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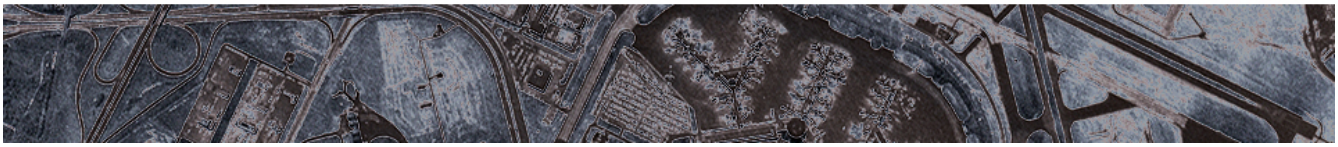

FCJ-218 Train Ticket Sharing: Alternative Forms of Computing in the City

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Abstract: Who exactly defines the internal flows of the city, and what happens when this 'flow' is rendered bottom-up? Rather than exploring the ways in which the digital affects the organisation of the city, in this paper, I aim to show how certain smart systems of coordination – based on a non-digital 'smartness' – exist in parallel to the increasingly digital smart city today. Various forms of improvised coordination and human-led calculation are an integral part of the smartness of a city and must not be overlooked. Drawing on ethnography of train ticket sharing networks in Germany, this paper explores the assemblages of human and non-human, digital and analogue actors that can attach themselves to an existent system, acting as 'parasitic infrastructure'. Understanding how these parasitic infrastructures emerge highlights how systems of calculation and computation exist beyond just the digital.

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Introduction

In the city of Grodno, Belarus, which is populated by around 300,000 inhabitants, the main form of transportation is the bus. This transit system is run by a public company called Grodno Bus Park. In 2008, the bus company cancelled their reduced-price tickets for students and seniors, and all passengers were expected to pay the same price for a ticket. While each ticket cost only 0.15 Euro (1700 Belarusian rubbles), this was enough for somebody on a 200 Euro monthly salary to get agitated. In order to challenge the change in ticket price, public bus system commuters started ticket sharing. A bus passenger would leave the bus at their destination and hand their used ticket to a boarding passenger, free of charge. As Grodno Bus Park tickets had to only be 'punched' by the ticket machine located inside the bus in order to be deemed valid, and had no time or bus number printed on them, bus drivers or ticket controllers were not able to prevent travellers from re-using these tickets over and over again. Strangers would often leave their unwanted (yet still valid) bus tickets on seats, or hand them over again to people standing at the bus stop as they left their bus. In 2013, Grodno Bus Park, [1] started an advertising campaign to help prevent this type of ticket sharing from taking place. Flat-screen televisions in every bus started periodically showing an advertisement featuring 'Do Not Share' boldly pointing at the ticket sharing scheme. These screens became

a symbol of a spontaneous system of coordination between citizens being confronted with the power of the state.

Similar ticket sharing occurs in various cities in various forms. Grodno's bus ticket exchange is an example of a non-monetised ticket sharing system, where passengers literally give away their tickets to others. A similar system is also popular in the Polish city of Poznan, where travellers leave their tickets on the bus seats for the next passenger to use. In certain cities in Pakistan, bus tickets are re-sold by illegal ticket vendors who buy and resell used tickets, in a sort of second-hand market. In Germany, monetised ticket sharing is becoming more common during train travel. With train tickets being less affordable, people are increasingly grouping together using online (for example, Mitfahrgelegenheit.de) and offline (for example, Hauptbahnhof) spaces in order to coordinate travel using group or family tickets, saving sometimes 70% off the regular ticket price. These examples, as well as the story of the Grodno Bus Park – aim to foreshadow certain spatial, temporal, and material aspects of computing in the city that will be explored in this paper. Searching out others to share a ticket with, as well as traveling with a group of strangers, requires a 'smart' system of coordination and calculation – creating a sort of social, material and technical infrastructure.

The origins of the smart city in the 1990s brought visions of an environment of constant management and control – connecting the 'physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure, to leverage the collective intelligence of a city' (Harrison et al., 2010: 2). Yet even earlier, the practice of 'computing the city' can be traced back to the vision of coordinating mobilities. The early days of smart, computable logistics were about coordinating and computing flight and train schedules, monitoring car traffic, or calculating the prices of tickets. The act of computing the city began, historically in the 1950s with the US-government-led SAGE (Semi Automatic Ground Environment) project, which developed a centralised command-and-control system whose structure mirrored the command structure of the United States' Air Force which funded it. Yet commercial real-time computing systems began with airline reservation software (Campbell-Kelly, 2003: viii). The first and classic civilian real-time project was the SABRE airline reservation system. Born in 1964 through a venture with IBM and American Airlines, it was a path-breaking application that gave American Airlines a great commercial advantage over competitors (Campbell-Kelly, 2003: 1). Soon after, other ticket reservation systems, bank automation, and retail systems also followed suit. These leading-edge applications required one or more mainframe computers, novel terminal devices, and telecommunications equipment, all of which had to be integrated by means of software (Campbell-Kelly, 2003: 41). The software that once calculated and coordinated airline reservations, ticketing, check-in, and management reporting is not so far off from the current DeutscheBahn (German Rail) system used to calculate and coordinate train mobilities.

