be peak hours for chauffeur services, the app further incentivizes working during less popular hours, subtly shaping workers' schedules. Similarly, some delivery apps implement 'forced dispatch calls', which compel delivery workers to accept orders if they have not taken a job after a certain period, as noted by LocalLabor6. These mechanisms are quintessential examples of digital Taylorism, as described by Head (2005), functioning like a non-stop digital assembly line.

Our app awards a 'preferential distribution ticket' if you accept more than 4 calls from 11 PM to 2 AM during the weekdays. With this ticket, calls appear about 5 seconds faster than for others. However, you must use the ticket within 72 hours; otherwise, it expires. This design encourages continuous participation to acquire tickets. While not mandatory, the system effectively imposes a sense of obligation. (LocalLabor12)

There are typically between 30-40 calls coming in, but if you don't choose one, they initiate a 'Gangbae (강배, shortened term for 'forced dispatch call')'. To ensure orders are accepted smoothly, you often have to opt for Gangbae. Once you receive a call, you must pick up the order within 15 minutes. If it takes more than 20 minutes, the restaurant owners become anxious, which can negatively impact the reputation of the delivery app. Consequently, this system pressures drivers into making quick deliveries. (LocalLabor6)

4.2.2.3. Network Time where Time Units Become Numb

Hassan (2003) accurately foresaw that in the digital age, traditional 'clock time' would be supplanted by a continuous and unfragmented 'network time'. This prediction resonates strongly with the experiences of many platform workers. During the interviews, several participants reported becoming desensitized to the passage of time, reflecting a blurred concept of time and day due to their immersion in work. This ongoing disconnection from conventional time units has practical repercussions; for instance, not a few interviewees of this research cancelled or asked for rescheduling their appointments because they forgot the interview date and time.

I really lose track of time these days. I live without noticing how the dates pass by. Sometimes, I realize only too late that I had things to do - 'It was yesterday? It's passed?' is a common thought. Frequently, I miss deadlines, like forgetting to pay the utility bill on time. If you hadn't called me earlier, I wouldn't have even remembered that today was the interview day. (LocalLabor2)

I used to be very punctual, but I've been late a lot lately. My sense of time has become dull, and I struggle to keep track of the days. I often don't know what day it is; sometimes, I wake up, and it's suddenly midnight. My regular life is completely disrupted, and I feel powerless to control this. (WebLabor15)

Time seems almost non-existent; it doesn't matter whether it's 1 o'clock, 2 o'clock, or 3 o'clock. I just work through whatever tasks are given, and I leave when I'm done. Rather than sticking to a schedule, my life revolves around my workload. Even if it spills into the next day, I have to finish, whether it's at 1 AM or 2 AM. (WebLabor13)

4.2.3. Extreme Relaxation in Non-Working Hours

Network time characterizes not only the maximization of labor intensity through the 'nanosecond culture' and 'digital Taylorism' but also manifests as extreme relaxation during non-working hours. This pattern indicates that platform workers, who exert superhuman effort during compressed work periods, often experience profound relaxation phases where they completely disengage both physically and mentally. Unlike the regular working and leisure hours in traditional industrial labor, which offer a consistent rhythm to daily life, the intense work schedules of platform labor lead to significant downtime reactions. Indeed, many platform workers interviewed described their breaks as periods of near-total inactivity, characterized by "doing nothing other than sleeping" (WebLabor8) and feeling "dazed and unable to do anything at all" (WebLabor15). As Berardi (2009/2013: 162-164) points out, both the bodies and minds of these workers are exhausted, caught in the relentless pace of 'cyber time' that demands living at an excessively fast speed.

I think I've always been incredibly busy ever since I started this job. That's especially true when hundreds of people call me at the same time, requiring me to keep working. Consequently, my sleep schedule is erratic; I often stay up for two nights and then sleep for 10 hours straight. Some days, I go to bed at 2 AM, wake up at noon, and then head out. (WebLabor8)

Working this way can ruin people. I used to sleep as though the world had ended. When I worked at a company, I would wake up early and go running. Since starting this job, I haven't run at all. I simply don't have the time or the peace of mind to do so. Even on the rare occasions I find myself with free time, I end up wondering, 'Oh, what should I do now?' and the time just slips away. This is a clear sign of burnout. I can't seem to do anything productive with my time. (WebLabor15)

When the time regularity is disrupted, it creates significant disturbances in human rhythms, a phenomenon Lefebvre (1992/2013: 73) terms as 'a-rhythmia'. According to Lefebvre, deviations from natural rhythms cause profound discomfort and pain. Location-based platform workers exemplify this effect, reporting momentary mental blackouts as a response to prolonged periods of intense focus on

mobile devices. They describe these episodes using terms like "zombie" (LocalLabor11) and "dumb" (LocalLabor13), illustrating the profound disorientation and cognitive shutdown experienced. The erratic pattern of intense work followed by extreme relaxation inherent in platform labor disrupts the biological rhythms of workers, leading to a gradual depletion of life's vitality.

At times, I find myself zoning out while riding a motorcycle. If I become fatigued from concentrating too hard, I end up riding almost like a zombie. (LocalLabor11)

Since I'm constantly staring at my phone, I feel like I've become dumb now. As I continuously focus on the screen, I often find myself blanking out. Now, caught in these momentary dazes, I frequently miss important calls. (LocalLabor13)

4.3. Responses of Platform Workers to the Reorganized Time-Space

Although platform labor fundamentally restructures workers' time and space in ways that diverge from traditional industrial labor, platform workers are not merely passive recipients of these changes. Instead, they actively engage with and reshape these transformations. This dynamic interplay aligns with Herod's (1997) concept of 'labor geography,' which manifests in various forms as workers navigate and influence their evolving digital and physical work environments.

4.3.1. Regarding Platform Work as a Temporary Stay

Many platform workers tend to view their job as temporary rather than a permanent career path. Baumann (1999/2009: 201) aptly predicted that in the liquid modern era, it would be challenging for individuals to pursue 'permanence' as a work goal. As labor becomes increasingly unanchored from specific physical locations and more fluid, traditional objectives of 'long-term' employment and 'stability' are undermined, making 'short-term' and 'temporary' engagements more common. Reflecting this perspective, platform workers often describe their current jobs as "transitional" (WebLabor2) or "not a lifelong job" (LocalLabor6). They see these positions as stepping stones, temporary phases they endure while aiming towards new goals or dreams.

While the delivery industry may seem similar everywhere, it's not a career for life. Unless it's for life-managing, most people take on this physically demanding job thinking they'll only stick with it for about three months. (LocalLabor6)

I don't see myself continuing in delivery work long-term. It's quite isolating, and I find the solitude challenging. For now, my goal is to manage the current situation, save up some money, and eventually move into a job that involves more interaction with people. (LocalLabor11)

It's kind of a transitional job. I understand it's difficult to endure, but many see it as a temporary stepping stone. I believe that those who are here have their own aspirations and goals they're striving towards. (WebLabor2)

Currently, I'm building a career on this platform, but my ultimate goal is to become a creator who influences people's lifestyles. I often wonder, 'Will society value this career when I'm in my 30s and 40s?' I feel that this job is something I can only do at a young age. (WebLabor8)

Despite viewing their platform work as temporary, platform workers often find it more difficult than anticipated to exit platform labor. Engulfed in the high-speed flow of network time, they experience a dissolution of traditional time concepts, leaving little room to plan for tomorrow or envision a future beyond their current situation. This relentless pace traps them in a state akin to a 'swamp,' as described by one platform worker (LocalLabor1).

