CHAPTER I

Introduction

DIGITAL TRANSFORMATIONS

Over the first two decades of the twenty-first century the daily experience of buying and selling products and services has changed drastically for billions of people all over the world. During this period, the digital economy has expanded from primarily software, video games, and other computer applications to encompass vast and varied markets that deliver digitized media via the internet, such as music or video streaming, as well as a broad array of goods and services accessed through digital platforms, often through mobile devices. It is true that before this expansion, in the late 1990s and early 2000s, users were already able to download many types of multimedia files from websites or via free peer-to-peer file sharing networks, such as Napster and LimeWire. However, these services were limited by factors such as narrow bandwidth and inadequate online distribution systems, as well as the shadow of piracy and the threat of legal penalties, which loomed large in peer-to-peer digital exchanges. However, since that time, technical, legal, and societal developments have created conditions for the emergence of “legitimate marketplaces” where providers of digital goods have become not only household names but powerful players in the global economy.

Thus, while file sharing networks and other ways of accessing free multimedia content online have not fully disappeared, they have largely given up ground to corporations like Netflix; Amazon (and its video and
music streaming services); Apple (along with its app and music stores and Apple TV+); and a growing number of streaming services that have emerged in the so-called “streaming wars” of the early 2020s: Disney+, NBC’s Peacock, HBO+, CBS All Access, and Discovery+, to name a few. Likewise, the publishing industry has been upended not only through the sale of print books online (most notably via Amazon), but also through the widespread popularity of electronic books and e-readers, such as Amazon’s Kindle, Barnes and Noble’s nook, and Rakuten’s Kobo. Parallel to the development of marketplaces for established multimedia products, new ways of accessing products and services through digital means have emerged. Central among these are digital platforms such as Uber, Lyft, Airbnb, Grubhub, Instacart, and countless others, which have leveraged digital tools like smartphones equipped with GPS tracking to provide new kinds of intermediary services that have come to reshape important industries beyond media, such as transportation, real estate, finance, logistics, retail, advertising, and a massive (state and nonstate) surveillance apparatus that bleeds into all of the above.

As the digital economy continues to grow along with the technologies that enable it, a profound transformation related to the digitization of global capitalism is underway. This transformation affects not only the very nature of goods and services that we consume, but also the markets where they circulate, how those markets are constituted, and how people interact with them. This book argues that the digitization of global capitalism has also resulted in profound impacts on the very geographic organization of the economy. In other words, digitization is not only changing how we shop, live, work, play, and communicate, but in the process, it is also reconstituting the very spaces and places where we engage in all these activities, the interconnections between them, and consequently the way we conceive of, organize, and navigate our societies and economies. Initially these changes became most immediately visible in media markets as these were first reoriented toward the trade in digital goods and then largely subsumed by digital networks and platforms. For instance, in the span of the first decade of the twenty-first century, multimedia consumption shifted from CDs and DVDs to individual song or movie purchases via online stores such as Apple’s iTunes store, to online subscription streaming services such as Netflix and Spotify. One visible effect of this has been the decimation of brick-and-mortar video stores and music shops, with giants of an earlier era like Blockbuster and Tower Records facing near-total extinction.1 A less visible effect of the same shift in the media industries has been the reshuffling of power
relations between different actors in the production and distribution process (e.g., record labels, artists, retailers, and technology companies). For instance, in May 2023, negotiations for a new contract between the Alliance of Motion Picture and Television Producers (AMPTP) and the Writers Guild of America (WGA) broke down. As a result, the WGA went on strike over changes stemming from the widespread digitization of the film and TV industry and its shift toward streaming, such as lack of residual payment, shorter TV seasons, and the threat of artificial intelligence (AI) as a screenwriting replacement. A few months later, the writers were joined by the Screen Actors Guild (SAG), whose contract negotiations broke down over a similar set of issues involving streaming platform residuals and the use of artificial intelligence to replace labor. At the time of writing, film and television production in the United States has been largely stopped due to the historic double strike paralyzing Hollywood, something not seen since 1960, when Ronald Reagan was the leader of SAG. However, while these changes have profoundly affected media industries, the digital transformation of capitalism goes well beyond the replacement of storefronts with digital portals or shifting power relations between guilds. Rather, it entails a fundamental reshaping of markets for goods and services across sectors of the economy according to a new spatial and technological order—what I call in this book the spatial architecture of digital capitalism.