Yet rather than exploring the ways in which the digital affects the organisation of the city, in this paper I aim to show how certain smart systems of computation and coordination – based on non-digital 'smartness' – exist in parallel to the increasingly digital smart city today. In any city, coordination and communication methods were not, and currently are still not, only developed through ubiquitous computing and smart sensor networks. Various forms of improvised coordination and human-led calculation, which make use of public infrastructure to create new forms of infrastructure, are also an integral part of the smartness of a city. In order to explore this 'smartness', I will introduce the improvised, dynamic, ad-hoc socio-technical infrastructure of ticket sharing. To help analyse these smart systems, I will draw from my own fieldwork of train ticket sharing, where I also used Erving Goffman's explanation of orientation and coordination among strangers. To explain how this practice of ticket sharing relates to the general train infrastructure in a city, I

introduce the notion of 'parasitic infrastructure'.

A parasitic infrastructure, much like the name suggest, functions as its own being, but needs the 'host' infrastructure to function. Much like the Grodno bus ticket, or the DeutscheBahn ticket sharing network, it is created as a result of an ad-hoc, improvised coordination and cooperation of various actors. A parasitic infrastructure attempts to operate without the detection of the host infrastructure, yet it's detection effects the actions of the host infrastructure, which adjusts its behaviour to repel the parasitic infrastructure. I will argue that this constant relationship between the host infrastructure and the parasite is necessary to keep a city 'smart': more efficient, more malleable, more in-tune with the various stakeholders living in a city. In order to paint a picture of another form of smart city, I will ethnographically outline one such parasitic infrastructure: a train ticket sharing system that exists in parallel to the large technical infrastructure of the German rail system. This parasitic infrastructure is ad-hoc, analogue, and encroaches on various legalities. Yet this system holds characteristics much like those prescribed to digital smart cities: an intelligent web of protocols, constantly updating itself based on its surroundings, a mixture of data (information), things, and people.

Introduction to Ticket Sharing

Ticket sharing is an informal, yet culturally recognised form of travel for most Germans who use the railway system as a method of transport. Train ticket sharing functions in a number of ways, depending on the time and day of travel, the number of people traveling, and the given route. Rail transport in Germany (DeutscheBahn) is one of the largest in the world, carries nearly two billion passengers per year, and is administratively divided into a national, regional (provincial) and city train system. Train travel is very costly, with regular travel between larger cities costing between 50 and 100 Euros. Yet in order to avoid the large expense of travel, the DeutscheBahn's various national, regional and city routes offer 'deals' on train travel, with the most popular being the weekend Schönes Wochenende ticket. This ticket allows five people to travel nationally, using only regional trains, on Saturdays or Sundays. For example, train travel between Hamburg and Frankfurt using regional trains on any given Saturday costs 70 Euros one way for one person. Grouping together with four other people using a weekend ticket will bring the ticket price for one person down to 8.40 Euros. Another popular discount often used by train ticket sharers is the regional ticket. This ticket allows five people unlimited 24-hour travel within one given state of Germany, and can be used any day of the week. A commuter traveling one hour between Hamburg and Kiel, for example, would normally pay 21.20 Euros for their journey. A five-person group ticket, costing 33.30 Euros, brings the price of one person's journey down to 6.66 Euros. While DeutscheBahn designed the group tickets for families and friends (for example, one of their earlier advertising slogans was: 'take your children or grandchildren along for a weekend trip'), the ticket sharing system has been adopted by groups of friends, colleagues, or strangers. The access to such a drastic discount in ticket price, or the opportunity to save money, has shown that actors using this infrastructure will shift and readjust the given infrastructure in order to transform it into something that suits their own needs.