Time flies so fast that it feels like I'm just stagnating here. Whenever my plans go awry, I feel stuck, as if I'm mired in a swamp. I know I need to escape this situation quickly, but there's a part of me that fears I might never manage to get out. (LocalLabor1)

4.3.2. Restoring Analog Time-Space Structure

4.3.2.1. Re-separating Time-Space

In response to the disorienting pace of digital labor, platform workers have developed strategies to reclaim a more traditional, analog sense of time and space. One significant strategy is the conscious differentiation between working hours and resting hours. Ideally, a routine of waking up in the morning, working through the day, and resting in the evening aligns with human biorhythms and provides a clear demarcation between work and leisure. However, many platform workers find themselves caught in a cycle of compressed labor and unfulfilling rest, leading to tangled life patterns and both physical and mental exhaustion. To combat this, some have chosen to revert to a more analog clock time, intentionally setting distinct periods for work and rest. By establishing their own time rules, they aim to create a structured daily routine that resists the constant pull of network time, tailoring their work patterns to better fit their personal circumstances and needs.

Recently, I've decided that I need a day off from receiving any counseling requests to rest. I try to keep my weekends work-free, and fortunately, consumer contacts are also fewer during this time. If I must work over the weekend, I limit it to three or four hours and then dedicate the rest of my time to myself. (WebLabor4)

At the start of my job, I responded to messages regardless of the time, even at 4 AM. However, constantly being on call became exhausting. Now, I manage my responses differently; if a message comes in late, I'll note that I'll reply later. I've established my own routine to handle these situations. (WebLabor9)

My workday begins at 1 PM. I typically shoot on Mondays and Tuesdays, dedicate Wednesdays to editing, film again on Thursdays, and do live streaming in the evenings. Fridays are reserved solely for editing, maintaining a consistent workflow. (WebLabor13)

There is a fixed update time every week. Although I've missed it a few times, I'm still trying to maintain at least two uploads per week. (WebLabor11)

Another key strategy for managing the integration of work and life spaces involves physically separating working and resting areas. This approach helps mitigate the risk of the entire home becoming a blurred workspace, which can erode necessary rest spaces. For example, WebLabor2 has designated only a small room in the home for work and deliberately takes breaks in the living room or other areas to maintain a clear physical distinction between work and leisure time. Meanwhile, WebLabor4, who currently lives in a studio apartment and faces challenges with this separation, plans to move to a two-bedroom house to better achieve this spatial division.

My house consists of a small room where I work, a main room, and a living room. After finishing my work, I step out into the living room to relax and take a break. (WebLabor2)

In my studio apartment, there's hardly any separation between my work area and my living space. So I'm considering moving to a place with an extra separate room. The house is so small right now. (WebLabor4)

WebLabor17, a seasoned creator, recently took a significant step to improve her work-life balance by setting up a separate work studio. She shared that having this dedicated space has enabled her to commute to work, mimicking a more traditional work environment. This change has helped her establish stable working hours.

Everyone usually starts at home. I got some financial comfort so I found a separate studio with a soundproof booth. This change has structured my work life similar to having a regular job. I go to work and then I leave. Having the studio allows me to maintain a consistent work schedule daily. (WebLabor17)

4.3.2.2. Having Analog Jobs Alongside
Interestingly, some platform workers have turned to real-world jobs to reconnect with analog experiences and restore their sense of well-being. For instance, after experiencing severe disruptions in her biorhythms and mental burnout, WebLabor17 took up physical labor at a coffee shop. This move was spurred by her realization that she needed a change from relentless mental labor, stating, "I shouldn't live like this." Similarly, WebLabor9, feeling isolated from working alone, started a part-time job at a restaurant to engage more directly with people. These part-time jobs not only provided a means of survival but also significantly improved their biorhythms and social connections, leading to an unexpected sense of "happiness" (WebLabor17). LocalLabor13, while primarily working as a chauffeur driver, also pursued part-time work as a video photographer, finding it rewarding and enjoyable to interact with colleagues in the broadcasting field. This blend of platform and real-world labor highlights a crucial aspect of work. Beyond earning a living, individuals seek to fulfill relational and ontological needs (Diener & Seligman, 2004). While platform labor often fails to meet these needs due to its isolated and demanding nature, combining it with traditional labor in real spaces can provide a more balanced and fulfilling work experience.

At one point, I realized I needed a change, so I took up part-time work at a coffee shop. I initially thought that working hard there would make me appreciate my main job more. However, to my surprise, the job actually relieved my stress. Interacting with people made me feel better and more resolved. I worked the part-time job with such joy. (WebLabor17)

I work part-time at a restaurant not only for the financial aspect, but also because it's close to home and allows me to continually meet and interact with people in my community. The relationships I've built with coworkers are significant to me; we often grab drinks together after work when time allows. (WebLabor9)

I earn my living as a chauffeur. Although the broadcasting staff environment is unstable and not particularly lucrative, I enjoy the job because it's fun to be active and work directly on-site. I spend time with the staff and get along well with everyone there, which makes even tiring days enjoyable. I feel rewarded too. (LocalLabor13)

4.3.2.3. Working Together

Similar to strategies employed in traditional industrial labor, some platform workers have adopted the practice of creating communal workspaces to combat the psychological loneliness that comes from working alone. To alleviate feelings of isolation, these workers often choose to work alongside others in shared spaces. For instance, WebLabor4, recognizing the value of social interaction, arranged to meet and work with freelancer friends at a local cafe.

I have colleagues I work with. We often decide to bring our laptops, meet at a cafe, and work together there. (WebLabor4)

Even in the absence of physical meetings, platform workers like WebLabor4 engage in online collaborations that bridge the gap of solitary work environments. By forming virtual teams, freelancers specializing in diverse fields such as planning, advertising, and logo design come together to share projects, dividing tasks to work cohesively as if they were in a traditional office setting. Similarly, WebLabor2 is considering joining a translator community to tap into the collective expertise and support system offered by peers. Observing that collaborative efforts within the community lead to greater productivity and provide significant social support, she anticipates that participation will enhance her translation skills and help overcome the challenges experienced in solitary work.

Freelancers often collaborate through networking. For instance, my expertise is in editing and designing, while my colleagues specialize in advertising or creating PowerPoint presentations and design planning. They would assign me the logo design work, and in return, they would create a PowerPoint presentation for the logo, fostering collaboration. (WebLabor4)

Shortly after I registered as a translator, I noticed someone with over 100 to 200 completed transactions in just 2-3 weeks. It turned out to be not just one individual but a group of about five to six people from a university club working together on translation projects. This enables them to handle a larger volume of work more efficiently. (WebLabor2)

WebLabor15, a YouTube creator, is exploring the idea of forming a creator cooperative. He believes that many challenges, particularly legal issues, are too complex for individuals to handle alone. By uniting as a cooperative, creators could pool resources, share expertise, and collectively advocate for their rights.

