Master's thesis

Urban Studies and Planning

'The becoming of a food delivery platform: a post-humanist and sociomaterial exploration of food delivery couriers' experiences and sensemaking processes in Helsinki and Espoo (Finland)'

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Tiivistelmä – Referat – Abstract

This thesis is an exploration of food delivery couriers' everyday experiences, practices and sensemaking processes through a posthumanist and sociomaterial approach that highlights the idea that technology and society are mutually shaping one another, and that considers the agency of non-human entities such as algorithms, transcendental. Moreover, by adopting a sociomaterial perspective, we can have a better understanding of how social and technological systems, as well as human and non-human beings, are interrelated, how they shape, and are shaped by one another.

This work's aims are threefold: First, it explores couriers' experiences at work and describes their daily practices in order to understand the enactment of agency from a sociomaterial and post-humanist philosophical tradition. Second, it explores the material implications of algorithmic management in couriers' lives, and finally, it explores the way couriers perform their work in context, both through the tethered geographical elements of the city, and amidst the platform's multiple entanglements and spatiotemporal arrangements.

The research design of this thesis has a strong qualitative research methodology, including methods such as walk-along interviews, semi-structured interviews, ethnographic reporting techniques, and the author's 3-month work experience as a food delivery courier.

The findings of this work suggest that we should acknowledge the platform as a constant becoming entity where couriers' sensemaking processes are produced at the intersection of their experience of the city and their relationship with the managing algorithms of the platform. A performative sociomaterial practice that constantly produces knowledge that is used by couriers to negotiate their participation in the platform.

This thesis expands previous understandings of digital workers' experiences of algorithmic management by incorporating a sociomaterial and performative approach in the analysis of couriers' sensemaking processes. Furthermore, by considering the relationships and interactions between human and nonhuman agencies in the food delivery platform industry, this work contributes not only to the understanding of agency within digital platforms but also to a broader understanding of agency in our increasingly digitally mediated societies.

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To my fellow couriers.

Thank you for your inspiring lives.

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This is a powerful metaphor.

This precise 'story' you hold in your hands,

It is a metaphor of the bodies and lives that bind the world together, of the beings that sense, rank, surveil, and take decision for us.

It is a powerful metaphor on how 'becoming' in the world is not pre-given but enacted.

[.]

1. Introduction

1.1 Opening words

Amid a pandemic world, I saw them; running, rushing, giving life to otherwise desertic streets and shopping malls; food delivery couriers were suddenly 'visible', their lives and stories suddenly mattered.

Interestingly, what kept my attention was their bodies in movement; not the technological backgrounds of innovative companies, nor the steering algorithms behind those companies, but them, people. People that seemed to move as frenetically as bees in a hive; and precisely as a hive, I wondered; how do they communicate? Is there a collective understanding of the things they do? What are their motivations, aims, and agendas?

What I did not know at the time was that answering those 'simple' questions would take me to an exploration of the most relevant societal change that humankind faces today: its increasing co-constitution with non-human artifacts and their agencies. After all, what does it mean to be human in our contemporary world?

Human beings are no longer the only ones responsible for the outcomes of our societies: discrimination is no longer an exclusive human feature, but it is inherent to algorithmic systems that take biased and discriminatory decisions that affect people's lives. Car accidents are no longer an exclusive realm of human mistakes, but of algorithms' liability. Therefore, comprehending our existence in this world requires us to see ourselves beyond anthropocentric and human-centered conceptions.

The contemporary human being is by no means a biologically distinct human –at least not yet–[1], but a human who is increasingly building its society and its reality in a frictionless and symbiotic relationship with machines, algorithms and artificial intelligence (AI). This intrinsic co-constitutive condition is what some authors have labeled as the 'post-human condition' (Pepperell, 1995), or simply 'The Posthuman' (Braidotti, 2013).

If we would follow Pepperell's suggestion that *'the post-human era begins in full when the output of computers is unpredictable'* (Pepperell, 1995) then, we necessarily ought to conceive ourselves as the first generation living in a truly post-human society.

Rightfully, at this point, it is fair of you to ask: what does all of this have to do with food delivery platforms? Well, believe it or not, it does. Food delivery couriers and food delivery platforms are a great example and access point to these societal debates.

Digital platforms are considered a centerpiece in a much larger project: that is, the reconfiguration of society itself (Dijck et al., 2018). A society where humans no longer 'go to work' but work in a gamified metaverse of their own existence; a society where humans no longer have 'a boss' but report to work to an algorithm; an ultra-surveilled society that rate, rank, control, and discipline people through its dependence on technology. Food delivery couriers are these people, and my attempt with this work is to present an embodiment of 'the post-human' through couriers' lives and experiences.

As a workforce, couriers embody deep changes in labor relations that are still in their underpinnings and will fast escalate to every other field of expertise. As individual workers, couriers interact constantly with non-human beings (algorithms) and negotiate multiple technological and non-technological materialities[2] that shape their work and lives.

By inquiring about couriers' experiences, by observing their relationships with the managing algorithms that supervise their work, by tracking their daily practices and negotiations of the platform's multiple technological and non-technological materialities, and ultimately, by trying to grasp the sensemaking processes through which they make sense of the platform, this work offers us not only an unusual view into food delivery platforms but also a provoking glimpse on how, in a posthuman society, we become together with technology and technology becomes together with us.

1.2 Aims of the study and research questions

As suggested in my opening words, this work's central motivation is to understand how human beings interact, work, and build their realities in co-constitution with non-human actors. To achieve this, food delivery platforms and food delivery couriers were selected as sites of exploration.

This work has three aims.

- **Aim 1.** To explore couriers' socio-material experiences and describe their daily practices in order to understand the enactment of agency from a sociomaterial and post-humanist philosophical tradition.
- **Aim 2.** To explore the material implications of algorithmic management in both directions; how this specific type of management is experienced by couriers, and how the managing algorithms could be potentially affected by couriers' behavior.
- **Aim 3.** To explore the way couriers perform their work in context, both through the tethered geographical elements of the city and amidst the platform's multiple entanglements and spatiotemporal arrangements.

To fulfill these aims, three research questions are proposed:

- **Research Question 1 (RQ1):** In which ways does the food delivery platform materialize in the city?
- **Research Question 2 (RQ2):** How do food delivery couriers experience and make sense of the platform and Quick's managerial algorithms?
- **Research Question 3 (RQ3):** How do food delivery couriers navigate and mediate the multiple entanglements of the platform?

To answer these questions, a strong qualitative research methodology has been followed. This included applying methods such as observation, walk along interviews, semi-structured interviews, ethnographic reporting techniques, and the author's 3-month period of work as a food delivery courier from which an autoethnographic diary was kept.

To ease the reader experience, the findings section of this work has been structured in direct correlation with the research questions mentioned above. Consequently, sub-chapter 7.1 presents the findings concerning RQ1, sub-chapter 7.2 presents the findings concerning RQ2, and sub-chapter 7.3 presents the findings concerning RQ3.

2. Literature Review

The study of digital and food delivery platforms has produced an immense amount of literature in recent years. A vast proportion of this scholarly production has come from the fields of geography, information studies (IS), science and technology studies (STS), labor studies, management theory studies, platform urbanism, and critical cultural and anthropological studies. Consequently, food delivery platforms can be understood in multiple ways, depending on the discipline through which is being inquired. Hence, to place this work amidst the vastness of literature produced within the field, I present next a synthesis of the fundamental streams of thought within platform studies.

There are at least 5 major inquiry streams among platform studies. First, the conception of platforms as vital infrastructures of our digitally mediated cities (Barns, 2019) second, platforms as infrastructures for capital accumulation, commodification, datafication, value extraction, and labor exploitation (Mager, 2012; Srnicek, 2017; van Doorn, 2017), third, platforms as new surveilling devices that control our data and pose challenges to our rights as individuals (Introna & Wood, 2004; Newlands, 2020), fourth, platforms as the new political agents planning our cities (Bauriedl & Strüver, 2020) , and finally, as the central elements of a 'platform society' (Dijck et al., 2018). Hence, we could suggest that platforms are indeed at the core of our inquiry and understanding of contemporary societies.

In a very influential paper, geographer Sarah Barns (2019a) provides an interesting definition of platforms; for her, platforms would be better conceived as *'ecosystems of interaction which remediates existing forms of socio-spatial encounter, and recalibrates the way in which we, as citizens, seek to know, interact, document and traverse'*. (p.10).

Conceiving platforms as creating new spaces of interaction is unarguably a fruitful approach to the study of digital platforms at large, and food delivery platforms in particular. Nevertheless, others (Graham, 2020; Richardson, 2020a, 2020b) have suggested that we should conceive platforms beyond their virtual coordination functions and pay attention to their intrinsic materialities. In Lizzie Richardson's words:

> *'The platform is not simply a virtual framework of spatial and temporal coordination of restaurant and customer, but rather territorializes this link through the delivered meal. Such territorializations of the platform –the delivered meal– are materializations of the flexible spatiotemporal arrangements that occur through the calculated coordination of the different actors'* (Richardson, 2020b, p. 2).

Richardson's highlights the importance of considering the pre-existing territorialized networks of the city on top of which the platform unfolds, additionally, it recognizes that platforms have an intrinsic territorialization, and finally, she identifies this territorialization as a central element for the platform's materialization. Consequently, there are at least three territorialized elements that are central to the study of food delivery platforms: the location of restaurants, the location of households, and the location of food delivery couriers. Hence, it is in the analysis of Quick's tethered (Restaurants and households) and untethered elements (Couriers), together with the relationships weaved among them, that we could discover the specific ways in which the platform materializes itself in the city.

2.1 Food delivery couriers: Between the fixity of a tethered system and the flexibility of a digital platform

Within platform studies -digital geography in particular-, we can distinguish two types of platform work; geographically tethered work and 'cloud' work (Wood et al., 2019).

Cloud work is work that can -in theory- be requested and conducted from anywhere; requesters, or clients, use digital labor platforms to find workers that may be located anywhere on the planet. On the other hand, geographically tethered work is work that can't be accomplished without the physical presence of the worker in a particular location (e.g., delivering food from a restaurant to an apartment or driving a person from A to B).

Interestingly, food delivery platforms behold a hybrid characteristic where: end-costumers can request a job to be performed on their behalf remotely (order food from an app), but at the other end, for this 'task' to be completed, the platform relies on thousands of geographically tethered bodies: food delivery couriers. The best possible description of these phenomena was made by Mark Graham (2020), who suggested that digital platforms operate through 'conjunctural geographies' that are simultaneously embedded and dis-embedded from the space-times they mediate (Graham, 2020). In Graham's words:

> 'It is in the conjunction of tethered and untethered relationships with space that we need to envision how platforms bring new digital geographies into being' (Graham, 2020 p.456).

Graham's conceptualization is crucial since it suggests that platforms' materiality and the digital geographies emerged along their deployment are only comprehensible through their interactions with space (tethered and untethered). In the same vein, Lizzie Richardson (2020) conceptualizes platforms as generating 'flexible spatial arrangements' in which the articulation of preexistent territorialized elements of the city is one of the platform's main

tasks. This articulation, according to Richardson, *'implies a reorganization of urban operations (such as transport, housing and so on) not through new physical infrastructures, but instead through novel technologies of coordination of those already existing'* (Richardson, 2020a, p. 2).

Ultimately, what both Richardson and Graham suggest is that platforms' most relevant site of analysis is not to be found in its intermediation functions but rather in its spatial materialization.

2.2 The Socio-Technical

The concept of the "socio-technical" in the field of Science and Technology Studies (STS) includes the agency of human and non-human entities, such as technology, machines, and algorithms. Bruno Latour, for instance, developed the concept of "actor-network theory" which emphasizes the agency of both human and non-human actors as equally meaningful in the shaping of technology and society at large. He defines socio-technical systems as *'networks of human and non-human actors, such as machines, organizations, and technologies, that come together to accomplish a shared task or goal'* (Latour, 1987). This view of socio-technical systems has refocused the discussion from a human-centered approach of agency to a co-constitutive conception of it. Hence, the 'Socio-technical' as a concept has impacted enormously the scholarly production across several fields of the humanities and technology studies.

When it comes to digital and food delivery platforms, STS scholars have long stated that platforms can only be conceived as embedded within these complex socio-technical systems and assemblages (Kitchin & Dodge, 2011). Hence, to inquire about food delivery platforms, we should look not only to food delivery couriers but also to the technological background wherein they perform their work.

In this vein, algorithmic management is a central feature of the food delivery platform industry. Hence, our exploration of Quick as a food delivery company considers thoroughly its algorithmic driven approach in managing its workforce (couriers). To do this, we will first frame a basic understanding of algorithms and the way they operate.

2.3 Algorithms and algorithmic management in Food delivery platforms

Algorithmic management is a central feature in the food delivery platform industry. Hence, our exploration of Quick as a food delivery company considers thoroughly its algorithmic driven approach in managing its workforce (couriers).

Having a post-humanist philosophical framing, and a clear sociomaterial approach, the present work will focus on the exploration of Quick's managing algorithms as performative entities; as *contingent, ontogenetic, and performative (in) nature'* (Kitchin, 2017, p. 14).

This intrinsic performative nature has been extensively recognized by several other authors, who have suggested algorithms as entangled with culture (Gillespie, 2014; Seaver, 2017; Striphas, 2015), geography (Ash et al., 2018; Ferrari & Graham, 2021), platform urbanism (Barns, 2019b; Fields et al., 2020; A. Lee et al., 2020; Leszczynski, 2020; Sadowski, 2020), management theories (M. K. Lee, 2018), and labor studies (Gandini, 2019; Sun, 2019; van Doorn, 2017) -just to name a few-.

In line with this vast literature, this thesis understands algorithms as more than simply lines of code. Algorithms are not only technological artifacts circumscribed to digital space, but entities that have material, and cultural implications, political connotations, and physical and spatial projections. Therefore, algorithms are co-constitutive of the realities in which people – and couriers– work and live in.

In this way, this thesis' inquiry on food delivery platforms is an inquiry about the performative connotations of Quick's algorithms, the contexts in which it is deployed, the interactions that arise from its contextualized deployment, and the material implications of it.

Quick's algorithms cannot be inquired as an isolated element of the platform. The logical coded structure of the algorithm, the protocols embedded in the delivery app[1], the planning laws that shape the city's structure, the number of couriers on the street, the modes of transportation they use, and even the time of the day when couriers deliver; all these elements -and a lot more- are the constitutive elements and relationships in which Quick´s algorithms exist/come to be.

2.4 Space, time, and the spatiotemporal

A long-standing tradition of philosophers, thinkers, and academics suggests that space and time are socially constructed (Lefebvre, 1991), deeply intertwined with the logics of capitalism (Harvey, 1985; Soja, 1996), and (co)relational to historical contexts, power relations, and people's interactions (Massey, 1994, 2005).

Following this scholarly tradition, Zheng & Wu (2022) argue that space and time are irreducible to their singularities and should always be conceived as mutually constitutive (pp. 5–6). Hence, instead of referring to 'time' and 'space' separately, they use the concept of 'spatiotemporality'. In doing so, they recognize the intrinsic performative and co-constitutive nature of space, time, and the social. Moreover, spatiotemporality as a concept is intrinsically linked to individual's social practices and their entangled materialities (Zheng & Wu, 2022).

Interestingly, just as we saw previously with algorithms, spatiotemporality is conceived as being 'multiple, relational, contingent, constitutive and entangled with everyday practice.' Zheng & Wu (2022, p. 4).

Spatiotemporality, thus, from a sociomaterial performativity approach, is the process of becoming of *'the temporal'* and *'the spatial'* frames in which the platform exists. Furthermore, it is a process of becoming that is not only space-time co-constitutive but also deeply embedded in people's interactions, practices and the materialities of their encounters with the social and the technological.

2.5 Sensemaking

Making sense of sensemaking is a demanding academic journey. There are at least 5 important scholarly traditions to understand the concept of sensemaking; Psychological, hermeneutic, narrative, phenomenological, and discursive (Schildt et al., 2020). Hence, these traditions have determined that the outcomes of previous literature on sensemaking processes would have been typically divided into three distinct types: (1) Individual and collective sensemaking; (2) Cognitive, discursive, and narrative forms of sensemaking, and (3) crisis and organizational/strategic sensemaking (Maitlis & Christianson, 2014). Now, despite the obfuscating list of different epistemological traditions and conceptual approaches to sensemaking, there are some common, well established, and shared understandings of it.

The establish literature conceptualizes sensemaking as an '*ongoing, situated process that involves creation of coherent understandings through interlinked observation ('extraction of cues'), interpretation and action ('enactment')*' (Parenthesis present in original) (Schildt et al., 2020, p. 245). Additionally, these processes are recurrent, co-occurring and intrinsically interconnected (Weick, 1995), suggesting that our understandings of the world are not fixed but they evolve in time.

In Schildt et al. words, 'sensemaking is essentially something that actors do as they engage in practice' (p. 245), and it is ultimately a 'pursuit of coherence' (Schildt et al., 2020, p. 245).

This approach to sensemaking as 'doing' in 'practice' is crucial to understand couriers sensemaking processes. Nevertheless, we, as socially bonded humans, do things and perform practices in a given context. Thus, understanding couriers' sensemaking processes would require, as well, to consider 'the contextual factors of structure and discourse in which individual sensemaking occurs' (Helms Mills et al., 2010).

Within this frame, couriers' sensemaking processes will be approached here as always evolving and developing in a double determined process; individually and introspectively, from the individual's experiences and its cognitive apprehension; and collective-discursively, from the contextualization of the individual's experiences, its elucidation through language (discourse/narratives), and its comparison with other individuals' narratives.

3. Theoretical Framework

3.1 Agency: a critical post-humanist approach

'Post-humanist theories share a commitment to giving agency to the nonhuman as a necessary corrective to centuries of Western philosophizing that attributes agency only to a specific kind of human: the male, white, heterosexual sovereign subject, capable of rational thought unencumbered by material objects, whether tools or his body'

Rosi Braidotti (2013)

Braidotti's non-anthropocentric and non-binary conception suggests that 'giving agency to the non-human' is not only a process of philosophical correction but, most importantly, a revindication of materiality as a central element of agency. Therefore, inquiring about digital platforms and food delivery platforms from a post-humanist philosophical tradition involves exploring the material connotations through which agency exists.

Agency in a post-humanist conception is the very process of becoming. Becoming human, becoming matter, becoming a book or a car. For post-humanist scholars, the pre-existence of the individual is false (K. Barad, 2003, p. 826), therefore, we become humans with the world, and it is within that process of becoming that agency exists. In Karen Barad's words.

'Agency is a matter of intra-acting; it is an enactment, not something that someone or something has. Agency cannot be designated as an attribute of "subjects" or "objects" (as they do not preexist as such). Agency is not an attribute whatsoever —it is "doing"/"being" in its intra-activity. Agency is the enactment of iterative changes to particular practices.'

(Barad, 2003)

It is in this enactment of change, in this continuous and perpetual process of becoming, that a post-humanist conception of agency should be understood.

Now, how has post-human agency been theorized? According to Rose (2017), there has been three big streams in the theorization of posthuman agency that have evolved in parallel during the last three decades: non-representationalists accounts of human agency, action-network theory (ANT) accounts of human agency, and science and technology studies (STS) approaches. Interestingly, in all of them, materiality and practice have been a central concern of their conceptualizations.

This marked consistent interest in materiality is what I consider fundamental for the present inquiry on food delivery platforms. Consequently, in the coming section, I will introduce the concept of 'sociomateriality' as indispensable for the purposes of this work.

3.2 Sociomateriality

The concept of 'sociomateriality' in the field of Science and Technology Studies (STS) refers to the ways in which social and material elements are mutually constitutive and co-producing of one another. This perspective suggests that technology is not just a tool that humans use but is also an active force and influential actor in shaping society.

For Wanda Orlikowski, the concept of 'sociomateriality' examines how technology and organizational practices shape one another. Moreover, she argues that 'sociomateriality' highlights the ways in which *'the social'* and *'the technical'* meet, blend, and are co-constituted in, and trough, practice (Orlikowski, 2007b; Orlikowski & Scott, 2008).

In the same vein, Karen Barad, a physicist and feminist theorist, understands the concept of sociomateriality as *'the study of the ways in which social and technical elements are mutually shaping and co-constituted in everyday entanglement'* (K. M. Barad, 2007, p. 801).

Additionally, Paul M. Leonardi, argues that the sociomateriality of digital technologies is the result of the ongoing co-creation and co-evolution of their social and technical elements (Leonardi et al., 2013). Furthermore, they also emphasize the importance of considering how digital technologies are shaping and being shaped not only by their human actors, but increasingly by their non-human ones (Leonardi et al., 2013).

Summarizing, the concept of sociomateriality highlights the idea that technology and society are mutually shaping one another and that considering the agency of non-human entities such as algorithms is transcendental. Thus, by adopting a sociomaterial perspective, we can have a better understanding of how social and technological systems, as well as human and non-human beings, are interrelated, how they shape, and are shaped by one another.

3.3 A Sociomaterial Performativity

One of the most influential sociomaterial approaches to understand how social reality *comes to be* is the work of French scholar and philosopher, Bruno Latour. Best known for the development of actor-network theory (ANT), Latour central concern is placed in highlighting the relevance of nonhuman actors, such as technology and objects, in shaping social relations.

ANT argues that both social and material elements are constitutive of sociomaterial assemblages (Latour, 2005).

Within the field of Information Science (IS) and Science and Technology Studies (STS), the concept of performativity has been commonly used in describing the blurry boundaries in the relationship of humans, machines, and socio-technical systems. Moreover, the notion of performativity stresses the idea that these relations and boundaries are not pre-given, but are instead enacted in practice (Orlikowski, 2007a). Consequently, we could suggest that a sociomaterial performativity approach should always encompass an inquiry of practice.

According to Barad (2007), Pickering (1995), and Orlikowski (2007a), emphasizing the role of performativity through individuals' practices allow us to understand how technology is not only 'used' but also shapes, and it is shape by, the very practices of the people who use it.

This last process of mutual determination, or better, of co-constitution between technology and its users is what some authors have described as the *process of becoming*; becoming-technological and becoming-machine (Mackenzie, 2017); becoming actant, becoming-interaction and becoming assemblage (Latour, 2005). Thus, all these authors understand performativity as the process of *becoming-together*.

In summary, the concept of performativity is a crucial part of understanding the ways in which technology and humans interact. It stresses the idea that the boundaries and relations between them are not pre-given but are instead actively enacted in practice. Furthermore, performativity is part of a sociomaterial understanding of agency where technology and humans are constantly and perpetually *becoming-together*.

4. Methodology

4.1 Research Design

The first stage of the research consisted of organizing and conducting a series of field trips to different clusters of restaurants around Helsinki's metropolitan area. Additionally, parallel to these first observations, a first draft of the research design for this work was sketched (Figure 1). This initial design outlined the basic structure for the research process and the data collection phase.
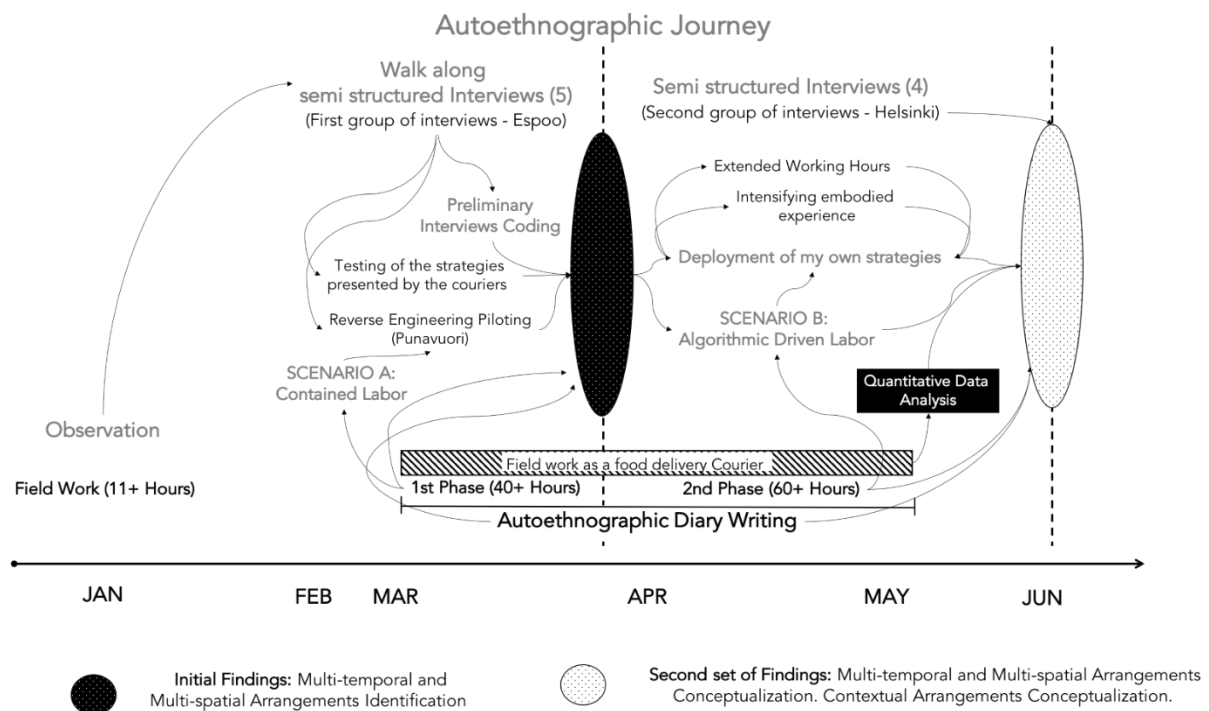
Figure 1. Research's design road map

As observed in Figure 1 the main bodies of data used for this work were gathered through observation, ride-along interviews, and the auto ethnographical diary I kept during my life as a courier.

The data gathering process was divided into two phases. The first phase consisted of a series of interviews with food delivery couriers in Espoo, while the second phase was focused in Helsinki. During this phase, I worked as a courier myself; as observed in Figure 1, this first part of my work as a courier was aimed at familiarizing myself with my new working environment and to test some early hypothesis that arose during my first round of interviews. In this way, this research got to a first saturation point (marked in Figure 1 with a black ellipse) where the initial coding of the first set of interviews was performed and a new approach for

my work as a delivery courier was determined. This new approach suggested that I should try to deploy my own strategies to maximize my earnings as a delivery courier.

During the second phase –and partially as a result of the strategies just mentioned– the length of my working shifts intensified considerably, and a large amount of quantitative data was gathered. Next, around May 2021, almost at the end of my active work as a courier, I conducted the second set of interviews with couriers and restaurant staff members in Helsinki. Finally, in June 2021, a second coding phase was conducted, and deeper analysis was performed.

4.1.1 The Exploratory phase

The aim of designing and conducting an exploratory phase for this study was three-folded. First, to familiarize myself with the settings where couriers performed their work; second, to identify patterns, behaviors, and routines performed by the couriers; and third, to provide a context specific example (Helsinki's metropolitan area) to which contrasts the literature I was reading about food delivery platforms.

I carried out the initial exploratory phase from January the 28th to February the 18th of 2021. During this period, several fieldwork trips were organized, as detailed in Table 1 (below). These preliminary observations helped me to identify my own critical approach to the phenomena I was observing and contributed to the framing of the research topic.

Table 1. Exploratory phase - Field trips in Helsinki's metropolitan area

Date	Location	Observation details	Length of the observation
28.01.2021	Matinkylä - Iso Omena Shopping Center	Identifying patterns and flows of couriers. Identifying parking areas used by couriers.	120 Min
30.01.2021	Pasila - Mall of Tripla	Identifying patterns and flows of couriers. Identifying parking areas used by couriers.	180 Min
06.02.2021	Itakeskus - Itis Shopping Center	Identifying patterns and flows of couriers. Identifying parking areas used by couriers.	65 Min

06.02.2021	Helsinki downtown area - Iso Robertinkatu	Identifying patterns and flows of couriers. Identifying parking areas used by couriers.	50 Min
13.02.2021	Leppävaara - Sello Shopping Center	Identifying patterns and flows of couriers. Counting and categorizing couriers.	90 Min
16.02.2021	Matinkylä - Iso Omena Shopping Center	Timelapse recording (1hour) + Observation. Taking contact with couriers.	130 Min
18.02.2021	Vantaa – K-Supermarket Pähkinärinne.	General Observation.	30 Min

Note. Elaborated by the Author.

The exploratory phase proved to successful; it provided insights into courier partners' lives and daily rhythms, their modes of transportation, their interactions, their use of the city's built environment and infrastructure, and especially, their gathering spots.

Figure 2. Identifying parking spots

Note. Photographs by the Author - January 2021

Figure 3. Couriers' interactions with the built environment (Iso Robertinkatu – Helsinki)

Note. Photographs by the Author – January 2021
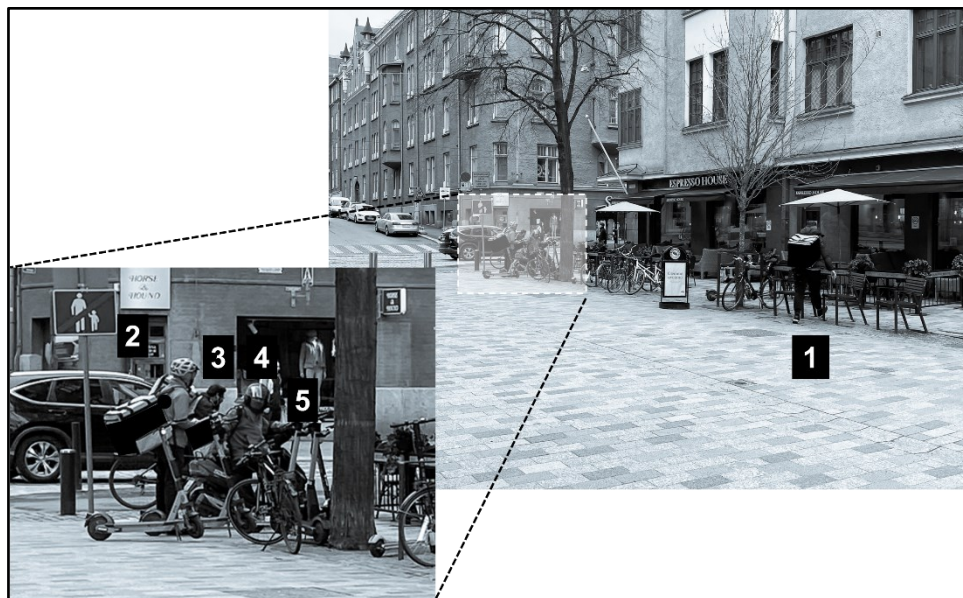
Figure 4. Identifying couriers' flows, mobility patterns, and gathering spots.

Note. Photographs by the Author – *April 2021*

Having the possibility to observe couriers at their workplace provided me with relevant input to fine-tune the methods I will later apply in this thesis. For instance, due to the characteristics of their job, and their high mobility patterns, note-taking proved to be difficult, and audio notes were recorded instead. These audio notes were transcribed and analyzed, informing the research design of this study and providing traceability to how the research process itself evolved.

4.1.2 The Study area: Geographical considerations of Helsinki and Espoo.

I conducted the present work in two different municipalities of the greater Helsinki metropolitan area: Helsinki and Espoo. Below, we observe two maps of the mentioned areas.
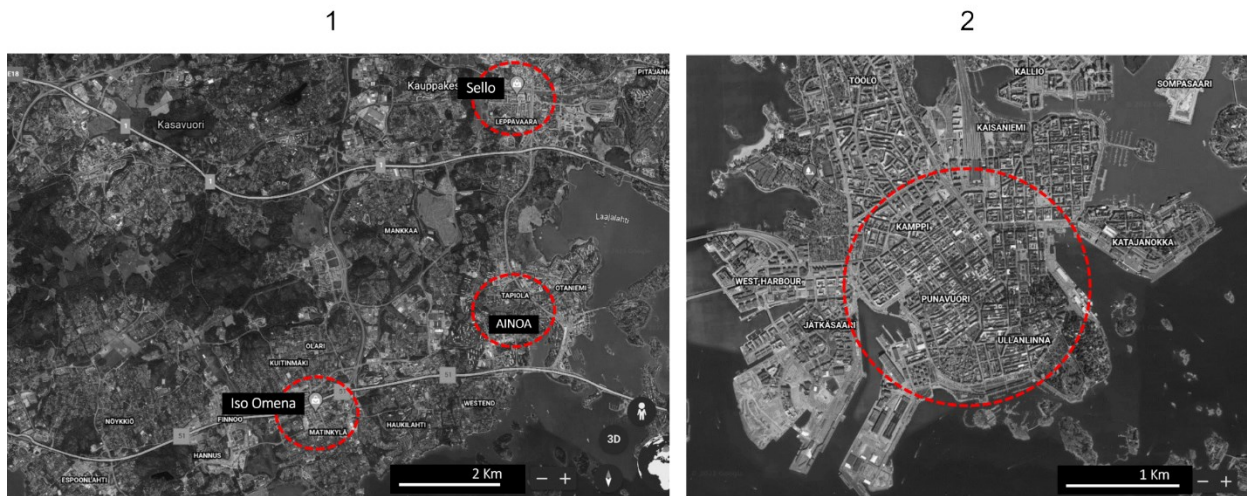
Figure 5. Study areas
Source: Google Maps

Figure 5 shows the two study areas that were explored to elaborate on the present thesis. The image on the left (1) corresponds to the city of Espoo, and the image on the right (2) corresponds to the core area of Helsinki City.

In Espoo's case, three sites are highlighted: Iso Omena Shopping mall, in Matinkylä, Sello shopping mall, in Leppävaara, and Ainoa shopping center, in Tapiola.

In an earlier phase of this research project, both cities were explored through field visits and observation, and preliminary informal interviews with couriers were conducted. Although all the three areas in Espoo presented good opportunities for fieldwork and potential interviewees, only one was selected. Additionally, it is important to highlight that Helsinki's study area has a proportionally overweighted representation in this work, since it was the area where I worked as a food delivery courier myself.

4.1.3 Autoethnography as a performative method

Autoethnography has been classified as a 'critical reflexive method' (Spry, 2011, p. 12) helping the researcher to make sense of his own experiences as a cultural experience. In Spry's words,

autoethnography could be conceived as *'a critically reflexive methodology resulting in a narrative of the researcher's engagement with others in particular socio-cultural contexts.'* (Spry, 2011, as cited in Denzin & Lincoln, 2018, p. 498). What distinguishes autoethnography as a method is its interest in the co-constitution of the researcher and his socio-cultural context, or as Spry (2018) has conceptualized as 'the performative quality of autoethnography'.

Performative autoethnography views the personal as inherently political and focuses on bodies in context as co-performative agents in interpreting knowledge (Spry, 2011). Therefore, autoethnography as a method is a reflective process by which the researcher does not rely solely on the representations that he has made of his own and other's experiences but rather tries to embody these experiences. Moreover, Spry (2011) suggests that *'Any attempt to embody another is an act of interpretation, representation, and epistemological empathy. Embodiment is an attempt to engage a most personally political intimate relationship'* (as cited in Denzin & Lincoln, 2018, p. 642). Autoethnography, therefore, emanates from the researcher's body, a body that is embedded in a sociopolitical context, with gender, skin color and privileges (Spry, 2011, as cited in Denzin & Lincoln, 2018, p. 630) from which we as researchers cannot escape.

In this work, practicing autoethnography meant to be exposed; expose to physical injury, to cold days, to fatigue and tiredness. But most importantly, it meant to expose my body to the same environment where my fellow couriers worked, to the same hazards and negotiations of courier's everyday life in the city.