In recent years, since the proliferation of smartphones, strangers have begun to seek out other strangers to travel with mainly by coordinating online, through ride-sharing websites like Mitfahrgelegenheit.de or Mitfahrzentrale.net. Here, one person advertises a journey (e.g., Hamburg to Frankfurt), on a given day (e.g., Saturday) at a given time (e.g., 13:00hrs), and indicates how many places they have available on their 'ticket'. Subsequently, the ticket holder coordinates their ticket sharers – asking them to meet at a certain

time before the train departure. The meeting point is negotiated, although repeated practice of ticket sharing helps develop distinct 'meeting spots' at a train station, and this meeting spot varies from station to station. When searching for ticket sharers at a train station – strangers search out other strangers in order to share their ticket. This process involves a coordinated, networked entrepreneurialism that uses digital technologies in order to 'leech' onto an existent infrastructure and compute and coordinate a transport system. But how does such leeching emerge?

The Infrastructure, The Parasite, The City

This work-around ticket sharing networks first started by asking, 'What does it mean to consider the city as a place that is not just inhabited but which is produced through that inhabiting?' (McFarlane, 2011: 3). The city is an urban assemblage, which 'makes possible a double emphasis: on the material, actual and assembled, but also on the emergent, the processual and the multiple' (Farias, 2010: 152). Yet, as some noted, 'while systems in industrial cities were mostly skeleton and skin', post-industrial cities, or smart cities, are much like 'organisms that develop an artificial nervous system, which enables them to behave in intelligently coordinated ways' (Chourabi et al., 2012: 2290). This skeleton, skin and nervous system can also be conceived as an infrastructure of a city. Infrastructure is a powerful phenomenon, shifting organisational routine, practice, and capacity.

Imagining the smart city as a multitude of overlapping infrastructures is useful to our analysis here as it can help us understanding the standards that help systems scale up, as well as the equally significant issue of how systems scale down, that is, making global infrastructures locally useful (Edwards et al., 2009; van Laak, 2004). Edwards et al. showed how infrastructure studies offer different lenses on phenomena fundamental to everyday life in contemporary societies (Edwards et al., 2009). Susan Leigh Star (1999) used the term infrastructure as an analytical concept in order to describe something that is neither simply technology, nor simply organisation nor simply institution. Using the theoretical approach of infrastructure studies can help to understand the point where humans and structures meet – making the moments of formation (Edwards et al., 2009) of infrastructure exciting. Larkin highlights the importance of '[redirecting] analysis upstream, away from the social effects of infrastructure and toward practices of conceptualisation that come before the construction of the systems themselves and which are engineered into them' (Larkin, 2013: 332).

But what if we return to McFarlane, and envision an alternative infrastructure that is produced through inhabiting, produced through a re-assemblage of the current system? What of the systems that make use of other systems? Within any meaningful account of how smart cities develop – issues of frailty, issues of failure, everyday embodied practices; all must be taken into account. Humans and structures do meet, infrastructure is customised, and a non-digital smart city exists and unfolds on many dimensions. I aim to explore these issues using the concept of infrastructure and more specifically, looking at how 'parasitic infrastructures' unfold. This analysis of these overlapping infrastructures also aims to show how sociality emerges, how cooperation works, and how power emerges within smart cities.

I use the concept of the parasite as a metaphor for the way in which socio-material systems function, in particular when one system works not in parallel, but rather exploits another, in order for it to function. Much like parasitic computing, parasitic infrastructure occurs when an urban infrastructure such as a train transport system serves unwittingly as the basis for other transport networks. The term 'parasitic

computing' was first introduced in August 2001, when Barabási et al. (2001) found a way to solve mathematical problems using external computational power without knowledge or permission of their respective owners. In their paper, they explained a parasitic computer 'attempts to solve a complex task by breaking it up into many small components and distributing the processing related to those components over a number of separate remote computers' (Barabási et al., 2001: 3). On another level, the parasite could be understood as a being that which not only uses the infrastructural power of the host, but also affects the actions of the host. In Serres' understanding, the parasite redirects reproduction: it steers it in a new direction favourable to it. The parasite adopts a functional role: 'the host survives the parasite's abuses of him – he even survives in the literal sense of the word; his life finds a reinforced equilibrium, like a sur-equilibrium' (Serres, 1982: 168). It is precisely this 'sur-equilibrium' that is necessary for smart cities to function, and this parasite infrastructure/host infrastructure relationship fuels the development of a city forward. As shall be discussed in this paper, forces that shift, develop, and re-configure cities can be understood through the relationship of the urban infrastructure and their parasites that affect their development.