I'm planning to establish a cooperative corporation. MCNs don't provide protection, and as individuals, we face significant limitations, especially with copyright issues, which are prevalent in our field. By forming a cooperative, we could provide members with protection and clear guidelines on what they can and cannot do. (WebLabor15)

Collaboration among platform workers extends beyond merely improving work efficiency. As WebLabor17 articulately expressed, having a "crew (colleague) to talk to with flesh" provides vital emotional support, allowing individuals to share work-related challenges and find collective solutions. This type of interaction fosters a mutual understanding. In striving to establish these coworker-like connections, platform workers are seeking to recreate the supportive social dynamics typically found in traditional workplaces.

If I plan to continue as a YouTuber, I believe having a crew is crucial. There's tremendous power in physical presence – like the significant impact of a hug. It's completely different speaking to someone in person compared to communicating through digital means. I need interactions that allow for physical touch. Especially when I'm feeling down or facing tough situations, having someone there to talk to and empathize with is essential. (WebLabor17)

4.3.3. Making Use of Digital Time-Space Characteristics
Platform workers are not solely dependent on traditional analog time-space norms to readjust to their uncomfortable digital work environments. Instead, they also exploit the very unique time-space characteristics of digital platforms to recreate more favorable conditions for themselves.

4.3.3.1. Virtual World: Moving between Platforms
One primary strategy platform workers employ to manipulate their work environment is by fluidly moving between different platforms. Unlike traditional jobs with fixed workplaces, platform workers are not tied exclusively to any single platform. While this lack of exclusivity can be seen as disadvantageous under traditional industrial labor standards—making it difficult for their status as workers to be recognized—it also provides them with unique flexibility. From another perspective, not being bound to a single platform allows them the freedom not to commit entirely to one employer or service. The platform workers who participated in this study leveraged this flexibility to their advantage. They maximized their benefits by strategically switching between platforms or by concurrently using multiple platforms.

Firstly, location-based workers frequently switch between apps to maximize their potential earnings. Given the nature of their work, which requires physical movement in response to calls from delivery or driver apps, these workers typically focus on using one app at a time during specific work periods.

However, these apps are not seen as permanent workplaces. Instead, during breaks while congregating in places like convenience stores or parks, these workers exchange information about emerging or 'rising apps'. Based on these discussions, they might decide to switch to these newer apps if they believe it could increase their earnings.

When delivery drivers from various companies meet, they often gather at convenience stores or parks to chat. The conversations typically revolve around their earnings, work conditions, and the volume of orders they handle. During these discussions, drivers might learn about more favorable conditions elsewhere, prompting some to switch affiliations. However, I've also seen many who, after making a switch, ended up regretting their decision. (LocalLabor3)

On the other hand, web-based platform workers typically engage with multiple platforms concurrently, rather than committing exclusively to a single one. Each platform possesses its unique algorithms, ordering systems, guidelines, user bases, and preferences, which influence the workers' decisions. Thus, web-based workers select various virtual workplaces that best fit their needs, circumstances, and specific tasks. Additionally, this approach allows them to distribute the stress and sense of control that might accumulate from relying solely on one platform.

I initially worked on a different platform but later switched to the K platform. The previous platform operated like an auction, where consumers accept bids. In contrast, the K platform simply lists the selling price, which is much more advantageous for professionals. I learned about this platform through someone I know, who advised, 'Sir, don't use that but try this (K platform),' which led me to make the switch. (WebLabor10)

I receive work through the D platform, but I also manage my own promotions through my blog, an open Kakao (a messenger app where one can open a chat room for unspecified targets) chat room, and separate Facebook promotions. Although I do post on these platforms, I make it clear that the content is not personally operated by me but is instead a page for sharing information. (WebLabor6)

I currently handle PPT outsourcing and lecturing across two platforms. Initially, I started by helping seniors and peers with projects and contests, and eventually, I began receiving outsourced work through acquaintances. A friend introduced me to these apps and suggested I join them, leading me to operate on both platforms now. (WebLabor8)

4.3.3.2. Real World: Moving to Favorable Locations

Platform workers are strategic not only in their virtual activities but also in their physical movements within real-world locations. Location-based platform workers, for example, often relocate to areas known for a high volume of orders. By choosing to position themselves in specific regions with frequent service calls, these workers enhance their chances of securing more work.

There are certain restaurants and stores that consistently have many orders. So I often go and wait in front of one of these busy stores. When I get there, I find that everyone else has gathered there too. (LocalLabor8)

I prefer working in areas with a lot of calls, such as Yeouido, Gangnam, Sangam-dong, and Jongno, which are bustling with office activity. Those places have a high volume of calls. The demand often outweighs the supply of drivers available, with some crowded places having about 1,500 people waiting in the area to pick up orders. (LocalLabor12)

However, the strategy of relocating to areas indicated by apps as having a high density of orders has its limitations in terms of increasing income. Since this information is accessible to all platform workers, many may converge on these high-demand areas.

The number of workers has increased significantly compared to before, so there's less work available than in the early days. There used to be a restaurant called S, from which I frequently received calls. It's about 10 minutes away from my house, and I would get several calls from there. Now those calls have completely stopped coming in. There are riders stationed midway, which blocks the calls from reaching me. (LocalLabor11)

As a result of the competitive saturation in high-demand areas, some platform workers strategically choose to move beyond their local districts or cities to regions where orders are expected to be more abundant. Typically, location-based platform workers are restricted to operating within a specific county or region. However, to access greater opportunities, some opt to use an app designated for a different area or even relocate their base of operations. For instance, LocalLabor6 shifted his work area from Gangbuk to the busier district of Gangnam, while LocalLabor4 moved from a small local city with fewer orders to Seoul, which offers a higher volume of potential work.

In Dongdaemun district, where I reside, there aren't many delivery agencies. It's typical for neighborhoods like mine to have a limited number of these offices. However, the area where I currently work has an abundance of agencies, which is why I chose to come here. (LocalLabor6)

I used to work as a delivery agent in the city where my friend grew up. After seeing him earn a substantial income by working in Seoul, I was inspired to move as well. It's been about a year and a half since I came to Seoul. (LocalLabor4)

While location-based platform workers relocate in response to fluctuating work opportunities, web-based platform workers often move to areas that offer better living conditions rather than improved working conditions. As their homes double as workplaces, many web-based workers find themselves confined to narrow living spaces, which can become stifling over time. To alleviate the challenges associated with their living spaces also serving as their workspaces, these workers seek out more open and relaxing environments. For example, WebLabor2 and WebLabor16 have chosen to work in cafes or travel destinations, refreshing their work environment in places they enjoy.