Finally, practicing autoethnography provided me with a framework in which critically reflects on the intersections of my life as a courier with those of my peers, the city, and the platform. Ultimately, choosing autoethnography as a method allowed me to be part of the platforms' deployment, and thereafter, to become part of the very materialization of the platform.

4.2 Ethical considerations

4.2.1 Food delivery couriers

Thanks to the initial exploratory phase of this thesis, I realized that closer attention should be paid to the composition of the food delivery workforce. Their predominantly immigrant background placed them in a vulnerable position towards the ongoing integration process they were going through in Finland, and towards this work and the representations that I was about to make of them. Therefore, some actions were pursued to minimize the potential damage this research project will represent for them.

First, a presentation video was recorded and sent to couriers to ensure that they were aware of my identity as a researcher and the motivations of this research.

Second, standard anonymization and pseudonymization procedures were followed. Group identities, names of places, references to gathering points, and other relevant third variables that might lead to identifying specific individuals were considered and consequently anonymized or pseudonymized. For instance, I conducted the exploratory phase of this study in several shopping centers in Espoo. Nevertheless, the interviews were conducted in only one of them. The name of this shopping center has never been specified. This has been an effort to not only protect individuals' identities but collective identities and group filiation as well.

4.2.2 The Food delivery company: Quick

In an early stage of this project, the food delivery company (from now on referred to as 'Quick') was contacted and informed about my activities as a researcher. Furthermore, the initial research design of this work included interviews with Quick's staff members.

Efforts were made to reach them and invite them to take part in this project. From mid-April to late June, intense communication was held between several company representatives and me. The main subject explored in those emails was related to the scope of the study, the research design, and the possibilities of Quick's collaboration. Some of these collaboration scenarios were two: (1) interviews with Quick's personnel and (2) providing specific data to run different GIS-based analyses of couriers' activities in the city.

Sadly, Quick refused to take part in the project under any of the proposed scenarios. Therefore, the company's identity has been anonymized under the pseudonym of 'Quick.'

Finally, it must be recognized here that attempts of associating this work to a specific company will inevitably happen, and -as I write this work- only two food delivery companies are operating in Finland, which may ease the way for a direct identification of the company. Nonetheless, efforts have been made here to guarantee that no direct association of this work with any of the operating companies in Finland will arise by simply reading this document.

4.2.3 Quick's restaurant partners

Restaurant registered on Quick's platform and the interviews I conducted with their staff members represented the more challenging conditions for an ethical review.

Since every restaurant I have visited and delivered food from is public and their locations are well known, no conflict of interest or potential damage was observed by naming the restaurants here. Consequently, no anonymization was deemed necessary. However, special efforts have been made to anonymize the name of the restaurants from which staff members were interviewed. Additionally, when the information shared by the interviewee might involve his/her company's sensible information, expose his/her identity, or lead to consequences for the interviewee, this work anonymized both; the name of the interviewee and his/her restaurant.

5. Data Gathering

5.1 Interviewing

I gathered two different sets of interviews for this thesis, and they presented spatial, temporal, and methodological variation.

Spatially, the first group of interviews was conducted with couriers in Espoo, and the second one was with couriers and restaurant staff members in Helsinki. Temporally, the first group of interviews was conducted before my enrollment and personal experience as a courier; on the other hand, the second group of interviews was conducted during my time as a food delivery courier. Lastly, methodologically, the first group of interviews was gathered using a ride-along interviewing method, and the second group of interviews was conducted using a standard-stationary semi-structured interviewing technique.

5.1.1 Ride-along Interviews

The virtues of ride-along as an interviewing technique have been extensively reported in literature (Anderson, 2004; Carpiano, 2009; Evans & Jones, 2011; Kusenbach, 2003) and it is a widely used method in a broad range of disciplines; from environmental research (Cao et al., 2019; van Cauwenberg et al., 2012) and urban ecology (Rivera et al., 2021), to health studies (Odzakovic et al., 2020; van Cauwenberg et al., 2012) and place-based human experience studies (Evans & Jones, 2011). Nevertheless, it is go-a long's use within the fields of social and cultural geography (Warren, 2016), as well as ethnography (Kusenbach, 2003; Reed, 2002), that has influenced its application here.

The possibilities of interaction that ride-along interviews offered to this work were outstanding; First, just as recognized by Phil Jones et al. (2008, p. 3), a constant stimulating context promoted conversation and brought up new topics into the discussion; second, I was able to scrutinize the socio-technical practices used by couriers in their everyday life, and third, it exposed me to an intimate bodily experience to the geographies where couriers performed their work. Furthermore, having the chance to join couriers and interact with them throughout their daily routines provided me with a richer and more nuanced palette of knowledge for this work.

Four couriers were interviewed using a ride-along interview technique. All 4 interviews were conducted in Espoo between February and March of 2021. All 4 interviewees were men between 24 and 35 years of age working as food delivery couriers by car. The interviews were

conducted along couriers' daily working hours, which meant couriers were always on the move. Consequently, the interviews oscillated between couriers' cars, restaurants' waiting areas, shopping center halls, parking lots, and clients' buildings, houses, and elevators.

Because of the dynamic nature of the interviews, a lavalier microphone was used. Using this type of microphone ensured a good quality of sound at all times, but most importantly, allowed the interviews to flow smoothly along couriers' multiple work-related tasks[1].

Table 2. Ride-along Interviews

Date of the Interview	Interviewee	Profile	Mode of Transporta-tion	Working Area	Duration of the Interview Hr:Min:Sec
February 2021	Bruno		Car	Espoo	1:46:52
March 2021	Ivan	Courier Partner (Quick)	Car	Espoo	0:52:43
	Carlos		Car	Espoo	0:49:26
	Gustavo		Car	Espoo	1:27:15
Total length of Interviews					**4:56:16**

Note. The column entitled 'Duration of the interview' refers to the interviews' audio final length after editing.

As observed in Table 2, the audio files of the interviews ranged from 49 minutes to one hour and 46 minutes. Nevertheless, the time spent with every courier during the interviews was usually longer. My encounter with Bruno, for instance; although the final audio of the interview is one hour and 49 minutes, the total length of my field trip with him was 3 hours and a half.

As a final remark, using ride-along as a method was a decision that proved to be effective in generating new scenarios from where to access the implicit and hidden knowledge embedded in couriers' daily activities.

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[1] Driving, looking for directions, interacting with the app, and a series of non-visible tasks.

5.1.2 Semi-structured Interviews

I conducted 4 interviews using a semi-structured interviewing method. All 4 interviews were conducted in Helsinki in May 2021. 2 interviewees worked in restaurants subscribed to Quick's platform and the other two were food delivery couriers. All 4 interviewees' ages ranged from 23 to 33 years old; three of them were men and one female.

Table 3. Semi-structured interviews - Helsinki

Date of the Interview	Interviewee	Profile	Mode of Transportation	Working Area	Duration of the Interview Hr:Min:Sec
May 2021	Joaquin	Courier Partner (Quick)	Scooter & Bike	Helsinki	1:17:24
	Ricardo	Courier Partner (Quick)	Bike	Helsinki	0:52:34
	Sergio	Quick's Restaurant Partner Staff	n/n	City Center's Restaurant Cluster	0:35:09
	Erika	Quick's Restaurant Partner Staff	n/n	Punavuori's Restaurant Cluster	0:28:03
Total length of Interviews					

Note. The column entitled 'Duration of the interview' refers to the interviews' audio final length after editing.

The interviews were conducted in different circumstances and settings: Erika's interview was conducted at her working place after she had finished her morning shift, at around 15:30. Sergio's interview was conducted at his working place during working hours, around 10:00 a.m. Ricardo's interview was conducted at 19:30 p.m., after his usual working day. Finally, Joaquin's interview; this interview was different to all the others. In Joaquin's case, I conducted the interview at his apartment; the environment was relaxed and friendly and we shared dinner together alongside the interview. As in Bruno's case, my interview with Joaquin lasted for nearly 3 and a half hours. Next, a table summarizing the interview settings.

Table 4. Contextual details of the second group of interviewees

Interviewee	Profile	Interviewed during working hours	Interviewed while working	Interviewed in his/her working environment
Erika	Quick's Restaurant Partner Staff	NO	NO	YES
Sergio	Quick's Restaurant Partner Staff	YES	NO	YES
Joaquin	Food Courier Partner (Quick)	NO	NO	NO
Ricardo	Food Courier Partner (Quick)	NO	NO	YES

Table 4 presents the contextual specificities of where the interviews were conducted. A profile of the interviewee is defined, and special attention is placed on the environment and timing of the interviews. Highlighting this type of contextual information is important since it opens the possibility of reflecting on the influence of the environment and the physical context on the interviewee's opinions and thoughts (Denzin & Lincoln, 2011).

As qualitative research demands, Table 4 is also an attempt to reflect on how the settings of the interviews have an influence in the power relation differences between researcher and interviewees (Denzin & Lincoln, 2011). Therefore, the information presented in table 4 is relevant since it promotes academic transparency and warns the reader about potential qualitative differences that could arise because of the methodological variation between the first and the second group of interviewees.

5.1.3 Snowballing as a sampling process

Snowballing is a widely used sample technique across the social sciences (Noy, 2008, p. 330). Described by some scholars as 'contacting one participant via the other' (Browne, 2005, p. 48), snowballing refers to a process by which the first interviewee acts as a trigger for the following interview to happen, prompting in this way a sort of 'chain reaction' that ease the process of finding new interviewees. A common feature of studies using snowballing as a sampling technique is that the researcher has faced a dead end in their quest for interviewees; as Noy (2008) points out, snowballing comes to be 'when other contact avenues have dried up' (p.

330). Therefore, snowballing is a method that has proved to be effective in accessing specific 'Hard to reach' groups (Browne, 2005, p. 48).

The stagnancy of the research project, as suggested by Browne (2005) and Noy (2008), was a familiar site to me during the early stages of this research. In early February 2021, I scripted and recorded a video as an open presentation of myself and my research objectives. I then shared this video with couriers as an introduction and an invitation to take part in this work. The expected outcomes of this video were twofold; first, to make explicit my identity as a researcher, and second, to engage with couriers, empathize with them, and try to get potential interviewees as an immediate result. During the last week of February and the first week of March 2021, I successfully shared the video with 11 couriers, and by mid-March, I was still struggling to get my first interview. I soon realized that I needed a new strategy and thus applied snowballing as my sampling method.

Summarizing, the first group of interviewees was sampled aleatory using a snowballing technique; meanwhile, the second group of interviewees was subjectively selected by me, based on the working relationships created during my work as a courier.

5.2 My life as a food delivery courier

> *'This is not my story; this is the story of others linked to mine/narrated through my experience'* (Chang, 2008, p. 55).

'The whistling of compressed air against the walls of a tunnel and the metallic shrieking of iron wheels against the rail track marked my very first trip to Helsinki's service area as a food delivery courier. Inside the metro, I felt safe, away from the judging sight of acquaintances or neighbors. I was just one more of many couriers that Helsinki urbanites will see stumbling around in the city that day'

'It was a cold Thursday morning at the very end of the winter season (begging of March), and as expected, when you have an important day, the weather gives its best to surprise you; It was snowy and windy (+/- 0 Degrees Celsius). You could think, well, a great morning to stay home and order a warm cappuccino inside. Well, this time I was the one delivering the capuccino!'

Author's field diary

Note. Author's Self-portrait. Somewhere in Helsinki, March 2021.

This is what a first day at work looked like back on that cold winter morning. During the coming weeks, the weather will only get better, just as my life and experiences as a courier. Next, I will present a timeline with important milestones of my life as a courier.
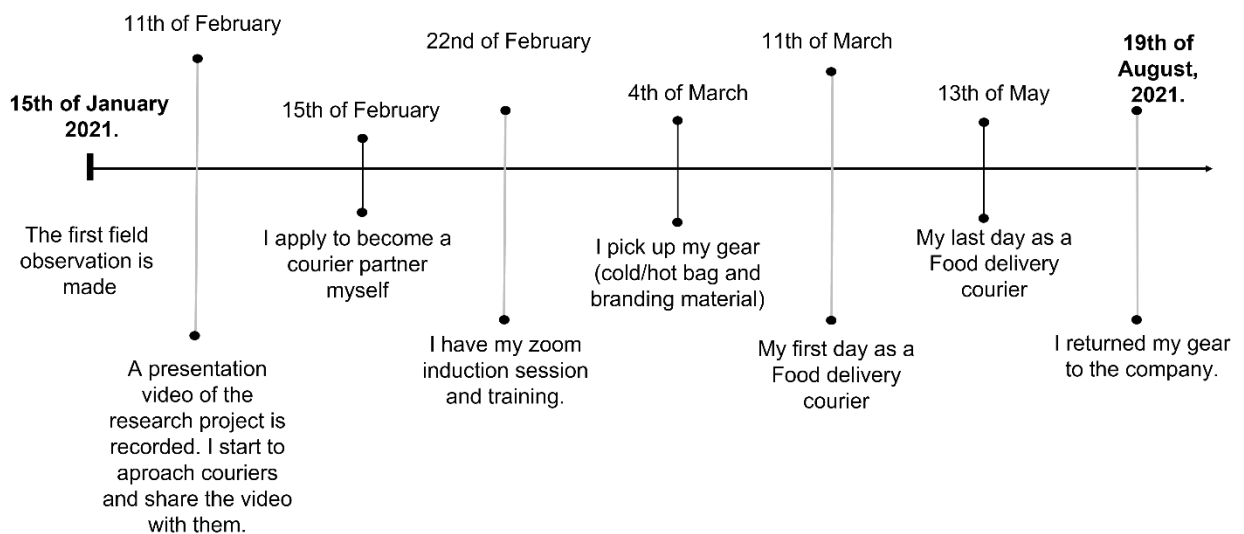
Figure 6. Author's working life as a courier timeline

15th of January 2021 *11th of February 2021* *22nd of February 2021*

1st field observation Presentation Induction/training

4th of March 2021 *13th of May 2021*

Picking Up my working equipment Last day as a courier

19th of August 2021

Returning my gear to the company

Field notes and audio notes

As part of my autoethnographic diary, field notes were taken, and audio notes were recorded as the two main methods to capture my daily experiences as a food delivery courier.

The first phase of the study (from the 11th to the 28th of March) was characterized by more written entries than the second phase, where more audio notes were recorded.

During the first phase, written field notes and reflections were more frequent because of confluent factors; a slow familiarization with the working area, a lack of peers to talk with, and longer waiting periods with fewer orders to deliver. In such a scenario, constant opportunities to be reflexive and to write in situ were created.

During the second phase, a better knowledge of the city where I was performing my work, an increased interaction with my peers, shorter waiting times, and ultimately, a higher number of orders delivered, were the main factors contributing to a decrease in my note-taking. Below, a summary of the number of entries and the overall amount of text written in every phase of the field work.

Table 5. Comparative table of note taking intensity during first and second phase of the field work

First Phase			Second Phase
Number of written entries	10	8	Number of written entries
Total amount of words	7.111	1.954	Total amount of words
Average amount of Words per entry	711,1	244,25	Average amount of Words per entry (Excluding audio transcriptions)

As we can observe in table 5, when we compare the note-taking intensity between the first and the second phase of the field work, we would see that there is a decrease not only in the number of entries (from 10 to 8) and their average length (from 711,1 to 244,25 words per entry) but there is an overall decrease of 72,5% in the amount of raw text written during the first and second phase of my life as a food delivery courier.

5.3 Quick's app integral data

We can't certainly know to what degree and what type of data is generated, gathered and stored by Quick's app. Nevertheless, what we know is that Quick shares some basic data with their couriers. This data concerns four main variables; (1) the name and location of restaurants from

where you pick the food, (2) the specific time when the food is picked, (3) the distances that you cover when delivering the food, and (4) the payment details for every delivery. This data will be available for you to review in real time and will be stored in the app as long as your contract as Quick's partner is valid. Once your contract is terminated, access to the app is restricted, and the data is no longer available. Yet, let's have an overview of how this data looks in the app.
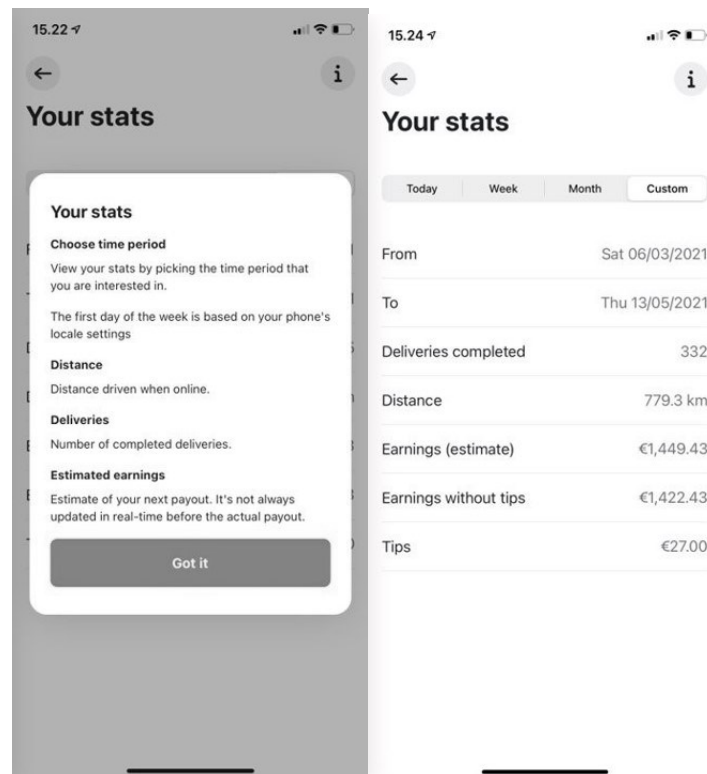
Figure 7. Quick's app Integral statistic feature

Note. Screenshots of Quick's app interface. Captured by the author.

As observed in figure 7, Quick's app offers versatile and customizable access to your own accumulated data on deliveries and earnings under 'your stats' option. According to Quick's integral statistic module, I made 332 successful deliveries, ridden 779,3 Km, and earned 1449,43 Euros before taxes. Moreover, Quick's app provides not only a large-accumulated set of data but also 'task per task' detailed information[2].

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[2] Interestingly, Quik's app never gives you data on the number of hours you have spent delivering food. This information would be vital to determine how much every courier earns per hour of work.
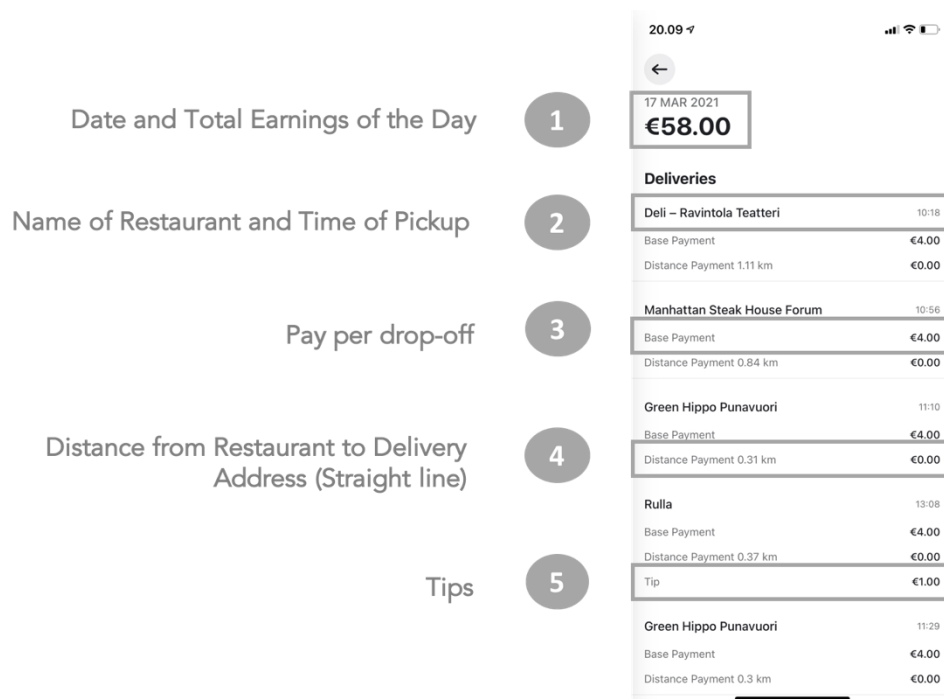
Figure 8. Quick's statistics on Deliveries

As shown in Figure 8, Quick also offers detailed data on every delivery you have made, the restaurant where you have picked the order from, and the straight-line distance (Km) between the restaurant and the final delivery address. In this way, keeping track of your earnings is not difficult.

The main data that was used and reviewed for the present work was the one concerning the location of restaurants, the time when every order was delivered, and the distance that was covered in every delivery.

The restaurants' location was a key element for the understanding the geographical entanglements of the platform. The time when every order was picked up, together with the categorization of orders according to peak hours, was crucial in understanding the different temporalities of urban life and its relation to the food consumption rhythms of the city.

As we have seen, a great part of this work's data had emerged from Quick's app's statistics module. Nevertheless, I have complemented it with independently self-generated data. Next, I will present this data.

5.4 Self-generated mirroring data

Researching on digital platforms is not an easy task. The intrinsic black boxed nature of corporately owned algorithms (Pasquale, 2015) poses serious challenges for researchers in accessing, generating, and working with data. This has pushed scholars (Bucher, 2016; Fields et al., 2020; Kitchin, 2017; Lindgren, 2019) to focus on the development of novel methods in data gathering. Among these wide variety of new strategies, there was a consensus about the need to produce and store mirroring data that allows researchers to make insightful analysis of the processes behind the front-end experience of a regular mobile application user. Two of such strategies are the ones proposed by Fields et al., (2020); counter mapping and proxying a platform's data (p, 465-466), the same that have been applied as data gathering methods for this work.

5.4.1 Counter-mapping delivery routes

One of the most important sets of data for the platform is geospatial data. Having a clear geo-referenced and real-time map of restaurants, clients, and couriers is a central element giving the platform its flexibility (Richardson, 2020b). Consequently, having my own geo-referenced data on the trips I made as a courier was mandatory.

Every day, right before starting my work as a courier, I turned on the tracking mode of my GPS watch[3] and start recording my trips. Once the tracking mode was activated, the recording period could range from a couple of minutes to several hours. The data was stored in the watch's internal memory, and afterwards, once connected to the internet, the data was stored in the cloud. Next, the data was exported to '.kml'[4] files and imported to Google earth for its visualization.

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[3] Smartwatch: Garmin vivoactive 4. For technical details about GPS accuracy of the device used for this study, please refer to: https://www.garmin.com/en-US/aboutGPS/

[4] '.kml' is the most common file format used to project geospatial data into Google Earth.

Figure 9. Self-GPS tracking of delivery routes

Note. Traces in the picture are formed by lines. Every line represents a trip to pick up or deliver a meal.

Having a visual representation of my trips as a courier was revealing for several reasons. First, although Quick's app showed me all my deliveries, my earnings and the distances for every trip, Quick never showed me a graphic representation of these deliveries. Second, been able to link my diary entries and audio notes to specific events, locations and places was undeniably an enhancer of my own sensemaking process of the platform.

5.4.2 'Proxying' Quick's app

Proxying according to Fields (2020), is an attempt to capture 'data as it moves' (p. 465); it is an effort to overcome the intrinsic socio-technical fuzziness of data (Coletta et al., 2017, p. 6 as cited in Fields, 2020 p. 465). Hence, proxying Quick's platform meant I was constantly taking screenshots of my app, and taking notes about my interaction with it and its multiple material implications.
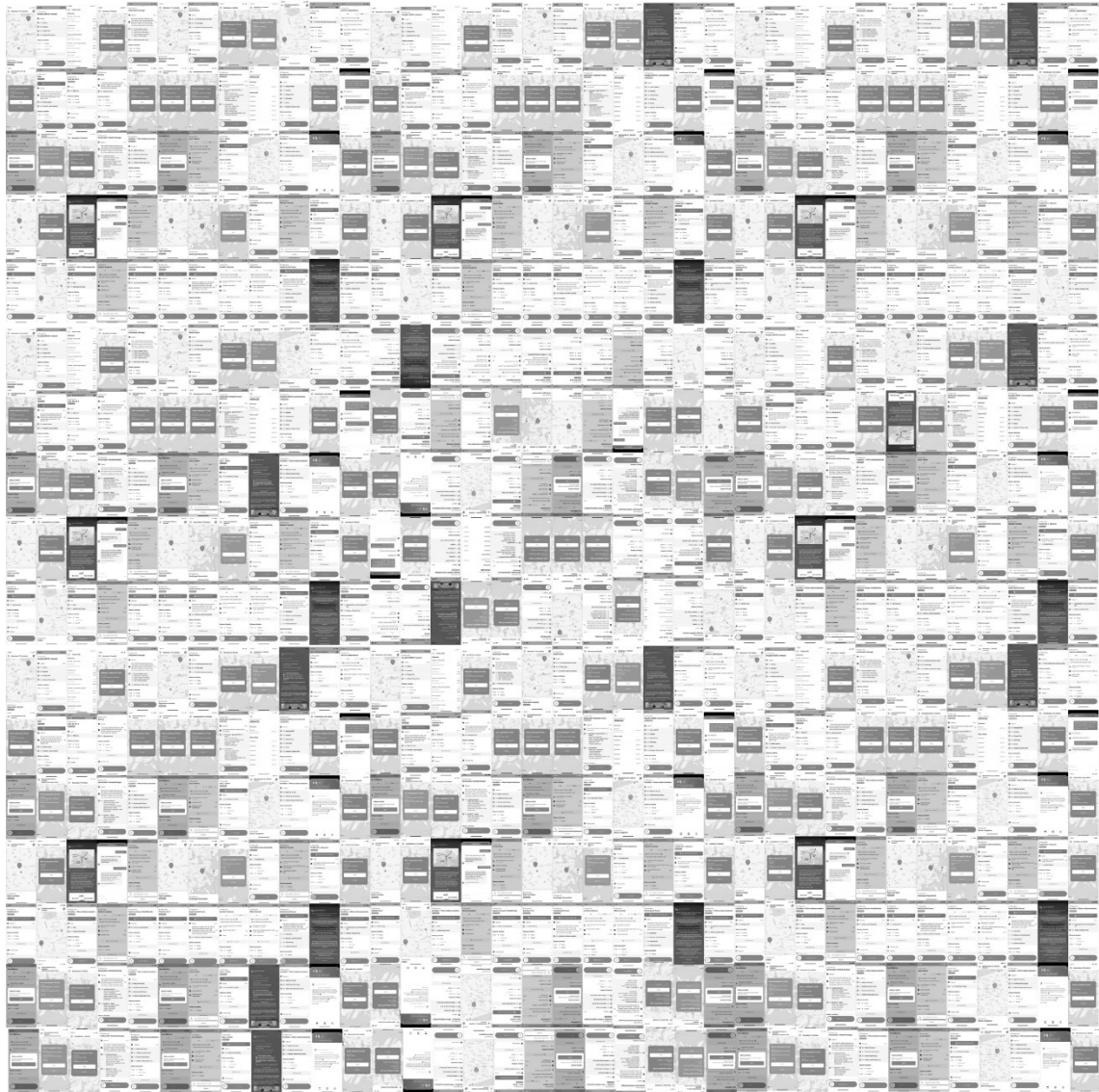
Figure 10. Screenshots of my interaction with Quick's mobile application

Note. The mosaic above represents 572 screenshots out of 600 I took during my work sessions as a courier. (Only 55 screenshots were used to generate this image).

The possibility of losing the data you need to perform your work is real. Addresses, the costumer's contact information and entrance door codes, are only there momentaneously, but you might lose internet connection, your app could crash, or, as we will see later, you might practice specific strategies that require you to dismiss information that you might need later. The possibilities of losing the data push you to take snaps of it via screenshots. Looking at data in Quick's app is like looking at a TikTok: if you don't take a screen shot of it, soon it will be lost, hidden, or forgotten.

6. Data Analysis

6.1 Analyzing Quick's app data

As explained in the previous chapter, Quick's app provides an open, friendly, and useful data interface as part of its integral design. However, extracting and using this data for more comprehensive processing and analysis proved to be difficult.

Analyzing The data gathered from Quick's App was not easy. Algorithms are recognized as 'black boxing', its code, transactions, and information (Pasquale, 2015). Consequently, even though 'Quick' offered -what seemed to be- a transparent and open interface for couriers to keep track of their earnings, it didn't guarantee unrestricted access to that data[5].

To ensure that I could always access my own data -even after my contract ends-, I transcribed the data into an excel spreadsheet and turned it into a functional database. The resulting excel sheet contained 5 columns; 'Date', 'Name of restaurant', 'Pick up time', 'base payment', 'Distance' and 'Tip'. Next, 3 columns were added; the first one, specifying the exact day of the week, the second one, to categorize deliveries according to 'weekdays' or 'weekends', and the third one, classifying the restaurants by the clusters where they 'belonged'. All the data from the 332 deliveries I made were gathered and filtered according to the columns described above.

Figure 11. Master sheet with collected data of deliveries

After sorting and classifying the data, filtering of the data was conducted. I applied this filtering to make sense of the data and to identify initial patterns and saturation points on the database.

The step-by-step filtering process is described next.

1. Filtering according to peak hours: Breakfast, lunch and dinner peak hours were determined according to the following parameters:
    a. Breakfast: Orders received from 07:00 am to 10:30 am
    b. Lunch: Orders received from 10:30 am to 14:00
    c. Dinner: Orders received from 17:30 to 21:30
2. Sorting by weekdays and weekends: the orders were sorted and regrouped into 2 main categories:
    a. Weekdays: Orders received from Monday to Friday
    b. Weekends: Orders received on Saturday and Sunday

Initially, some other sorting and filtering approaches were used, such as grouping the orders according to the restaurant clusters they were coming from or differentiating the orders according to the restaurant's cluster morphological nuances, I.e., if they were coming from restaurants at the street level or from restaurants inside a shopping mall. Nevertheless, since no meaningful patterns or trends were evidence, soon these approaches were abandoned, and the ones mentioned in point 1 and 2 were privileged.

6.2 Transcription

I accomplished the transcription of all the audio materials of this thesis in 3 steps; First, I transcribed the audio recordings with the help of automated transcription software[6]. Second, I performed an exhaustive proof-reading and fine print. Third, the proof-read interview transcriptions were exported to a '.pdf' file and securely stored (password protected), waiting for the analysis phase.

During the first step, I performed an initial anonymization process, replacing the interviewee's real name with a pseudonym. Additionally, written comments were made, highlighting specific contextual information, personal impressions, and meaningful details of the interviewing process that might be useful during the analysis process.

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[6] Microsoft Office Word cloud services were used. Under common license of the University of Helsinki.

During the proof-reading of the software-assisted transcriptions, no major mistakes were evidenced; the most common ones being the same that a human transcriber would typically make; errors arose from language, E.g., name of places and streets in Finnish, and errors originated from a strong or difficult accent of the interviewees, and errors attributable to poor quality of the interview recording. Afterwards, a second round of anonymization was performed; references to courier's personal and private life details were deleted from the text, and any other element that might lead to the identification of the interviewee's identities was concealed.

The transcription process of my field diaries followed the same three-step approach as the interview data. First, I transcribed my voice memos with the help of automated transcription software and then merged them with my written field notes into a single document. Next, once merged, the document was proof-read and careful anonymized or pseudonymized. Finally, the document was exported to a .pdf file to wait for the analysis phase.

6.3 Coding, conceptualizing and categorization

Coding of the gathered material for this thesis has been developed in two moments; first, an abstract open-code analysis round was performed in a sample of the gathered data, and second, a more in-depth categorizing coding was performed across the whole data set. For the purposes of coding and analysis, this study has used Atlas.ti as a computer assisted qualitative data analysis software (CAQDAS).

In the coming two titles, I will explain these two phases of the coding process.

6.3.1 First descriptive round of coding: Open coding and conceptualizing

The first coding phase applied an open coding technique, as a tool to open-up the text's intrinsic ideas, meanings, and implicit knowledge (Strauss & Corbin, 1998, p. 101). This first coding round was performed in three interview transcripts until a first saturation point was reached. During the coding of the third interview, ideas were starting to deal with the same topics, and no meaningful new perspectives arose from the interview transcript; as a result, 57 codes were created.

By coding, I started to recognize a set of common properties weaved into couriers' narratives; thus, as suggested by Strauss & Corbin (1998), coding was a fundamental step preparing the data to be grouped and classified according to these shared qualities.

This process of sorting, grouping, and classifying is referred to in qualitative research methodologies as 'category building' (Corbin & Strauss, 2008; Strauss & Corbin, 1998), and it belongs to a second–more advanced–phase of the analysis process.

6.3.2 Second round of coding: sorting, grouping, and categorizing

The second round of coding was performed in the remaining five interviews of the data set. The main action practiced during this round of coding was re-applying codes that were already created in the first round. Nevertheless, 32 new codes were created. During this second round of coding, some codes were merged, and the first groups of codes were created. At the end of this phase, a final number of 89 codes and 14 groups (categories) of codes were created.