Given the profound changes brought about by digitization, examining a set of seemingly basic, mundane, and decidedly “non-digital” activities such as food preparation and delivery can help illustrate the many layers of this systemic shift. Preparing and delivering food are hardly new activities, and at first sight they may not seem like intuitive exemplars of the digital economy. In fact, food could be considered a quintessential “non-digital” commodity—given its perishable, sensorial, and nutritional attributes, food cannot (at least at the time of writing) be experienced in digital form, and its consumption generally must take place within a short time from preparation. Even with enormous advances in food transportation and preservation in the past century, freshly prepared food continues to be an enormously popular good, as demonstrated by the billions of people the world over who flock every day to restaurants, eateries, and all manner of establishments where they consume food prepared on demand. Furthermore, food production, distribution, and consumption are deeply rooted in culturally specific and highly localized contexts and thoroughly embedded in all aspects of the economy—both as industries in themselves (e.g., agriculture, grocery,
restaurant industries) and as a basic necessity for human sustenance—thus they are fundamental to all other economic activities. It is precisely due to both its local rootedness and its ubiquity that we can take food to be a microcosm of capitalism’s digital transformations, where the continuities and ruptures brought on by widespread digitization coexist and interact.

For instance, well before the arrival of food delivery platforms such as Uber Eats, Grubhub, and Doordash, many cities throughout the world had well-established, highly localized, and differentiated markets for the delivery of prepared food. In many cases those markets functioned (and many continue to do so) by customers contacting restaurants directly and ordering “for delivery.” Restaurants would then dispatch the order by foot, bicycle, car, or motorcycle directly to the customers’ home, workplace, or some other location. The payment would take place either during the initial order (via phone or, more recently, online) using credit/debit card, or upon delivery using cash (or card, if the delivery person had a credit card imprinter or, more recently, an electronic terminal). In these food-delivery markets the people who transported food orders from door to door were often employed directly by the restaurants, and their income would be supplemented by (or often entirely made up of) tips from customers. In some instances, however, this basic arrangement gave rise to particularly sophisticated systems of intermediaries dedicated to connecting food producers and consumers across space.

The lunchbox delivery system in Mumbai known as dabbawala is a fascinating example of how such a model evolved and took root in an era prior to the development of digital technologies. This system began to take form toward the end of the nineteenth century, when increased migration from the countryside to the city, a shortage of prepared food establishments, and a gendered and caste-based division of labor created conditions for its emergence in the context of British colonialism in India. According to anthropologist Gauri Sanjeev Pathak, the roots of this system can be traced back to 1890, when Mahadu Havji Bache, “an immigrant to Mumbai from the Rajgurunagar taluka (subdistrict) of the Pune district of Maharashtra, discovered that there was a demand for the delivery of home-cooked lunches amongst Indians working for British administrators. To meet this demand, he recruited relatives from within his taluka. The system started with around twenty people but rapidly expanded to include members from neighbouring talukas.”

Over time, this food delivery system has become thoroughly embedded in the urban life of Mumbai. Today it relies on about five thousand
couriers who serve hundreds of thousands of customers. **Dabbawalas** (who are overwhelmingly men) collect prepared food from private homes, where food is cooked (usually by women) and packed in cylindrical stacked lunchboxes (**dabbas**) that keep it warm. In complex urban journeys that include transportation by bicycle, train, handcart, and even by foot, dabbawalas deliver the lunchboxes to customers at their worksites by lunchtime. This routine takes place day in and day out with remarkable punctuality and a negligible rate of error. This is because, beyond being a food delivery system, the dabbawala is also a sophisticated, well-organized, and smoothly executed information processing system, where each lunchbox is marked with a unique code that corresponds to the individual dabbawala, the origin/destination, and recipient. By some accounts, around two hundred thousand meals are delivered daily, with a remarkably low error rate that some estimates put at just one in six million deliveries.⁷ In addition to processing information in a way that allows for the collection, transportation, and successful delivery of meals, it is important to highlight that the dabbawala system is embedded within Mumbai’s particular social structure and division of labor. For example, the dabbawalas constitute a relatively homogeneous group belonging to the Maratha caste. The profession inhabits a space where they have earned widespread praise and affection, but it is not commensurate with their economic circumstances, given their low monthly earnings.