Translation work doesn't have to be confined to home, so I travel and work from various locations. I also enjoy working in cafes. (WebLabor2)

My favorite places to work are rooftops where the wind gently blows and the view is open. I really cherish such spots, and once I find one, I tend to work there for extended periods. It feels like I'm constantly creating favored workplaces. (WebLabor16)

Some web-based platform workers have taken the flexibility of their work arrangements to the next level by moving abroad in search of more comfortable living environments that facilitate both work and rest. Makimoto and Manners (1997) foresaw this trend, predicting that the digital transformation of workplaces would lead to an increase in "digital nomads" – individuals who work remotely while traveling, unbound by fixed locations. This prediction has materialized as evidenced by WebLabor3, an IT developer who embraced the digital nomad lifestyle, spending about a year moving between Da Nang in Vietnam, Bali in Indonesia, and Melbourne in Australia. These cities are celebrated as "digital paradises" due to their favorable living conditions and supportive environments for remote work (BBC, 2017.11.22). Similarly, WebLabor4 is planning to adopt this lifestyle, aiming to explore and work from various Southeast Asian cities, known as digital paradises.

I truly lived the digital nomad lifestyle, spending about three months each in Vietnam, Bali, and Australia, a total of a year. I had the freedom to work from anywhere. I even saw some people who settled down in those places to work. In the IT field, it's particularly easy to adopt this lifestyle, working locally while traveling. (WebLabor3)

My friend embarked on a Southeast Asian tour with just a laptop, proving you can literally work anywhere as long as you have a laptop. This flexibility feels like having more time. It's something I couldn't have imagined when I was working in a conventional office, but now I'm planning to live and work in Southeast Asia myself. (WebLabor4)
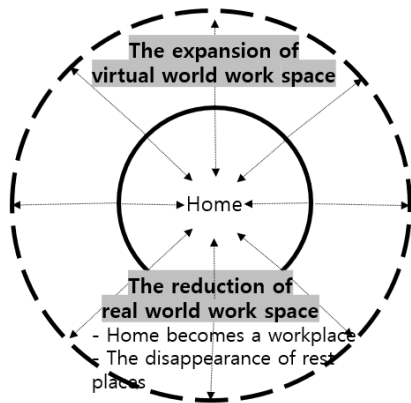
Likewise, platform workers are optimizing their work and living arrangements by strategically relocating their workplaces and residences. While instances of such active movement are currently limited, as digital platform labor becomes more widespread, we can anticipate a significant reorganization of human time and space. This shift could mirror historical changes such as those seen during the industrialization era, which fundamentally altered urbanization patterns.

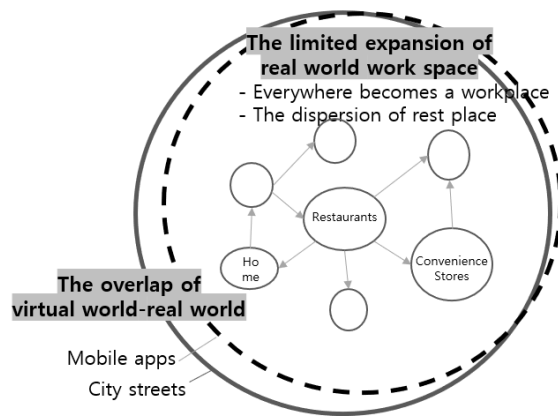**5. Conclusions: Theorizing the Results**

This study investigated the reorganization of time and space in platform labor, drawing from the real-life experiences of platform workers. The findings are summarized as follows:
Firstly, from a spatial perspective, web-based platform labor, which operates through virtual environments such as websites and mobile apps, generally expanded the workplaces available to workers. However, there were noticeable differences in the spatial arrangements between web-based platform workers, who primarily conducted their tasks online, and location-based platform workers, who operated in physical offline spaces. This distinction in workspace structuring is illustrated in [Figure 1].

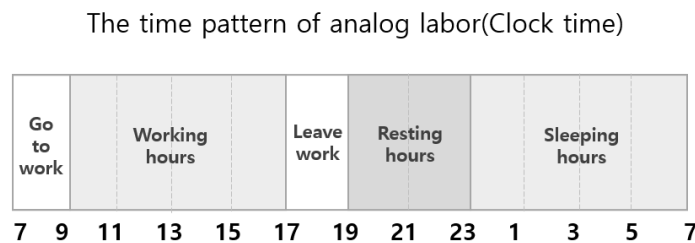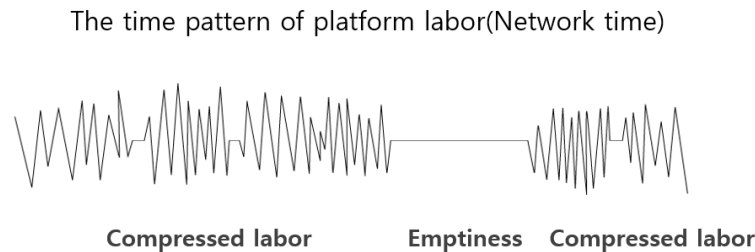**The space of**
web-based platform workers

The expansion of
virtual world work space

Home

The reduction of
real world work space
- Home becomes a workplace
- The disappearance of rest places

The space of
Local-based platform workers

The limited expansion of
real world work space
- Everywhere becomes a workplace
- The dispersion of rest place

Restaurants

Home

Convenience Stores

The overlap of
virtual world-real world

Mobile apps
City streets

Web-based platform workers have witnessed an expansion of their workspaces within the digital virtual world. Through digital platforms, they can engage with customers from diverse locations, significantly extending their economic activity radius. This allows them to interact with a broader network of people compared to those in traditional face-to-face offline workplaces. However, despite the expansion of their virtual workspaces, these workers often experience a contraction of their physical labor spaces in the real world. For many, their homes serve as both living and working spaces, which, while convenient, can lead to social isolation and a loss of distinct personal rest areas. The considerable disparity between their rich virtual interactions and limited real-world contacts contributes to feelings of alienation. This situation exemplifies what Giddens (1990/1996) described as "time-space distanciation," where digital information and communication technologies create a disconnect in the time-space continuum of human interactions. Web-based platform labor starkly illustrates the fractures that emerge as workers navigate between the places they inhabit and the virtual spaces where they conduct economic activities.

On the other hand, location-based platform workers, who utilize mobile apps to receive orders, can operate over a broader area compared to those confined to a single workplace. Unlike their web-based counterparts, these workers experience a tangible expansion of their labor space in the offline, real world as they navigate across streets. Moreover, as they receive orders while roaming rather than from a fixed location, their labor and rest spaces become dispersed and ubiquitous, transforming all locations into potential workplaces and rest places simultaneously. However, the spatial expansion experienced by location-based platform workers has inherent limitations due to the physical constraints of travel distance. A key aspect of location-based platform labor is the concept of 'net locality,' as mentioned by Gordon & de Souza e Silva (2011). Workers using apps that can connect from anywhere remain continuously linked to these apps even while moving around urban spaces. Thus, location-based platform workers engage simultaneously with the virtual world of the apps and the real world of the streets, blurring the lines between their virtual and physical workspaces. As

Giddens (1990/1996) diagnosed, in such scenarios, physical places and cognitive perceptions of time-space are intertwined, exhibiting characteristics of net locality, where virtual and real worlds overlap. Secondly, from a temporal perspective, platform labor introduces time patterns that are significantly different from those observed in traditional analog industrial societies, as illustrated in [Figure 2].