Algorithmic Equalization (AE) – 5 Codes

AE_Equalization_Indivudual (5)
AE_Equalization_Pad (8)
AE_Equalization_Strategy_Bundle_Tasks (1)
AE_Equalization Strategy_Mileages (6)
AE_Equalizing Couriers_Income (12)

Algorithmic Sense Making (ASM) – 4 Codes

ASM_Algorithmic_Sense_Making_Collective (8)
ASM_Algorithmic_Sense_Making_Individual (19)
ASM_Algorithmic_objectivity (6)
ASM_Quick's_Black_Boxed_Nature (7)

Algorithmic Flow (AF) – 4 Codes

AF_Algorithmic Flow (3)
AF_Algorithmic_Flow_Self_Awarness (2)
AF_Missing_the_Flow (2)
AF_Against_the_Flow (3)

Algorithm's Politics (AP) - 4 Codes

AP_Algorithm's Politics (2)
AP_Priviledged_Workforce (19)
AP_Courier's_perception_of_Fairness (8)
AP_Quick's_Coorporate_Politics (4)

Sociotechnical Practices (STP) – 3 Codes

STP_Courier's Sociotechnical_Skills (20)
STP_GPS_Bypassing_&_Negotiation_Strategies (9)
STP_Sociotechnical_Skills_Asymetries (2)

Working Conditions (WC) – 5 Codes

WC_Couriers_Vulnerability (1)
WC_Couriers_Accidents (2)
WC_Work_Intensification (8)
WC_Freelancing (2)
WC_Security_&_Health_Risks (8)

Algorithmic_Glitches (AG) – 4 Codes

AG_Priviledge_Workforce (19)
AG_ Algorithmic Vacums (11)
AG_ Compromised_Algorithmic_Decision_Making (13)
AG_ Technological_Glitches (6)

Algorithmic Management (AM) – 23 Codes

AM_Compensation (3)
AM_Discipline (3)
AM_Predifined_Tasks (2)
AM_Forecasting (2)
AM_Surveillance (3)
AM_Courier-Costumer_Fidelization (3)
AM_Courier's_Rating_as_performance_indicator (2)
AM_Filtering_Couriers_Through_Rating (1)
AM_Historic_Geographical_Acumulation (14)
AM_Known-path_Prioritization (2)
AM_Rating_Based_Order_Allocation (5)
AM_Order_allocation_Bundle_Tasks (4)
AM_Order_allocation_Chance/Lucky (1)
AM_Order_allocation_Queing_Anomalies (1)
AM_Rewards_Rating_based (3)
AM_Rewards_via_Bundle_Tasks (2)
AM_Rewards_via_Mileages (4)
AM_Rewards_Short_Distance (1)
AM_Rewards_Delivering_on_Time (1)
AM_Rewards_fast_couriers (2)
AM_Rewards_Courier's_Relieability/Cosistency (4)
AM_Rewards_Courier's_Work_Inrensification (8)
AM_Constant_Human_Intervention/Mediation (8)

Spatio-temporal Assemblages (STA) – 10 Codes

STA_Couriers_Sociotechnical_Assemblages_Selfwearness (2)
STA_Couriers_Spatio-temporal_Selfawareness (1)
STA_Restaurant_Staff_Spatial_Arrangment selfwarness (1)
STA_Restaurants_(own)_Spatio-temporal_Arrangements (8)
STA_Quick's_Spatio-temporal_Arrangements (7)
STA_Inter-Platforms_Spatial_Arrangments_Differentiation (1)
STA_Temporal_Arrangement_Breakfast (1)
STA_Temporal_Arrangement_Dinner (1)
STA_Temporal_Arrangement_Disruption (3)
STA_Spatial_Sigularity_Restaurant_Uniqueness (3)

Algorithmic Agency (AA) – 4 Codes

AA_Algorithmic_Punishment (2)
AA_ Algorithmically_Driven_Work (1)
AA_Courier's_Algorithmic_Management_Self_Awareness (2)
AA_ Courier's_Lack_of_Agency (5)

Contextual Arrangements (CA) – 2 Codes

CA_Couriers_Contextual_Arrangements (7)
CA_Quick's_Contextual_Arrangements (3)

Courier's Group Identity (CGI) – 12 Codes

CGI_Collective_Algorithmic_Sense_Making (8)
CGI_Cooperation_&_Community_Building (6)
CGI_Meeting_Ponits (3)
CGI_Personal_interactions (6)
CGI_Frindships_pre-existing_ties (2)
CGI_Digital_Platforms_Collaboration (2)
CGI_Feelings_of_Belonging (4)
CGI_Group_Empowerment (1)
CGI_Organized_Collective_Action (3)
CGI_Group_Differentiation (2)
CGI_ Whatsapp-Group_Entry_Requirements (4)
CGI_Filtered_access_to_Whatsapp group (1)

Geographical Entanglements (GE) – 4 Codes

GE_Couriers_Geographical_Fidelization (8)
GE_Geographical_Constraints (6)
GE_Restaurant_Clusters (1)
GE_Socioeconomic_&_Sociodemographic_Determinants (9)

Human Agency (HA) – 5 codes

HA_Human_Biased_Decision_Making (2)
HA_Human_Errors (7)
HA_Human_to_Human_Interaction (17)
HA_Sociotechnical_Skills_Asymetries (2)
HA_Work_Intensification (8)

CODES: 89
CODE GROUPS: 14

Figure 12. List of codes and code groups after the first and second phase of coding

Codes and code groups are central in the development of categories and a central part of the analysis process, and the more you work with your data, the more categories might emerge. It is common to see a tendency to group interviews according to gender, socio-economic background, age, and an endless list of variables depending on the type of study, the universe of the data, or the interviewee's background. Additionally, been attentive to saturation points and following the 'cues' or connecting points the data offers is key.

As for this research, none of the variables mentioned above were deemed relevant. Still, as shown in figure 13 below, an additional grouping of the data was made at the level of documents.

All Interviews – 8 Documents

Bruno_Espoo_Car
Carlos_Espoo_Car
Gustavo_Espoo_Car
Ivan_Espoo_Car
Joaquin_Helsinki_Scooter
Ricardo_Helsinki_Bike
Sergio_Restaurant_Cluster_City_Center
Erika_Restaurant_Cluster_Punavuori

Restaurant Staff – 2 Documents

Sergio_Restaurant_Cluster_City_Center
Erika_Restaurant_Cluster_Punavuori

Couriers Espoo – 4 Documents

Bruno_Espoo_Car
Carlos_Espoo_Car
Gustavo_Espoo_Car
Ivan_Espoo_Car

Couriers Helsinki – 2 Documents

Joaquin_Helsinki_Scooter
Ricardo_Helsinki_Bike

Autor's Autoethnography's Field Diary – 1 Document

My_Autoethnographic_Diary

Figure 13. Document Groups in Atlas.ti

I grouped the documents according to the location where the interviewees performed their work, the means of transportation they used, and the type of participation they had within the platform.

Coding, analyzing, and practicing qualitative research is not a linear process but a cyclical, fluid, and iterative one. Therefore, critical reflection is not something that happens 'only after' coding, but as something embedded in the coding process itself (Corbin & Strauss, 2008; Strauss & Corbin, 1998). As I moved through the documents, reviewed the audios of the transcriptions, and revisited the places and experiences I had, the analysis process was taking place right there, simultaneously and connected to the very practice of labeling, coding, grouping, and categorizing.

During the data analysis process, code descriptions were written for many of the codes (Figure 14), and memos were written every time the data prompted initial findings, insights, hypotheses, and critical reflections on the data set (Figure 15).
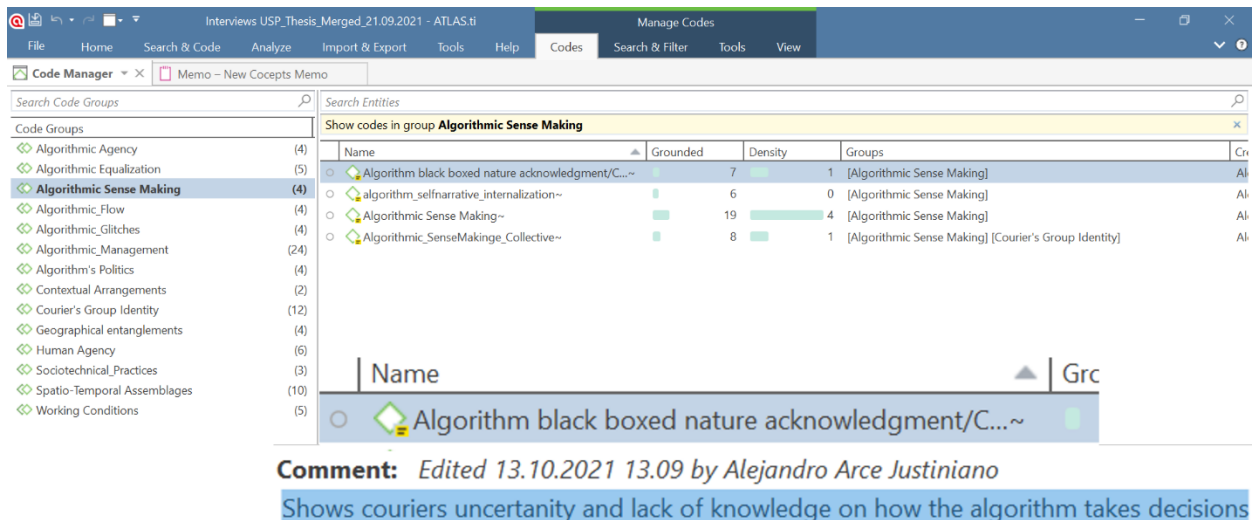
Figure 14. Code descriptions in Atlas.ti
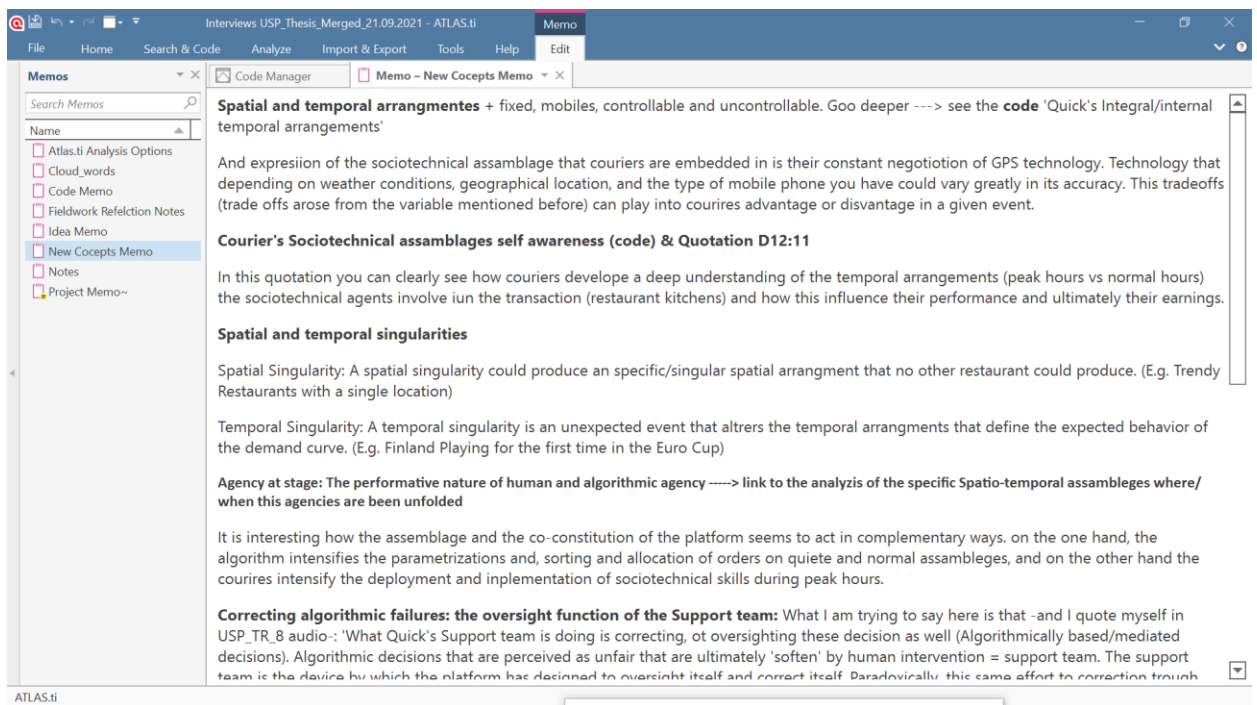
Figure 15. 'Memos' in Atlas.ti as part of the analysis process

The previous two figures show some of the basic analysis tools that scratch the surface of the wide range of possibilities offered by Atlas.ti. This work used them, and eventually I made use of other valuable analysis tools offered by Atlas.ti; such as co-occurring code analysis, network visualizations, and Sankey diagram visualizations.

The coming subchapter will describe how some of the analytical tools mentioned above were used in this research project.

6.4 Agencies at stage: Author's and Interviewees contributions

During the coding phase, codes and concepts could potentially emanate from two sources: from my interviews with food delivery couriers or from my autoethnographic diary. Therefore, the ideas that emerged, and the categories that were built during the coding phase of this work, result from a 'triple agenced' process. This means that the concepts presented here are simultaneously rooted in the interviewee's agency and the author's agency. Nevertheless, it is important to recognize that they also emerge from the interplay of these agencies into a third hybrid notion of things.
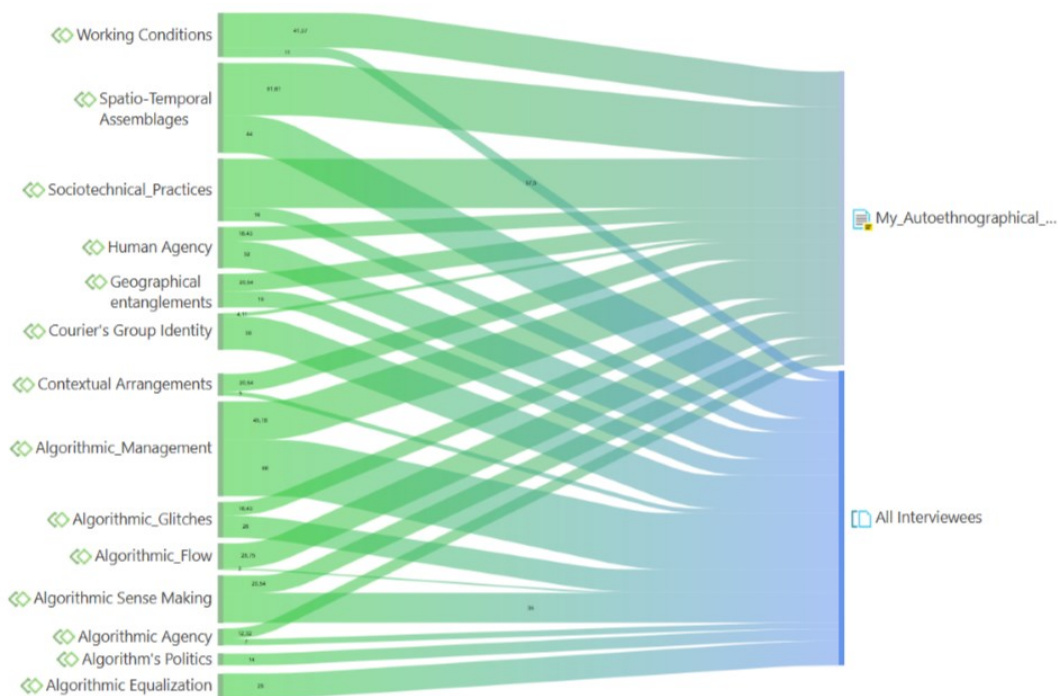
Figure 16. Author's and interviewees' contribution to the category building process of the research project

In the Sankey diagram depicted in figure 16 we can observe how my inputs impacted almost every category built during the coding and analysis phase. Nevertheless, although quantitatively significant and distributed across the data, my contributions present different intensity patterns depending on the category you focus on (Figure 15).
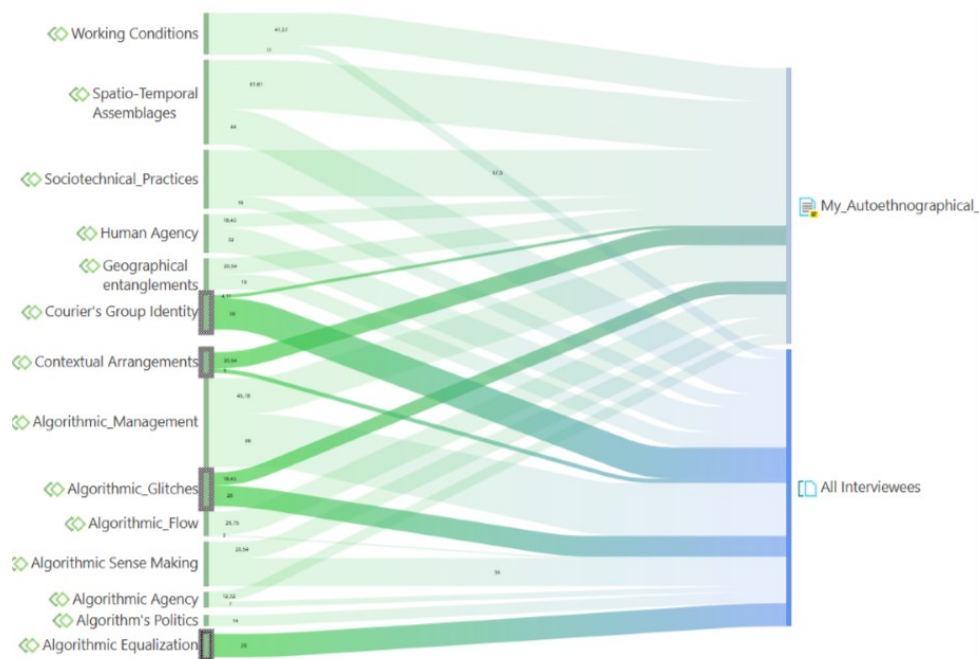
Figure 17. Author and Interviewees category building intensity contribution Diagram

It is based on the different intensities of author's and interviewees' contributions to the category building phase, that I propose four qualitatively relevant typologies: (1) Author's grounded categories, (2) interviewees' grounded categories, (3) equally grounded categories, and (4) exclusively grounded categories.

(1) *Author's grounded categories:* These are categories where the inputs (Codes and quotations) came directly or in a greater magnitude from the author's autoethnographic diary; hence, the author's agency is presumably more meaningful and determinant within the research process. As observed in figure 17, the category 'Contextual Arrangements' is one example of such an 'author's grounded' category.

(2) *Interviewees' grounded categories:* These are categories where the inputs came directly or in greater magnitude from the interviewees themselves; hence, the interviewee's agency is presumed to be more meaningful and determinant within the research process. As observed in figure 17, the category named 'Couriers group Identity' is one example of such an 'Interviewees' grounded category.

(3) *Equally grounded categories:* These are categories where the inputs came proportionally and more or less equally weighted between the author's autoethnographic diary and the interviewee's transcriptions; hence, a co-constitutive agenced nature needs to be acknowledged. As observed in figure 17, the category named 'Algorithmic Glitches' is one example of such an 'Equally grounded' category.

(4) *Exclusively grounded categories:* These are categories where the inputs come exclusively from one actor –or group of actors- with no single contribution from the

other ones; hence, a unique agency needs to be acknowledged. As observed in figure 17, the 'Algorithmic Equalization' category is one of such 'Exclusively grounded' categories.

Table 6. Typological classification of the research categories according to their level of agency 'groundedness'.

Category	Type of category	Observation
'Working Conditions'	*Author's Grounded*	
'Spatio-Temporal Assemblages'	*Equally Grounded*	Slight tendency to be overweighted by Author's input.
'Sociotechnical practices'	*Author's Grounded*	
'Human Agency'	*Interviewee's Grounded*	
'Geographical Entanglements'	*Equally Grounded*	
'Courier's group Identity'	*Interviewee's Grounded*	
'Contextual Arrangements'	*Author's Grounded*	
'Algorithmic Management'	*Interviewee's Grounded*	
'Algorithmic Glitches'	*Interviewee's Grounded*	Meaningful author's contribution
'Algorithmic Flow'	*Author's Grounded*	The original expression that gave origin to this category was expressed by a courier and was coded in vivo[2] as 'Going with the flow', when this code was merged with other codes depicting the same phenomena, the author changed the name of the category to 'Algorithmic Flow'.
'Algorithmic Sense making'	*Interviewee's Grounded*	
'Algorithmic Agency'	*Author's Grounded*	
'Algorithm's Politics'	*Exclusively Grounded (Interviewees)*	
'Algorithmic Equalization'	*Exclusively Grounded (Interviewees)*	

The interplay of author's and interviewee's agencies shown in table 6, is a valuable resource in trying to illustrate the various sources and different intensities in which multiple agencies were mingled and imbricated during this research project.

It is important to consider here that categories are, after all, ideal typologies trying to capture glimpses of reality within the living and complex process of this research. And ultimately, we shouldn't forget either that the very nature of a genuine autoethnographic approach is its

embeddedness and inseparable connection with the community that the researcher is both part of and researching in.

7. Findings

Pre-existent Infrastructures in Helsinki and Espoo

Acknowledging and identifying the pre-existent infrastructures and networks is a determinant step towards the understanding of its deployment and unfolding characteristics. Variables such as population density, road planning characteristics, zonification of commercial and residential areas, commercial floor area distribution, and restaurant clustering patterns– among several others- are relevant variables to take into consideration when analyzing the geographical entanglements of food delivery platforms. Next, I present the two variables I considered most relevant for this work: population density and restaurant clustering patterns in Helsinki and Espoo.
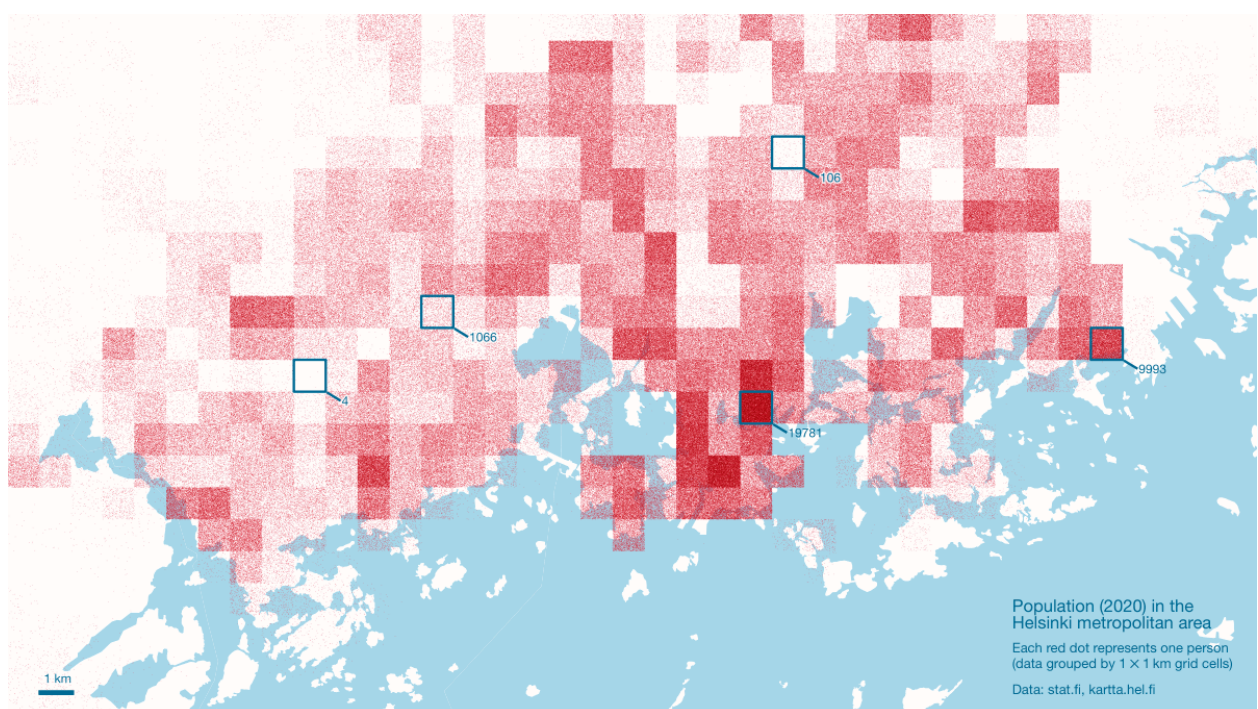
Figure 18. Population Density in Helsinki and Espoo

Data Sources: stat.fi and kartta.hel.fi (Reproduced with Kind Permission of Its author: Christoph Fink / Digital Geography Lab)

Figure 18 above illustrates the distribution of the population living in Helsinki's metropolitan area. Every red dot in the graphic represents a person, and the overall population of the area has been overlapped with a 1 square kilometer grid. Thus, forming the grid pattern observed in the image. Additionally, marked with a solid blue outer line, five sample squares are visible and labeled with a number corresponding with the population living in each cell grid; from left to right, these numbers are: 4, 1066, 19781, 106, and 9993 inhabitants respectively.

For the purposes of this study, I will categorize the sample squares provided in Figure 18 as follows:

1. Very Low-density areas – Grid cells resembling the sample square of 4 inhabitants
2. Low density areas – Grid cells resembling the sample square of 106 inhabitants
3. Medium density areas – Grid cells resembling the sample square of 9993 inhabitants
4. High density areas – Grid cells resembling the sample square of 19781 inhabitants

These 4 basic categories are illustrative only and aimed at helping us identify relevant nuances in the population distribution within our study areas. Next, I will locate the study areas visited during my field trips on top of the density map of Helsinki's metropolitan area.
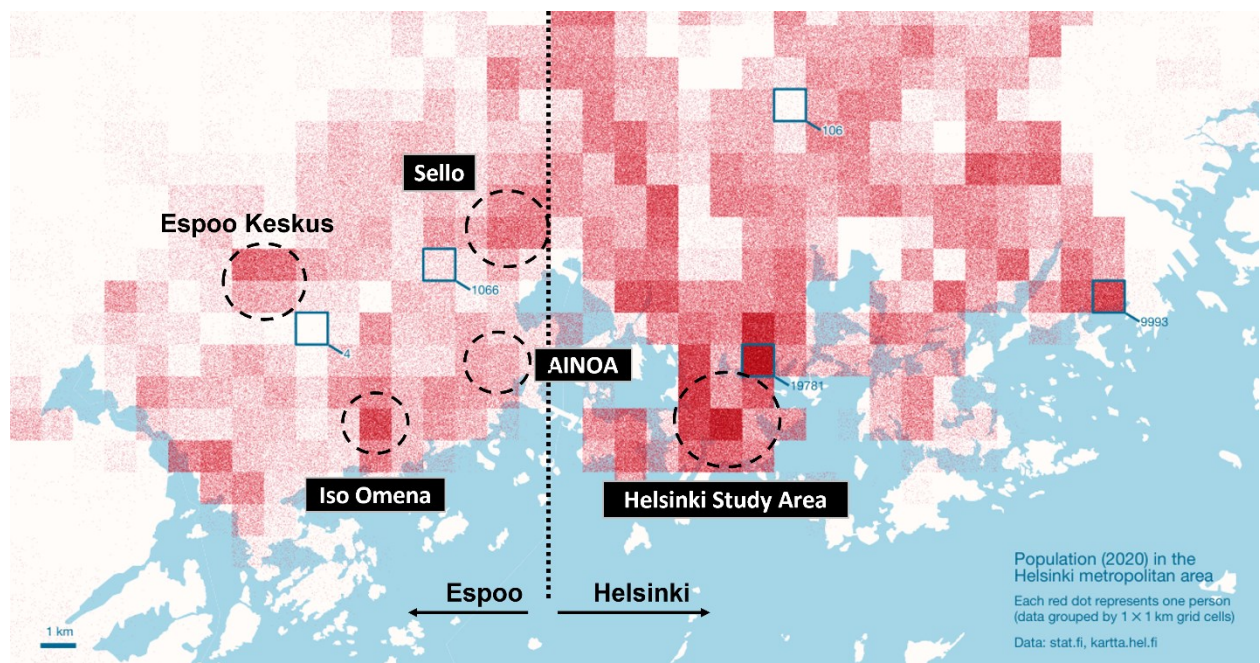
**Figure 19.** Study areas in context: Population density in Helsinki and Espoo
Data Sources: stat.fi and kartta.hel.fi (Reproduced with Kind Permission of Its author: Christoph Fink / Digital Geography Lab) Identification of restaurant clusters, municipal labeling, and doted lines were not part of the original.

Observing Figure 18, the first thing we will notice is the slight difference in density between Espoo and Helsinki. Using the built categories, this work would suggest that Helsinki gathers a larger proportion of cells that could be classified as medium density areas or high-density areas, meanwhile Espoo has a larger proportion of cells that would range from medium to low density. Although Espoo's general characteristic is to present a medium to low density, it has some pockets where density could be moving from medium to high density areas. Interestingly, these areas correspond to the same areas where one of the shopping centers of our case study is located (as shown in Figure 19).

Now that we have a basic notion of the demographic context in which Quick as a food platform operates, next, I will present the spatial distribution and clustering patterns of restaurants in Helsinki and Espoo.
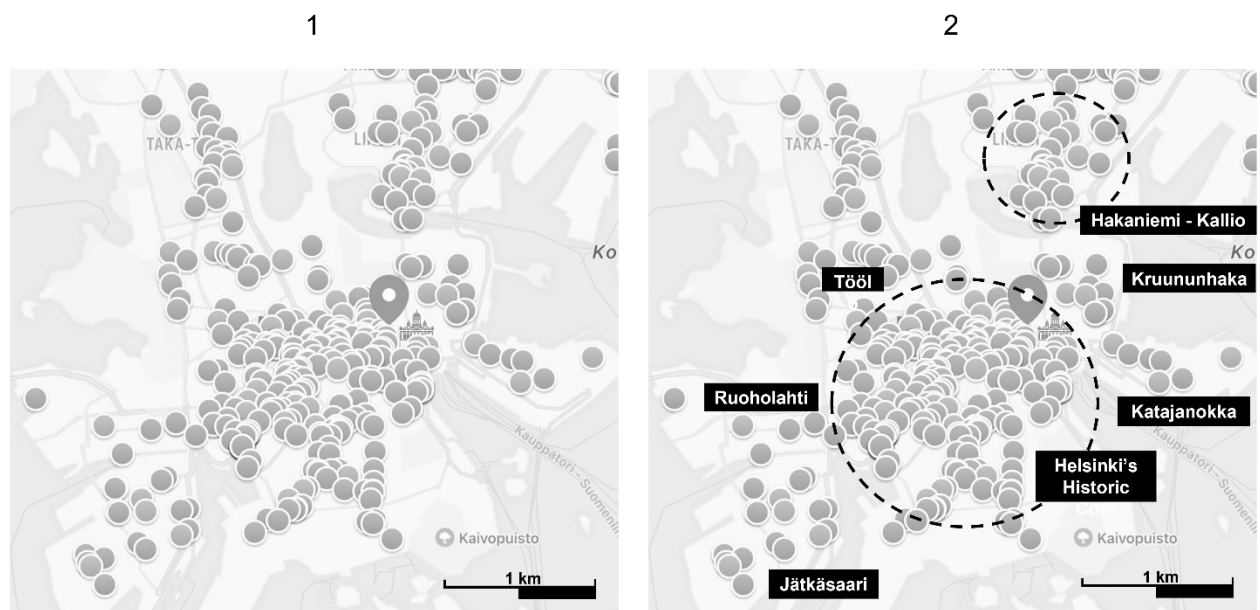
Figure 20. Helsinki's restaurants registered in Quick by January 2022

Figure 20 and Figure 21 (next page) present a visualization of the restaurants registered on Quick's platform by January 2022. In both figures, maps are presented in two parallel images; the first one, on the left side of the figure, shows a basic projection of the restaurants on top of the cities, meanwhile the second image on the right side of the figures, shows the restaurants together with basic labeling depicting the most important neighborhoods and landmarks in each city.
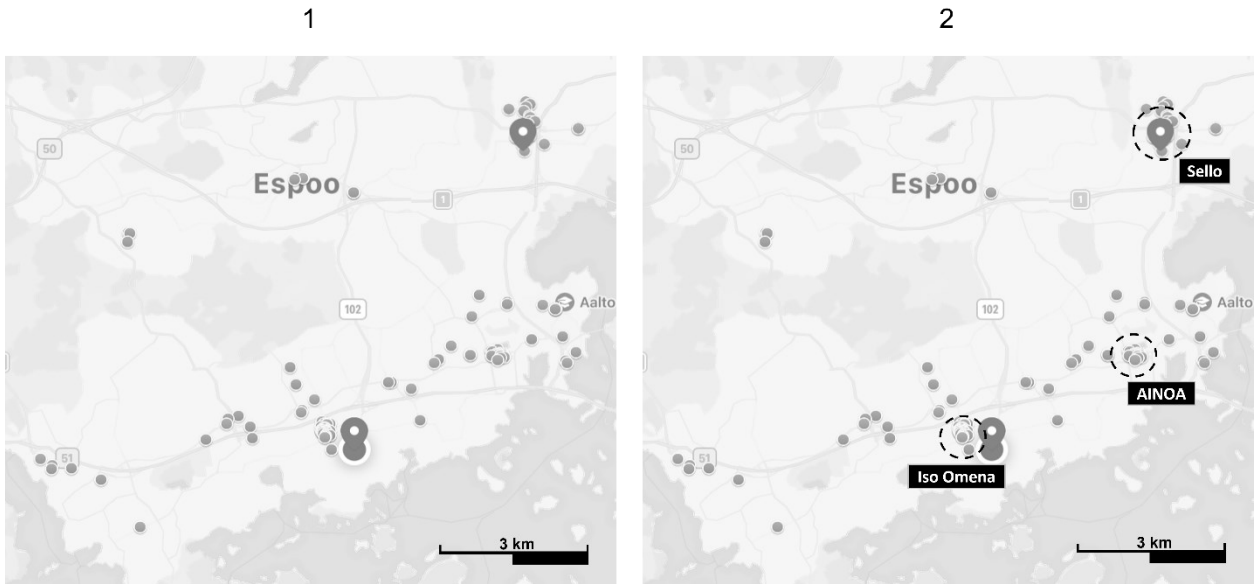
Figure 21. Espoo's Restaurants registered in Quick by January 2022

Next, a comprehensive table summarizing key elements to consider when assessing the relevance of these pre-existent infrastructures for the platform's deployment.

Table 7. Pre-existent infrastructures characterization table

		Espoo (Study area)	Helsinki (Study area)
Population Density	High		X
	Medium	X	X
	Low	X	
Type of Restaurants Clusterings	Highly centralized - Polycentric	X	
	Low centralization		X
	Distributed		X
	Scattered		X
Purchasing Power of the Areas (Socio-Economic determinants) *	Income levels segmentation (Quartiles or deciles) joint with postal code georeferenced data.		

* This variable is not further elaborated in this work because of limitations on the scope of this project. Nevertheless, it is mentioned here since its use could prove useful for more in-depth quantitative and GIS (Geographical Information System) based analyses.

Following the above classification, Espoo's case study is characterized by having a medium-low population density with a densified polycentric clustering of restaurants. On the other hand, Helsinki's study area presents a medium-high population density with an evenly distributed clustering of restaurants across the study area.

These preexistent characteristics are important, and they will affect how the platform unfolds in each study area. Moreover, they are also crucial to couriers' sensemaking processes—as we will see next.

7.1 The Platform's Materializations in the City

In a sociomaterial key, food delivery platforms are not fixed objects, but constantly becoming entities. Thus, when we refer to the platform's materialization, we refer to the patterns, clues, episodes, and glitches from which we gain access to snapshots of its becoming.

The platform becomes in time, becomes in space, becomes in a place, becomes connected to the pre-existent infrastructures of our cities, and becomes weeded with the city's segregation patterns.

In food delivery platforms, this *'constant becoming'* happens together with the city, the restaurants, the food delivery couriers, the customers, and the temporalities of urban life. Examples of those materializations are the spatiotemporal arrangements of urban temporalities, the spatial arrangements of restaurants and Quick, and the broader geographical entanglements of the platform and the city.

Food delivery platforms are embedded and co-constituted with the cities they unfold, the couriers that deploy it, the restaurants that prepare the food, and the costumers using the app.

7.1.1 Urban Temporalities and Spatiotemporal Arrangements

Temporalities are deeply embedded in urban settings, and structure the rhythms, flows, and consumption patterns of urbanites and urban life (Blunt et al., 2021). Common examples of urban temporalities are those produced by working-days and weekends, and temporalities associated with the daily rhythms of a household, such as breakfast, lunch, and dinner (Blunt et al., 2021; Nemeškal et al., 2020).

Temporalities would typically -if not always- produce regular, repetitive, and routinary traces in space; the waste truck coming on a specific day of the week, the first-morning bus departing at the same hour every day, or the rush of grocery shopping preceding an extended weekend. Consequently, it is thanks to these spatially materialized and identifiable patterns of events that we can perceive and 'see' temporalities being present and partially responsible for the rhythms of our urban life. Nevertheless, what are those identifiable patterns, and which are their spatial materialization within food delivery platforms?