This system depends not only on the dabbawalas themselves, who undertake the food delivery, but on the hundreds of thousands of people who prepare and pack the food every day. This task takes place primarily inside private homes and within heteronormative family structures, where it is carried out overwhelmingly by women. Specifically, food preparation in this context is often an expectation for mothers or wives who stay at home while their sons or husbands go to work. Food preparation in the dabbawala system thus works in tandem with both a specific family structure and the broader division of labor in the local economy. As feminist scholars have long argued, much of the labor needed to maintain and reproduce society is precisely the kind of labor that is both essential to the workings of capitalism while at the same time being generally left out of the formal economy.⁸ In the case of the dabbawala system, the labor that goes into food preparation is uncompensated labor that takes place in the household and is mostly done by women. In contrast, the delivery work carried out by the dabbawalas themselves, a mostly male-driven workforce, is part of the market
economy and as such compensated in monetary terms. Addressing this tension, feminist media studies scholar Kylie Jarrett argues that “labor done in the home—“women’s work”—is a necessary input to capitalist circuits of exchange, producing healthy, socially adept, well-nourished laboring bodies.” Yet, despite being essential in many ways, this “feminized” domestic work is often excluded from the monetary sphere and rendered invisible in how we conceive of, and operate, the larger economy. In this case, the food preparation done in the homes is an integral part of the dabbawala system, but is not remunerated with a wage, which can lead some to consider it an entirely separate activity.

In addition to relying on the unpaid labor of preparing food in the home, much of the success of the dabbawala can be attributed to the refinement of an efficient and well-coordinated system of informational organization and delivery logistics. Undoubtedly this system performs an important social function that both employs thousands of dabbawalas and provides nourishment to thousands of Mumbai’s workers across industries throughout their workday. However, to understand this system’s success it is important to also understand its embeddedness in a particular geographic context and prevailing social order, both of which are heavily shaped by structures such as caste, gender, family relations, and the historical legacy of British colonial rule. In addition to its organizational and logistical innovations, the dabbawala’s reliance on the division of labor within families, and between different social groups, has lent stability to this food delivery system and allowed it to become such a fixture in the city life of Mumbai. And yet, while dabbawalas are seen as an esteemed institution by many Mumbaikars, this occupation—and the system it underpins—is under important pressures for change. As in many other cities all around the world, Mumbai has recently seen the rise of food delivery services coordinated via digital platforms. These services simultaneously challenge, overlap with, and extend the existing networks of intermediaries built through systems such as the dabbawala. Considering the transformative forces reshaping food delivery markets in Mumbai (and elsewhere), it is worth examining how these platform-based food delivery networks compare to the dabbawala along social, spatial, and technological dimensions. This comparison can in turn serve as a microcosm where we can glean the emergence and development of digital capitalism, its myriad manifestations across specific geographic contexts, and the spatial architecture that characterizes this new economic formation.
THREE BUILDING BLOCKS OF DIGITAL ECONOMIES

At a surface level the dabbawala system appears to resemble the digital platform–based delivery networks of Uber Eats or Grubhub. After all, in both cases intermediaries are paid to pick up prepared food in one location and deliver it on time in another. However, beneath this veneer of similarity there are significant differences that suggest a broader change in the social, technological, and economic dynamics underlying not only food-related industries and the service sector, but also the broader economy. In this example, and in the rest of the book, I examine how a wide range of activities—such as food preparation and delivery—undergoes transformations through digital technologies, enfolding into digital capitalism and producing new spatialities in the process. To analyze the construction of digital capitalism, and highlight its spatial and geographic dimensions, I consider the three interconnected processes (Figure 1) that together form the core theoretical framework of this book: location, valuation, and marketization (LVM). Location identifies how and where things, people, or activities in digital capitalism are situated in space. Valuation in turn refers to the assignment of a kind of economic worth (which may be monetary, but not necessarily) to specific elements in the context of digital capitalism, ranging from goods and services to assets, relations, attention, clicks, or myriad others. Lastly, marketization describes the construction and workings of the markets that structure digital capitalism, as well as the interaction, circulation, exchange, and regulation

![Figure 1. Location, valuation, and marketization in the spatial architecture of digital capitalism. Elaborated by the author.](image)
involving constellations of actors, goods, services, and other elements throughout such markets, along with the various outcomes produced by them (e.g., profits, losses, and both negative and positive externalities). Below I explore each of the three processes in the LVM framework as they manifest in the case of the dabbawala food delivery system to illustrate the continuities and transformations brought by the incorporation of digital technologies into various spheres of economic activity as well as social structures and the places and spaces where all of these unfold.