The research for this paper is based on ethnography of the train ticket sharing practices in Germany, and was initiated by Alexa Färber at the HafenCity Univerity in Hamburg, as part of the Low Budget Urbanity Research Group. Alexa Färber's initiated fieldwork among ticket sharing networks in Berlin and Hamburg (Färber, 2014), my phase of fieldwork was conducted between November 2012 and June 2013. The work was multi-sited and engaged in a range of semi-structured interviews and participant observation. By engaging in multi-sited ethnography (Marcus, 1995), 'the relevant boundaries to the analysis are not fixed a priori, they are "discovered" on the ground' (Candea, 2007: 177). During this time, I 'hung around' Hamburg Hauptbahnhof, tracking travellers and patterns of behaviour of ticket sharers. I travelled with ticket sharers from Hamburg to Kiel and Lübeck between the same periods, as well as between Hamburg and Berlin and Hamburg and Leipzig. The so-called 'second generation of multi-sited ethnographers' prefer to talk about 'cross-fertilisation of sites' (Gallo, 2009: 89) to move away from holistic aspirations that could have been observed in the first stage of development of that multi-sited concept. I worked with reflexive qualitative interviews (Alvesson, 2003), a method often accompanying observation (Darlington and Scott, 2003). In-depth interviews were also conducted with 20 travellers, ticket sharers, as well as two expert interviews with representatives from German rail (DeutscheBahn). These interviews were conducted in German, and were loosely structured (Whyte, 1984).

The Emergence of a Parasite

Searching for ticket sharers involves a 'multiplicity of processes of becoming, sociotechnical networking, and heterogeneous collectivity… the alignment of different elements' (McFarlane, 2011: 5). The coordination and 'intelligence' of the train ticket sharing system relies on a variety of collaborating elements, which make up socio-material infrastructures (although their conscious collaboration is not necessary):

- The intelligent transport system (train schedule system)
- The ticket machine
- The train ticket

- The DeutscheBahn app
- Train station (platforms, hallways, etc.)
- Online ridesharing websites (Mitfahrgelegenheit.de)
- Ticket regulations/DeutscheBahn (etc.)

Although this list is not exhaustive, it outlines the variety of non-human actors – which belong to the host infrastructure – and which set the stage for the parasitic ticket sharing practice. Identifying these elements of the host that enables this new practice is crucial, because it can outline the way in which the parasite 'customises' the host's built environment to fit its needs. In the case of ticket sharing, the relationship between the physical setting and the way practices and infrastructures are formed and transformed is a crucial part of the process of customising infrastructure. During fieldwork, I noted:

> I arrive to the Hamburg Hauptbahnhof (mainstation) at rush hour. It's 16:38 on Tuesday, the 6th of November and I try to search out departure times for regional trains – these are the trains that offer the five-person, group ticket discounts. Trains going to Kiel and Lübeck seem to be leaving around every 15 minutes. I walk around the building, searching around for ticket machines. My colleague mentioned that people searching for ticket sharers tend to place themselves near ticket machines. (field notes, November 2012).

The complex character of the train station as an 'immobile platform' represents the 'multiple fixities or moorings often on a substantial physical scale that enable the fluidities of liquid modernity, and especially of capital' (Hannam et al., 2006: 3). The train station, much like the airport or bus station, is a key platform of coordination and cooperation between intimates and strangers – and the way in which people collaborate and cooperate is done parasitically – using the physical setting as a breeding ground for their own practices. As Serres noted, there is 'no house, ship or palace that does not have its share. There is no system without parasites' (Serres, 1982: 12). The Hauptbahnhof is a host for a variety of parasitic practices.

An interview with a frequent commuter in Leipzig revealed that the Hauptbahnhof is not just a structure of platforms and waiting areas, but that within this practice, the space comes to acquire certain hot spots – places that acquire meaning because of their importance in the ticket sharing exchange. This is the first example in which a built infrastructure becomes a host, onto which the parasite attaches itself and develops. Hot spots such as meeting points become an invisible yet highly important place of coordination. These certain key spaces of coordination in a main station actually materialise in the consciousness of each commuter, and are invisible to those in constant flux or mobility. Those who want to search out a commuter will return to certain meaningful spaces in order to find other ticket sharers or other commuters. For example, the commuter in Leipzig described the certain areas around the station which acquired significance for ride-sharing:

> … in Leipzig there is one big spot for Mitfahrgelegenheit.de users at the east side of the Hauptbahnhof. It's actually a parking lot for travelling buses and so actually it's not allowed to park on this parking lot but there are – I would say from Friday to Monday or Sunday mostly like 20 cars at the same time and exchanging from nine to eight in the evening… (30 year old male respondent, Leipzig)

In another instance, I spoke to a ticket 'manager' – meaning the entrepreneurial figure who rides the trains back and forth on a popular train commute (for example, Hamburg to Kiel), and re-sells the four places on his five-person train ticket. This particular 'manager' I spoke to started explaining how he finds people to buy a place on his ticket:

> P: How do people find each other?
>
> V: You want to see it now?
>
> P: Yeah…
>
> V: How we find others?
>
> P: Okay. Yeah.
>
> V: Those (points) here there, there yeah, yeah easy ways.
>
> P: Easy ways?
>
> V: When someone goes by you, you just go over to them… ask and talk…
>
> P: Ah. So near the ticket machine is better as a place?
>
> V: Right at the ticket machine. (50 year old ticket male ticket 'manager', Hamburg)

The location of ticket sharing flows such as stopping and going is not arbitrary, and certain places in the main station gather meaning as the practice of ticket sharing unfolds. The Hauptbahnhof is thus customised by a collective (in this case, by ticket sharers), in order to accommodate their practice. Here, the intention of an infrastructure – that it provides a platform for travellers buying tickets, transporting luggage, or greeting friends and family – gains a new purpose as the parasite makes the infrastructure its home. At the Hauptbahnhof, an area intended for family members to wait for the arrival of their loved ones, becomes hijacked and customised to fit the needs of train ticket re-sellers or 'managers'. In Leipzig, users of the ride-sharing and ticket sharing website Mitfahrgelegenheit.de use a certain parking lot to meet. While this re-configuration of a space might not be a desired practice for the DeutscheBahn who helped build and maintain the space, for those fostering a parasitic practice, this flexibility and lack of regulation over a given space helps their practice grow.

At the moment of my own fieldwork, ticket sharing became a contested practice, and security officers at various train stations began to monitor 'suspicious' activity. Only when the parasite becomes noticeable can it be eliminated. Serres (1982) notes that the parasite at times makes noise, which, once noticed by the host, puts the parasite in danger of being discovered and thus eliminated. In this instance, security officers are employed in order to eliminate the parasite – and chase away any activity that contests the original purpose of the train platform, and the ticket 'managers' who offer alternative forms of ticketing to the existent train infrastructure. But this 'noise, through its presence and absence, the intermittence of the signal, produces the new system, that is to say, oscillation' (Serres, 1982: 52). Power over a space is

constantly being shifted from the host infrastructure to the parasite who customises it to fit its needs.

The Body of the Parasite

'Many of the spaces of the urban built form are engineered to facilitate these practices of waiting particularly in relation to journeying and travel … shelters, benches, platforms, waiting rooms, and traffic lights' (Bissell, 2007: 282). The ticket sharer is constantly jumping between action and inaction – between waiting and acting. Those who yet have no ticket are waiting at the whim of another to offer them a space on their ticket. There are moments where the ticket sharer just stands or paces back and forth around the ticket machine, with his/her ticket in hand, waiting for a traveller to approach them. And vice versa, there are moments where the traveller is passive, just waiting by the ticket machine in hopes that a ticket sharer will approach them. Both the ticket sharer and the ticket traveller do their share – with their bodies, through their gestures and movement – in creating the parasite. Thus, 'the body itself is of course engaged in and enacting a whole kaleidoscope of different everyday practices and forms during the course of this waiting' (Bissell, 2007: 282).

I would argue, then, that the parasite's body must improvise, calculate and be flexible – to do what is not prescribed by the host infrastructure. In this instance, when the main station halls are designed for mobility, a ticket sharer who wants to customise the given infrastructure to fit his or her goals must be comfortable with immobility – with stopping, with getting pushed by commuters, stared at and gawked at. The following passage from my field diary also shows the significance of waiting:

> I find a spot near the southern ticket station to stand, and notice two 20-something men standing by the railing near the ticket booth. They are waiting for something or someone. Both are playing with their mobile phones. I start to feel awkward standing around with nothing to do so I also take out my phone. The object creates a separation from my body and those around me. It builds a wall to my nakedness. A method of escape. An excuse to divert unwanted attention or eye contact. I also start to feel more normal with my phone, as if having it confirms to others that I am 'minding my own business' rather than staring at them, stalking, or being a voyeur. One of the trains to Kiel leaves, and then the one to Lübeck. The two men keep waiting. I move a little northward, and stand under the Lübeck platform. The other young man who was begging for money sees me again and this time comes up to me. He asks me in German for money, and I tell him I don't have any small change. He suggests that I can exchange a larger bill. I shake my head. He keeps walking. (field notes, January 2013).