For the purposes of the present study, we will be focusing on three main temporalities; Breakfast, lunch, and dinner9. The first step though, would be to understand how it is that a temporality can materialize itself in space. In figure 22 below, I present an ideal representation on how restaurants' opening hours could help us understand the relation between temporalities and their spatial projection in space.
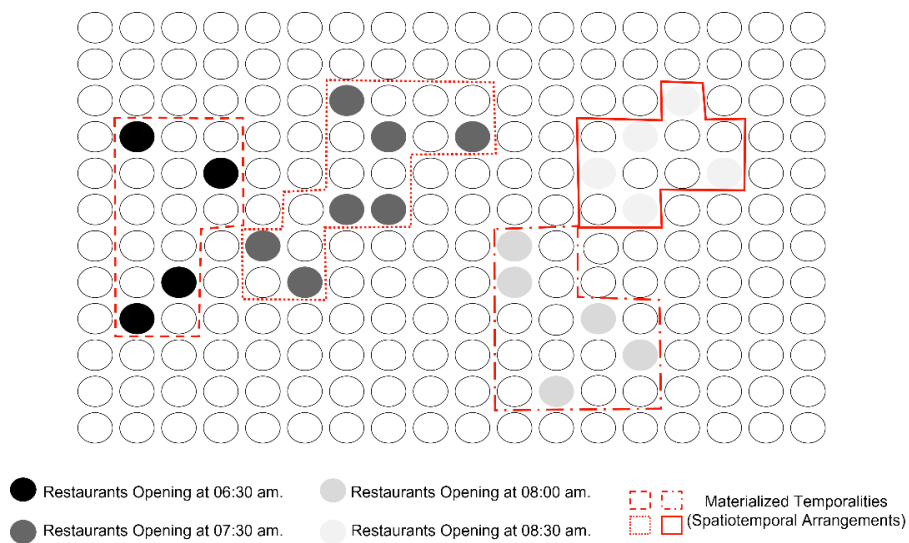
Figure 22. Restaurant opening hours and their materialization in space; ideal representation

Note. Circles represent the universe of restaurants that exist in a city. White circles represent closed or non-active restaurants; meanwhile colored ones represent active ones. From black to light gray, circles (restaurants) have been color graded according to their opening hours.

As we can see in Figure 22, restaurants' opening hours vary, but more importantly, their locations vary. Therefore, when two or more restaurants open at the same time in a similar area of the city, we have a spatial correlation, and it is to this spatial correlation that this work refers to as spatiotemporal arrangement.

As a board of lights turning on and off, restaurants go on and offline in asymmetrical patterns –temporally, and hence, spatially. Therefore, the materialization of temporalities is not uniform in its spatial distribution, nor restricted to a single timeframe. This last feature of *urban temporalities* suggests that we should consider them as having *multiple spatiotemporal arrangements*.

Breakfast in Helsinki

'The first *breakfast-ish* restaurants to open in Helsinki are coffee houses, they 'go online' as early as 06:30 am, at the central railway station. Afterwards and systematically, the rest of breakfast-ish restaurants open.'

Authors Diary

As highlighted in the fragment of my diary above, Helsinki's breakfast temporality starts early in the morning, along the first departing and incoming trains in Rautatientori (06:30 am.) and it could extend itself until 11:00 am around Punavuori and Ullanlina; Now, within this period of time, breakfast temporality in Helsinki materializes in different geographical locations.
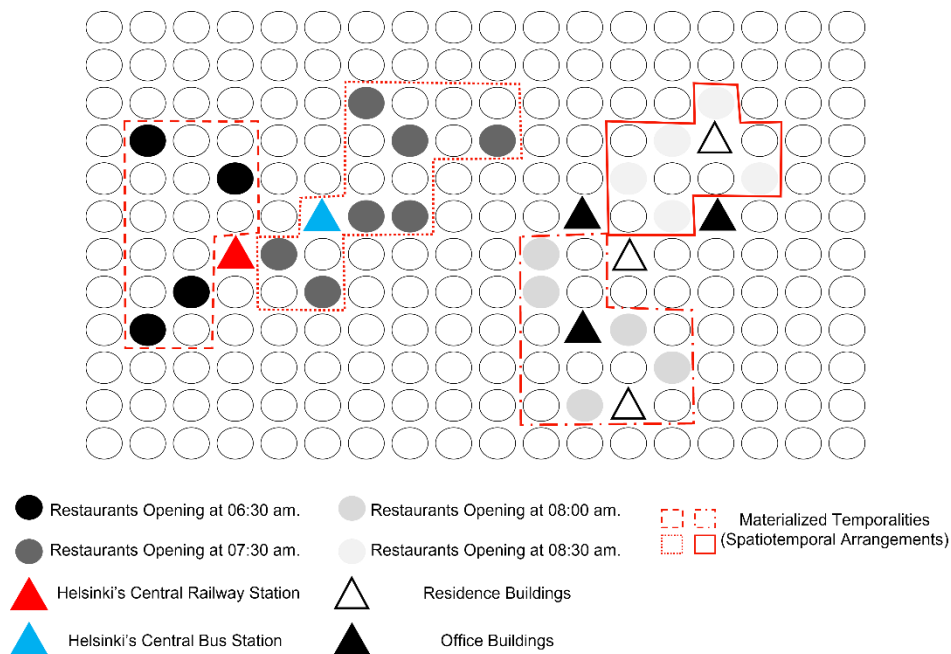
Figure 23. Spatiotemporal arrangements and their relationship with pre-existent infrastructures

In figure 23 we have 4 groups of restaurants demarcated by distinct types of dotted and solid red lines. These areas -as explained earlier- are the spatial projection of specific layers of

breakfast temporality. Hence, the first two groups of restaurants opening in Helsinki, the ones colored in black and dark grey, are the ones closer to Helsinki's two main transportation nodes: the Central railway station, and the central bus station. On the other hand, the second group of restaurants, colored in light gray, are those found closer to single use or mixed land-use areas of residential and office buildings –just like the areas suggested before in the author's diary fragment.

This last analysis shows how intrinsic the relation of the platform with the pre-existent infrastructures of the city is; land uses, for instance, will not only determine where people live and work but also where they gather to commute. The same analysis suggests that urban temporalities are interlinked and mutually constitutive; in simpler words, it is because of urban transportation temporalities that breakfast temporality unfolds this early in this specific area of the city.

In our daily lives, we are familiar with the weaved nature of urban temporalities and the city; in big cities9 for instance, we know that following the city's nightlife can lead us to find food in late hours in the night; or going to a park early on a Sunday morning will expose us to a narrow selection of users; dog walkers, determined joggers, or drunk people in some cases. Nevertheless, our intrinsic knowledge of the city has not been 'given' to us or found in a book. It has been gathered through experience, through trial and error; in the same way, the knowledge that couriers gather about the platform needs to be comprehended through their practices and experiences.

Restaurant staff perceptions of spatiotemporal arrangements

> *For us, the sales start to come at 11:00 Max. 11:30 am, and they continue until 13:00. Next, sales start to go up again beginning at 4:30 pm until 8:00, 8:30, but during weekends the tendency is to make orders until 09:30 in the evening.*

> Erika – Restaurant Staff - Helsinki

> *In the big picture we know that the peak hours are Friday nights, Saturday nights, (whatever), and lunchtimes. But still there might be some surprises.*

> Sergio – Restaurant Staff – Helsinki

In southern parts of Helsinki, there were like, really big orders weekly, but mostly of course the big orders are...you can see from the orders that there might be some kind of a house party ,they order for guests as well, so, of course these orders go towards the end of the week: Thursday night, Friday night, Saturday night.

Sergio – Restaurant Staff – Helsinki

Sergio's and Erika's comments hold at least 3 meaningful contributions for us to understand the importance of temporalities in their working place and for food delivery platforms at large;

First, Erika made an incredibly precise description of how she experiences the unfolding of lunch and dinner temporalities at work. Erika described temporalities not as a fixed element but as having length/duration; In Erika's restaurant, lunch temporality extends for approx. 2 hours (from 11am to 13:00pm), meanwhile dinner temporality spreads across a vast timeframe of 4 hours and a half (from 16:00 to 20:30).

Second, Sergio –and partially Erika– points out that the highest peak of orders is experienced towards the end of the week and during weekend evenings, suggesting that temporalities have not only a spatial correlation, but they also have qualitative attributes such as 'duration' and intensity.

Third, Sergio suggests a correlation between a specific part of the city, the size of the orders, the day of the week (Friday and Saturday evenings) and social life itself; 'Parties' and hosting 'guests.

But what about couriers? Do they also perceive the effect of temporalities in their daily work?

Food delivery couriers' perceptions of spatiotemporal arrangements

Couriers do not only perceive the existence of temporalities, but they also take one step further and start making correlations between temporalities, the types of restaurants they will be going more often under a specific temporality, or the area of the city where more orders will be generated. Let's see a fragment of my interview with a courier:

Alejandro

Which one would you say is the best selling restaurant according to your experience?

Bruno

*That's actually a very critical question, well**... it depends on the time**. In the **mornings**, the best selling restaurants are Espresso House and also this ... La Torre Fazione. Then in the **evenings**. I think, uhm... Bangkok 9. They have a lot of customers. Bangkok 9 and Beijing 8, they always have a lot of customers, specially Bangkok 9, you know. You see, their food must be really nice, and the families always order mostly from those restaurants... Yeah, big big orders. Ahh... and also Fuku (Sushi).*

Couriers do not only perceive the existence of temporalities, but they also take one step further and start making correlations between temporalities, the types of restaurants they will be going more often under a specific temporality, or the area of the city where more orders will be generated. Let's see a fragment of my interview with a courier:

The level of knowledge that experienced couriers have about urban temporalities is remarkable. When faced with a totalizing idea -as the question I posed- the courier immediately clarifies that 'it depends on the time'. Moreover, the interviewee's detailed report on which restaurants are more salient during a specific temporality suggests that couriers have a remarkable knowledge of the platform's multiple entanglements with urban temporalities.

Interestingly, just as Sergio before, Bruno makes a correlation between the size of orders ('big, big orders') of two restaurants (Beijing 8 & Bangkok 9) and the profile of customers to whom he would be more likely delivering those orders to; Families.

This section has tried to show us how temporalities materialize in space. Furthermore, it has shown that these materializations are not uniform nor ubiquitous but multilayered and co-constituted in interaction with several other elements; other temporalities (remember the example of transportation temporalities and weekends), preexistent elements in the city (e.g. transportation nodes), the type of user interacting with the app (couriers or restaurant staff members), and even the final costumers' '*profiles*' (Families or 'Party people').

Thanks to Sergio and Erika, we can understand urban temporalities as crucial elements dictating the rhythms, speed, duration, and intensity of restaurants' kitchens. Moreover, thanks to Sergio's and Bruno's suggestive comments on a series of temporal, spatial and social correlations, we can also suggest that understanding the connections between urban temporalities, couriers and restaurants is an important gateway to grasp the materiality of the platform itself. Consequently, understanding a spatiotemporal arrangement requires much more than only showing its spatial connotations; it is about multiple elements and actors arranged in a particular way during a given timeframe.

During the next two sub-chapters we will take a closer look into these spatial and temporal frames, their co-constitutive nature, and the strategies that restaurants and Quick use when trying to modulate the outcomes of the platform.

7.1.2 Restaurant's spatiotemporal arrangements

Restaurants' spatial distribution in the city is an independent element preceding food delivery platforms. Nevertheless, as we have seen earlier, restaurant's location, density, and spatial distribution influence the platform's unfolding in the city. Consequently, during my interviews with couriers, I was interested in exploring the platform's geographical connotations. My interview with Joaquin, for instance, is particularly relevant in this sense.

> *'There are special restaurants, like the Green Hippo, for example. This one is special in the center because they have this one, only one... Many, many restaurants in Helsinki, they have two or three restaurants for example Fafa's, they have restaurants in several places, but the Green Hippo they have only one[7]'*

<div align="right">Joaquin - Helsinki</div>

Joaquin's observation about the difference between singular restaurants and big franchised ones was interesting but, to be honest, I did not fully understand the connection or relevance of his remark. Thus, I asked him to develop further on why he considered those differences worth noting. Taking another singular restaurant as an example, he kindly explained to me:

> *'it's the only restaurant in Punavuori that makes the things like they do. You know? They make pasta, but the pasta that they make is different than other restaurants so, when I take/accept some tasks (orders) from Bar N9 I can say it's possible to go to Jäätkasari, or punavuori or töölo. It's possible, because I know it's the only restaurant that make things different than others'*

<div align="right">Joaquin - Helsinki</div>

The observations above are insightful. They complement each other and they expand on each other. Joaquin's first quotation highlights the importance of differentiating singular restaurants from franchised ones. Moreover, in his second quotation, he does not only explain why these singular restaurants are special (in Joaquin's example, due to the uniqueness of its menu) but most importantly, he links the restaurant's singular location with a set of specific spatial correlations; 'when I take/accept some tasks (orders) from Bar N9, I can say it's possible to go to Jätkäsaari, Punavuori or Töölö' (Joaquin).

If we would recreate Joaquin's explanation on top of a map, we would have something as depicted below.

---

[7] At the time of the interview with Joaquin (May 2021) the Green Hippo had only one restaurant in the city, later that same year, they will open a second one in a popular neighborhood of Helsinki (Kallio).

Figure 24. Orders' range delivery fluctuations in a singular restaurant

Figure 24 depicts the areas named by Joaquin and shows how the delivery ranges could vary from 200 or 300 meters to 1,5 kilometers for this particular restaurant. Now, why is this important? The increase in trips delivery distances has a direct impact on couriers' lives; it produces more fatigue; it consumes more time, and it is not always rewarded with a better payment per task. Hence, it is not a surprise that Joaquin was particularly attentive to the order allocation patterns of these types of restaurants.

Additionally, Joaquin's observations show that spatiotemporal arrangements are not only produced by urban temporalities, but they could also steam from restaurants distribution patterns across the city. Unlike the spatiotemporal arrangements described earlier in this work, singular restaurants (E.g., Green Hippo, Bar N 9, Ekberg, etc.) could present singular spatiotemporal arrangements where, for instance, the variation in their delivery distances would not only be explained by the temporalities of the day or the week but from its unique existence. Now, would the same be truth for franchised restaurants? Next, we will explore that perspective.

Sergio is an experienced manager in a popular, high-end franchised restaurant in Helsinki. Let's explore the spatial arrangements of these types of restaurants with him.

Alejandro A.

And why do you think orders are coming from Punavuori, if you can't see the addresses of the customers?

Sergio – Restaurant Staff Helsinki

*Because of the range, if you live in Kallio, you can't order 'Our food' from Punavuori. So, **we can, and we have asked 'Quick' to set how far the food can be delivered from the restaurants**.*

Sergio's quotation shows how franchised restaurants could explicitly set independent delivery boundaries to their branches. Furthermore, franchised restaurants use their own strategies as a valuable resource when trying to have optimal coverage of the city.

So, for example, when this (City Center) was closed during the lockdown, because of the locations we have in Helsinki; Punavuori, Fredrikinkatu, Kallio and Töölö and then, this one in city center. So, no matter where you live in this area, you can always eat the same food. If you live in Kruununhaka and this one (City center) Closes, you can order from Kallio.

Sergio – Restaurant Staff – Helsinki

Sergio's comments show how restaurants are not passive agents within the platform; on the contrary, they help to create the spatial arrangements in which couriers -and consumers- navigate. Furthermore, by setting independent delivery ranges for every branch, franchised restaurants operate more as a complex distributed network than singular restaurants. Let's take Sergio's franchised restaurants as an example:
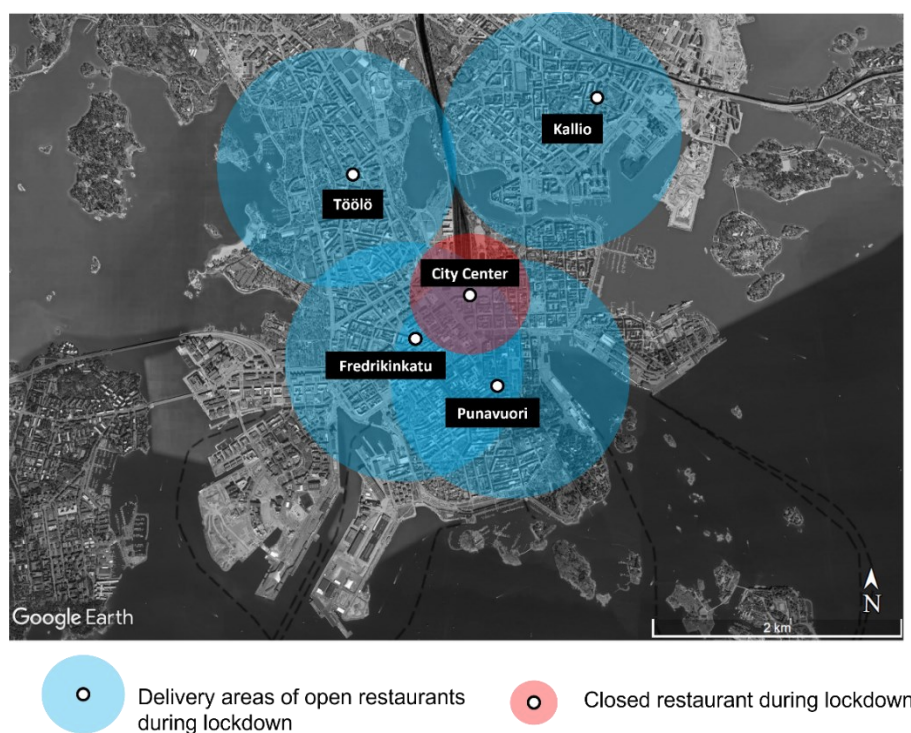
Figure 25. Franchised restaurant delimitation of their own coverage areas

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As shown in Figure 25, and just as Sergio mentioned in his quotation, having more than one restaurant in the city guarantees accessibility for costumers no matter where they are in Helsinki. Additionally, an important input arising from Sergio's interview is the active role of restaurants in tailoring or setting specific delivery areas for every branch they have.

Another observation we can make based on Figure 25 is that the larger the number of restaurant branches, the more overlapped their delivery areas; thus, the need to set specific delivery areas for every restaurant; in Sergio's words: *'if you live in Kallio, you cannot order our food from Punavuori'.*

The type of dynamics present in Sergio's restaurant is important, and it gives us a clear example of how franchised restaurants have an enhanced leverage capability to negotiate the platform's deployment in the city. Furthermore, Sergio's restaurant case shows us how the platform's spatial arrangements in the city are impacted not only by the pre-existence of restaurants but also by the way these restaurants are managed. Ultimately, being a big restaurant franchise acting as a network instead of being constrained by a single location could create a more balanced and distributed demand across restaurant branches, as we see below in figure 25.
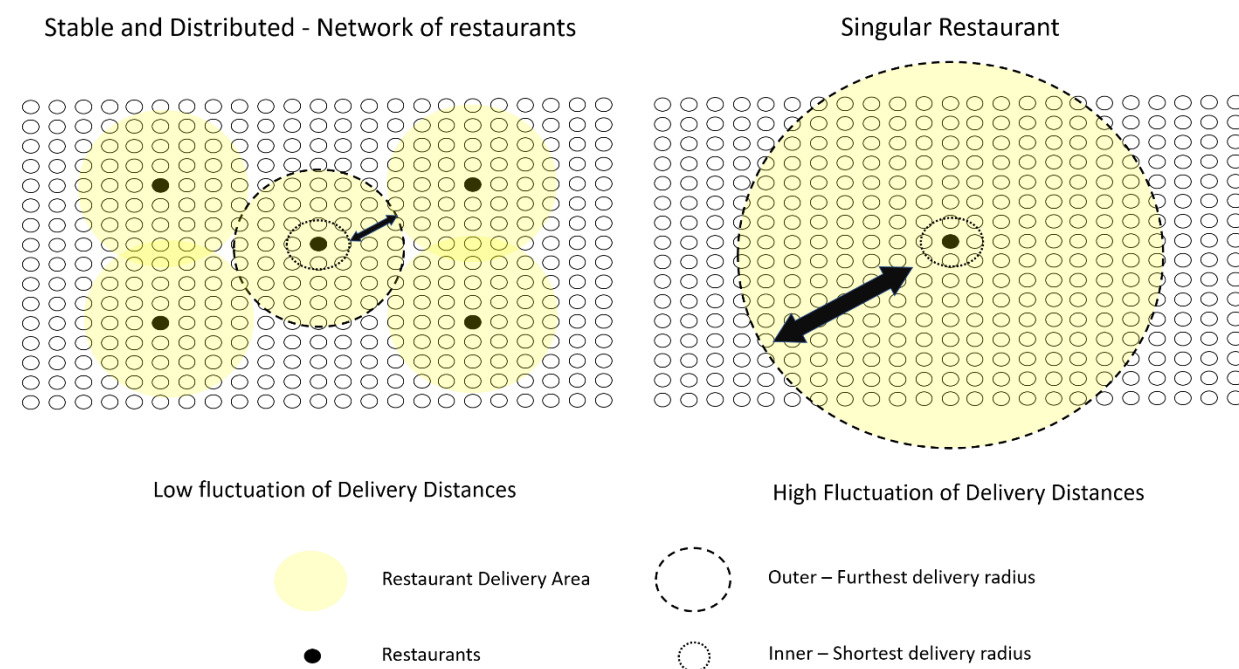
Figure 26. Franchised Restaurant's Network and Singular Restaurants Delivery areas

Figure 26 above depicts two ideal scenarios: the first one, on the left side of the figure, corresponds to a distributed network of restaurants with several nodes (branches), and the second one on the right side of the figure, corresponds to a restaurant with a singular location or a singular node. One of the first and most meaningful differences between single restaurants and franchised restaurants is a reduction in their expected coverage areas. Furthermore, in real life, restaurants in Helsinki do resemble the kind of dynamics just analyzed. Let's see a concrete example.

'Picnic' Franchaised restuarants in Helsinki   Singular restaurant in Punavuori
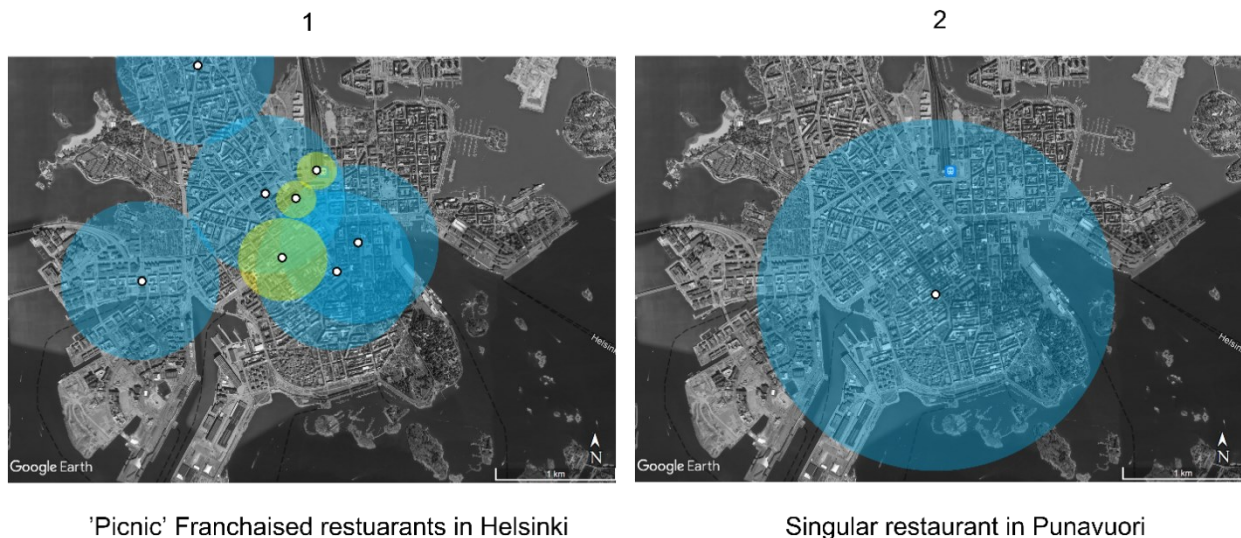
Figure 27. Franchised and singular restaurants' delivery areas in Helsinki

Note. The yellow color on three of the restaurant's delivery areas is only used to make these areas visible.

As shown in Figure 27, Singular restaurants tend to present bigger delivery areas, while franchised restaurants generate multiple smaller delivery areas for every restaurant in their network. Additionally, these variations in delivery area extension will have a direct impact in couriers work, and it will be evidenced by a noticeable fluctuation in delivery trip distances: theoretically, the more nodes you have in your network of restaurants, the smaller the delivery area for each of them, hence, shorter delivery rides for couriers. On the other hand, in singular restaurants, every order needs to be covered by this unique node, thus producing longer delivery trips for couriers –Just as we saw in Joaquin's example earlier.

Looking at restaurants' distribution patterns in the city and noting their differences allows us to have a clearer picture of how restaurants' tethered nature produces specific spatiotemporal arrangements within the platform's deployment. Moreover, considering restaurants – especially those with extended franchised networks– as active participants tailoring the 'spatial reach' (delivery distances) of their service areas, and the temporal windows of their

opening hours, give us a valuable resource to understand restaurants' entanglements with the city and the platform.

7.1.3 Quick's Spatial Arrangements

As well as couriers, Quick as a company is constrained by the same urban temporalities and pre-existent infrastructures that we have explored in previous chapters. The only difference, though, is that, as owners of the digital platform, the company has a lot more space for leverage. One of these meaningful leverage possibilities is Quick's capability of reconfiguration of the delivery areas where couriers work.

Figure 28. Quick's territorial delimitations (New delivery areas – modification to existent delivery areas)
Source: Quick's newsletter to couriers

Figure 28 shows how Quick attached new delivery areas to Helsinki's core delivery area. Helsinki core area is unquestionably the most intense area for food delivery activity in the whole country. Therefore, controlling who gets access to this area is a key resource in controlling the platform itself. Thus, by setting boundaries, limits and managing entry conditions, Quick takes an active role in defining couriers' mobility possibilities –for good and bad.

Additionally, this type of re-territorialization or delimitation of delivery areas is not limited to specific areas within a city but could also include intermunicipal boundaries, as we will see next:

> *'Before, you could change anytime you want, between Espoo, Helsinki, and Vantaa, at the same time. Because you could see from the application, it was showing you the status of everywhere.'*

<div align="right">Ivan</div>

Ivan refers to Quick's policy until 2020; during that time, couriers were allowed to move freely across Vantaa, Espoo, and Helsinki (The 3 biggest municipalities in Finland). Moreover, the fact that –according to Ivan– the app was showing real-time updates about the status of the different areas suggests that this mobility policy was not only an integral part of Quick's territorial planning but even a desired outcome.

Thanks to Quick's flexible mobility approach, couriers were able to explore multiple scenarios and locations across the metropolitan area where they could maximize their earnings:

> *'I could work here (Espoo) until 8:30 or nine in the evening, you know, it becomes quiet. And then I went to Helsinki. I used to go to Helsinki during weekends because in Helsinki I used to make in one weekend, on a Saturday or Sunday I made two hundred, 250 Euros.'*

<div align="right">Ivan</div>

It is extremely interesting how Ivan describes what he did; first he implicitly suggests that in Espoo[8] will become quiet around 8:30 - 09:00 pm generally. Secondly, he makes clear that during weekends Helsinki would be always a better choice than Espoo. Interestingly, Ivan is not the only one who realized this, another of my interviewees also mentioned these phenomena:

> *'They (couriers) did that because, like when it's quiet in Espoo, they go to Helsinki because in Helsinki you're always guaranteed to have deliveries'*

<div align="right">Bruno</div>

The shared perception of these two couriers on the existence of different urban temporalities amidst Helsinki's metropolitan area is remarkable, as is their determination when working across these different geographies. Having the possibility to move freely across municipal boundaries gave couriers a wider maneuver range to negotiate the multiple spatiotemporal

---

[8] 'Espoo', meaning the exact shopping mall from which he usually works and delivers food from.

arrangements of the platform and define the most cost-effective spatial arrangements to work on. Nevertheless, these are strategies that eventually could be foreclosed unilaterally by the company.

Quick monopolizes the control over crucial elements of the spatial reach of the platform, I.e., setting delivery areas, drawing boundaries of these delivery areas, modifying the extension of them, etc. Additionally, Quick also monopolizes the size, characteristics and distribution of their workforce (couriers).

> 'Now, I think if they are not hiring anymore Guys (couriers) in in Espoo, yeah, I think they have got their target here, so the only place I think they're hiring now is in Helsinki. And like you know they were lacking couriers in Helsinki.' (Ivan - Espoo)

Consequently, by controlling these two central elements of the platform (Territory and workforce) Quick ensures for itself the biggest leverage margin to negotiate the natural fluctuations of offer and demand of the food delivery market. Nevertheless, as we will see in the coming chapter, there is still an important set of scenarios where the platform materializations are not directly dependent on Quick's control, but instead they are the product of the ongoing performative relationship of the platform's actors and elements.

7.1.4 The Platform's Spatiotemporal arrangements

As early as the end of March 2021 (only three weeks after becoming a courier), I started schematizing the first notions of the spatial and geographical implications of the platform.
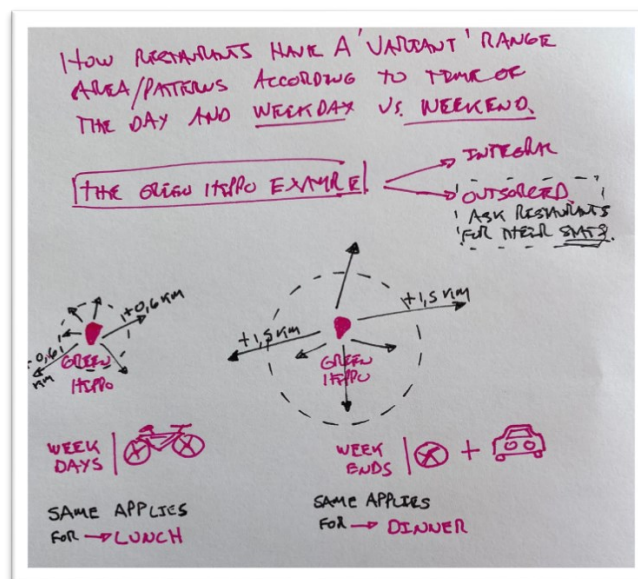
Figure 29. Early drafting of spatiotemporal arrangements in Helsinki

As shown in Figure 29 there was a significant fluctuation in the delivery distances that couriers would cover depending on the specific temporalities they were working on (Weekdays Vs. Weekend). These asymmetries in delivery distance -only hypotheses at that stage of the study- were immediately noted for further exploration. Consequently, I expanded my inquiry's scope and made the same comparative analysis in a larger sample of restaurants (Figure 30).
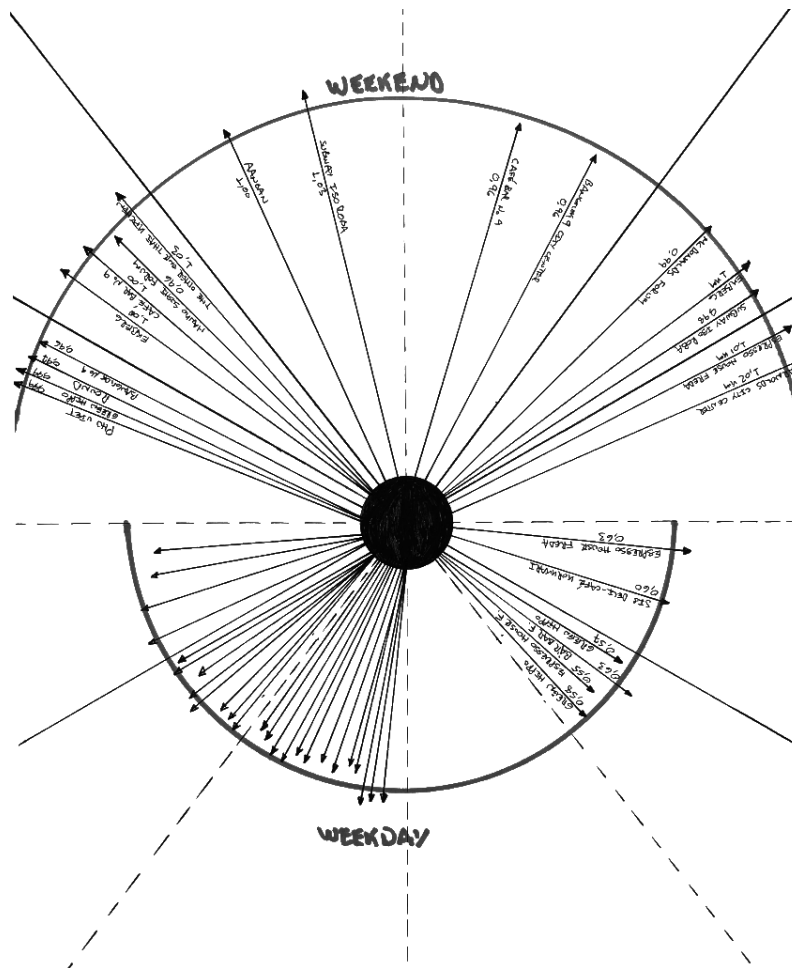
Figure 30. Delivery distance fluctuations in Helsinki (Weekdays Vs. weekends)
Hand-drawn by the Author – End of May 2021

As suggested by Figure 30 the fluctuation in delivery distances between weekdays and weekends was not an erratic pattern but a consistent one. Delivery range fluctuations were not an isolated variable of a handful of restaurants, but rather a constant pattern in all of them. Moreover, every restaurant I had delivered food from, regardless of their menu offer, their specific location within the study area, or their presumed 'niche' of customers, all presented the same delivery distance variation between weekdays and weekends, as we will see in the next figure.

	Weekday	Weekend	Fluctuation
Average Delivery Distance 331 Deliveries	● 0.62	⬤ 0.88	29,5%
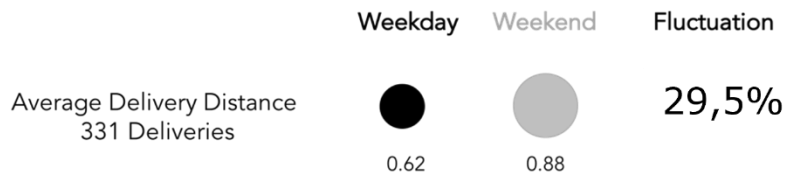
Figure 31. Delivery range fluctuations for the universe (331 deliveries) of the data collected (Distances in km)

According to figure 31 above, the average delivery distance within a weekday was 620 meters or 0,62 Kilometers, meanwhile the average weekend delivery distance was 880 meters or 0,88 Kilometers. Consequently, the total variation between weekdays and weekend for the whole universe of the data set was 29,5%.

These percentages could be interpreted as a moderate variation. Nevertheless, when looking closer to the data, we can find quite significant variation percentages across different restaurants (Figure in next page).
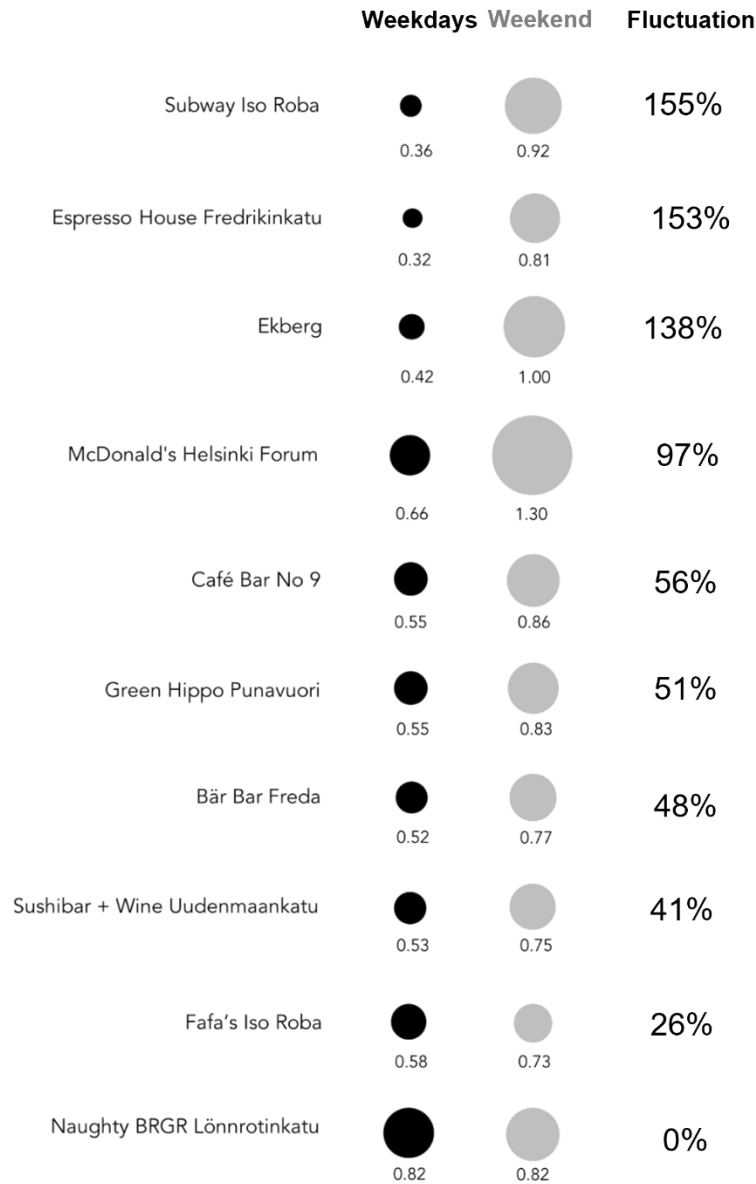
Figure 32. Highest delivery range fluctuations in restaurants in Helsinki.