The time pattern of platform labor(Network time)

Compressed labor   Emptiness Compressed labor

The time pattern of analog labor(Clock time)

Go to work	Working hours	Leave work	Resting hours	Sleeping hours
7 9 11	13 15 17	19	21 23 1	3 5 7

In traditional analog industrial societies, most workers adhered to a structured daily routine: going to work, working, leaving work, resting, and sleeping, all aligned with regular clock time. In contrast, platform workers enjoy autonomy with flexible working hours, starting and ending tasks at their own discretion. However, this flexibility comes with its challenges, as digital platforms operate on continuous network time, lacking traditional time units like hours, days, or weeks. This leads to platform workers losing their sense of time and often becoming incessantly tied to labor without adequate breaks. For example, location-based platform workers constantly receive calls every second, while web-based platform workers endure immense time pressure, remaining in a state of waiting-mode for 24 hours. This reality echoes the 'nanosecond culture' that Rifkin (1987) predicted with the advent of computers.

Moreover, the algorithms embedded in these platforms—such as transaction rankings, real-time evaluations, and forced dispatch calls—exacerbate this scenario, a modern form of digital Taylorism. This system remotely supervises and intensifies platform workers' activities, pushing them to extremes. The resultant work pattern disrupts the biological rhythms of platform workers. To counteract the continuous tension from work, they often spend their non-working hours in a state of emptiness, doing nothing or sleeping excessively. This irregular time pattern, depicted as highly erratic waves in [Figure 2], leads to a condition described as 'arrhythmia', which significantly contributes to emotional exhaustion among platform workers.

This scenario has been critically analyzed by Autonomia Marxists like Hardt, Negri, and Berardi, who describe digital labor as 'labor of the soul' that consumes the mind and nerves (Hardt & Negri, 2005; Berardi, 2009). The interplay of nanosecond culture and digital Taylorism in platform labor vividly demonstrates the specific mechanisms contributing to these challenges.
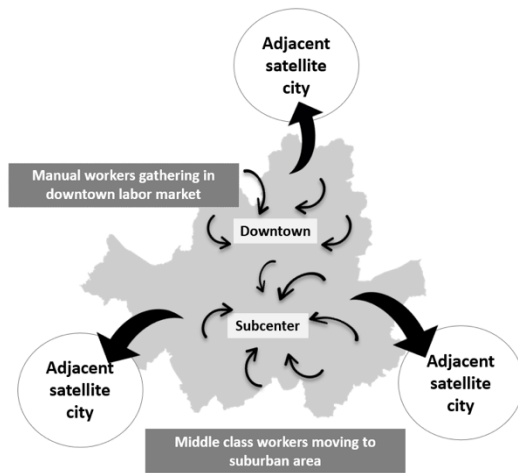
Platform workers have not merely passively accepted the transformations in time-space driven by digital capitalism. As Herod (1997) argued, they have adapted to the imposed time-space structures while also actively striving to transform them through their own strategies. The platform workers participating in this study, while enduring current difficulties and contemplating eventual exits from platform labor, have also been actively engaging in 'spatial fixes'. These fixes involve reorganizing and transforming the labor topography to maximize their benefits. Examples include working according to traditional clock hours, physically separating workspaces, creating collaborative workplaces with fellow platform workers, and attempting to restore elements of analog labor by taking on part-time roles in the real world.

Some platform workers actively restructure their labor geography to better suit their needs by choosing more advantageous platforms or utilizing multiple platforms simultaneously to maximize their earnings. Unlike traditional workplace employees who are often bound by exclusivity and cannot arbitrarily change their workplaces or engage in multiple jobs, platform workers benefit from a lack of exclusivity. This absence of fixed workplace commitments not only challenges their recognition as traditional workers but also provides them with the flexibility to optimize their working conditions.

In analog contexts, platform workers demonstrate a similar flexibility in moving their activity spaces. This spatial movement is similar to the hierarchical distribution of space observed in traditional industrial society, as shown in [Figure 3]. Historically, low-skilled manual workers often congregated in downtown areas where jobs were plentiful, while professionals and office workers moved to suburban areas for better living conditions, leading to phenomena like urban harlemization and urban emptiness (Kain, 1992; Stoll, 2006). Although not as pronounced in Korea, there are tendencies for manual laborers to gravitate towards labor markets in areas like Jongno and Namguro, while middle-class workers may relocate to satellite cities near major urban centers.

In the digital society, a similar pattern emerges. Low-skilled workers, such as those in delivery app and chauffeur services, often move to downtown areas like Gangnam and Jongno, which offer more call opportunities. Conversely, web-based platform workers, especially those in the IT sector, might choose to move to suburban or rural areas that provide a more comfortable living environment, or even to other cities or countries recognized as digital paradises. This migration reflects the continuing stratification and segmentation in real-world spaces, even within a digital capitalist society mediated by virtual environments. However, unlike traditional middle-class office workers who relocate to suburbs near their offices, the migration of web-based platform workers can lead to de-nationalization and de-urbanization driven by the nature of digital labor, which does not require a fixed workplace.

The spatial stratification of analog industrial society | The spatial stratification of digital platform economy
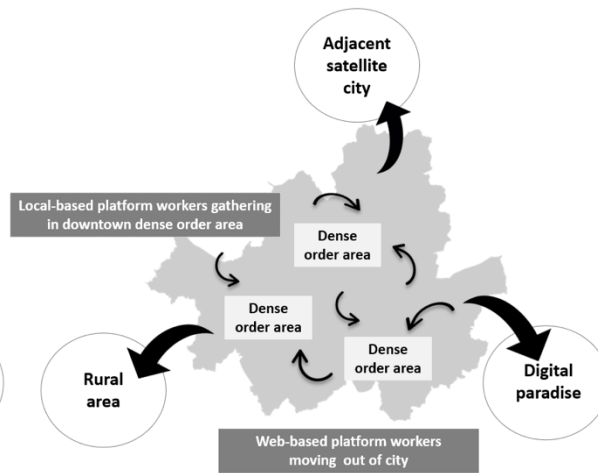
6. Policy Discussions

This study has examined the reorganization of time-space in platform labor, moving beyond theoretical discussions to explore practical examples. Through empirical analysis, it investigated the applicability of traditional time-space theories to platform labor and identified areas needing supplementation and revision. The research specifically differentiated between location-based and web-based platform labor, uncovering both differences and commonalities in how time-space is constructed by each type of labor. Based on these findings, the paper proposes a set of policy implications designed to address the unique challenges faced by platform workers.

Firstly, policy design must account for the unique time-space structure experienced by platform workers. In December 2021, the Korean government announced the "Platform Worker Protection Measures for a Humanity-Centered Platform Economy," aimed at creating a safer work environment, strengthening the responsibilities of platform companies, establishing social security for platform workers, and protecting their rights through fair contracts (Joint governmental agencies, 2020). These measures are expected to significantly improve the increasingly unstable working conditions that have proliferated with the rise of the untact era. However, while these protection measures are a step in the right direction, they are predominantly based on the production relations and employment contract concepts derived from modern industrial society. As evidenced in this paper, platform labor exhibits distinct time-space characteristics that differ from traditional industrial labor. Therefore, there is a need to adapt and evolve these policies to better align with the specific lifestyles and labor patterns of platform workers.