This passage shows that when becoming static in a highly mobile environment, one suddenly becomes a protagonist of this space – a familiar stranger to other static protagonists. People take notice more because one's presence is not momentary. One is there, in that particular space, to stay for a while. Those searching out for ticket sharers also become protagonists of the train station, and those who customise the main station to their purpose. Moreover, making one's body visible also helps networks between others who also are customising the infrastructure in a similar way:

> I walk a few metres to the ticket booth where I was standing previously. I notice one of the young men who were standing there before approach a woman at the ticket machine and ask her if she is going to Lübeck. She shakes her head to indicate 'no'. He then notices that I was staring at them and asks me if I am going to Lübeck. I pretend not to speak German and ask him if he speaks English. He asks the other young man standing next to him, if he speaks English. The second guy says 'yes'. I explain that I often take trains and I want to know why they are asking other people if they are going to Lübeck. He tells me that it's 'way cheaper' to take a group ticket. 'So you ask people you don't know?' He says 'yes'. 'But how long do you wait?' The first guy answers me in German 'For the next train, and then if nobody comes, I wait for the following one. I do this for about an hour.' I explain that I understand and thank them for their information (field notes, January 2013).

Thus, the parasite grows and stabilises while moving through the host infrastructure in a way that use the host's resources, but also alters the host's intended use of its infrastructure. This manifests itself through bodily gestures that go unnoticed to those passers-by who are part of the host infrastructure. Yet these gestures also serve as a signal to others who are feeding the parasitic infrastructure, and becoming part of its system. Moreover, the parasite's body also serves as a beacon for others hoping to also join the process of customising an infrastructure. One body can help the orientation of another in navigating the rules of the parasitic infrastructure. When new practices like ticket sharing are in the early stages of being socially configured, every interaction between a stranger who knows about this practice and another who does not know risks being 'disorienting' (Goffman, 1983).

Clusters of people are also significant. Clusters are two or more people grouped together, usually standing in one place or slightly shifting from one area to another. The significance in the cluster is that they are either a) waiting for somebody or something (a train) or b) discussing with one another their method of action. The importance here is twofold: while actors also may wait for somebody or review their next methods of action, these processes are difficult to distinguish with the naked eye. A cluster has visual significance – a group of people bunched together in public space much more clearly conveys point 'a' or point 'b' as I outlined above. In the case of ticket sharers where groups of five people are required to use one ticket, the actor searches first for clusters and then, when none are found, moves one's sight to the level of the individual, and scans for signals which might reveal his or her intentions to share their ticket.

The Parasite's Rituals

Until now, I have outlined the way in which the built environment is customised to fit the parasite, as well as how the body is used as a tool to create the parasitic infrastructure. I also pinpointed the significance of flows (starting and stopping), and clustering. I would like to now outline the role that human-to-human interaction rituals – such as eye contact, solicitation, and gesturing, can play when forming the parasite. Significant human actors in the ticket sharing process are not only limited to the travellers searching for a cheaper ticket. There are also the ticket sharers, or more officially the 'peer providers' who first invest in buying the ticket, and therefore take the risk in finding travellers to share with before their train leaves. These ticket sharers can be divided into those who commute and do this 'non-professionally', and professional ticket sharers, meaning those who use the ticket sharing system on a regular basis to earn money.

The professional ticket sharers, (colloquially termed 'mafia', 'managers', or 'schleppers') invest in buying a ticket and travel back-and-forth between any given destinations, as many times as the time schedule and their willingness permits them to, searching for more people to share the ticket with. For example, a professional ticket sharer can buy a regional ticket for the province of Schleswig-Holstein for 49.90 Euros for five people. The ticket allows these passengers to ride around the region from the first train in the morning, to the last train after midnight. During the time of my fieldwork, there was no requirement specified by the DeutscheBahn that these five passengers must be the same people. Thus, the ticket 'manager' takes four people for 1.5 hours to Kiel, and then once in Kiel, searchers for others to come back with them to Hamburg. Based on my observation, a manager can sometimes make six trips daily, and earn as much as 3000 Euros monthly.

The interaction between these actors is highly significant in assembling this practice. The importance of gesturing, and the nature in which a ticket sharer approaches another is a delicate manoeuvre. The interplay between human and non-human actors is also very significant – how a person holds their ticket, where they stand by the ticket machine, how far away they stand from the platform – all become key in manifesting this practice. Note how important the ticket as well as facial gestures are in the ticket sharing process:

> Two girls walk by me. One of them holding out a ticket in front of them. They pass me. They then walk back and stop five metres in front of me and continue to talk to each other. They then look up and see me looking at them. They smile. I smile back at them and approach them. I ask them if they speak English. They say 'yes'. I then ask them if they are looking for someone to join their regional ticket. They say 'yes' (field notes, January 2013).