Note. The restaurants included in this list were obtained from the author's delivery data. Generalization of this data is not intended.

Figure 32 shows us the 10 restaurants with the highest fluctuation in their delivery distances. From Subway in Iso Robertinkatu with a 155% fluctuation in its delivery ranges, to Fafa's, also in Iso Robertinkatu, with its 26 percentage, figure 32 also shows us that delivery ranges can massively change from weekdays to weekends depending on the restaurants you deliver food from. Additionally, some restaurants (Naughty BRGR) could present minimal or no variation at all.

As observed in the previous set of figures, temporal arrangements do have specific spatial implications, and their impact is evidenced on different scales and intensities across

restaurants and the city itself; I.e., a sustained variation in delivery distances between working days and weekends. Hence, it is not surprising that couriers are aware of these temporal and spatial correlations.

As a new courier, I believed that the most important peak hours were lunch and dinner. However, as I gained more experience and started covering more working hours, especially during early mornings, I realized that such a thing as 'a breakfast peak hour' existed. Furthermore, I noticed that morning orders were being consistently generated in a very particular area of the city, and interestingly, I was not the only one noticing it; A fellow courier, Ricardo had also the same impression.

> Alejandro
>
> *Where do you usually take your first orders of the day?*
>
> Ricardo – Helsinki
>
> *I just go directly to Punavuori because there are most breakfast-ish restaurants.*
>
> Alejandro
>
> *And why do you think that that the orders are leading you to punavuori?*
>
> Ricardo – Helsinki
>
> *No, What I'm saying is that the orders come from Punavuori because there are mostly breakfast-ish restaurants there.*

Although Ricardo's affirmation that most part of restaurants in Punavuori are breakfast oriented is not necessarily true, what is important to keep from our interaction is the perceived connection between the time of the day (Breakfast time) and the spatial correlation of incoming orders during that specific timeframe. This same correlation is something I would experience myself;

> Monday, the third of May 2021
>
> > *My first order came from Bär bar in Fredrikinkatu, and from there, I went to the most southern west part of the city (Ullanllina).*
>
> *Author's field Diary*

Interestingly, in both of our experiences, the spatial correlation of breakfast temporality in Helsinki was tightly linked to Punavuori. Moreover, when reviewing my data and my other interviews, 3 restaurants were constantly mentioned: The Green Hippo at Fridrikintori,

Espresso House in Annankatu, and Bär Bar in Fredrikinkatu. These three restaurants formed an imaginary triangle that I decided to call 'The breakfast golden triangle'

Figure 33. Helsinki's breakfast golden triangle

Figure 33 depicts this imaginary triangle marked in yellow. Additionally, represented by white dots, we find the rest of prominent restaurants in the area, which were also very active during breakfast. These were undoubtedly one of the busiest groups of restaurants in Helsinki during breakfast time, and consequently one of the busiest areas for couriers to get orders. This was the spatiotemporal arrangement in which I usually delivered food during breakfast time in Helsinki.

Additionally, experienced couriers might be able to 'track' these spatial correlations in both ends of an incoming order: in one end, they anticipate that during a specific Spatiotemporal arrangement, incoming orders could begin to arrive at a handful of restaurants e.g., Helsinki's breakfast golden triangle. On the other end, they can also anticipate the areas where these orders are more likely going to be delivered[9]. Furthermore, these spatiotemporal

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[9] More about courier's anticipation and predictive skills later in sub-chapter 7.3, pag. 107.

arrangements are not only present during breakfast but also during lunch, dinner, weekdays, and weekends.

Spatiotemporal arrangements result from the interplay of urban temporalities, the city's many geographies, and the materialities produced from the interaction of human (couriers) and non-human (Algorithms) entities participating in the platform. Ultimately, Quick´s spatiotemporal arrangements could only be understood as malleable, fluid, elastic and constantly becoming.

7.1.5 Spatiotemporal Arrangement elasticity

A spatiotemporal arrangement is produced at the entanglement of several other processes; the temporalities of urban life and their spatial projection in the city, the geographical entanglements of restaurants in the city, restaurants' spatiotemporal arrangements, Quick's spatial arrangements, and of course couriers' contextual arrangements. In this sense, a spatial arrangement is not an end by itself, but a *mean* where all these other processes take place; a *mean* through which the platform becomes.

To illustrate how the spatiotemporal arrangements arise, I propose to analyze the way how the 'status' of an area is determined by Quick. Quick has three possible statuses for a delivery area; 'busy', 'quiet', or 'normal'; and its definition is not unilateral, but emerges from the company's recognition of the constant, multi-entangled, and performative relationships weaved among the platforms. Let's dive into it.

> Alejandro A.
>
> *How is it that sometimes the app says that it is 'Normal' or 'Busy', how can it know? How do you think Quick defines this?*
>
> Carlos
>
> *You know, we think that 'the busy' comes like, when comparing the number of orders coming in, and the number of partners who are online. Yeah...*
>
> Alejandro A.
>
> *So, what you are trying to say is that orders and couriers are important to determine the status of an area?*
>
> Carlos
>
> *Yes, yes, I think they use those variables to determine the status of the area. Yes, I think so. Well, it could be that it is not that, but that is what I think.*

Before meeting and talking with Carlos, I believed that the status of an area was determined exclusively by the volume of orders been received and processed by the platform. Hence, It made sense for me that lunch and dinner hours were busy because more people were generating bigger number of orders. Nevertheless, I never considered that the number of couriers on the street could also be an important part of the equation. Thanks to Carlos, that mistake was amended. To further illustrate this, I have created an example of 3 possible scenarios when defining the status of a delivery area.

Table 8. 3 scenarios defining the status of a delivery area

Scenario	Open restaurants	Couriers on the Streets	Incoming Orders	Orders to Couriers Ratio	Couriers to restaurants Ratio	Area Status
1	6	3	20	6,6 to 1	0,5 to 1	Busy
2	15	11	20	1,3 to 1	0,73 to 1	Normal
3	27	20	20	1 to 1	0,74 to 1	Quiet

The scenarios above consider three variables; 'open restaurants', 'Couriers on the street', and 'incoming orders. Two of these variables change across the scenarios, while one of them remains constant (incoming orders). The reason to keep incoming orders constant is to focus our attention on how the status of a delivery area can be affected by other elements and not solely by the number of incoming orders.

Additionally, to complement this analysis, every scenario described in table X will be projected on an ideal spatial representation of the city; this will help us to contextualize these elements spatially. Moreover, the graphic representation of every scenario would allow us to see the spatial implications of each of them.

07:00

Restaurants Opening Hours

• Couriers: 3   ◯ Restaurants Total Universe : 368   Restaurants taking Quick's orders: 6
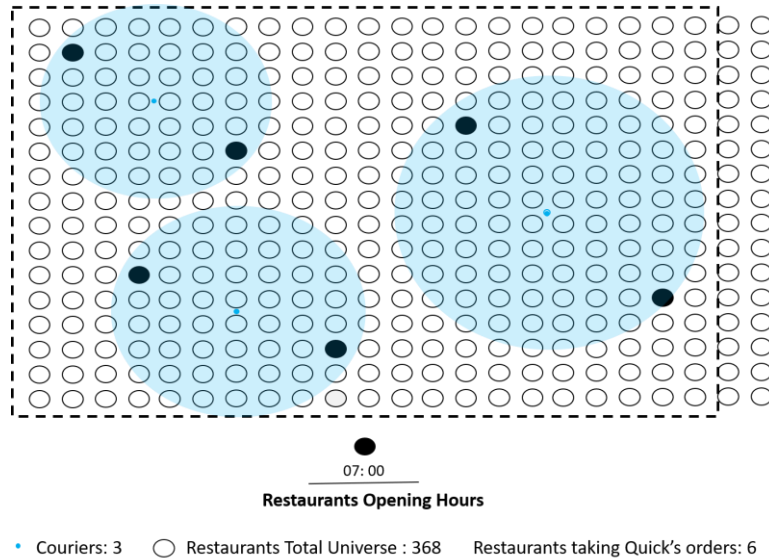
Figure 34. Scenario 1: a busy delivery area

Figure 34 presents scenario 1 of our example. In it, couriers are represented by a small light blue dot, restaurants are represented by a bigger black dot, and couriers' pickup ranges are depicted by a translucid light blue buffer-like circle. Additionally, the legend of the figure clarifies that these restaurants are the ones open at 07:00 am. Under this scenario, at a constant of 20 incoming orders being generated, the orders-to-courier ratio would be 6.6 orders to each courier. Next, we will present scenarios 2 and 3.

07: 00   07: 30   08: 00

Restaurants Opening Hours

• Couriers: 11   ◯ Restaurants Total Universe : 368   Restaurants open and taking Quick's orders: 15
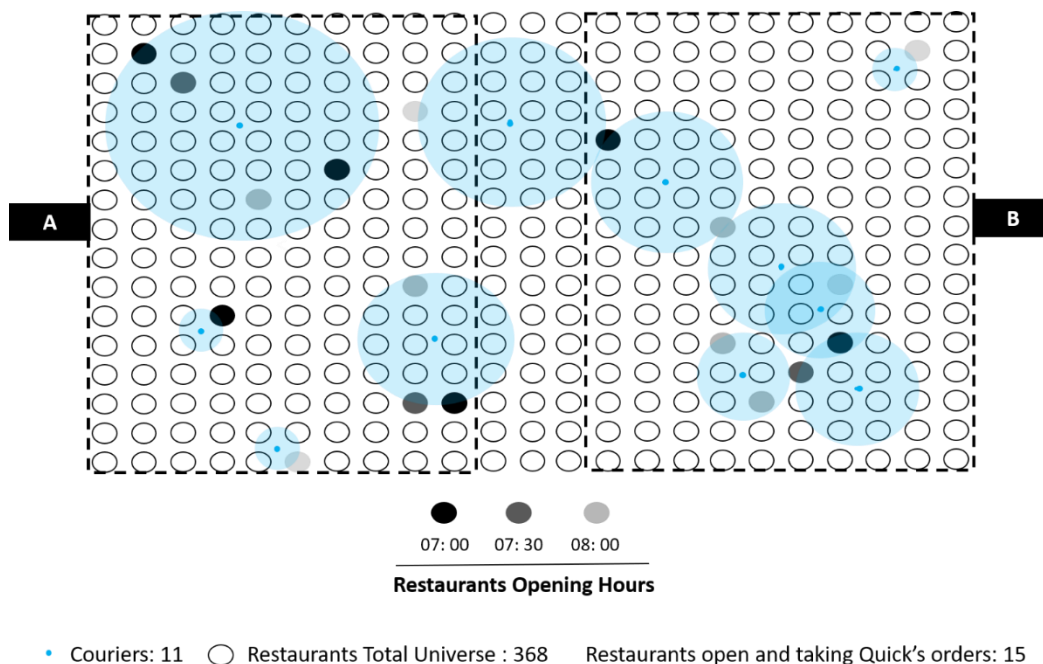
Figure 35. Scenario 2: a normal delivery area

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The Scenario 2, as depicted in Figure 35, is very similar in logic and symbolic representation as scenario 1 in figure 34. Nevertheless, we should note the presence of new elements; firstly, more restaurants have popped up within the delivery area; secondly, these restaurants' opening times are considered in the figure; thirdly, two doted-lined rectangles appeared, marked as 'A' and 'B'. The rectangles are highlighting the appearance of a basic clustering of restaurants and couriers' activity in two specific sections of the delivery area.

Additionally, although more restaurants and more couriers are present in the delivery area, a constant number of 20 incoming orders makes the status of the area go from 'Busy' (Scenario 1) to 'Normal' with an overall ratio of 1,3 orders per courier.
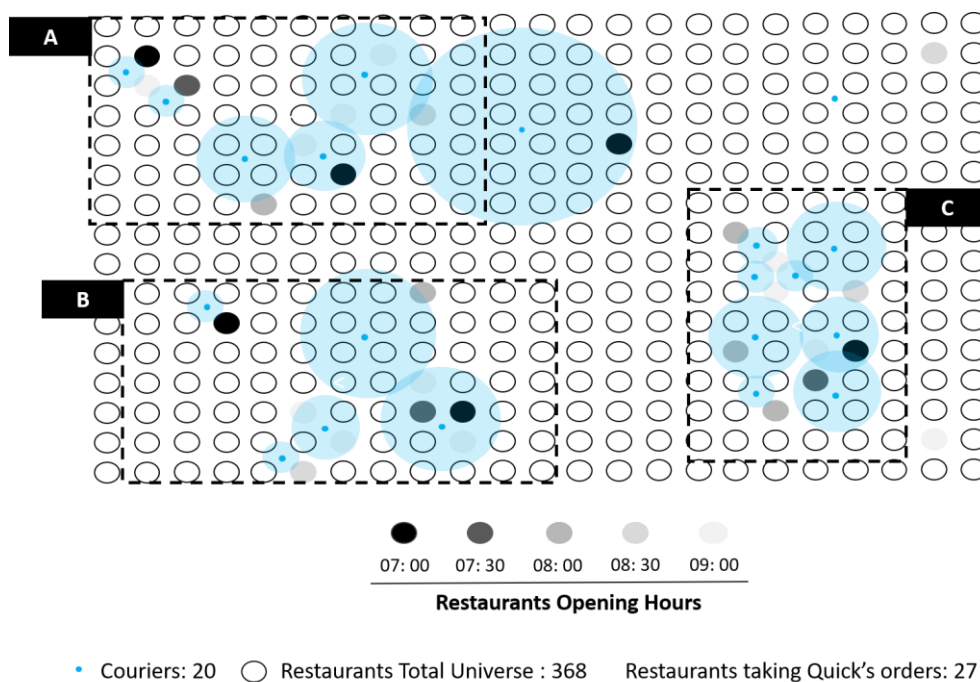
Figure 36. Scenario 3: a Quiet delivery area

Scenario 3 in figure 36, holds the same symbolic representation as our two previous figures. The additions in scenario 3 are more restaurants, and the emergence of a third clustering of restaurants and couriers' activity. At a constant of 20 incoming orders, the status of the area goes from normal (Scenario 2) to quiet, with an orders-per-courier ratio of 1 to 1.

Across the three scenarios just presented, we have mainly looked at the orders-to-courier ratio as a relevant variable determining the status of a delivery area. Nevertheless, thanks to the visual representation of every scenario, we have observed meaningful changes in the spatial dynamics of each of them. Next, I will address these spatial connotations.

There are four important elements I would like to focus when analyzing these 3 scenarios' spatial connotations, they are: (1) the density of restaurants, (2) the density of couriers, (3) the perceived emergence of restaurants clusters, and (4) the variation in couriers' pickup trips (Represented by a buffer-like light blue circle).

Table 9. Spatial dynamics in Quick's delivery areas' different statuses

	Density of Restaurants	Density of Couriers	Clustering	Couriers to Restaurants Ratio	Courier's pick-up trips distance
Scenario 1	Very low	Very low	No	0,5 to 1	Long
Scenario 2	Medium	Medium	2 clusters	0,73 to 1	Medum
Scenario 3	Very High	High	3 clusters	0,74 to 1	Short

Looking at table 9 we can suggest that it has two interesting correlations; first, we could suggest that clustering is a characteristic of highly densified environments; and second, that couriers' pickup trips distances tend to be inversely proportional to the density of the delivery area/cluster, meaning that the denser the cluster, the shorter the distance for couriers' next pickup, and vice versa.

A couple of interesting questions arise from this analysis; what happens at every end of the spectrum when the status of a delivery area changes? and perhaps, more importantly, how is exactly that this change happens?

The answers are contained in our set of scenarios:

There are at least three important phenomena to understand: (1) The density of the restaurants' clusters in relation to the number of couriers in the area will determine couriers 'spatial reach', (2) The lack of both, open restaurants and couriers on the streets (case scenario 1) promotes more elastic, hence wider delivery areas for couriers to cover. (3) as more couriers are available and more restaurants open, the platform's algorithms start to operate to match these new emerging spatiotemporal arrangements (this is why figures 35 and 36 are focused in highlighting this new clustering of restaurants that pop-ups as we approach midday)

Scenario 1 (Figure 34), for instance, depicts a specific arrangement of elements in the platform from seven to eight in the morning. At this time of the day, there were two elements of the platform that are typically scarce: open restaurants and couriers on the streets. Thus, Quick's algorithm proceeds to allocate long range pick-up trips to match demand (few restaurants opened) and offer (few couriers on the streets). Under this scenario what happens is that the spatiotemporal arrangement of breakfast temporality expands geographically and produces tangible changes in the materiality of the platform; first, a sudden expansion of the restaurant-

to-courier proximity ratio in which incoming orders are allocated, and second, an increase in the delivery ranges that couriers will have to cover when delivering.

In this way, thanks to the previous examples, we begging to understand how the materiality of the platform is affected by the constant performative relationships of the platform's elements. Couriers, restaurants, hungry costumers, and data driven algorithms, they all perform together and become-together in space, and in time. And it is to these becoming that we have extensively and continuously referred to as the spatiotemporal arrangements of the platform.

7.1.6 Geographical Entanglements

As shown in the previous sections of this chapter, urban temporalities such as breakfast, lunch, and dinner produce spatiotemporal arrangements in the city. Moreover, these spatiotemporal arrangements tend to unfold in a patterned and systemic way, allowing us to recognize them, and sometimes, even anticipate them. Consequently, it is to this patterned, recurrent, and systematic deployment of spatiotemporal arrangements in the city that we will refer to as *Geographical Entanglement.*

7.1.7 Helsinki's Geographical Entanglements

Finding that urban temporalities have spatial correlations or spatiotemporal arrangements, as this work has called them, is something couriers discover every day, along with their daily routines and work experience. After hundreds of deliveries made, and more likely a couple of dozen from specific restaurants, you begin to see some patterns in the delivery areas and addresses where these orders will lead you. This is one of the first steps in grasping the platform's entanglements and its patterns.

> *I have been lately taking orders in* **Punavuori** *and* **Ullanllinna***, and the number of orders going to the same streets and addresses is a constant pattern, streets like Merimiehenkatu, Sepänkatu, and Pietarinkatu, are already part of my top 3 delivery streets.*
>
> Author's Field Diary – 29th of April 2021

As we observe in the fragment of my diary, tracking the origin and destination of orders gave me spatial correlations that were hard to ignore. And once you start noticing these patterns, it is hard to stop; I would find myself trying to make sense of these correlations more and more

often. Consequently, I started to build my first mental map of the platform's order distribution patterns across the city.

1   2

The Areas   The Perceived Patterns

Figure 37. Intensity of delivery trips and patterns of the delivered food

Image 1 shows the first restaurant clusters I was able to perceive in the city, together with their subtle differentiation regarding physical distribution; A first group of restaurant clusters is that of indoor shopping centers, symbolized by a solid white circle, from bigger to small; we have Kamppi, City Center, Forum and Kluuvi. A second group of restaurant clusters is that of street level ones. More evenly distributed than the first group, white dotted lines and white transparent polygons symbolize the areas where these restaurants are present (Image 1) on top of the areas where the density of these restaurants is more significant.

Image 2 adds a series of white arrows with different thicknesses pointing towards different areas; the arrows thicknesses represent the volume of orders, and its orientation shows the most common delivery areas where these orders would end up.

Thanks to Figure 37, I was able to recognize an intense core (highlighted in red), and considerably less intense peripheral areas (marked in yellow) of order distribution within the city. Additionally, by drawing the trajectory of my own trips and their destination, I could identify patterns of the platform's entanglements I wouldn't have reached otherwise. The most noticeable patterns being, (1) orders were intensely being generated and delivered within the core 'red areas' of the city, (2) Orders generated in the southern and northern restaurant clusters of the city tended to be delivered within the northern-most and southern-most neighborhoods, respectively. Finally, (3) the peripheral areas (marked in yellow) represented marginal areas of the platform entanglement with the city.

Together with this identification of patterns, I started to be more attentive to the way these patterns were influenced by the time of the day I was delivering in.

> *Progressively, as soon as I was not worried about addresses and directions, my mind started to think about other things; the daily eating rhythms of households, the peak hours, the apparent 'coherence' or double determination of the type of restaurant and its possible clients, the distribution of tasks across time and places, etc.*

Author's Field Diary – 27th of March 2021

As you can see by my notes, the temporalities of urban life (eating rhythms, peak hours) and the spatial correlation of them -their spatiotemporal arrangements- were central concerns of my inquiries during my life as a courier.

To make sense of my own experience of the platform and its entanglements with the city, I started drawing, and in drawing, I found myself projecting my own experiences onto a map; A map that ultimately opened the door to understand my own work as part of the platform I was helping to deploy.
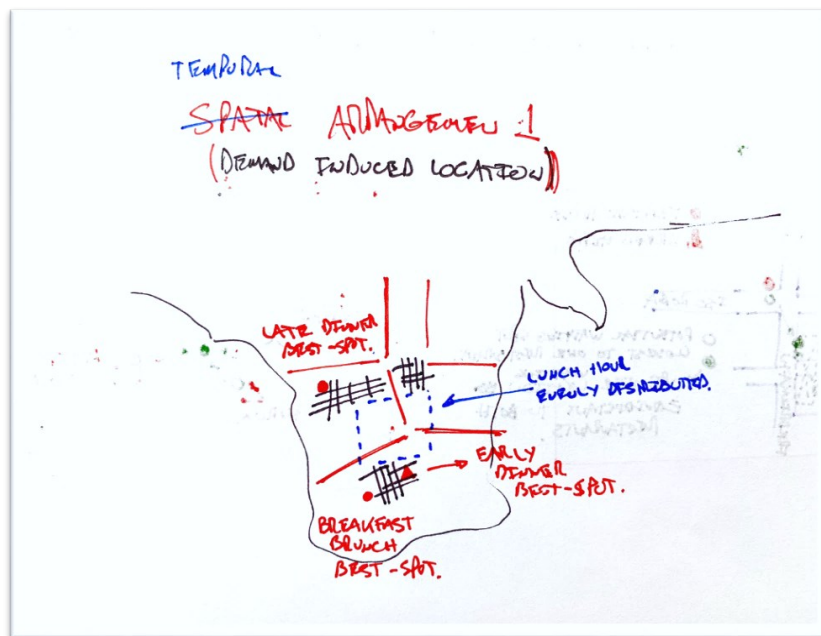
Figure 38. Early identification of the platforms' geographical entanglements in Helsinki

In figure 38 you can read -I hope- tags that I was writing to myself, as a sort of reminders or sticky notes about where to be at a specific time of a working day. These tags are very explicit; 'Late dinner best spot', 'early dinner best spot', 'Breakfast-brunch best spot' and so on.

Additionally, together with these tags, we can also find valuable geographical and infrastructural references; geographically, there is no doubt that the drawing represents Helsinki's city historic core; and infrastructurally, we can see at least three main roads depicted; Bulevardi, going from west to east, Esplanadi, going from east to west and finally, Mannerheimintie, starting in the intersection of the last two and going north. Furthermore, the figure also contains a dotted square right at the middle of the whole area tagged as: 'Lunch Hour – evenly distributed'.

What I did by drawing the image in Figure 38, was the very first representation of the platform's geographical entanglements in Helsinki.

7.1.8 Espoo's Geographical Entanglements

Espoo is characterized by a polycentric urban structure with no visible dominating or central core/area. Less dense than Helsinki, and much more sprawled, Espoo's polycentric hallmark will be reflected on the type of restaurant clustering and the density of them. (Next page).
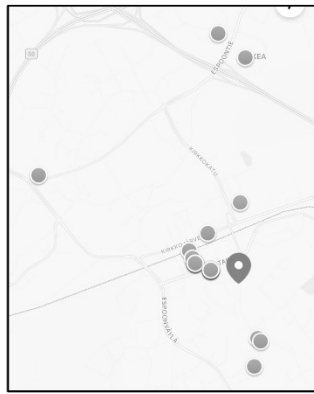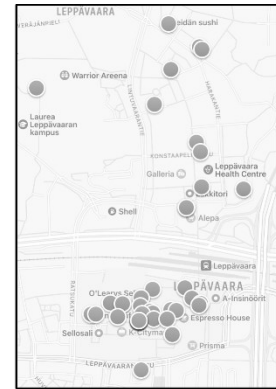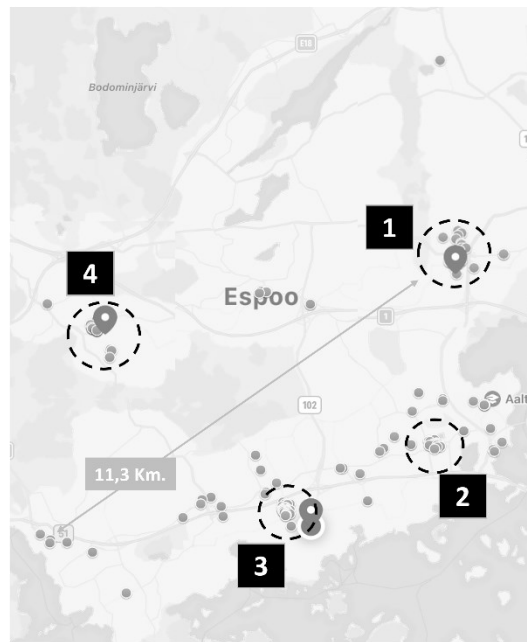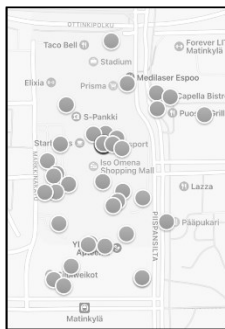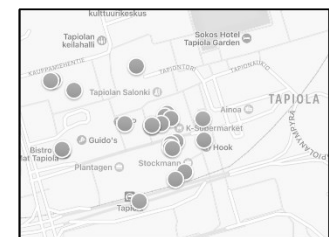
Figure 39. Restaurants distribution in Espoo

From a total number of 136 restaurants registered in Quik's platform in Espoo[10], 67 are placed inside 3 shopping malls (Sello, Ainoa, Iso Omena), in other words, 49,2 percent of Quik's restaurants in Espoo are clustered in only 3 locations.

Additionally, Figure 39 confirms a polycentric clustering of restaurants in Espoo in 4 visible nodes; Sello Shopping mall in Leppävaara, AINOA shopping center in Tapiola, Iso Omena shopping mall in Matynkilä, and finally, a more disperse and less dense cluster of restaurants in Espoon Keskus. This will have direct implications in the way the platform unfolds and entangles with the city.

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[10] Number of Restaurants present in Quick's platform taken on the 24th of January 2022.
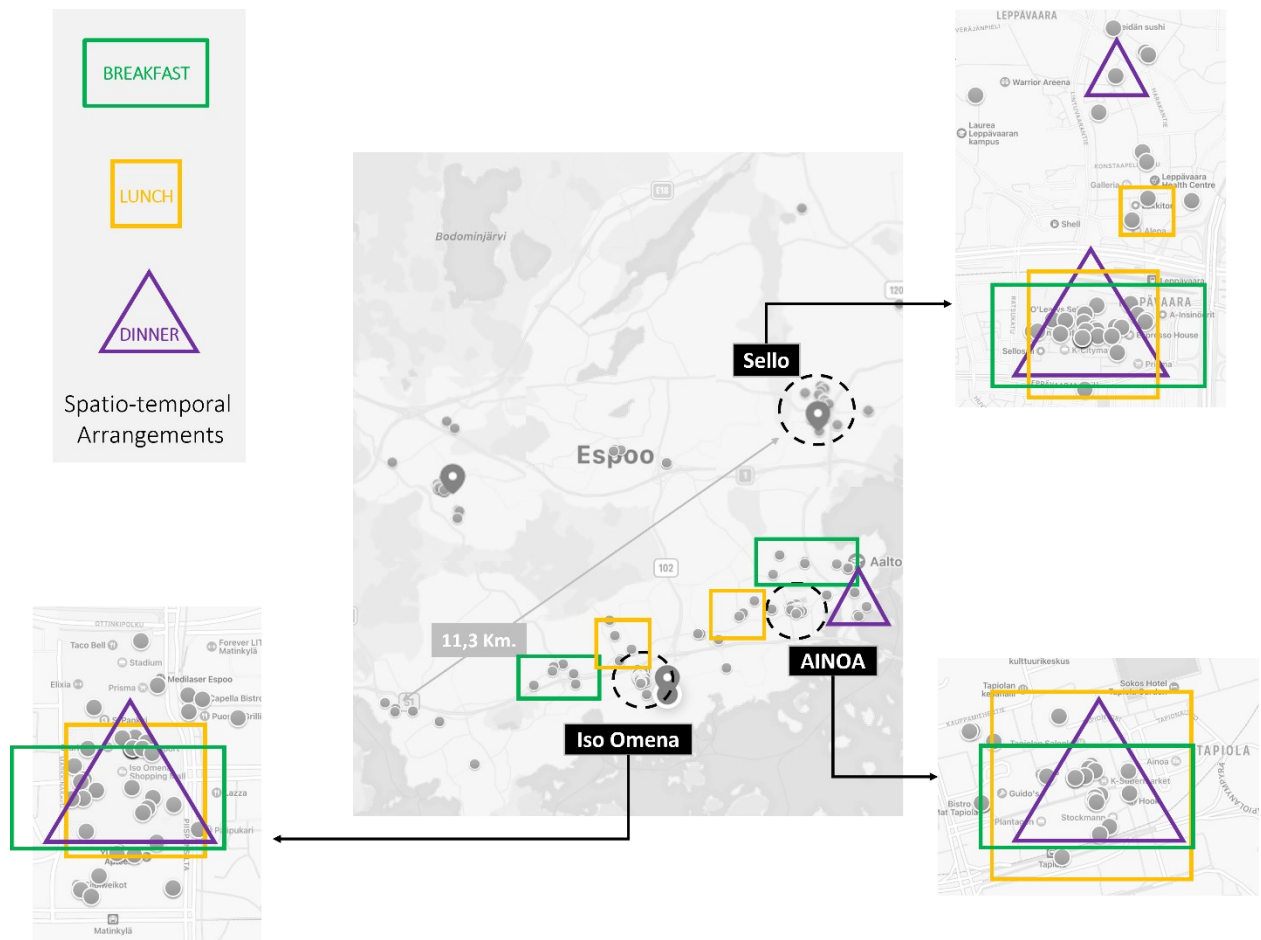
Figure 40. Quick's spatiotemporal projections in Espoo

As observed in Figure 40, Quick's spatiotemporal projections in Espoo overlap with the polycentric nature of Espoo's urban structure. When observed closer, an interesting phenomenon is observed; Because of the intense clustering of restaurants within shopping centers, the spatiotemporal projection of the platform overlaps constantly.

Furthermore, when compared to the platform's geographical entanglement in Helsinki, Espoo's case is certainly contrasting. It is so contrasting that couriers recognize it and are even influenced by it when choosing their working areas.

> *I prefer working here (Espoo), because here, most of **the restaurants are located in one place** so it is easier to locate them. (Gustavo – Espoo)*

> *It's a bit challenging in Helsinki because the **restaurants are scattered all over the place**. Yeah… (Bruno – Espoo)*

As observed by Gustavo and Bruno, we are talking about a fundamental spatial variable; location, proximity, density, clustering, etc. These are structural conditions of restaurants distribution in space.

The physical distribution of restaurants in every city are important elements impacting the spatial patterns in which the platform's spatiotemporal arrangements are projected in the city. Hence, comparing these differences between Helsinki's and Espoo's would be a good analytical exercise.
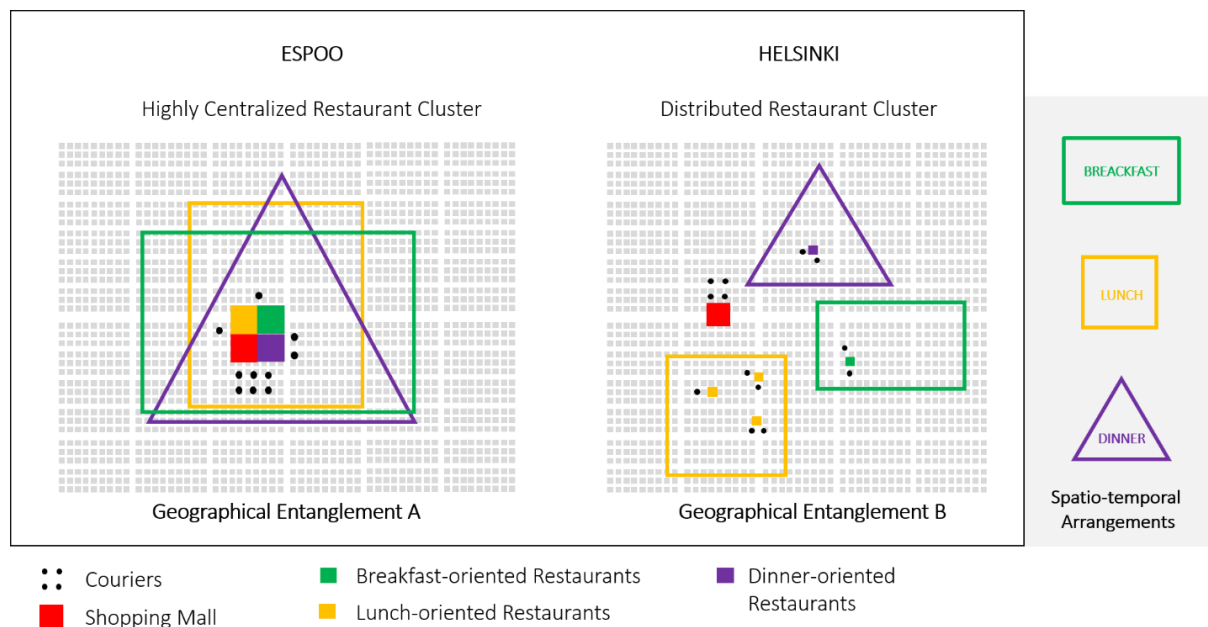
Figure 41. The platform's geographical entanglements in Helsinki and Espoo

In Espoo's and Helsinki's case, we see a very contrasting type of spatiotemporal arrangements, and therefore, a different type of geographical entanglement. Their notorious difference in urban structure provides a polarized scenario that prompts even more polarized entanglements -as observed in Figure 41.

In Espoo's case study (a shopping center), all restaurants were located inside the shopping mall. Therefore, the spatiotemporal arrangements produced by each temporality unfold consistently on top of the same spatial plane: the shopping mall; which increases couriers' intensity of use of the same spaces and gathering locations.