Many issues faced by platform workers stem directly from the spatial attributes of their digital workplaces. For instance, the high incidence of motorcycle accidents among location-based platform workers can be attributed to the challenges of operating in a net locality, where physical and virtual spaces intersect. Workers navigating the streets while simultaneously engaging with apps are significantly more susceptible to accidents due to the dual demands of real-world maneuvering and

digital interaction (Kang & Kim, 2020). The question of liability—whether the platform company or the worker should be responsible for accidents—often arises post-incident. However, it is crucial to recognize that the fundamental cause of these accidents is the spatial overlap inherent in their job. Given that the nature of the workplace significantly endangers their physical safety, platform companies must take responsibility and develop effective measures to enhance worker safety. Additionally, the issue of forced dispatch calls and preferential distribution tickets, which has remained largely unaddressed even during the COVID-19 pandemic (Labortoday, 2020.06.02; Hankyoreh, 2021.11.02), underscores the need for more proactive discussions on improving the spatial attributes and labor conditions of location-based platform workplaces.

The restoration of rights for location-based platform workers in urban spaces is an urgent need. Lefebvre (1968/1996) underscored the importance of reclaiming worker rights in urban areas dominated by capitalist interests. Although Seoul city has taken steps by installing mobile rest areas for location-based platform workers across the city (Seoul City Press Release, 2020.12.22), these efforts, while beneficial, might be seen as merely cosmetic solutions that provide space on a charitable basis rather than empowering workers. To genuinely secure spatial sovereignty, it is essential to explore more substantive measures. An example of such an initiative is the 'Worker Info Exchange' in the UK, which advocates for the rights of Uber and Deliveroo drivers by providing them access to spatial information. Platform companies routinely collect extensive data from workers, including location, movement patterns, and transport distances, which they use to manage worker movements and develop new business ventures. Yet, the workers, who are the primary source of this data, are typically denied access to it. This collected data is invaluable, as it could enable platform workers to optimize their routes and manage their schedules more efficiently. The Worker Info Exchange is pushing for a movement where platform companies are required to share the collected big data with the workers. By gaining access to this data, location-based platform workers could significantly enhance their operational efficiency and, importantly, reclaim some control over their work environments.

For web-based platform workers, the significant psychological alienation that arises from the discrepancy between virtual and physical spaces necessitates the development of targeted measures. These workers often endure isolated labor conditions, caught between their virtually boundless work environments and the increasingly limited confines of their homes. This dichotomy not only fosters a sense of isolation and loneliness in the physical world but also subjects workers to intense mental strain and stress in the digital realm. The severity of this issue was tragically underscored by recent reports of web-based workers suffering from mental confusion and anxiety, exacerbated by online hostility, with some incidents tragically culminating in suicide (The Joongang, 2022.02.07). This form of psychological distress can be viewed as a type of digital industrial accident, intrinsic to the virtual workplace called the platform (Kim et al., 2021). Despite the richness of social interactions and communication in the virtual space, web-based platform workers often find equivalent interactions in the physical space lacking, which could potentially mitigate these negative experiences. Local governments have started to address these challenges by introducing space planning projects, such as shared workspace rentals for freelancers and housing support programs for creators (Lee et al., 2017; Gangdong-gu, Seoul City Recruitment Announcement, 2018.08.24). Furthermore, developing a

variety of offline group activities aimed at fostering social networking and leisure could offer crucial opportunities for these workers to engage meaningfully outside their home environments.

Considering that the primary workspace of web-based platform workers is virtual, support structures in the online space are crucial. An exemplary initiative in this regard is the concept of a digital labor union proposed by Unionen, a Swedish office workers' union (Söderqvist, 2017). Recognizing that platform workers primarily use the internet and smartphone apps for their work, without the need for a physical workplace, Unionen suggested the creation of a digital labor union alongside digital collective agreements easily accessible within virtual spaces. To foster participation and interaction among platform workers, Unionen developed a meta-platform that consolidates labor conditions and contract standards of various platform companies. This allows workers to share information about their working conditions and enter into business agreements digitally. Such a digital labor union, unconstrained by geographic location, aligns seamlessly with the lifestyle of web-based platform workers. More importantly, it serves as a spatial organization that corresponds directly to the virtual nature of their workplaces, offering a modern alternative to traditional unions.

In addressing the temporal dimension of platform labor, it is crucial to restore platform workers' time sovereignty and humanize their labor hours. Previous research has predominantly highlighted the instability of employment and income as fundamental aspects of the precariousness experienced by platform workers. However, the irregularity of working hours in platform jobs also significantly contributes to this insecurity, disrupting workers' biorhythms and breaking the regularity of life. While platform work offers the freedom to choose working hours, the reality often involves physical and mental exhaustion due to the relentless pace set by the digital platforms' 'conveyor belt'. Traditional social policies aimed at humanizing work typically focus on physical adjustments like reducing working hours, increasing vacation time, or introducing flexible schedules to promote work-life balance (e.g., Hildebrandt, 2006; Ahmad, 2013; Ahn, 2000). However, these approaches may not fully address the unique challenges faced by platform workers, who already benefit from flexible work and rest hours but suffer from disrupted biorhythms due to the very flexibility that defines their work. Instead of merely limiting working hours or mandating vacations, there is a need for innovative and more delicate measures that help maintain the natural biorhythms of human beings within the context of network time.

Central to the challenges faced by platform workers is the erosion of mental and physical well-being, driven by the network time intrinsic to the virtual world and the pressures of digital Taylorism imposed by platform companies. While it would be ideal for individual workers to break free from this Möbius-strip-like labor pattern, in reality, network labor often resembles a 'swamp' from which escape is difficult without external help. Thus, to mitigate the rapid dehumanization of labor time, the proactive engagement and effort of platform companies are essential. A promising example of such initiatives is seen in the 'Code of Conduct' developed by nine German crowdsourcing platform companies (The Crowdsourcing Association, 2017). Led by Testbird, these companies have sought to distinguish themselves from their North American and European counterparts by fostering a labor-friendly work environment aimed at attracting high-quality domestic platform workers. As a result of these efforts, ten guidelines were established, with Article 6 emphasizing 'clear tasks and reasonable timing'. This guideline encourages coordination among customers, platform workers, and workers

from competing platforms to ensure platform workers have adequate time to complete their orders, especially considering the intensified competition when customers demand quick turnaround times. Furthermore, the guidelines delineate the limits of tasks that can be reasonably completed within a given time frame and assert that platform companies have an obligation to help establish reasonable timelines for work completion. This recognition that the disruption of platform workers' biorhythms is a structural issue, not merely a personal one, underscores the need for a collective and structured approach to reforming labor conditions within the platform economy.