Goffman explained that, when in public, passing strangers generally uphold a non-written rule of non-solicitation. This rule can be broken only in certain specific cases: strangers can request certain free goods of each other when asking for information about directions and places. This type of request is often prefaced by an excuse for initiating talk and an alert regarding the search for information. For example: 'Excuse me, would you happen to know...' is normally prefaced before approaching a stranger, as 'asking someone for information they could not reasonably be assumed to have is a perceivably disoriented (and disorienting) thing to do' (Goffman, 1983: 38).

In the practice of ticket sharing, other forms of socialisation are also acceptable. I spot two people clustered together and approach them to solicit information about the destination of their journey. The issue in doing this is its awkward, embarrassing nature due mainly to the fact that in requesting this information, I risk that these two people might not know why I am asking them this question. Asking if somebody is going to Lübeck and using the group ticket is only a welcome solicitation for somebody who understands the rules of the game so-to-speak. Any signal (such as waving a ticket) between ticket re-seller and traveller (who are part of the parasitic infrastructure) might be indiscernible for the host (DeutscheBahn). Serres (1982: 142) explained by stating, 'look at the variety of languages and accents that mottle the globe. Here strangers understand nothing and signals are nothing but parasites for them. The signal proper is noise for a third, who is excluded.' The signal, here standing near a ticket machine and waving a group ticket, might be a signal to some, but noise for others.

Waiting for ticket sharers also involves an emotional engagement in the attention to others – a sensitivity to

those who are starting and stopping their journey, to the speed of flows circling around my own being. Significant are those who stop – those who look down at the ground or up at the train board. Every moment somebody stops they open up a chance that they are stopping to talk to a ticket sharer. This process also underlines one's level of activity, even in 'stopping and standing' – where the actor can approach others with their sight, attention, or desire to interact.

Shortly after conducting my fieldwork, in the spring of 2013, DeutscheBahn changed the regulations of the group ticket – requiring users to sign their names onto the ticket. This new regulation was implemented in order to avoid ticket sharing practices. This shift is also an example of the direct influence the parasitic infrastructure has on the main infrastructure. Here the parasite, through its actions, forced the infrastructure to shift its behaviour.

The Digital Parasite

As we explore how parasitic infrastructures are configured, the role of the digital is becoming increasingly central for the creation and robustness of the parasitic infrastructure. A growing number of apps and websites help the parasitic system use a mainstream urban infrastructure – often unnoticed. These digital platforms thus form an underbelly for these practices, helping ease or speed up processes of creating a parasitic infrastructure, mainly because the 'rules' of the new infrastructure are often written out online and made incredibly explicit. I would argue that ad-hoc searching out ticket sharers at the Hauptbahnhof, without knowing the rules of engagement, is both labour-intensive and socially awkward, as was already outlined in the previous paragraphs. Searching out a ticket sharer online, through a specific app or website, can help in coordinating the new ad-hoc system. To reiterate, in the case of ticket sharing, rules of engagement can be guessed and negotiated offline: an actor wishing to share their ticket can seek out spaces in the Hauptbahnhof where tickets are exchanged, one can gesture and place one's body out as a beacon of engagement. Yet doing so involves a labour that might not be part of the actors' intentions. The same actor can also use a platform like Mitfahrgelegenheit.de in order to make these rules more explicit.

At the moment of my fieldwork in 2013, Mitfahrgelegenheit.de was the most widely used train ticket sharing site in Germany. 4.5 million registered users and thousands of other unregistered travellers coordinated via this website and smartphone app. I noted that Mitfahrgelegenheit.de was often used to substitute waiting in the train station for somebody to come by with a ticket to share. The website minimised risk of finding another traveller, it helped with coordinating meetings – when one person buys a cheap group ticket to a given destination, they then log onto the website to find other willing train travellers to share the ticket with them, and set up the exact time and place they will meet. Most of the meeting spots suggested via Mitfahrgelegenheit.de were the same locations as the offline ticket sharers used. But the website helped coordinate the right meeting point within the train station (especially useful for new users), and helped calculate a time of arrival and departure as well as the material costs of such travel. Sociality is thus constantly being renegotiated as trust is manifested online and offline between strangers, before and during the journey.

An informal market has also developed online as well as offline – with entrepreneurs beginning to travel back and forth along regular routes, taking on multiple travellers per day. But they also gain travellers by advertising their trips via the website, and they also calculate and compute which trips would 'pay off' once travellers contact them via email or SMS, expressing their interest in a certain route. These

Mitfahrgelegenheit.de users developed their own processes of 'calqulating', meaning 'anticipating, measuring, testing, influencing and correcting the discrepancies between their own position' and that of their other ride sharers and providers (Cochoy, 2008: 30).