On the other hand, in Helsinki's more evenly distributed network of restaurants, the spatiotemporal arrangements produced by each temporality were distributed across the city.

Consequently, the intensity of the use of the spaces and gathering locations decreased, making it more difficult for couriers to meet and talk.

7.2 Couriers Experiences and Sensemaking Processes

This work is not intended as a comparative case study between couriers in Espoo and Helsinki, nevertheless, the initial results of our analysis of couriers' interviews suggested a tendency for the data to be concentrated in polarizing ways. As the analysis process deepened, different saturation intensities were noted in specific codes and categories depending on their correlation with the two main groups of couriers interviewed. In other words, whilst couriers in Espoo and Helsinki do share a common understanding of their interactions within the platform, they also seem to have developed a specific understanding of it.
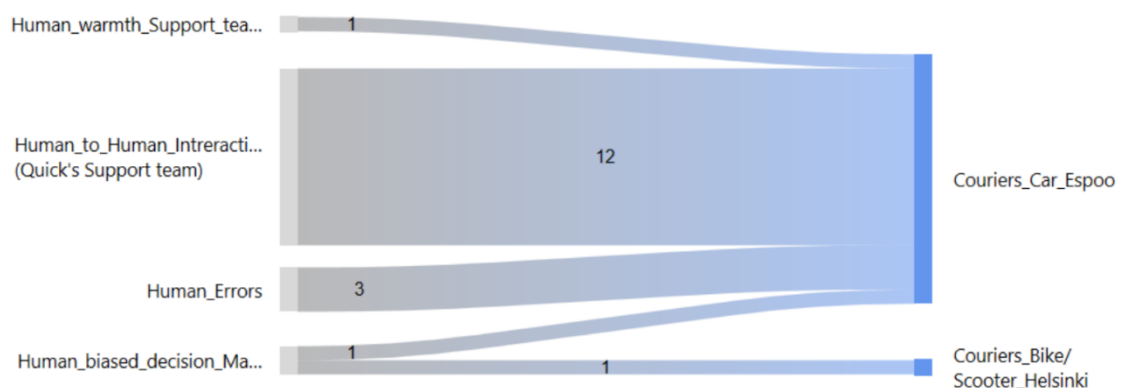
Figure 42. Code-to-group co-occurrence analysis: Human Biased decision making within Quick's algorithmic management

In figure 42 above, our focus shouldn't be necessarily put in the relevance of the category we used to generate the diagram ('Human biased decision making'), but on the right side of the diagram, where we can evidence which group of couriers is contributing to the emergence of this category. Using Atlas' code-to-group co-occurrence analysis, the diagram above shows the different intensities in which every group of couriers contributed to a specific category or set of categories.

Thanks to figure 42 we can observe how Espoo's couriers' perceptions human-biased decision making were significantly higher than their peers in Helsinki. Nevertheless, just like Espoo's couriers' data presented higher saturation in this specific category, couriers in Helsinki will

show a meaningful saturation of data in other variables, codes, and categories. Let's see some examples next.
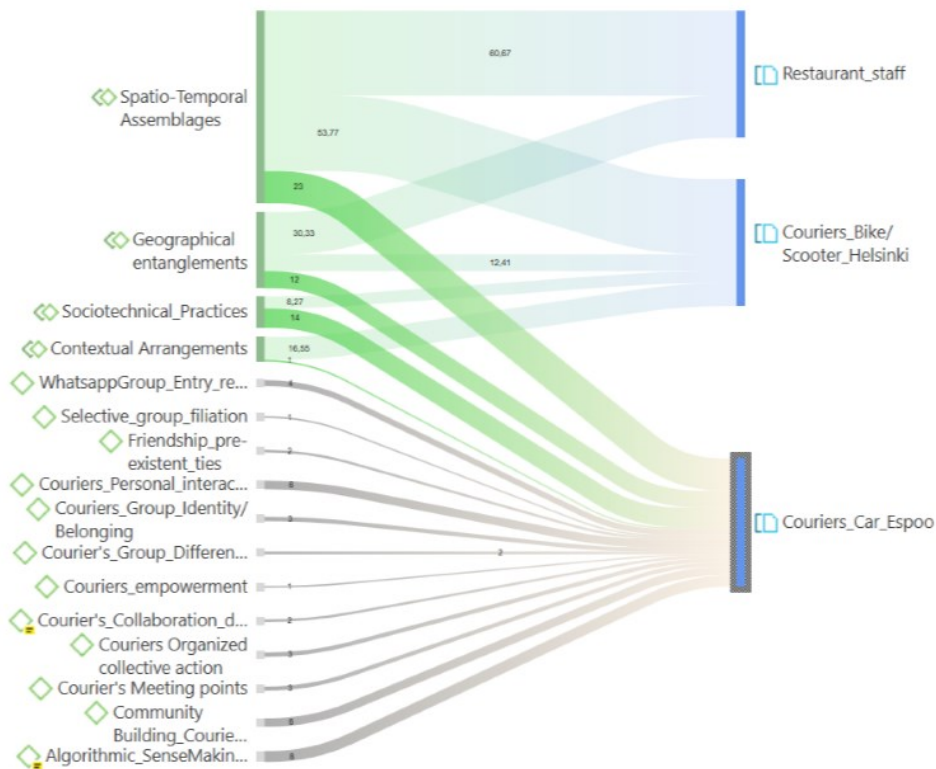
Figure 43. Group of interviewees and saturation of multiple categories

Figure 43 above, shows us each group of interviewees contributing in different intensities to different codes and categories of this thesis. Additionally, the figure also allows us to see that different groups of interviewees could have a wider repertoire of topics to explore; that is the contrasting case between couriers in Espoo and couriers in Helsinki: meanwhile couriers in Espoo touch upon several codes and categories –sixteen, to be precise– couriers and restaurant staff in Helsinki focus only on a handful of them (four). Now, we could ask ourselves, what is more important, diversity (as in Espoo's couriers)? or consistency and intensity (as in Helsinki's couriers and restaurant staff)? Both are.

Diversity of topics suggests a more comprehensive understanding of the platform, while consistency and intensity suggest the development of highly specialized knowledge in certain areas or functions of the platform. Consequently, why is it that some couriers (Espoo) talked more about algorithmic management, group identity, or human biased decision making? while others (Helsinki) were more concerned about the geographical aspects of their interactions with the platform?

The answer in brief is that couriers' sensemaking processes emerge from practice, from their specific and contextual interactions with the platform and the city.

Consequently, to make sense of couriers' sensemaking processes, we should consider at least 3 variables:

1. *The type of entanglements of the platform and the city wherein couriers' work*: the characteristics of the pre-existent infrastructures in the city, the multiple spatiotemporal arrangements of the platform and its geographical entanglements.
2. *The intensity, consistency and periodicity of couriers' interactions with the platform*: Part-time or full-time courier, sporadic or consistent working patterns.
3. *The community of workers where they work*: Is it a community that builds helping networks and shows a collective identity? or is it one where couriers rely more on their individual performances and skills?

In figure 44 below, we integrate and analyze these 3 variables in a single diagram:
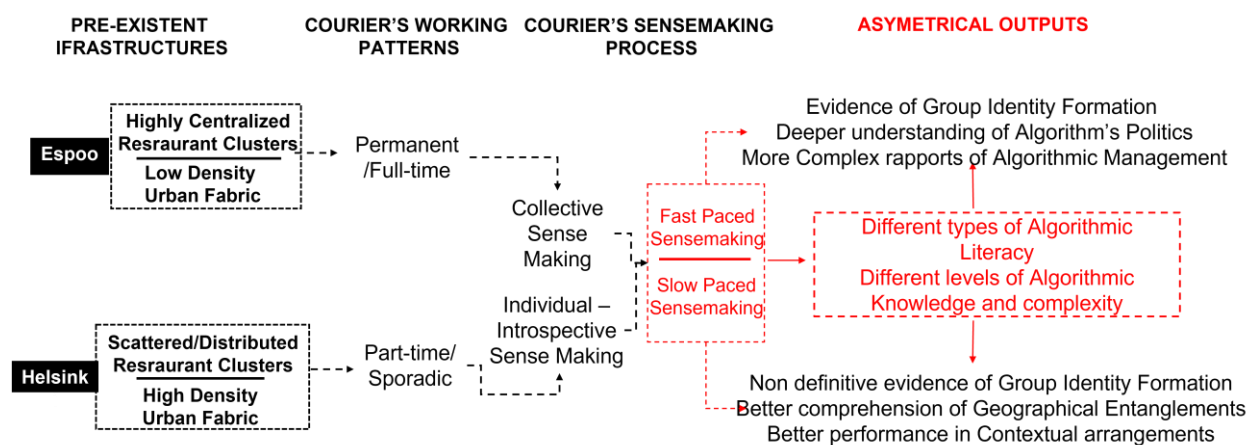
Figure 44. Courier's sensemaking processes in Espoo and Helsinki

As shown in figure 44, couriers' sensemaking processes are specific, contextual and performative, and they are affected by a multiplicity of elements; the way the platform entangles with the city, couriers' working patterns, and even the community of couriers to which they are part of. Additionally, analyzing figure 44 we arrived at the following findings/conclusions:

We found that collective identity formation was enhanced in areas where the platform entangled with pre-existent infrastructures that favored the hyper-centralization of restaurants (Espoo) whilst areas with more distributed clusters of restaurants hindered this possibility.

We found that couriers that participated in communities with a more developed sense of collective belonging could meaningfully speed up their sensemaking processes1, whilst couriers working in areas where individual sensemaking was more common, could potentially see a slow-paced progression in their sensemaking processes.

We found as well that there seemed to be a correlation between the platform's geographical entanglements, the emergence of collective identity, and the speed of couriers sensemaking processes. Nevertheless, we also found that regardless of the speed, we were also seeing qualitative nuances in the sensemaking outputs of both groups.

Espoo's couriers sensemaking processes were highly influenced by a more present and active community of couriers who talked, discussed, shared knowledge and even collaborated and took actions as a group. Their discussions reflected on a wide range of topics, ranging from politics and algorithmic management to working conditions and human biased decision making.

Helsinki's couriers' sensemaking processes, on the other hand, were predominantly more individual-oriented and introspective. Nevertheless, Helsinki's couriers were qualitatively better equipped to navigate the multiple geographical entanglements of the platform in Helsinki and presented an overall better performance in planning and deploying contextual arrangements than their peers in Espoo.

In this way, analyzing figure 44, we can suggest that couriers present different levels of complexity on their accounts of the platform and its managing algorithms, they develop diverse and distinct types of algorithmic knowledge, and they ultimately acquire the sufficient algorithmic literacy to navigate the specific entanglements of the platform in which they work.

Thanks to the previous set of findings, we can suggest that couriers sensemaking processes are indeed performative, they emerge from couriers' experiences and practice, they are shaped by couriers' positionality within the platform, and they produce –almost intrinsically– precise knowledge that facilitates their navigation of the platform. Thus, the outcomes of couriers' sensemaking processes will have a huge impact on couriers' practices and strategies.

During the coming titles, we will present a series of episodes that will illustrate how sensemaking is deeply rooted in couriers' practices and strategies, and how at the same time, the knowledge acquired by couriers through their sensemaking processes helped them to refine their strategies. To help us do so, we will present our findings structured around the two more meaningful types of knowledge we have observed across our data; these are: algorithmic knowledge and geographical knowledge.

7.2.1 Couriers Algorithmic Knowledge

Algorithmic knowledge refers to every category in which couriers reflected about Quick's algorithmic management impact in their daily lives. Additionally, it also includes categories in which couriers reflected more holistically about the role, nature, and goals of Quick's algorithmic management. Thus, couriers' algorithmic knowledge will touch upon topics[11] such as algorithmic management, algorithmic sensemaking, algorithmic glitches, algorithmic flow, algorithmic equalization, algorithmic politics, algorithmic agency, and human agency.
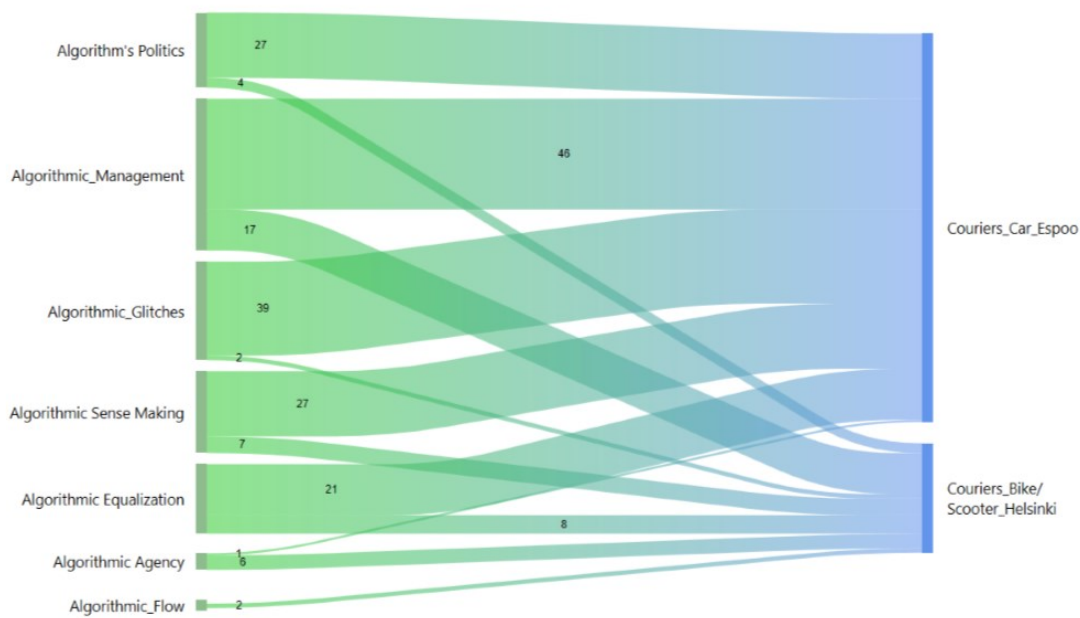
Figure 45. Algorithmic knowledge categories and code groups

As observed in Figure 45, couriers' understanding of Quick's algorithmic management was more salient among couriers in Espoo than in Helsinki's. This is consistent with the previous findings in this work suggesting that couriers' sensemaking processes are contextual and produce asymmetrical results depending on the positionality of couriers and the specific entanglements of the platform on which they participate.

Another important vein from where to inquire about couriers' algorithmic knowledge was rooted in their daily experiences of algorithmic management; thus, their narratives on the 'glitchy' and fuzziness of algorithmic decision making were key resources to make sense of the managing process itself. Next, I will present two concrete examples of this type of experience.

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[11] Each one of these topics corresponds with a group of codes (Category) of the same name. To take a closer look at the code book of this work go to Figure 12 in pag. 49.

Quick's Algorithmic Glitches: episodes of Compromised algorithmic decision making

Algorithmic decision making is often seen as a logical, objective and transparent process with no human subjectivity involved. Yet, food delivery algorithms are always custodians of corporate interests, hence, their marked tendency to black-boxed its code and processes (Pasquale, 2015). Nonetheless, under the right circumstances, couriers are able to grasp the internal functioning of Quick algorithms. Literature referred to these episodes as *glitches* (Leszczynski, 2020) or *fissures* in algorithmic power, as *'moments in which algorithms do not perform as intended'* (Ferrari & Graham, 2021).

The present section will focus on these fissures and glitches as episodes in which couriers perceive a 'failure' in the logical functioning of the algorithm. Furthermore, this section will present a detailed set of episodes where Quick's algorithmic decision making was perceived by couriers to be influenced or altered, by code or through direct human intervention (human-biased).

Human biased decision making

> *Sometimes you can just sit here, and your phone doesn't have any other until you even write to support. 'Hey, I am not getting orders' (He writes), then they tell you: Just wait there hopefully you get something and then you just receive one order.*

> Gustavo - Espoo

> *Sometimes you don't get an order and when you write to them and tell them 'Why I have not gotten any order for one hour?' Immediately you finish saying that, you get an order. They will tell you; 'OK, we hope you will get one soon'...*

> Ivan - Espoo

> *It was incredible! Right after I wrote to them, only seconds after the support team saw my message, I had a blue box (an incoming order) popping into my screen!*

> Author's Autoethnographic Diary

As observed in the previous quotations, couriers perceived that complaining to Quick's management team had a positive, and frequently, an immediate result. Consequently, couriers that have had these experiences tend to believe that the human beings with whom they interacted have the possibility of influencing the decisions that were being made by the algorithm.

> *I think sometimes, they (the management team) have the power to also assign, apart from the machine, I think they can also assign the orders.*

<div align="right">Ivan - Espoo</div>

> *'But finally, after that (after he has complained that he was not receiving any task), one or two minutes. Then they are going to give me a task, so they cannot convince me that this is by chance... One thing we believe, even if they say* **the whole system is based on algorithm** *or something, we believe that is bullshit.'*

<div align="right">Bruno - Espoo</div>

The idea that 'something', -in this case direct human intervention- was altering the natural flow of orders, made couriers doubt about the algorithm's 'objectivity' and 'impartiality'. Furthermore, this apparent non-objective decision making was making couriers feel frustrated, angry and powerless. Hence, they developed political judgements about Quick's order allocation policy (Something we will develop further at the end of this chapter).

Algorithmic Biased decision making

Algorithms store not only our data. Data storage, or better, data gathering, is the first, and fundamental step, to perform more complex processes. Once stored, the data is fed into sophisticated statistical models to predict consumption patterns, political affinity, or risk of mental health disorders (Pasquale, 2015). Additionally, the data can also train algorithms via machine learning, and ultimately the data can inform processes of algorithmic rating and ranking of user's performances within a platform.

In food delivery platforms, rating and ranking couriers have been identified as a central element of platforms' managing algorithms (Kellogg et al., 2020). Rating and ranking have not only been used to measure and evaluate couriers' performances, but also to predict their future performance (Kellogg et al., 2020, p. 377).

In line with the previous arguments, couriers in Helsinki and Espoo perceived the inherent process of algorithmic rating and ranking they were being subjected to. Moreover, couriers

were able not only to perceive the ranking and rating function of the platform but also to give concrete examples of when they perceived it, and how they were impacting their lives.

The most common scenario of rating-based alteration of algorithmic decision making was described by couriers as a 'differentiated treatment' between old and new couriers, between permanent intensive-working couriers and part-time sporadic couriers. According to them:

(Old Vs. new courier)

'We know, I know the guys who have been here long enough, or long ago and those who are here long times during the week. So, for instance, if we are all parked outside, you see when someone gets an order, yeah and sometimes someone goes twice, and you are still there waiting.'

<div align="right">Carlos – Espoo</div>

'There are some partners here that they have more deliveries, they always have more deliveries than everyone because they have been here from the beginning... So, I realize, the more you stay in Quick, the more orders you will get than a new person (courier).'

<div align="right">Bruno – Espoo</div>

'I have also tried to ask 'S' (A respected old courier in the area) how he does, but there is no difference from what we do, but he gets 3 tasks you get one, he gets four you get one. The difference is that he is an older courier.'

<div align="right">Ivan – Espoo</div>

(Permanent intensive Vs. Part-time sporadic)

for instance, someone who is doing this full time and me who is doing it just a couple of days in a week. If we come to work and there are few, very few tasks coming in, they will -I don't know if it's the algorithm or Quick's management team distributing the tasks-, but I know that they give more to those guys who are permanent.

<div align="right">Carlos – Espoo</div>

I think they can make the priority, for example, the priority about someone who works full time, and someone who does not work that much.

<div align="right">Joaquin – Helsinki</div>

This perceived differentiation made by Quick among couriers is relevant for this work in a handful of ways. One, it continues to enlarge the series of algorithmic glitches from where couriers access and make sense of the platform's managing algorithms. Two, it suggests that the platform allocates orders to couriers using its own ranking and rating parameters -that might not correspond to a logically organized procedure. Hence, couriers perceived Quick's algorithmic decision making as biased.

Additionally, these biases are perceived to go beyond sporadic or isolated events. Rather, Quick's algorithmic biases were identified by couriers constantly:

Then, when you are here in the parking, you stay right here, and **you will see** *him going to pick something, coming back, going again. And then is when you are wondering what is happening?*

Ivan – Espoo

Sometimes you notice that people are getting tasks, you can stay here (At the parking lot), and **you see** *when someone gets tasks, goes to deliver, comes back the next time, picks up, go to deliver, and you are still here waiting …*

Carlos – Espoo

You see *how these other guys are coming and going. They could have 3 orders and you only one. But that was the time when I was not that active in doing this, you know?*

Gustavo – Espoo

I have realized there is one guy here (an old and experienced courier) and sometimes you are with him here and he is the one getting the tasks, but you were here first!

Ivan – Espoo

Given the way the platform entangles with Espoo's Polycentric urban texture, and especially the fact that 90% of Quick's restaurants in Espoo are located within a shopping mall, couriers are usually waiting for orders in the same places. This fact gave them the possibility 'to see' exactly when and who is getting more orders. Which in turn increased couriers' self-awareness of Quick's algorithmic decision-making processes.
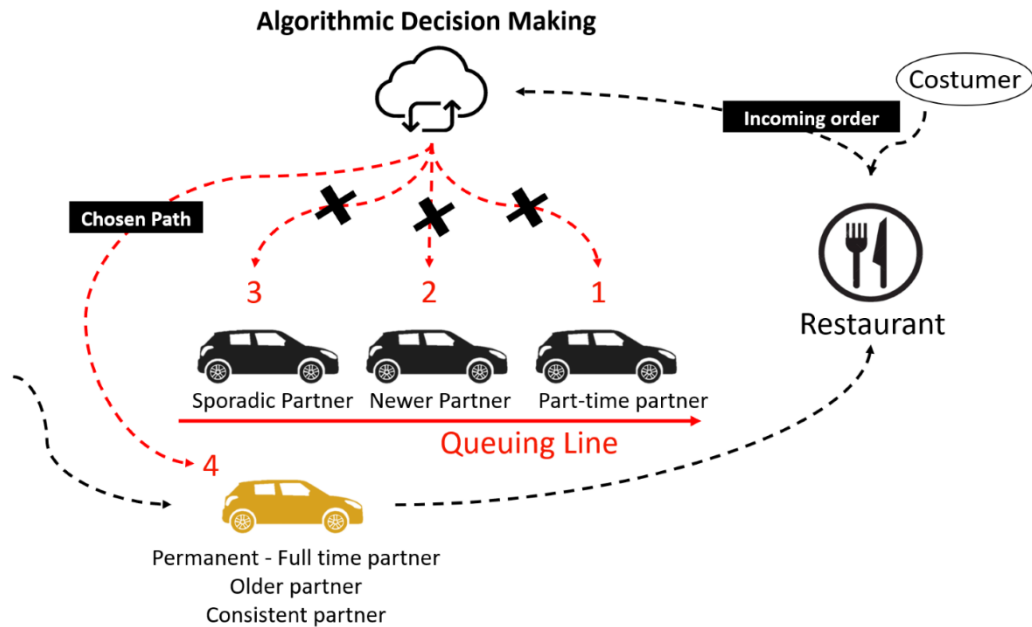
Figure 46. The algorithm skips the queuing line

As observed in Figure 46 and the series of quotations before it, been an older-full-time courier was perceived by couriers as a meaningful variable used by Quick's algorithm to make its decisions.

This episode shows how Quick's algorithm effectively used ranking and rating mechanisms to inform its decision making and order allocation parameters, favoring in this way older and permanent couriers over new and sporadic ones. This ultimately creates a tangible bias that is visible to couriers:

> *They should start like, giving the tasks to the first person who came there, and then to the second person that was in the line. They should look how long you have been there waiting. I mean, that is what they should do if they would like to be fair, but **it doesn't work on the basis of Fairness**, you know?*

<div align="right">Brumo</div>

Bruno's quotation illustrates how couriers perceived the internal dynamics of Quick's algorithmic decision making. Furthermore, Bruno suggests two new decision-making pathways to correct what he perceives as a failure. First, he identifies that order allocation should correspond to couriers' order of arrival. Second, complementing the order of arrival, Bruno also suggests that order allocation should consider couriers waiting times.

Bruno's closing statement on fairness is revealing; there, he draws a relation where algorithmic procedurality equals fairness and implicitly suggests that the noncompliance with

it could lead to unfair decision makings. Consequently, algorithmic management systems are not a 'politics-free' environment; feelings of unfairness, injustice, and biased decision making are experienced.

This specific section shows us how, even when Quick's algorithmic decision making was black boxed, its outputs were not. Thus, couriers made sense of the algorithm through its visible, contrastable, and tangible effects on their daily lives. Furthermore, we need to highlight that every time that the algorithm was perceived as steering a particular management decision to 'favor' someone, couriers have perceived this as a sensible political decision. To be more precise, every time a courier expresses feelings of injustice and unfairness is an opportunity to scrutinize the politics of the algorithm.

7.2.2 Couriers geographical knowledge

Couriers will constantly refer to several geographical elements of the city; from simple observations about the morphological nuances of the city's streets to complex arguments about the perceived distribution of the city's population according to income levels.

Joaquin, for instance, makes a very insightful observation on the morphological nuances of Helsinki's streets and neighborhoods:

> *For me, I think, All the time I prefer short (Delivery trips). For example, in Punavuori, I know the streets are close, it's all time close, like 50 meters, 50 meters. So, when I take my order in Punavuori, I Know is not going to take time [to deliver] But if I take for example like Rouholahti. There the streets are different than in Punavuori, they are longer.*

Joaquin - Helsinki

According to Joaquin's statement above, the city's streetscape and its unique morphological characteristics are perceived as having a direct impact on the distance ridden and time spent on every delivery. Additionally, Joaquin also suggests that he has found a direct correlation between incoming orders from a given Neighborhood (Punavuori) and their overall drop-off distances; according to him, it is because the streets in Punavuori are 'short' that orders drop-off distances are always 'close' by.

In the same vein, I also noticed some interesting correlations between the platform's dynamic and the different areas of the city.

Monday the third of May 2021

Let's say you are delivering in the most south-eastern extreme of the city; Kaivopuisto, where a cluster of embassies is. The probability of having an order close by is reduced drastically since this area has few to null presence of businesses, restaurants, or bars. On the other hand, if you are delivering in Punavuori, and from there towards Kamppi, taking orders along the way from Bulevardi's, Uudemankatu's, and Löonnrontinkatu's restaurants, then the chances of receiving one order immediately after the other increases significantly! This is the dreamed oasis for couriers! We love delivering within this axis since this ensures that the number of trips without orders will decrease, hence! The total number of orders delivered within a day will increase!

Author's field Diary

The area I described above is undoubtedly the densest cluster of restaurants in the city[12], but even within this relatively compact area, my experience was impacted by a planning-related variable: land uses. Kaivopuisto is a homogeneous low-density residential area, meanwhile Punavuori/Kamppi are considerably more mixed-use and high-density areas. Hence, my moving patterns –and by extension, those of my peers– are affected by these preexistent variables. Consequently, we could suggest that there is an apparent direct relationship between density, mixed land uses, and the frequency of incoming orders.

Interestingly, the tracing, identification and perception of these infrastructural nuances doesn't end in the morphological or legal frames shaping the city's physical structure. Couriers also traced demographic and socioeconomic nuances, just as Ricardo and Sergio will do in the coming fragments of their interviews.

Alejandro

Why do you think it is that orders are leading you to that specific area of the city?

Ricardo

Well, customer wise I think it's the 'upscale' area. They Obviously have high live (living) standards, and they can afford to order breakfasts. Punavuori, 'Ullalina', Eira, are these types of people that maybe are busy, or they have just no time...

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[12] For a closer look at the area, see Figure 20. Pag. 57

Just as Ricardo, Sergio, an experienced staff member of a big high-end restaurant chain located in Punavuori, observed some tendencies in consumption patterns that suggested - according to him- that these areas were proportionally 'better-off' than the rest areas of the city.

> *'For example, there, in Punavuori. Because over there, the southern side of Helsinki, starting from Bulevardi to the South all the way to koivopuisto and the ocean, those are the most expensive areas to live in Helsinki. I noticed like in the first three days, that there are a lot of 'regulars', some people might order four times a week from us, -and we don't sell the cheapest food in town, you know-, but over there, in that south side of Helsinki where people have a bit more money, I also noticed that the orders themselves are much bigger, meaning much more expensive… I could say like 10 names that ordered, like all the time almost, but that just goes to show that they have more money to spend over in that part of the town'.*

<div align="right">Sergio – Restaurant Staff</div>

Sergio's statements directly support the ideas expressed earlier by Ricardo, and although their undeniable subjectivity, the argument they present is reasonably valid: The higher the socio-economic quartile, the bigger the volume of orders and the frequency of them. Furthermore, the way they clearly identify that income levels determine subtle but noticeable changes in consumption patterns (expressed in a more intense use of the platform), shows how important this sensemaking process is for couriers and restaurants' staff.

Just as myself and Joaquin, Ricardo and Sergio made sense of the platform not only from their digitally mediated experience of it through the app, but most importantly, from their daily routines. Along their daily working days, couriers and restaurant's staff are active agents helping citizens to get their daily meals, but at the same time, they are passive agents gaining access to the rhythms of urban life, the consumption patterns of households, and of course, the origin and destination of the delivered meal.

This social, economic, and geographical knowledge is the kind of knowledge we saw –and we will continue to see– across our interviewee's narrations. Interestingly, this knowledge was not there before; it was certainly not there when I started delivering food, and, as far as I can presume, it was not there for the large part of my fellow immigrant couriers in Helsinki.

This deep and intrinsic knowledge of the city built up in time; with every delivery, with every hour spent on the saddle –and the screen, and with every kilometer rode to customers' front

door. Knowledge was being created along the way, embedded in our daily lives and working routines.

Unexperienced Courier	Experienced Courier
'I took the order, I went to the address to deliver it, and I didn't mark it as delivered until it was fully delivered at the consumer's doorstep. The real reason for this was that I was not entirely sure if I was in the right building, if I was at the right address, if I would find the right door where to drop off the bag. In other words. I was afraid of marking the food as delivered and, after that, not finding the client's door… because the truth is that, once you mark a task as delivered, you go blindfolded; all the information related to that specific task disappears, specific floor and apartment number, access codes for the main entrance and other coded doors, the client's telephone number, everything vanishes from the app'	'As I became more experienced, I was more confident about the addresses I was visiting, not because I would have known every building in Helsinki, but I did know the logic of addresses in Helsinki, a common pattern, a specific way in which some legal framed has shaped the physical address landscape in the city. I knew that there is only one number 17 within a street. Once that you are in the correct address and access door even in multiple building within the inside (usually marked as A, B, C, D, E or F), even in those cases I was confident that I would be able to find the suitable building inside of the premises of the address… Then, once I had found the right building with its corresponding letter finding the right apartment was just a matter of time. In 90% of the houses in Helsinki, as soon as you go in and look at the left or right side of the main entrance, you will find a board where you can easily identify the last name and number of the apartment where your order is going'
Author's Diary – March 2021	Authors Diary – May 2021

Figure 47. Geographical knowledge in use: Experienced Vs. Unexperienced courier

Geographical knowledge in food delivery platforms is not generated by 'accident', but as an intrinsic part of being a courier. It is not generated as a byproduct, but as an indispensable capital for couriers to navigate the platform. Moreover, it is not couriers the only ones benefiting from this knowledge, but most importantly, and critically, the platform itself.

In the coming section, we will present a clear example of how couriers' geographical knowledge is used by the platform as a variable in its algorithmic decision-making process.

Historic geographical accumulation

Historic geographical accumulation refers to the algorithm's accumulation of historic data regarding every address where a courier partner has delivered food. In couriers' words;

> *'For example; if you have visited maybe a particular address, there's a high probability that the app is going to give you tasks on that address next time, because the app knows that you already have been there.'*
>
> Bruno – Espoo

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'Most of the time the system recognizes where you have gone for a long time. Like, you see where we are going right now? in that address I have gone, maybe to the same person, about three times before'.

<div align="right">Gustavo – Espoo</div>

'I have realized it is most of the time you deliver to one person all the time. When I'm here, there are those people that I have gone to their homes maybe more than 20 times, the same person.

<div align="right">Ivan – Espoo</div>

'The app knows you have been there'; whit this statement, couriers suggest that Quick's algorithm stores all the data regarding their deliveries, but not only that, but they also suggest that this information is later used to make decisions about order allocation.

I have myself experienced these kinds of episodes while delivering food as a courier.

*Once that you are, for example, delivering in **Kruunuhaka**, -that happened today- the app took me two times more to Kruunuhaka. Precisely to the same street, different buildings, but the same street. It happened in the same way when I was delivering somewhere close to Ruoholahti; the app would try to make me stay in Ruoholahti to take some orders from there.*

<div align="right">Author's Field Diary – 20th of March 2021</div>

Just as described by my interviewees before, I did also perceive that 'the app' was using my recent delivery historic data to redefine, or at least induce, a change in my delivery area.

Going back to my fellow couriers, when asked why they thought this was happening, they answered,

'Because, you know, if you go to that place for more than three times, (then) you can now go without getting lost'.

<div align="right">Gustavo – Espoo</div>

Because another thing that I've realized is that most of the time you deliver almost always to the same customer every time. Because like me, I know places that when I am given an order, I know this customer just by the name and I know in which direction I should go.

<div align="right">Ivan – Espoo</div>

Ivan's and Gustavo's quotations support the idea of historic geographical accumulation and bring two valuable perspectives to the table; Gustavo brings the issue of 'being lost'. Meanwhile, Ivan highlights the importance of route planning.

As in any other job, delivering food has a learning curve that every courier needs to climb. Consequently, there are 3 main sources of discomfort and confusion when you first start as a courier: 1) Finding Restaurants, 2) finding the right delivery addresses, and 3) Good Interaction and integration of 'the app' into your working flow.

Two of the above-mentioned variables are intrinsically related to geography.

'Being Lost', as implicitly recognized by Gustavo, is one of the most time-consuming situations for a courier. It does not only reduce the total number of deliveries a courier partner will make, but also has a direct negative impact on the waiting times of end-customers. Hence, being a 'lost' delivery partner is one of the most penalizing and less efficient scenarios for both the couriers themselves, and for a highly efficient algorithmic system.

Therefore, acquiring geographical knowledge is a vital, and almost natural process in couriers' Lifes. To better illustrate this, let's look at my own experience:

> *'As I became more experienced, I was more confident about the addresses I was visiting, not because I would have known every building in Helsinki, but I did know the logic of addresses in Helsinki. A common pattern, a specific way in which some legal frame has shaped the physical address landscape in the city. I knew that there was only one number 17 within a street. Once that you are in the correct address and access door, even in multiple building housings (usually marked as A, B, C, D, E or F), even in those cases I was confident that I would be able to find the suitable building inside of the premises of the address.*
>
> *Then, once I had found the right building with its corresponding letter, finding the right apartment was just a matter of time. In 90% of the houses in Helsinki, as soon as you go in and look at the left or right side of the main entrance, you will find a board where you can Easley identify the last name and number of the apartment where your order is going.*
>
> Author's autoethnographic Diary

Judging by my detailed description above, finding an address is not a straightforward process, and it represents one of the major challenges for new couriers. Hence, navigating the platform

requires the ability to navigate the city first. In this way, couriers' geographical knowledge built-up in time and it emanates from couriers' daily commutes across the city.

Now, how is it that this geographical knowledge –that is both owned by, and stored in couriers' bodies and minds– will contribute to the platform's algorithmic decision making? Well, the answer is simpler than it might seem: time. The more geographical knowledge a courier accumulates, the less time it takes for him to deliver the meal.