Furthermore, by deepening our collaborative efforts, a variety of measures could be proposed to involve the state, local governments, platform companies, platform workers, and citizens in humanizing the time and space of the digital economy and restoring sovereignty together. This study anticipates that future platform labor policies will evolve to include practical solutions that take into account the time and space in which workers live and work.

References

Adams-Prassl, J. (2019). What if your boss was an algorithm? Economic Incentives, Legal Challenges, and the Rise of Artificial Intelligence at Work. Comparative Labor Law & Policy Journal, 41, 123-146.

Adams-Prassl, J. (2020). Humans as a Service: The Promise and Perils of Work in the Gig Economy (Le,, Y. Trans.). Seoul: Soombook. (Original work published 2018)

Ahmad, S. (2013). Paradigms of quality of work life. Journal of Human Values, 19(1), 73-82.

Ahn, H. (2000).Reduction in Working Hours: Its Point at Issue and Humanization of Working Hours.Korea Social Policy Review, 7(1), 109-143.

Altenried, M. (2022). The Digital Factory: The Human Labor of Automation. Chicago: University of Chicago Press.

Bauman, Z. (2009). Liquid Modernity(Lee, I. Trans.). Seoul: Gang. (Original work published 1999).

Berardi, F. (2013). Precarious rhapsody: semiocapitalism and the pathologies of the post-alpha generation(Jung, Y. Trans). Seoul: Nanjang. (Original work published 2009).

Berg, J., Furrer, M., Harmon, E., Rani, U., & Silberman, M. S. (2018). Digital Labour Platforms and The Future of Work: Towards Decent Work in The Online World. Geneva: International Labour Office.

Boyatzis, R. E. (1998). Transforming Qualitative Information: Thematic Analysis and Code Development. Thousand Oaks: Sage Publication.

Cairncross, F. (1997). The Death of Distance: How The Communications Revolution Will Change Our Lives. Boston: Havard Business School Press.

Chae, S. (2021). Assembling Food Delivery App Mobile Labor Workforce in South Korea. Korean Journal of Communication & Information, 108, 58-91.

Choi, B. (2005). Development of Informational Technology and Reconceptualization of Space. Space and Environment, 24, 8-49.

Collier, R. B., Dubal, V. B., & Carter, C. (2017). Labor platforms and gig work: the failure to regulate. IRLE Working Paper No. 106-17. Berkeley: University of California, Berkeley.

De Stefano, V. (2015). The rise of the just-in-time workforce: On-demand work, crowdwork, and labor protection in the gig-economy. Comprative Labor Law & Policy Journal, 37, 471-504.

Diener, E. & Seligman, M. E. (2004). Beyond money: toward an economy of well-being. Psychological science in the public interest. 5(1), 1-31.

Forde, C., Stuart, M., Joyce, S., Oliver, L., Valizade, D., Alberti, G., & Carson, C. (2017). The Social Protection of Workers in The Platform Economy. Strasbourg: European Parliament.

Foucault, M. (2020). Surveiller et punir (Oh, S., Trans.). Paju: Nanam. (Original work published 1975)

Galloway, A. (2004). Intimations of everyday life: Ubiquitous computing and the city. Cultural studies, 18(2/3), 384-408.

Gerber, C., & Krzywdzinski, M. (2019). Brave new digital work? New Forms of Performance Control in Crowdwork. In S. P. Vallas, & A. Kovalainen(eds). Work and Labor in the Digital Age, Bingley: Emerald Publishing Limited.

Giddens, A. (1986). The Constitution of Society. Cambridge: Polity Press. (Original work published in 1984).

Giddens, A. (1996). The Consequences of Modernity. Cambridge: Polity Press. (Original work published in 1990).

Gordon, E., & de Souza e Silva, A. (2011). Net Locality: Why Location Matters in a Networked World. Chichester: Wiley-Blackwell.

Graham, M., & Anwar, N, A, (2019). Labour. In J. Ash, R. Kitchin, & A. Leszczynsky(eds). Digital Geographies. London: Sage.

Graham, S., & Marvin, S. (1999). Planning cybercities? Integrating telecommunications into urban planning. The Town Planning Review, 89-114.

Ha, T. (2018). Legal Status of Digital Platform Workers - Focusing on the Case of Delivery Driver. Law Review, 58, 1-33.

Hardt, M., & Negri, A. (2005). Multitude: War and Democracy in the Age of Empire. New York: Penguin Books.

Harvey, D. (1992). The Condition of Postmodernity. Oxford: Blackwell. (Original work published in 1989).

Hassan, R. (2003). Network time and the new knowledge epoch. Time & Society, 12(2/3), 226-241.

Hassan, R. (2014). A temporalized internet. The Political Economy of Communication, 2(1). 3-16.

Head, S. (2005). The New Ruthless Economy: Work and Power in the Digital Age. Oxford: Oxford University Press.

Heiland, H. (2021). Controlling space, controlling labour? Contested space in food delivery gig work. New Technology, Work and Employment, 36(1), 1-16.

Herod, A. (1997). From a geography of labor to a labor geography: Labor's spatial fix and the Geography of capitalism. Antipode, 29(1), 1-31.

Hildebrandt, E. (2006). Balance between work and life—new corporate impositions through flexible working time or opportunity for time sovereignty?. European Societies, 8(2), 251-271.

Huws, U. (2016). Logged labour: A new paradigm of work organisation?. Work organisation, labour and globalisation, 10(1), 7-26.

Huws, U., Spencer, N. H., & Syrdal, D. S. (2018). Online, on call: The spread of digitally organised just-in-time working and its implications for standard employment models. New Technology, Work and Employment, 33(2), 113-129.

ILO(2021). World Employment and Social Outlook: The Role of Digital Labour Platforms in
Transforming the World of Work. Geneva: International Labour Office.

Jacinto, G. (Trans). (2013). Factory and Society, M. Tronti. La fabbrica e la società. (1962). Quaderni
Rossi 2, 1-31. https://operaismoinenglish.wordpress.com/2013/06/13/factory-and-society/.

Janelle, D. G. (1969). Spatial reorganization: a model and concept. Annals of the association of American
Geographers, 59(2), 348-364.

Jang, J. (2020). 플랫폼노동종사자보호방안마련을위한실태조사[A Survey on the Protection of
Platform Workers]. Sejong: Korea Labor Institute.

Kain, J. F. (1992). The spatial mismatch hypothesis: three decades later. Housing Policy Debate, 3(2),
371-460.

Kang, M. & Kim, S. (2021).Why Do Delivery App Drivers Continue to Work on Delivery? - Drawing on
Bourdieu's Forms of Capital -. Korean Journal of Social Welfare,73(1), 65-94.

Kim, I. (2016). 사회복지연구에서질적방법과분석[Qualitative Methods and Analysis in Social Welfare
Research]. Seoul: Jipmoondang.

Kim, J. (2020). A critical review of spreading digital platform labor and its pitfalls. ECONOMY AND
SOCIETY, 125, 296-322.

Kim, J. et al. (2019). 플랫폼경제종사자규모추정과특성분석[Estimation and Characteristic Analysis of
Platform Economy Worker Scale]. Korea Employment Information Service.