This doesn't mean that digital platforms provide instant solutions to various problems that can arise when building parasitic infrastructure. When interviewing the two female travellers (who appeared in a previous section of this paper), they told me: 'You should really then try this one website called Mitfahrgelegenheit.de.' I replied, 'I know that website. I've used it before. But why didn't *you* use it today?' I suggested this seeing that they couldn't find somebody to share their ticket with. 'We did use it, but nobody showed up', the other girl explained. The digital platform thus becomes an alternative form of coordination – a sort of 'plan a' or 'plan b' in coordination, but not the sole method used. If one parasitic system fails, the other parasitic system is there as a backup, and vice-versa. In this instance, the two girls did originally use the website, but had to resort to physically searching out others in the Hauptbahnhof, because the users of the digital platform did not cooperate. This mobility between the physical and digital method of coordination is characteristic of customising an infrastructure such as a train ticket sharing system.

Various apps and websites help contest existing infrastructures by providing alternative platforms to communicate between other ticket re-sellers or travellers, coordinate their travel times, and calculate their costs. While the digital holds an important role in helping to customise such infrastructure – specifically through its ability to help coordinate strangers, the body, the space, and the gestures of the parasite – based on material and bodily coordination, is still key to this system.

Conclusions

In this paper, I focused on low-budget inter-rail transport in Germany, with a specific focus on the practice of ticket sharing. The everyday practice of ticket sharing was used to show how improvised, spontaneous bottom-up systems are part of the story of how smart cities emerge. Though the metaphors of the 'parasite' and 'parasitic infrastructure,' I aimed to explain the ways in which internal flows of the city become redefined. Systems like ticket sharing networks are assemblages of human and non-human, digital and analogue actors, which can attach themselves to existent systems – acting as parasitic infrastructures. The metaphor of the parasite is thus useful as it goes beyond just explaining competing infrastructures as systems of power that emerge either bottom-up or top-down. The parasite refers to not only to the power one system has over the other, but also the dynamics in the relationship between the host infrastructure and its parasite. A parasitic infrastructure attempts to operate without the detection of the host infrastructure, yet it's detection effects the actions of the host infrastructure, which adjusts its behaviour to repel the parasitic infrastructure. Thus, as a concept, it helps explain the dynamism and relationality inherent in smart cities.

This constant relationship between the host infrastructure and the parasite is necessary to keep a city 'smart', as these systems are part of the collective intelligence that shapes the city. Moreover, the relationship between the host infrastructure and its parasite affects the functionality of such systems and helps provide alternatives to a given system. Parasitic infrastructures today are an inherent part of living in cities – and the emergence of such infrastructure is often made possible through the physical parasite (through re-claiming areas of a given infrastructure to create new meaning), the body of the parasite (through gestures and movement), and the digital parasite (platforms designed to help customise and

coordinate the body through a given space). Where a ticket sharer stands in the Hauptbahnhof, their positioning in relationship to the ticket machine, where they place themselves in relation to various other ticket sharers, and the platform where the train is leaving must all be taken into account. The process of scanning the actors at the train station for potential ticket sharing groups can also help in finding a ticket sharer – making the placement of the body incredibly significant. Moreover, various digital platforms help speed up the coordination of the body and space within which a new infrastructure develops.

Understanding how these parasitic infrastructures emerge – whether it is a bus ticketing system in Belarus, or German's rail ticketing system – helps uncover how systems of calculation and computation exist and emerge beyond just the digital. It also reveals how agency and power are distributed, stabilised or destabilised in cities today, generating knowledge about the dynamics of smart cities.

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Notes

[1] Grodno's Bus Park website is only available in Russian – see http://www.ap1.by.

References

- Alvesson, Mats. 'Beyond Neopositivists, Romantics, and Localists: A Reflexive Approach to Interviews in Organizational Research', *Academy of Management Review* 28.1 (2003): 13-33.
- Candea, Matei. 'Arbitrary Locations: In Defence of the Bounded Field-Site', *Journal of the Royal Anthropological Institute* 13, 1 (2007): 167-184.
- Chourabi, Hafedh, Nam, Taewoo, Walker, Shawn, Gil-Garcia, J. Ramon, Mellouli, Sehl, Nahon, Karine, Pardo, Theresa A. and Scholl, Hans Jochen. 'Understanding Smart Cities: An Integrative Framework', *45th Hawaii International Conference on System Science (HICSS)* (2012): 2289-2297, http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6149291
- Cochoy, Franck. 'Calculation, Qualculation, Calqulation: Shopping Cart Arithmetic, Equipped Cognition and the Clustered Consumer', *Marketing Theory* 8.1 (2008): 15-44.