Delivering is an action executed in at least three stages: picking the food, transporting the food, and delivering the food. Additionally, in every stage, there are several implicit processes that a courier undergoes;

Table 10. Stages of the delivery process

Stages	Couriers' Implicit actions
STAGE 1: Picking the food	- Identify where the restaurant is located - Tracing the best possible route to get to the street where the restaurant is - Know the specific entrance, level, and location where the restaurant is (Specially in shopping centers) - Know the 'pick-up policy' of the restaurant (do they have a specific window for delivery platforms? Do they call your customer's name, or do you need to check for the name on the bag?)
STAGE 2: Transporting the food	- Identify where the household is located - Tracing the best possible route to get to the street where the household is
STAGE 3: Delivering the food	- Know the specific entrance, building, level, and door number of the household.

3 stages and at least 7 variables to manage within a single delivery. In this way, a poor knowledge of the area and its restaurants will lead a courier to wrong addresses, wrong buildings, and wrong entrances, making his workflow erratic and slow. On the other hand, having couriers with higher accumulations of historic geographical data for their deliveries presents a clear decision path for a highly efficient algorithmic system.

What I am suggesting here is that a great part of Quick's efficiency relies heavily on, and is embedded in, couriers themselves. In other words, the efficiency of the platform relies on couriers as much as it depends on complex algorithmic calculations.

7.3 Couriers strategies to navigate the platform

In this chapter, we will first take a look at 3 specific practices/strategies couriers developed and apply in their daily work; *Looking for orders*, *defining safe and risky delivery areas*, and *rejecting orders*. Comprehending how these practices emerge and why couriers decide to use them is central to understanding the second part of this chapter; courier's contextual arrangements.

The second part of this chapter will present in detail the type of contextual arrangements this work has identified.

7.3.1 Basic navigation functions

7.3.1.1 Looking for orders

Once I had identified the main restaurant clusters in Helsinki, and typically when orders were scarce (usually from 14:00 to 16:00), I started to actively 'look for orders'; all couriers did. Usually, and almost as a ritual, we ceremoniously launched this process with phrases such as 'let's move around' or 'let's start moving', which meant that none of us was getting orders at our current location.

The quest for orders is a 'one-man'[13] task. Everyone could take a different route, following their gut, their instinct, or the knowledge they had about the area's own rhythms and spatiotemporal arrangements. In any case, the idea was the same. By moving between the main clusters of restaurants in the city, you were increasing your chances of getting orders. Next, I will present an episode of my life as a courier where I describe my own way of looking for orders.

> Undated
>
> *'After waiting for almost 20 min I jumped in the bike and rode for a while towards Kamppi in* **my usual hunting for orders route!** *This time, instead of turning left in Frederikinkatu to head back to Punavuori, I decided to turn Right and try my luck in Kamppi.'*
>
> Author's Diary

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[13] 'One-man' is used here to denote not only the obvious; that this activity is usually performed alone, but to denote as well how food delivery platform's workforce (couriers) is a male-dominated environment.

Looking for orders emerged as a routinary practice. Every time you reached a point in the day where no orders were being assigned to you; in my case, this was usually between 14:00 hrs. and 16:00 hrs. I was usually standing around Iso Robertinkatu in Punavuroi, and from there, I would start looking for orders elsewhere.
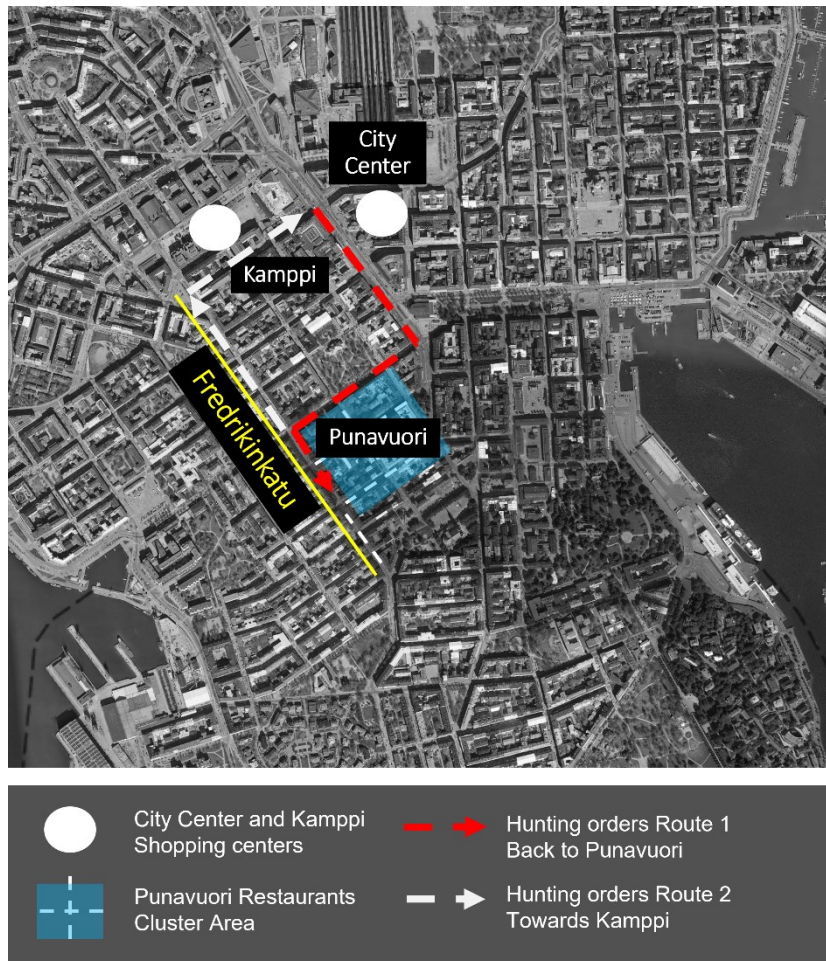
Figure 48. Looking for orders in downtown Helsinki

A 'hunting for orders route' can be spontaneous and improvised. You could fly around the city randomly, and you will still get orders. Nevertheless, by making it periodically and systematically, you have the chance –or at least the feeling– that you can somehow set some boundaries to your own delivery areas. My 'hunting route' was precisely aimed at trying to do this.

I traced my hunting route using roads that will take me closer to Helsinki's major cluster of restaurants but would still allow me to move fast to the next cluster if no order was coming.

7.3.1.2 Safe and risky delivery areas

The identification of safe and risk delivery areas, together with the identification of safe and risk delivery restaurants serve a twofold purpose, first it helps to define the boundaries of a courier's 'comfort zone', which is to say, a specific area of the city where couriers know the restaurants in the area, where distances are appropriate and cost-effective to their means of transportation (Bike, scooter, car), and where they can anticipate the different ranges of the delivered meal. Nevertheless, identifying this comfort zone requires a complex sensemaking process. Next, I will present my own experience on how I got to identify my comfort zone.

During my working sessions as a courier, I developed a sort of mental tags, warning signs and landmarks that helped me identify potentially 'risky' delivery trips, or to be more precise, 'risky' restaurants that could potentially lead me to longer trips, and ultimately, to be dragged out of my preferred working area.

> *An order from a suspicious restaurant poped up on my screen, but the name just resembles familiar to me, so I took it. Big mistake! The order was coming from Kluuvi, on the opposite side of my area of work, well, let's be honest, not that far, but the truth is that I asked for it to be removed... Kluuvi is probably the last cluster of restaurants within the downtown area of Helsinki, the next cluster of restaurants is across the bridge (Pitkäsiltä) in Hkaniemi-Kallio. The thing is that **the closer to the bridge you are, the higher the risk of being drag away from downtown area**. I think this was also a reason why Intuitively I was so negative about this particular order.*

> Author's Field Diary – 20th of March 2021

> *I am coming back from a **delivery in Katajanoka** and a new order pops up in my phone from Via Tribunali in Sofiankatu. Sometimes, especially if it is rush hour, I am not going to take that order, especially if it says that it will be ready in ten minutes for example, because Then I know that I will be there waiting 10 minutes. At the same time, I think is better to ride fast back to Punavuori, where I might get a new order that is ready for pickup and will go shorter in distance allowing me to do 2 orders, or even three orders, instead of one (I don't want to be dragged again back to kruununhaka because the most likely is **that the order from Via Tribunali will take me back to Katajanoka or krunnunhaka**).*

> Author's Field Diary – 20th of March 2021

As you can see from my notes, the feeling of being dragged was not a positive one, all the contrary, being dragged meant potentially longer trips, exhaustion, and above all, uncertainty. Therefore, to avoid these unpleasant scenarios, I started labelling some restaurants with a big mental sign stating: 'Danger, you are about to be dragged'.

To avoid been dragged, I started labeling more restaurants with a 'danger' sign, among them; Via Tribunali in Sofiankatu, Pizza Express in Kruununhakka, the chicken joint at Runeberginkatu and Morton restaurant at Mechelininkatu.
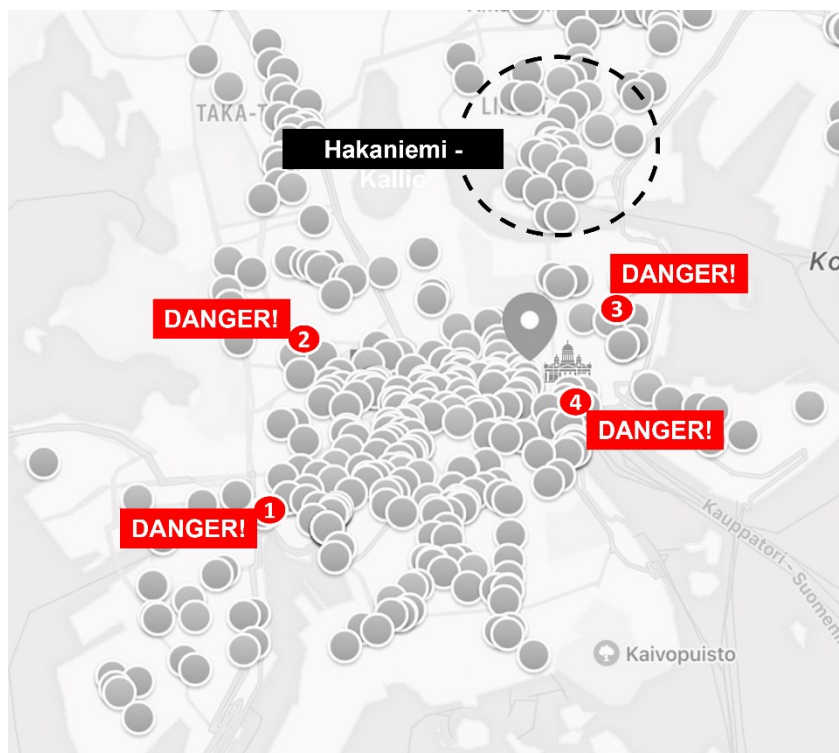
Figure 49. Authors mental map of risk pick-up restaurants in Helsinki

As observed in Figure 49, by land marking these restaurants, I was delimiting the boundaries of my preferred area of work within the city.

Figure 50. Authors mental map of risk pick-up restaurants in Helsinki

Hence, every order coming from restaurants located before the 'danger' geographical landmarks would be considered safe to take, while orders coming beyond the dashed red circle would be considered risky. Hence, as shown in figure 50, I had created my own mental map of safe and risky pickup and delivery areas in the city.

When looked closer, the patterns of 'behavior' of the delivered food were consistent; Safe delivery areas tended to generate orders that will keep you close to the main cluster of restaurants in your delivery area, meanwhile risk delivery restaurants had a marked tendency to place orders to isolated areas, far from a meaningful cluster of restaurants (As shown in figure 51, next page).
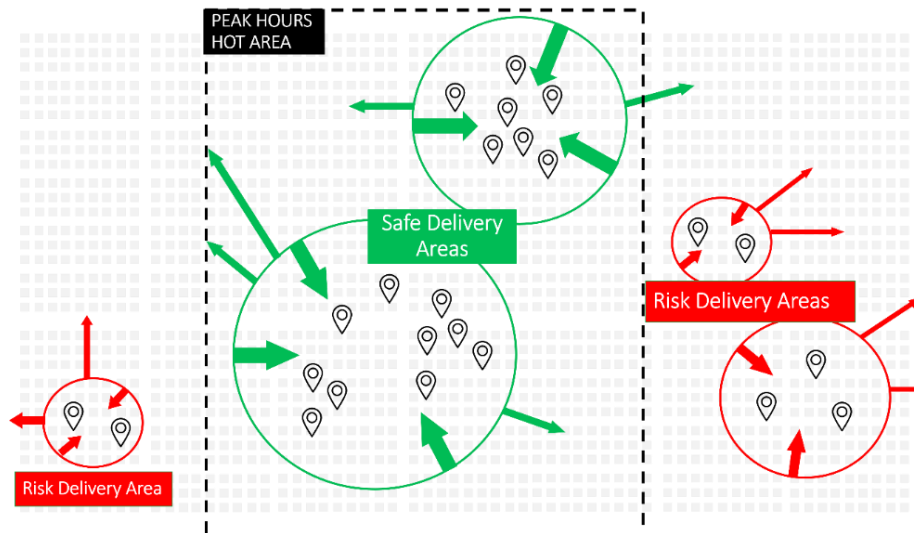
Figure 51. Safe and risky delivery areas: orders direction patterns

In figure 51's green safe areas, we can observe thick arrows pointing inwards that represent the tendency of orders to be delivered within an area with high restaurants density, thus maximizing the chances of getting orders as soon as the delivery is completed. On the other hand, risk delivery areas present considerably lower density of restaurants, which in turn makes it less probable to receive incoming orders from nearby restaurants.

These complex assessments of how restaurant density could potentially influence a courier's chances to get new orders are best described in a fragment of my field diary:

> *'when I was inside of a building delivering something, I just marked the food as delivered, so I could pick some of the other orders that were piling up in the queuing section of the app, those orders would be very close to my current location... Usually, the restaurant would be around the corner somewhere, so I like this fact that when I was delivering something, the order came from a really close by restaurant. This happened a lot, of course, **depending on the clustering of the restaurants and the density and presence of restaurants, which is very high in Kamppi and Punavuori areas**. This rarely happened when I was delivering in Jatkasaari or Kruununhaka for example.'*

> Post-filed notes – 20th of May 2021

> *That area (Kamppi-Punavuori) is the dreamed oasis for couriers !! We love to deliver within this axis since this ensures that the number of trips without orders will decrease, hence, your overall paycheck at the end of the day will increase!*

> Author's Field Diary – 3rd of May 2021

These episodes of my own experiences as a courier -although not generalizable-, add valuable insights into couriers' perception of order allocation, the intensity with which new orders are assigned to them, and their correlation with the tethered elements of the platform; I.e., restaurants' density and clustering patterns. Additionally, the consistency or 'the flow' of orders –as some couriers call it– is perceived as having a direct impact on the number of orders received, the length of trips made, and the final payment you get at the end of the day. Therefore, staying in the flow becomes a critical skill for couriers to master, since it will guarantee smoother, less fatiguing, and more rewarding days.

Thus, we could suggest that restaurants' clustering patterns and their density is a key element in guarantying a constant flow of incoming orders. Furthermore, this constant flow of orders is perceived as having a direct impact on the amount or orders received, the length of trips made, and the final payment received.

7.3.1.3 Staying in the flow

'The flow'. That is the term used by some couriers to refer to a constant stream of incoming orders. Thus, staying in the flow suggests the strive of couriers to place themselves within these constant flows of orders. Now, how these streams of orders are produced, in which areas will they be generated, and finally, is there a way for you to secure a place within those flows? In this subchapter, we present two approaches to start scratching the surfaces of these questions.

As we have presented earlier, couriers develop two major sources of knowledge about the platform, these are geographical and algorithmic knowledge. Consequently, couriers' understanding of the 'flow of orders' is somehow pre-filtered by these two types of knowledge. Hence, this work has identified these flows as geographically induced and algorithmically induced.

Geographically induced flows are those scenarios where couriers attribute their constant flow of orders to geographical factors, such as restaurant cluster density, population density, or morphological characteristics of the city streetscape. On the other hand, algorithmically induced flows are those scenarios where couriers attribute this flow of orders to the algorithmic managing system of the platform.

Staying *in the flow* is the most rewarding and satisfying experience for couriers, but what about missing the flow? Analyzing the situations where couriers are not in a good flow or orders could be interesting as well, since it will give us more contextual information on what couriers' perceptions of the platform are during these off-flow periods. Let's look at some of my own experiences on this matter.

'Today, around 16:30 I took an order slightly outside of my preferred service area and ever since, I was dragged by the algorithm to Jätkäsaari and Ruohalahti, actually, I spent some hours making long trips from the central area to Jätkäsaari and Ruoholahti area... I realized I didn't like to make those trips anymore! They required much more effort and time from me and drained my energy more quickly than the kind of trips I used to do in my preferred area of work (Punavuori)'

20th of March 2021 – Authors Diary

As suggested in the fragment above, been in a flow of orders that drags you away far from your 'preferred area of work' or safe delivery area, is not a pleasant scenario; As shown above, making long delivery trips is time consuming, and if you are a bike-courier like I was, energy penalizing. Therefore, it is understandable why staying within your safe delivery area was so important to me; note the final comparison made at the end of my quotation.

Another way to realize you have missed the flow of orders is to see yourself delivering randomly across the city with no apparent pattern, just as I had been so many times.

*Today I could not find my own rhythm because the two or three initial orders were placed in different locations, different addresses, not even in the same area. From there onwards, it was tough to have one specific area where your orders were assigned. **The orders I was getting were randomly placed across the whole downtown area**... I believe it has to do with the fact that when I went online, I was not in Iso Robertinkatu. **If I had been there** –at least that's my theory- and **if I had been there earlier**, then the chances of having a smoother day would have been higher.*

Monday, the 3rd of May 2021 – Authors Diary

The fragment above holds one central argument: the place and time where you go online as a courier could have a determinant impact in the flow of orders you get into –in my case above, a bad one. This might sound like a bold statement to make. Nevertheless, different episodes in my life as a courier suggested this might be having a real impact on the flow of orders you end up having.

Let's now consider a temporal example:

I couldn't start my evening shift at 16:00 today, as I planned. I ended up starting at 17:30. Now as I write these lines, it is 19:30 .. and I am already at the metro station about to take my train back home. During the last 2 hours, I have only delivered 4 orders for an average income of 8 € hours before taxes. Does it really worth it? Definitely not.

23rd of March 2021 – Authors Diary

The quotation above shows not only my lack of experience as a rider, but fundamentally it tries to reflect on how an alteration of one hour and a half in your starting time could produce an immense impact on couriers' perception of productivity. Moreover, it also shows that timeframes are vital when trying to get into a good flow of orders.

Before every decision, couriers consider the status of the area (if it is busy, quiet, or normal) the possible geographical implications of an incoming order; is this new order going to take you far out from the hotspot delivery area or is it going to keep you *in the flow*?

Being synchronized with the platform's 'flow', or more precisely, with the incoming orders flow, is one of the best things that could happen to you as a courier; it provides you with a constant stream of orders in a relatively compact area, allowing you to deliver more orders per hour, which in turn maximizes the conversion time-money. Nevertheless, staying in the flow requires some craftsmanship. Next, we will explore some of the strategies couriers used to stay within an area and benefit from a good flow of orders.

7.3.1.4 Rejecting Orders

A common way for couriers to stay within a 'safe delivery area' or within a specific 'good flow of orders' is by actively rejecting orders.

Alejandro:

Sorry, you talked very briefly about not taking orders, I mean, to be selective on each order. Could you tell me more about that please?

Joaquin:

Yeah, sometimes I am selective.

Alejandro:

So, you usually reject a a lot of orders?

Joaquin:

Yes, I reject a lot

Alejandro:

In a busy day for example, how many orders do you think you reject?

Joaquin:

Mmm... I reject many, many orders. In a Saturday morning, I reject maybe, 10 orders?

Alejandro:

How come? how can you refuse to take an order? Why do you do it?

Joaquin:

*In Hakaniemi for example, sometimes Im in hakaniemi, and then, they send me something to Kalasatama, and I say no, no way, I don't want to go there. Many many days a reject soo much **because I don't want to lose my time**.*

As observed in the fragment of my interview with Joaquin, rejecting orders is a very common practice for him. Furthermore, Joaquin gives a reason why he would typically reject an order; not to lose time.

To understand Joaquin's decision making, we would need to consider some variables he is considering; the first and most important one, is to know what Joaquin's options are if he decides to reject that specific order coming from Kalasatama. From the information he gave me, we know he was at Hakaniemi's square market -or at least nearby it- therefore, he is close to 4 important clusters of restaurants that could potentially generate incoming orders.
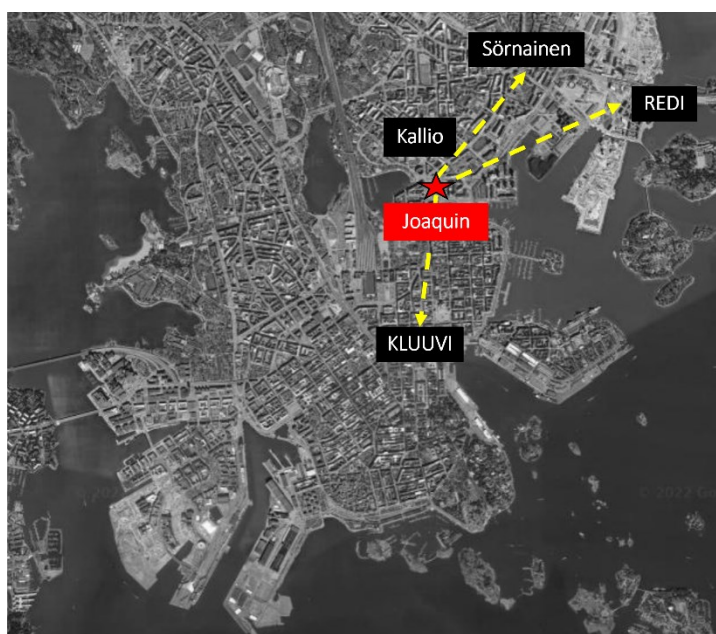
Cluster	Restaurants in Cluster*	Courier to Cluster Distance	Recurring orders expectation
Kallio/Hakaniemi	15-18	100-300 meters	Good
Sörnäinen	17	1.4 km	Good
Redi Shopping mall	5	1.8 Km	Poor
Kluuvi	17-21	1.2 km	Very Good

Figure 52. Joaquin's contextual arrangement

As illustrated in figure 52, Kalasatam's Redi shopping mall represents not only the longest pickup trip but also, a comparably reduced possibilities of getting a good flow of new incoming orders because of its low density of restaurants. Thus, when we put together all this data, compare it, and assess it, we might agree with Joaquin in rejecting that order.

During my life as a courier, I also practice extensively the rejection strategy:

> *Since 16:30 or something like that, when I took an order slightly outside of my preferred service area, I was dragged by the algorithm to Jatkasaari and Ruohalahti. Actually, I spent some hours going back and forth, making long trips from the central area to Jätkäsaari and Ruoholahti area. I realized I don't like to make those trips!* ***They require much more effort and time from me and drain my energy more quickly than the kind of trips I used to do in Punavuori****. Finally, to return to my preferred area… I simply needed to reject orders. I rejected at least 4 incoming tasks, most of them from Kamppi, and I rejected one more from Naughty burger (been afraid of waiting times since we were entering peak hour on the weekend).*
>
> <div align="right">Athor's Field Diary - Undated</div>

The reasons to reject an order -as counter-intuitive it might look- are clearly explained in the previous quotations; in my case, making the deliveries by bike required a pumping heart and two good pair of legs, therefore optimizing the distance of every delivery was vital; on the other hand, in Joaquin's case, fatigue was not his main concern (since he rode a scooter at the time of our interview), instead time was; shorter distances equals less time in pickup and delivery trips, which means more deliveries per hour, meanwhile longer distances equals more time spent during pickups and delivery trips, meaning fewer deliveries per hour. In this way, a more contained and denser cluster of restaurants is always more efficient than a scatter and less dense one[14]. In figure 53 below, I merge our previous example on safe and risk delivery areas with our current example of rejecting orders, to illustrate why contextual arrangements happen.

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[14] This is of course the case for couriers in Helsinki, riding a bike or a scooter. Couriers delivering by car in Helsinki would probably have a different opinion on this specific statement, as well as couriers in Espoo, or elsewhere.
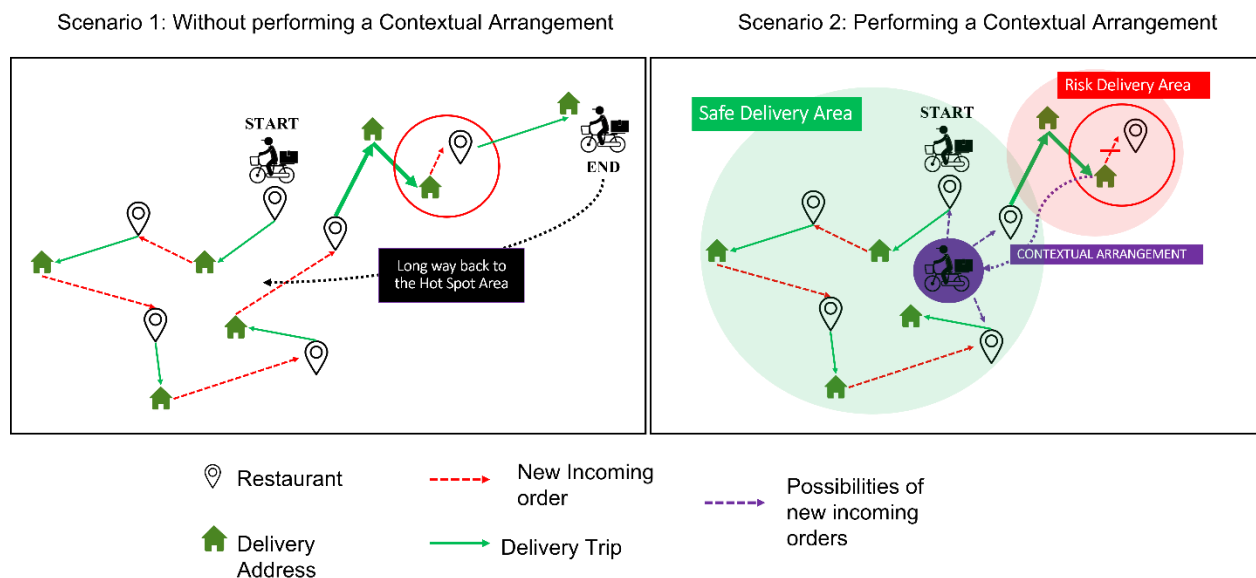
Figure 53. With and without contextual arrangements

Figure 53 helps us to understand the importance of rejecting orders as a resource in performing contextual arrangements. By rejecting an order coming from a restaurant that could potentially lead you to longer trips (as illustrated in Joaquin's and my own experience), couriers are able to go from a non-favorable scenario (scenario 1), where their final destination compromises the immediate possibilities of getting more orders, to a more favorable one (Scenario2), where the possibilities of getting more orders with closer delivery trips increases.

Finally, what Joaquin and my own experience show us is that couriers' rejection strategies are not sporadic nor erratic behavior. They are essential tools in navigating the multiple entanglements of the platform and the city. Moreover, rejecting orders helps couriers to reposition and re-contextualize themselves in an ever-changing, multi-entangled reality. Therefore, rejecting orders is an essential practice of couriers when practicing contextual arrangements.

7.3.2 Couriers' contextual arrangements

Because of food delivery platform's flexible (Richardson, 2020a) and conjunctural (Graham, 2020) nature, couriers are constantly challenged to reposition themselves in space so they can synchronize themselves (stay in the flow) with the platforms always-changing spatiotemporal arrangements. It is to these constant relocation strategies that I refer here as contextual arrangements.

Courier's contextual arrangements are practiced and deployed to exploit the spatiotemporal arrangements and the geographical entanglements of the platform. In other words, performing contextual arrangements is about finding the right places to be at the right times, so couriers can maximize their possibilities of getting a constant flow of orders. Consequently, been able to describe where, when, and how these contextual arrangements happen is critical.

During my time as a courier and throughout my interviews, I identified 4 scenarios where contextual arrangements were practiced:

1. Contextual arrangements between restaurants (less experienced riders)
2. Contextual arrangements between different spatiotemporal arrangements (more experienced riders)
3. Contextual arrangement between different geographical entanglements (esperienced riders)
4. Contextual arrangement between different delivery areas and city boundaries (experienced couriers by car)

Next, we will address one by one these different types of contextual arrangements.

7.3.3 Contextual arrangements between restaurants

There are popular restaurants in the city that are well known by couriers due to the large number of orders these restaurants generate. Sometimes these restaurants are close to one another, some other times slightly distant. As we have discussed previously, one important variable in order allocation is couriers' proximity to the restaurant. Consequently, being as close as possible to the restaurant is one of the first things a beginner courier learns. Nevertheless, sometimes being in between, at an equidistant point between two restaurants, is advantageous. Let's see an example. (Next page)
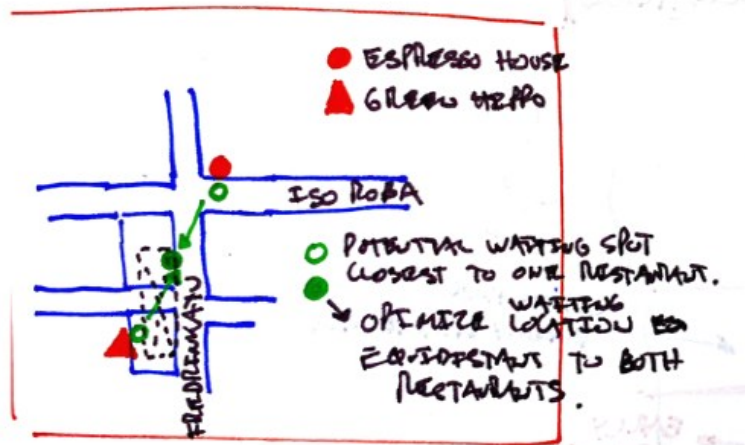
Figure 54. Courier's contextual arrangements between restaurants

Note. Hand drawn by the author.

Blue lines depict streets. A red solid circle and triangle represent two restaurants. Green circles represent couriers' location, the filled circle representing the courier at an equidistant point of the restaurant, meanwhile the unfilled green circles represent the courier's closest location to the restaurants.

In figure 54 we observed a basic contextual arrangement where an optimized location at an equidistant point between two restaurants is preferred instead of being immediately outside of the restaurant door. The basic reasoning for this is that an improved location between two restaurants could potentially maximize the possibilities of getting orders from both restaurants instead of only one. Nevertheless, what are the motivations behind this strategic repositioning? Is it an informed decision? Is it based on previous experiences? Well, couriers certainly reflect on these matters and build their own justifications for them. This is what I was thinking at that precise moment.

Sunday the 21st of March 2021 – 10:04 am

'I start to think about possibilities again. Should I receive an order from the Green Hippo here (50 meters away) if another courier is also available right there at their doorsteps? At this point in my experience, I would answer yes and no. Yes, I might receive a task despite a courier that was there first; if the order is going to one of the buildings or streets that I have been delivering before and the other courier is not familiar with. And no, I won't receive the order if the other courier has more experience and more deliveries in the same area than me. I won't get the order either if the order has been placed in an area that is equally unknown for the two of us. Under similar conditions regarding familiarity, the proximity variable will be applied.'

Therefore, this contextual arrangement is based on a two folded assumption:

1st assumption - *skipping the queue*: I presume that skipping the queue is possible and that the algorithm will assign me a task even if there were other couriers waiting for an order before me.

2nd assumption – *historic data over proximity*: I knew the permanent and regular couriers in the area, and I didn't see them around. I just saw new faces. This made me presume that the historic data of my deliveries in the area will be enough to outweigh my apparent distant location.

In both assumptions, I take for granted the internal functioning and decision making of Quick's algorithm, reaching the conclusion that I had an advantageous correlation of 'decision factors' compared to those of my peers. Thus, I acted accordingly and placed myself 50 meters away from the restaurants and not at their doorsteps as I would normally do.

This type of contextual arrangement was common during my life as a courier. It happened naturally in fractions of a second, almost as a reflex. Hence, this type of behavior is a clear sign that couriers' understanding of the platform's entanglements and its algorithmic decision-making influence directly influence their strategies at work.

7.3.4 Contextual arrangements between restaurants clusters

Couriers' positionality is perceived to be an influencing factor for the allocation of new orders, as such, as we have seen in the previous section, couriers tend to locate themselves in –what they believed– the optimal locations for the specific spatiotemporal arrangement they are delivering in. Thus, locating yourself at an equidistant point between two restaurants is one possible strategy. Consequently, wouldn't it be possible to locate yourself between restaurant clusters instead of individual restaurants? Indeed, it is possible, and couriers perform this type of contextual arrangements as well.
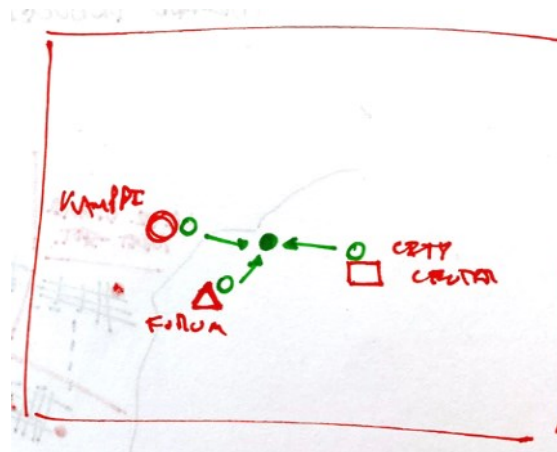
Figure 55. Contextual arrangement between restaurant clusters

Hand drawn by the author – March 2021

Note. Major clusters of restaurants are represented by a square, a red circle and a triangle, respectively. Courier contextualized location is represented by a green dot and couriers' original location is represented by a green circle. Movement patterns represented by green arrows.

Figure 55 shows how during the early stages of my work as a food delivery courier, I considered this type of strategy. Nevertheless, an important remark needs to be made here; although I planned to apply this strategy, I never managed to fully put it into practice. Instead, what I did was to use my looking for orders strategy (p. XX) since I considered it more effective than staying static in one single location[15].

Additionally, something to have in mind when analyzing restaurant clusters in Helsinki is that they tend to present their own internal dynamics. In other words, if a restaurant cluster is big enough, as it is distributed in space, soon you will start to perceive a characteristic unfolding of spatiotemporal arrangements that only happens in this cluster; and this is precisely what we conceptualized earlier in this work as geographical entanglements. Hence, couriers' contextual arrangements are also deployed between geographical entanglements.

7.3.5 Contextual arrangements between geographical entanglements

In this section we will present 2 examples of couriers' contextual arrangements between geographical entanglements; the first one made between geographical entanglements in the

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[15] This happened during March 2021, still winter in Helsinki with temperatures around 0° C. It could be also that been 'on the move' was a strategy to stay warm, ultimately influencing my decision.

same city, and the second one deployed between geographical entanglements in different cities. Our first example is from a food delivery courier in Helsinki.

Let's take a look at the following fragment of my interview with Joaquin:

Alejandro

Could you clarify this for me please; Every day, when you go to work, where do you set yourself as 'online'?

Joaquin

Sometimes I go online in Helsinki University, and when I am there, I know I can have some order coming from McDonalds in Hakaniemi. I can get maybe one order from Rautatientori, or they (Quick) can give me maybe an order coming from Kamppi.