Kim, J. et al. (2021). 플랫폼종사자의규모와근무실태[Scale and working conditions of platform
workers]. 고용동향브리프(Employment trend brief). 2021(9), 14-31.

Kim, S. (2021). 디지털시대의사회복지패러다임: 네트워크적접근[Social Welfare Paradigm in the
Digital Age: A Network Approach]. Seoul: Jipmoondang.

Kim, S., Kang, M., & Park, J. (2021). Digital industrial accidents: A case study of the mental distress of
platform workers in South Korea. International Journal of Social Welfare.
https://doi.org/10.1111/ijsw.12522.

Kim, S., Kang, M., Ha, E. (2018). Economic Activities in Digital Platforms - Types, Natures, Risks,
Policy Suggestions -. Korea Social Policy Review, 25(4), 199-231.

Kim, Y. (2017). 플랫폼노동, 새로운위험사회를알리는징후[Platform Labor, Signs of a New Danger
Society]. Culturescience, 92, 74-102.

Kofman, E., & Lebas, L. (Trans). (1996). The right to the city (pp. 63-184). In Writings on Cities. H.
Lefebvre. (1968). Le Droit à la ville. Oxford: Blackwell Publishers.

Latour, B. (1996). On actor-network theory: A few clarification, Soziale welt, 369-381.

Lee, S., Baek, S., & Nam, J. (2020). Labour Process in South Korean Platform Labour Market and its
Mismatch with Social Protection System. KOREAN JOURNAL OF LABOR STUDIES,
26(2), 77-135.

Lee, Y., Park, J., & Lim, B. (2017). 서울특별시청년공간조성및운영계획:
청년공간무중력지대를중심으로[Plans for the Creation and Operation of Youth Space in
Seoul: Focusing on the Youth Space Zero-gravity Zone]. Seoul: Seoul Youth Hub, Project
Noah.

Lefebvre, H. (2011). La production de l'espace (Yang, Y., Trans.). Seoul: Ecolivres. (Original work
published 1974)

Lefebvre, H. (2013). Éléments de rythmanalyse: introduction à la connaissance des rythmes(Jung, K.
Trans). Seoul: Galmuri. (Original work published 1992).

Makimoto, T., & Manners, D. (1997). Digital Nomad. Chichester: John Wiley & Sons.

Mitchell, W. J. (1999). City of bits : space, place, and the infobahn(Lee, H. Trans.). Seoul: Gimmyoung. (Original work published 1995).

Nahm, J. (2021). A Study on the Labor Conditions and Job Satisfaction of the Platform Workers.Quarterly Journal of Labor Policy, 21(2), 101-133.

Nice, R. (Trans). (1979). Algeria 1960: The Disenchantment of the World, The Sense of Honour, The Kabyle house or the World Reversed. P. Bourdieu. Algeria (1963), The sense of Honour(1972), and The Kabyle House (1972). Cambridge: Cambridge University Press.

Park, S. (2021). Culture of Immediacy and Shadow Work in Platform Delivery Economy.ECONOMY AND SOCIETY, 130, 208-236.

Ping, S. U. N., & Chen, J. Y. (2020). Temporal Arbitrage, the Fragmented Rush, and Opportunistic Behaviors: The labor politics of time in the platform economy. New media & Society. https://doi.org/10.1177/1461444820913567.

Postone, M. (1993) Time, Labor, and Social Domination: A Reinterpretation of Marx's Critical Theory. Cambridge: Cambridge University Press.

Rifkin, J. (1987). Time Wars: The Primary Conflict in Human History. New York: Henry Holt and Company.

Schmidt, F. A. (2017). Digital Labour Markets in the Platform Economy: Mapping the Political Challenges of Crowd Work and Gig Work, Bonn: Friedrich-Ebert-Stiftung.

Schroer, M. (2010). Räume, Orte, Grenzen: auf dem Weg zu einer Soziologie des Raum(Jung, I. & Bae, J. Trans). Seoul: Ecolivres. (Original work published 2006).

Silverman, D. (2016). Qualitative Research. London: Sage.

Söderqvist, F. (2017). A Nordic Approach to Regulating Intermediary Online Labour Platforms. Transfer: European Review of Labour and Research, 23(3), 349-352.

Stevens, L., & Shearmur, R. G. (2020). The end of location theory? Some implications of micro-work, work trajectories and gig-work for conceptualizing the urban space economy. Geoforum, 111, 155-164.

Stoll, M. A. (2006). Job sprawl, spatial mismatch, and black employment disadvantage. Journal of Policy Analysis and Management: The Journal of the Association for Public Policy Analysis and Management, 25(4), 827-854.

Taylor, F. W. (2004). Scientific Management. London: Routledge. (Original work published in 1912).

The Crowdsourcing Association.(2017). Code of Conduct: Ground Rules for Paid Crowdsourcing/Crowdworking.

https://crowdsourcing-code.com/media/documents/Code_of_Conduct_EN.pdf

Thompson, E. P. (1967). Time, Work-Discipline, and Industrial Capitalism. Past and Present, 38, 56-97.

Trinder, B. S. (2013). Britain's Industrial Revolution: The Making of a Manufacturing People, 1700-1870. Lancashire: Carnegie Publishing.

Van Doorn, N. (2017). Platform labor: on the gendered and racialized exploitation of low-income service work in the 'on-demand' economy. Information, Communication & Society, 20(6), 898-914.

Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019). Good gig, bad gig: autonmy and algorithmic control in the global gig economy. Work, Employment and Society, 33(1), 56-75.

Zook, M. (2019). Industry. In J. Ash, R. Kitchin, & A. Leszczynsky(eds). Digital Geographies. London: Sage.

Websites

"The digital nomads working in paradise". www.bbc.com. (2017. 11. 22.)

"The uber-loneliness of the sharing economy driver" . www.theguardian.com. (2016. 2. 4.)

"[콜할당량 못 채우면 후순위] 대리운전업체가 쥔 '우선배차권'이란[If you don't meet the call quota, you'll be in the latter rank]". Labor Today. (2020.06.02.)

"BJ잼미 숨지자 사과영상 올린 유튜버… 누가 진짜 그녀를 죽였나 [A YouTuber who posted an apology video when BJ Jammi died...Who really killed her?]". The Joongang. (2022.02.07.)

"강제배차에 지각하면 벌금…배달라이더, '자영업자' 맞나요? [If you're late for forced dispatch calls, you'll be fined...Are delivery riders really 'self-employed'?]". The Hankyoreh. (2021.11.02.)

"서울시, 필수노동자 전담조직 지자체 최초 신설…뉴노멀 시대 新노동자 집중 지원[Seoul Metropolitan Government establishes a dedicated organization for essential workers for the first time...Intensive support for new workers in the new normal era]". Seoul Metropolitan Government News Report. (2020.12.22.)

"1인 크리에이터를 위한 맞춤형 임대주택– 청년 안테나 입주자 모집공고[Customized rental housing for single-person creators - Announcement of recruitment of young antenna tenants]". Seoul Metropolitan Government Gangdong-gu office notice no. 2018-1315. (2018.08.24.)