Joaquin actions are everything but improvised, he chooses a specific location, within a specific timeframe, knowing -presumably from experience- that, by locating himself in that place (Helsinki University) he is maximizing his chances to get orders from more than one cluster of restaurants. Interestingly, the University of Helsinki's metro station is the last metro station before the beginning of a new cluster of restaurants: Hakaniemi/Kallio.

Right after my interview with Joaquin, I made a fast sketch on the strategy that he described:
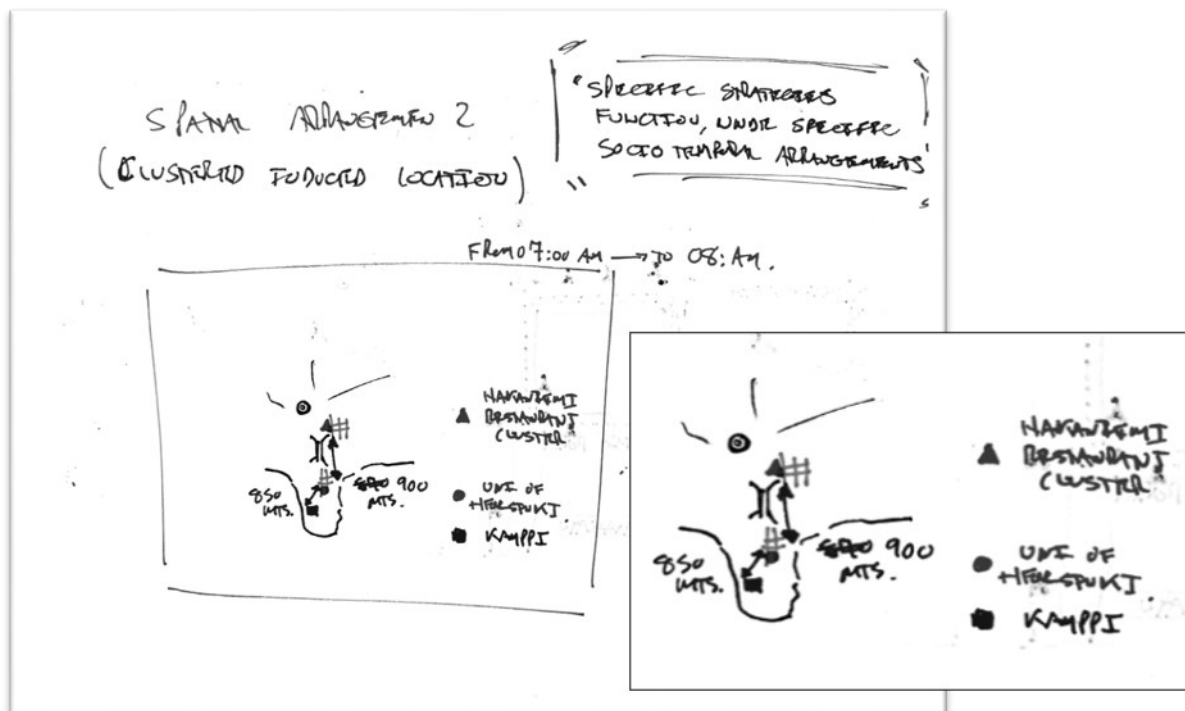
Figure 56. Diagram of Joaquin's contextual arrangement

Figure 56 recreates Joaquin's contextual experience on a map; first, I drew some basic geographical coordinates: Helsinki's main peninsula, the Pitkäsilta bridge, and right at the north-end of the bridge, a triangle and a circumference, the first one symbolizing Hakaniemin Tori (the market square of Hakaniemi), and the latter representing a landmark of the city, Helsinki's Ympyrätalo[16]. Additionally, at the upper right part of the image, we see additional information regarding the time of the day in which the events happened (07:00 to 08:00 am.).

Together with Joaquin's inputs, I also added some conceptualizations of my own; 'Spatial arrangement 2', 'clustered-induced arrangements', and finally a small definition, 'specific strategies function under specific spatiotemporal arrangement'[17]

What Joaquin was describing was a contextual arrangement performed between two of the main geographical entanglements of the platform in Helsinki.
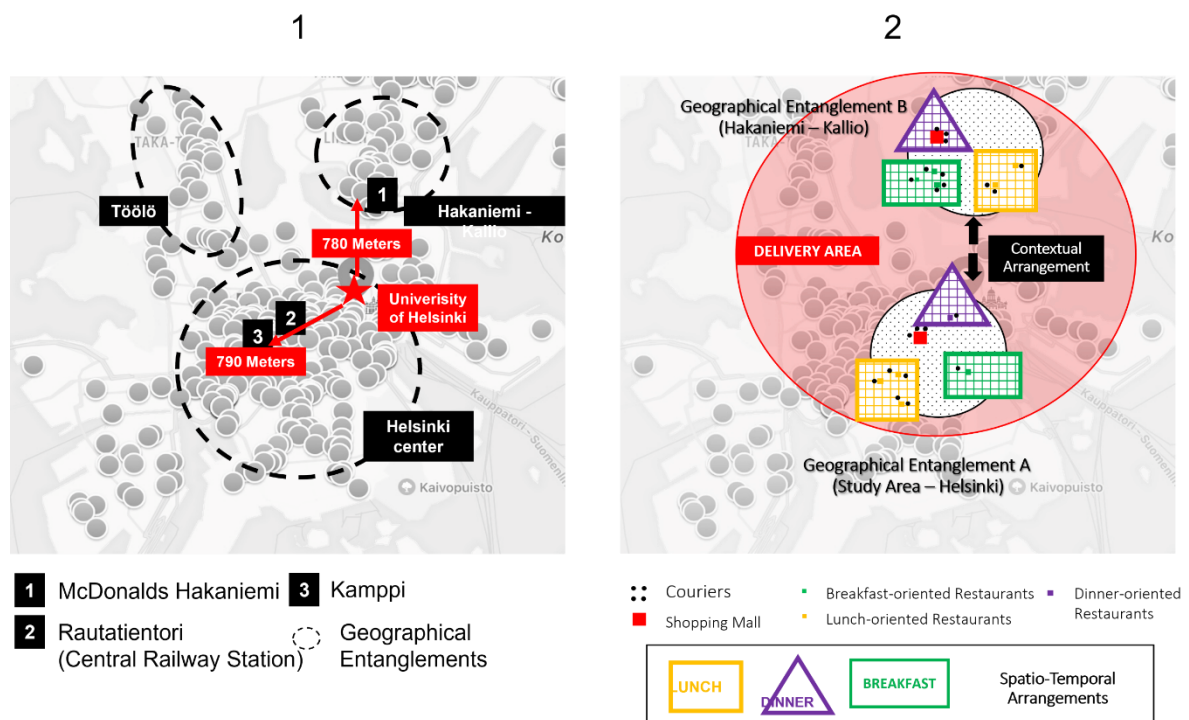
Figure 57. Joaquin's contextual arrangement between geographical entanglements

In figure 57 I recreated Joaquin's detailed description of the events, this time, making visible the most important restaurant clusters in the area and highlighting the location of every restaurant he mentioned. Surprisingly –or perhaps not surprisingly at all– Joaquin's location

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was sharply at an equidistant point between two of the three main geographical entanglements of the platform in Helsinki.

7.3.6 Contextual arrangements between city boundaries

Before, you could change anytime you want, between Espoo, Helsinki, and Vantaa, at the same time. Because you could see from the application, it was showing you the status of everywhere, like, you could identify which place was good for you at that time. If it was busy in Helsinki, and here was quiet, then I just went to Helsinki.

Ivan- Espoo

Ivan suggests that cross-municipal mobility was possible, and it was effectively practiced by couriers[18]. Additionally, he implicitly suggests that this decision was taken based on a comparative analysis of the status of different delivery areas. Nevertheless, Ivan's information is vague and reduced to a correlation of a single variable (status of an area). Taking such a decision might involve other considerations as well. Let's see further narratives on the same type of event;

The difference between Helsinki and Espoo is opening hours and closing hours; in Helsinki by 08:00 is open. In Matinkylä is 10:30, 10, 10:30. And at night it's 10:00 o'clock. But in Helsinki on Fridays and Saturdays is even three or 2am…

Ivan – Espoo

I Used this tactic before; I could be working here in Espoo, until 08:00, 08:30 in the evening, you know, until it became quiet. Then, I went to Helsinki. And also I used to go to Helsinki during weekends, because in Helsinki I used to make 200 or 250 Euros on a Saturday or a Sunday.

Ivan – Espoo

You see, I think Quick realized that most couriers work in Espoo during weekdays and then go to Helsinki during the weekend, so then, they decided to close it.

Gustavo - Espoo

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[18] At the time of the interview (February 2021), this was already only a memory. Quick had just restricted that possibility in December of 2020.

The quotations above show that one of applying this strategy was induced by an awareness of the nuance of urban temporalities that paced the rhythms of both cities. In other words, couriers were making decisions based on their deep knowledge of the platform's multiple entanglements with urban temporalities.

Ivan's and Bruno's previous quotations show us how restaurants' opening and closing hours variation across Helsinki's metropolitan area reflects the city's own urban temporalities. Additionally, these gaps in restaurants' service hours constitute themselves as sites of exploitation in which potential contextual arrangements could and do happen. Moreover, Gustavo's quotation shows how couriers learn, enact and ultimately follow the unfolding spatiotemporal arrangements of the platform, in this case, practicing a weekly based contextual arrangement between Espoo and Helsinki.

8. Discussion

At the beginning of this study, I pose three research questions; these were:

1. In which ways does the platform materialize in the city?
2. How do food delivery couriers experience and make sense of the platform and Quick's managerial algorithms?
3. How do food delivery couriers navigate and mediate the multiple entanglements of the platform?

Concerning the first research question, our findings suggested the platform materializes through specific spatiotemporal arrangements that are produced performatively amidst the interaction of the platform's different elements. Moreover, these materializations are not uniform nor ubiquitous, but elastic, multilayered, and co-constituted in interaction with several other elements; other temporalities (e.g., transportation temporalities and weekdays/weekends), tethered elements in the city (e.g., restaurant clustering patterns and transportation nodes), and the always changing balance between couriers on the street, orders being generated, and open restaurants.

Concerning the second research question, our findings suggested that couriers' sensemaking emerges from the intrinsic performative nature of the platform; not as a set of bi-directional outcomes, but as the result of the entanglement of couriers' everyday interactions with the city they commute in (geographical knowledge), the fellow couriers they talk–or don't talk– with (collective sensemaking or introspective sensemaking), and the episodes of fissured and glitched algorithmic management they experience (Algorithmic knowledge). Furthermore, our findings suggest that couriers' sensemaking processes are correlational to the specific spatiotemporal arrangements and geographical entanglements in which they work.

Concerning the third research question, we had three main findings; first, that contextual arrangements are only possible when sensemaking processes have been carried out. Second, couriers' repertoire of contextual arrangements is directly proportional to the diversity and complexity of their sensemaking processes outcomes. And third, contextual arrangements are practiced and deployed in two veins: (1) to exploit the algorithmic glitches of the platform; and (2) as strategies to constantly recalibrate couriers' positionality according to the spatiotemporal arrangements and the geographical entanglements in which they work.

Thanks to the set of findings highlighted above this study suggest that we should acknowledge the platform as a constant becoming entity, in which, its materialization (RQ1), comprehension (RQ2), and the development of any strategy to navigate it (RQ3), is not fixed but performatively co-constituted through the platform's multi-entangled interactions.

This study's research questions have been indispensable as research devices; by answering them, I have gained invaluable insights on the platform's functioning and the multiple relationships nested within it. Nevertheless, by simply answering its research questions, this study would not fulfill its central aims.

In the coming titles, I will present –and discuss– the three most meaningful entanglements that shape the platform's existence in direct correlation with each on of the three aims set for this work.

Table 11. Aims and entanglements correlation

Aims	Entanglements (E.)
Aim 1. To explore couriers' experiences and describe their daily practices at work as a resource to understand the enactment of agency from a sociomaterial and post-humanist philosophical tradition.	**E. 1** Couriers sensemaking processes: a performative sociomaterial practice
Aim 2. To explore the material implications of algorithmic management in both directions; how this specific type of management is experienced by couriers, and how the managing algorithms could be potentially affected by couriers' behavior.	**E. 2** Platform Knowledge: the indivisible product of human and non-human agency that is essential to the functioning of the platform.
Aim 3. To explore the way couriers, perform their work in context, both through the tethered geographical elements of the city and amidst the platform's multiple entanglements and spatiotemporal arrangements.	**E. 3** At the intersection of geography and labor process theory; how the city affects couriers sensemaking processes.

These entanglements give concrete examples of how the platform's multilayered, multi-entangled and performative nature affects directly the sociomaterial conditions in which the platform exists.

8.1 Entanglement 1: Couriers sensemaking processes: a performative sociomaterial practice

Opening discussion

Existent literature suggests couriers' understanding of algorithmic systems and digital platforms is affected by couriers' positionality and materiality within the platform (Ferrari & Graham, 2021, p.6). Scholars have also suggested couriers' experiences are not only contingent to intersectional lines of class, gender, and social divisions (Zheng, 2020), but also that workers' understanding of managing algorithms vary across delivery areas, degrees of labor fragmentation, and geographies (Ferrari & Graham, 2021, p.6).

In the same vein, but from the viewpoint of algorithmic systems, scholars have argued that it is precisely in algorithms' intrinsic, contingent, and performative nature that its ontogenetic materiality is found (Ferrari & Graham, p.4). In this way, materiality is not an 'added' accessory in the understanding of algorithmic systems, but the foundation of the system itself. Nevertheless, previous literature fails to present a more concrete view on how these intersectionalities and materialities produce different outcomes regarding couriers' understanding of algorithms and the platform itself.

The present work helps to fill that gap by suggesting sensemaking as a fruitful site from where gain access to the changing materialities involved in couriers' experiences of the platform.

Discussing my own findings

Unpacking couriers' sensemaking processes from a sociomaterial and performative approach is, by far, one of the main contributions of this work. From a sociomaterial approach, couriers become in practice (Orlikowski, 2008), bonded together with the city, the algorithms, and the people they interact with.

Understanding food delivery platforms through sociomaterial lenses entails the comprehension of sensemaking processes as always changing, moving, and evolving. Sensemaking is a constant 'pursuit of coherence' (Schildt et al., 2020); coherence that, under the realm of food delivery platforms, is intrinsically linked to couriers' practices, routines, and contextual experiences of the platform. Thus, it is within couriers' practices, routines and contextual experiences of the platform from where we should begin to understand, not only couriers becoming, but the becoming of the platform itself.

This work has identified, presented and analyzed couriers' sensemaking processes in relation to a triple-sourced performative relationship with different elements of the platform. These were; (1) Couriers' individual relationships with Quick's managing algorithms; (2) Couriers' personal experiences of the spatiotemporal arrangements and the geographical entanglements in which they work, and (3) Couriers' interactions –or lack of it– with their fellow workers. Hence, to make sense of couriers' sensemaking processes, this work has framed couriers' actions and behaviors in constant reference to these imbricated triple-sourced performative relationships.

Several examples of events and situations illustrating the multiplicity of entangled and performative relationships of couriers within the platform have been given in this work's findings section. Nevertheless, I would like to connect some of those events with the concrete arguments presented here.

By exploring couriers' geographical experiences of the city, this work shows how couriers' sensemaking processes are enacted in practice (Schildt et al., 2020). Thus, the findings of this thesis show how couriers develop an intrinsic knowledge (geographical knowledge) of the delivery areas where they perform their work and use that knowledge to improve their efficiency and overall performance in delivering food.

By exploring couriers' relationship with Quick's managing algorithms, this work shows how couriers' sensemaking processes are carried out deeply interconnected with the socio-technical assemblages of the platform (Kitchin & Dodge, 2011); as a result, the findings of this work show that, under different spatiotemporal arrangements and geographical entanglements, couriers experiences, sensemaking processes, and their overall understanding of the platform will vary. For this reason, we will see couriers for whom algorithmic sensemaking processes are framed by power relations and power imbalances (Courier's in Espoo) while others (Helsinki's couriers), showed little concern about the intrinsic power relations embedded in their relationship with the platform, and instead, were more focused and developed a more practical geographical knowledge.

By exploring couriers' relationship with their co-workers, this study shows how workers' sensemaking processes are shaped by the sociomaterial assemblages from which they emerge (Barad, 2002; Orlikowski, 2008). Our findings suggest couriers' sensemaking processes are correlated with the platform's geographical entanglements and the resulting uneven fragmentation of couriers' workforce. Moreover, this correlation creates the material conditions for couriers to meet, talk and interact with their peers, affecting decisively the proportionality in which couriers would make sense of the platform from an individual introspective way or from a more active engagement and participation in collective sensemaking processes.

Ultimately, what these findings suggest is that couriers' sensemaking processes are inseparable from couriers' multilayered experience of the platform.

8.2 Entanglement 2: At the intersection of geography and labor process theory; how the city affects couriers sensemaking processes

Opening Discussion

The established scholarship affirms that digital labor fragmentation holds back the emergence of solidarity between workers, hinders the possibility of labor-based identities to be formed, and rules out collective action emergence (Tassinari). In the same vein, Ferrari & Graham

(2021) acknowledge that labor fragmentation within digital platforms mediated work plays a central role in disempowering workers. These two approaches steam directly from a labor process theory perspective. As such, their main concern has usually been couriers' possibilities to organize, resist, and subvert algorithmic control.

This work recognizes the importance of views such us Ferrari's and Tassinari's, but also highlights their inherent antagonistic understanding of social relationships. Thus, just as before, I propose not to conform ourselves with an understanding of the politics of platform labor, instead, I would like us to re-steer the discussion towards the understanding of how the inherent labor fragmentation of digital platforms affects couriers sensemaking processes.

Discussing my own findings

A central element the findings of this work has helped us to comprehend, is that labor fragmentation is not consistent across the different entanglements of the platform, rather, it is spatially distributed, focalized, and intensified in direct correlation with the platforms' multiple geographical entanglements. In other words, the lack or presence of solidarity and collective identity -and by extension: collective sensemaking- among food delivery couriers is not a transversal, nor a homogeneous characteristic, but a performative one.

This study showed that the density and the distribution of restaurants in Helsinki and Espoo were key elements creating –or foreclosing– opportunities for couriers to meet and talk. Espoo's highly centralized clustering of restaurants intensified couriers' presence in the same locations (waiting spots), meanwhile Helsinki's more evenly distributed network of restaurants spread couriers across larger sections of the city making more difficult to meet in the same spots with the same people. Additionally, it was observed that the more centralized the cluster, the more predictable and consistent the meeting points were, meanwhile the more distributed the network, the more random the meeting points were.

These dynamics of where? And for how long? were couriers able to meet determined optimal or sub-optimal conditions for collective sensemaking processes to emerge. In this way, if couriers in Espoo showed a more intensive collective sensemaking process and couriers in Helsinki showed a more individual and introspective one, it was not necessarily because the first ones were more extroverted and socially competent than the second ones; it was fundamentally a consequence of the platform's entanglements with the city.

8.3 Entanglement 3: Platform Knowledge: the indivisible product of human and non-human agency that is essential to the functioning of the platform.

Opening Discussion

Scholarly production dealing with sensemaking processes within food delivery platforms, and specifically with knowledge as the main result of couriers' sensemaking processes, is scarce. Perhaps, the closest to explore these phenomena is Sun P. (2019). for her, couriers develop their own 'labor algorithms' to negotiate and re-consider algorithmic control; as a result, couriers deploy strategies and enact practices aimed to alter the outputs of algorithmic management. In the same vein, Ferrari & Graham (2021) argue that couriers use their knowledge about the platform to produce fissures in algorithmic management through subversive, manipulative and disruptive practices.

Sun's and Ferrari's arguments have two underlying agreements; (1) both agree that knowledge is a necessary condition for couriers to act, and (2) both present the enactment of knowledge (couriers' deployment of strategies and practices) as antagonistic to the platform's algorithmic management. The first agreement is an agreement on the pre-requisites for action; knowledge, meanwhile the second agreement, is about the aims of couriers when enacting their practices and strategies.

The result of this work supports forcefully Sun's and Ferrari's first agreement, yet it disagrees with the second one. I believe that the way platform knowledge enactment is presented and conceptualized in this work is profoundly contradictory to Sun's and Graham's in a twofold manner. First, understanding couriers' performative relationship with the platform from an antagonistic perspective risks a refocusing of our attention away from the sensemaking process itself towards the underlying power asymmetries embedded in the platform. Second, and more meaningfully, this refocusing entails a symbolic -and practical- resignation in the quest to understand the ontology of the platform (it's becoming) in exchange for a limited understanding of its politics.

For me, and more importantly, for the aims set for this work, understanding the platform as a space of interaction and multiple performances is more enlightening than understanding it as a battlefield of oppress and oppressors, and consequently, understanding how knowledge is produced is more important than how it is instrumentalized.

Discussing my own findings

As this work has extensively suggested, the main output of couriers' sensemaking processes is knowledge; knowledge that, from couriers' perspective, has one main goal: to improve their performances in delivering food[3]. To accomplish this, couriers need to put this knowledge into practice and incorporate it in their daily routines and practices.

Examples of such processes of knowledge creation are algorithmic knowledge and geographical knowledge. Both knowledges are expected to be produced by an average courier; nevertheless, as this work has showed, couriers' sensemaking process, its resulting knowledge, and the enactment of this knowledge as a tool for enhanced performance, is deeply affected by the context wherein couriers' work.

Couriers working in different areas of the city, using different transportation means, experiencing different spatiotemporal arrangements, and navigating through different types of restaurants' entanglements (densely clustered or distributed), present asymmetric outcomes regarding the diversity, complexity and refinement of the knowledge being created.

Because of the multiple entangled relationships from which knowledge is generated, it would be inappropriate –or at least limited– to refer to it in its singular form; Instead, I stress the importance of using 'knowledges' in plural; in doing so, I put emphasis on the platform's intrinsic performative nature.

'Knowledges' within food delivery platforms should not be conceived as tools that play in couriers' favor, but as elements that shape the dynamics in which the platform operates and takes decisions. Just as couriers generate knowledge based on their interactions with the different elements of the platform, in the same way, other elements of the platform, such as Quick's managing algorithms, produce knowledge that is processed, incorporated, practiced and enacted by the algorithms as decision-making patterns[4] that differ depending on the same intrinsic contextual and performative relationships of the platform. In other words, the decision-making patterns of Quick's managing algorithm in Töölö are not the same as the ones in Kamppi or Punavuori, as the latter is not the same one as in Espoo, nor elsewhere.

The platforms intrinsic performative nature suggests that knowledge creation within food delivery platforms is as vast as elements in the platform, as diverse as the entanglements from which it is produced, and as complex as the spatiotemporalities wherein it emerges.

8.4 Limitations and Suggestions for Further Research

Theoretical frames, methodological choices, sample sizes, and geographical specificities. These are some of the most prominent sources for research limitations; and they all apply for this work.

The theoretical framing of this work as a post-humanist sociomaterial inquiry was intentional, and it provided the emphasis I was looking for in grasping the materiality of the otherwise usually neglected scrutiny of couriers' experiences and sensemaking process. Additionally, the selection of purely qualitative methods was also a conscious decision, intended to open food delivery couriers' more intimate and personal experiences of the platform, so we could get access to the materialities of their daily lives. All these decisions were good decisions, they were theoretically coherent, methodologically pertinent, and contributing to fulfilling the aims of this work. Nonetheless, having placed couriers' experiences and sensemaking processes at the center of this work's inquiries meant that other important elements would be overlooked. For instance, the experiences and practices of end-costumers, the experiences of the human support team oversighting Quick's managing algorithms, the insights about the constant code improvements made to the algorithm by the company's software engineers, and overall, any other experience arisen from different actors interacting with the platform.

Methodologically, the choices made were aligned with the work's theoretical framing. The methods used were the most pertinent ones to explore individuals (couriers) lives, experiences, practices, sensemaking processes, and their subjective experience of the platform.

Geographically, this work focused solely on food delivery couriers in two cities (Helsinki and Espoo) in Finland. Nevertheless, although the findings of this work cannot be generalizable to couriers in other cities or countries, its conceptual contributions, on the other hand, have the potential to be use elsewhere.

Concepts such as, the platforms' 'spatiotemporal arrangements', 'platform knowledge', couriers' 'contextual arrangements', courier's 'geographical' and 'algorithmic knowledge' -just to name a few- reflected about couriers, the platform, and its managing algorithms not only from its geographical determination, but from a more holistic perspective.

These conceptualizations served a double process; as a resource to understand the phenomena at hand, I.e., The sociomaterial and performative connotations of Quick as a food delivery platform in Helsinki and Espoo, and as solid efforts aiming to create a conceptual toolbox that could be used in future research in the field.

In this way, the present work provided not only an explanation to how Quick as a food delivery platform becomes in the study area, but developed key conceptual tools, and ways to see and analyze this type of phenomena in almost any other city around the globe.

Future Research Ideas

Future research could potentially focus on (1) conducting comparative studies across different delivery areas, cities, and countries where the same food delivery company operates, (2) conducting comparative studies between two or more delivery companies operating in the same geographical areas. (3) deepening the inquiry lines in specific elements of the platform, (4) approaching the study of food delivery platform as a team effort, and of course (5) expanding the scope of the present study.

Conducting comparative studies across delivery companies or within different delivery areas, cities, and countries where the same food delivery company operates would give us a macro perspective on the systemic implications of food delivery platforms in our contemporary digitally mediated cities. These efforts, though, should consider some of the contributions this work has made to the field. (a) the study areas should be selected according to the pre-existent infrastructures of the cities. For instance, the cities chosen should tend to have around the same net population and similar population density. (b) Additionally, the definition of the study areas could be based on the type of restaurant clustering observed. These research design strategies will allow for a better comparability not only of the results, but most importantly, of the experiences, strategies and sensemaking processes of couriers. Alternatively, it is important to remark that consciously choosing study areas that are in the opposite extremes are also an incredible opportunity to contrast the becoming of the platform and the experiences of its actors in drastically different settings.

Deepening the research in other elements of the platform, such as managing algorithms, human algorithmic surveillance teams, and end-costumers, could provide a more comprehensive understanding of how the platform performs, not limited to a courier-dominated perspective, but including other actors' experiences, practices and materialities. Making an exhaustive inquiry on the materialities of managing algorithms could, for instance, be focused on scrutinizing the changes in the 'decision path' routes or neural connections (in case neural network-based models are used) on the algorithm's side. This would, at some degree, serve as a corroboration that the changes happening in real life on the ground, does not only affect and produce new materialities for couriers, but it produces equally meaningful changes in the managing algorithm's materiality itself.

Larger teams of researchers could have a more comprehensive approach in the exploration of food delivery platforms. Independent members of the team could simultaneously be researching on the same platform and the same delivery area, but each of them could focus on the sensemaking processes and experiences of different actors on the platform. In this way, we would have a lot more resources to comprehend the intrinsic performative nature of the platform and the multiple co-constitutive materialities produced amidst the actors' interactions.

Finally, expanding the scope of the present study to scrutinize the experiences, practices and sensemaking processes of more actors in the platform such as Quick's managers, software developers, the algorithm surveillance team, and end-users of the app. Exploring these other perspectives would decisively enrich our knowledge of the sociomaterial implications of the platform for all their participants. A possible way to achieve this would be by partnering with a food delivery company. Having the commitment, support, and the level of information access that a food delivery company has will open interesting possibilities for more creative and ambitious research designs, goals and research aims. Some of these research-design possibilities could include (a) the redefinition of boundaries of delivery areas according to the specific needs of the research, (b) controlled alterations of the number of couriers working in specific delivery areas or timeframes, (c) restriction on specific types of couriers' transportation means, etc. All these pre-design actions would be aimed to test how these changes affect the way the platforms unfold in the city, how couriers react and adapt to these alterations, how sensemaking processes are impacted, and how the spatiotemporal arrangements of the platform morph as a response to these changes.

9. Conclusions

In the introduction of this thesis, I set three clear aims, with three research questions emerging directly from them. Next, in the discussion section, I gave concrete answers to this work's research questions and fulfilled its research aims through the development of three conceptual entanglements guiding the reader through the intrinsic performative nature of the platform. Further, in the limitations section, I acknowledged the theoretical, methodological, and geographical constraints of this work while at the same time highlighting some of the useful conceptualization this work achieved. The table below summarizes this.

Table 12. Summary of research aims, questions, and findings

Research Questions (RQ.)	Aims	Entanglements (E.)	Concepts Developed
RQ. 2 How do food delivery couriers experience and make sense of the platform and Quick's managerial algorithms?	**Aim 1.** To explore couriers' experiences and describe their daily practices at work as a resource to understand the enactment of agency from a sociomaterial and post-humanist philosophical tradition.	**E. 1** Couriers sensemaking processes: a performative sociomaterial practice	*Algorithmic Knowledge, Geographical knowledge.*
	Aim 2. To explore the material implications of algorithmic management in both directions; how this specific type of management is experienced by couriers, and how the managing algorithms could be potentially affected by couriers' behavior.	**E. 2** Platform Knowledge: the indivisible product of human and non-human agency that is essential to the functioning of the platform.	*Platform Knowledge*
RQ. 3 How do food delivery couriers navigate and mediate the multiple entanglements of the platform?	**Aim 3.** To explore the way couriers, perform their work in context, both through the tethered geographical elements of the city and amidst the platform's multiple entanglements and spatiotemporal arrangements.	**E. 3** At the intersection of geography and labor process theory; how the city affects couriers sensemaking processes.	*Couriers' contextual Arrangements*
RQ1. How Does the platform Materialize in the City?			*Quick's spatiotemporal arrangement.*

Presenting the aims, questions and the entanglements used in this thesis in a single visual resource (Table 11) helps us to make explicit and see the underlying connectedness of the arguments presented in this work. We can see how the aims set for this work guided and informed its writing across the whole research project. We can perceive the intrinsic embeddedness and performative co-constitution of the platform, and by extension of this research project's findings.

A final remark on table 11 is referred to research question 1 (RQ.1). It was proposed, planned, executed, and presented as the first research question of this work. Nonetheless, it didn't respond to any specific aim, and according to the structure of table 11, it is transversal to the whole research project. Why?

This is the basic way in which we, human beings, meet with the world: we sense it. I needed first to describe the visible characteristics of the city I was working in. I needed to identify its streets and restaurants. I needed to contextualize my experiences as a food delivery courier somewhere in space. In doing this, in describing my experiences and that of my interviewees, I was indeed describing the materialities through which we, as couriers, were making sense of the platform's materiality. Yet, describing is not the same as understanding; and as we have seen across this work, understanding how the platform materializes in the city (RQ.1) would only be achieved after elucidating the multiple ways in which food delivery couriers experience and make sense of the cities they work in (RQ. 2), the algorithmic management they are subject to (RQ. 2), and the contextual arrangements through which they negotiate the platform's multiple entanglements with the city (RQ. 3).

A great part of the scholarly production on food delivery platforms attempts this, a description of the different phenomena occurring within food delivery platforms, yet, just a handful of them -most of them cited in this work- focus in providing a more holistic perspective on how platforms are reconfiguring our social relations, rewiring our behaviors, and ultimately, how our social existence in the world is mediated through digital platforms and its algorithmic assemblages. This was the gap in literature I wanted to address and, consequently, it was the central aim of this work.

This work has achieved its aim by providing an understanding of Quick as a food delivery platform from a posthumanist, sociomaterial, and performative approach. This study suggests that we should acknowledge the platform as a constant becoming entity, of which, its materialization (RQ1), comprehension (RQ2), and couriers' development of any strategy to navigate it (RQ3), is not fixed but performatively co-constituted in everyday interactions and practice.

Steaming from the previous statement, a central contribution of this work has been the incorporation of a robust body of theory already available and developed within Science and Technology Studies (STS), Organizational Studies, and Information Studies (IS) that was underdeveloped or under used in the study of food delivery platforms.

Incorporating a sociomaterial approach focused our attention on the material implications of couriers' everyday experiences and practice. Framing this work as a posthumanist endeavor allowed this work to fully recognize non-human's agency capabilities. Moreover, using

performativity as the main concept through which analyze and understand the relationships of the different actors within the platform raised awareness of courier's process of becoming-together with technology and the platform's co-constitution with its non-human actors.

By considering the relationships and interactions between human and nonhuman agencies in the food delivery platform industry, this work contributes not only to the understanding agency within digital platforms but also to a more holistic understanding of agency in our increasingly digitally mediated societies.

Given the benefits this thesis got from its theoretical framing; this work suggests that food delivery platforms should incrementally be inquired through a sociomaterial performative approach. An approach that recognizes the platform's intrinsic performative nature and focuses on the constantly changing materialities produced amidst the platform's actors' interactions. Additionally, this study suggests that platforms should also be conceived from their entanglements with time and space, or as this work has conceptualized, from the platform's spatiotemporal arrangements.

Another important contribution is the linking of Organizational and Labor Studies with Digital Geography. Thus, this work argues that workers' understanding of algorithmic management vary not only across delivery areas, degrees of labor fragmentation, and geographies (Ferrari & Graham, 2021, p.6), but also, and fundamentally, that couriers sensemaking processes are the product of a multi-entangled performative process. Additionally, the findings of this work expand previous understandings of digital workers' experiences of algorithmic management, arguing that couriers' experiences are not only contingent to intersectional lines of class, gender, and social divisions (Zheng, 2020), but are also contingent to the platform's geographical entanglements and the spatiotemporal arrangements in which couriers work.

Ultimately, this work suggests that labor fragmentation is not only a proxy for workers' resistance –as extensively conceived in classic labor process theory approaches– but also a powerful element affecting the materialities through which couriers experience and make sense of the platform.

This work urges us to understand that the relationships weaved within food delivery platforms are not intrinsically antagonistic but co-constituted, and although every element of the platform have an agency of their own, they also hold an indivisible performative agency (part human, part non-human) that is essential to the functioning of the platform. It is only through the understanding of this 'indivisible agency' that the concept of Platform Knowledge becomes alive as an indivisible element on its own; as knowledge that is constantly and performatively co-produced, that, by partially serving courier's aims, serves a bigger purpose: to give existence, efficiency and viability to the platform.

In this way, the present work provided not only an explanation to how Quick as a food delivery platform becomes in the study area, but developed key conceptual tools, and ways to see and analyze food delivery platforms in almost any other city around the globe.

Concepts such as, the platforms' 'spatiotemporal arrangements', 'platform knowledge', couriers' 'contextual arrangements', courier's 'geographical' and 'algorithmic knowledge' -just to name a few- reflected about couriers, the platform, and its managing algorithms not only from its geographical determination, but from a more holistic perspective.

These conceptualizations served a double process; as a resource to understand the phenomena at hand, I.e., The sociomaterial and performative connotations of Quick as a food delivery platform in Helsinki and Espoo, and as solid efforts aiming to create a conceptual toolbox that could be used in future research in the field.

Another important contribution is this work's methodological design and methods selection. Not because its novelty (autoethnography and interviewing are established methods in qualitative research) but because of the relevance of making that choice in the 'Big-Data' era. In this era, algorithmic decision-making systems are so complex, process such an incommensurable amount of data, and operate at such speeds, that no one can understand how is it that they really work. And yet, even when we don't know how they operate, we do perceive their increasing presence and embeddedness in our daily lives; we sense them, we change our behaviors to 'trick' them, we protect ourselves from them, and sometimes, just as a food delivery courier, we need them.

Our relationship with technology, algorithms, and artificial general intelligence (AGI) is affective, and as with any affective relationship, it is not a matter of quantity, but of quality.

Understanding our becoming as human beings in this post-human era will increasingly require self-awareness and consciousness of our co-constitution with non-human beings, and accomplishing this will require the right combination of theory, practice and embodiment. A combination that I would like to believe this thesis has achieved.

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