**Location**

The dabbawala addresses the problem of locating and connecting the sites of food preparation with those of food delivery through an analog information system developed over decades and refined through repeated practice at scale. This system relies on a logically and organizationally coherent syntax of personalized codes physically marked on lunchboxes. This informational system allows for the sorting and allocation of lunchboxes in geographic space with a high degree of reliability. Having accurate and well-organized information, however, is not enough. This is why the dabbawalas’ highly refined skill for interpreting and using this information to navigate the urban space of Mumbai is essential for the successful coordination of an enormous number of food deliveries every day. Each dabbawala has developed the practical knowledge of navigating specific routes at particular times and accumulated the social knowledge that comes from interacting with a stable pool of customers day in and day out. In practice this translates to the daily weaving of relatively stable locational networks made up of vast numbers of individual transactions and relations, which in aggregate corresponds to the spatial expression of a citywide food delivery market.

All of this adds up to a very effective system that is nevertheless limited by its very strengths: food is picked up and delivered along the same routes every day, and each route generally connects the same pair of locations in space: a home kitchen with its corresponding office or workspace. Therefore, on the question of location, the dabbawala system is highly effective and specialized but relatively inflexible, since it is tied to very specific social relations, and their corresponding locations (i.e., the same pairs of home kitchens and offices/workspaces). In other words, the advantages that allow dabbawalas to effectively deliver millions of home-prepared meals to office workers do not necessarily translate to changing food delivery contexts—such as customers without someone to
cook for them at home or those with unpredictable schedules, who may order food from different restaurants on irregular days.

By contrast, digital food delivery platforms such as Uber Eats, Zomato, and Swiggy (the latter two very popular in India) operate on a different locational logic—one that is largely disconnected from the familial and social relations that support the dabbawala system. Instead, these platforms connect food producers and consumers into continuously reconfigured locational and transactional networks that reflect who orders what, when, and from where at any given time. While some customers may have a favorite restaurant, from which they order with a certain frequency, they are not tied to ordering from said restaurant every day—unlike office workers in the dabbawala system, who receive daily deliveries of food prepared by family members in their own homes. Similarly, even if a customer orders from the same restaurant every day, the shifting labor pool of delivery workers at any given time and place means that there is no intrinsic connection between individual delivery workers and specific locations or the routes that connect them. By the same token, in the food delivery system organized by digital platforms, neither delivery workers nor restaurants (or other food establishments) have a fixed clientele and are instead faced with fluctuations in the volume, composition, and location of orders they receive every day.

This constant reconfiguration of social, spatial, and transactional networks is the result of one of the key features of digital food delivery platforms, which sharply contrasts with the dabbawala system. Platforms like Grubhub, Swiggy, and Zomato operate as intermediaries that connect buyers, sellers, and delivery workers on demand. Thus, the connections between pickup and drop-off locations in space are established on a case-by-case and platform-by-platform basis. These connections are established and assigned an economic value through a combination of variables such as user preferences (what people search for), availability (which restaurants are part of the delivery network), hour of the day, and time/distance of each delivery. These and other variables are weighed into the calculations made by the proprietary algorithms of each platform, which ultimately determine not only the price of each delivery (and how it will be allocated among the various parties involved) but also the specific configurations of people and places that assemble into ephemeral networks of buyers, sellers, and delivery workers.

A key aspect of the digital food delivery platform ecosystem (which applies to many segments of digital capitalism) is the constitutive role
played by real-time location tracking. The shifting networks woven by 
connecting customers, establishments, and delivery workers on demand 
are made possible because the location of all parties is tracked in real 
time by the digital platforms through the GPS capabilities on mobile 
phones or using IP (internet protocol) geolocation in personal comput-
ers. It is this ability to match buyers, sellers, and delivery workers in 
real space/time, and to provide a means for tracking and communica-
tion between them, that underpins the business models of food deliv-
ery platforms. While food delivery is not new, and neither is the role of 
intermediaries, the innovations of digital platforms reside in combining 
location and other data collection capabilities with an interactive inter-
face that connects and coordinates the various parties to each transac-
tion in real time. However, the change in food preparation and delivery 
brought by digital platforms is not limited to the remaking of the social 
and spatial networks involved in each transaction. In other words, digi-
tal platforms not only reshuffle who is involved in each food delivery, 
where they may be located, and how they connect with each other, but 
they also transform the very nature of what we mean by “food delivery” 
as an economic activity and the role it plays in market and nonmarket 
exchanges. A crucial aspect of this transformation is that when trans-
actions are mediated by digital platforms, they involve complex forms 
of economic valuation that substantively differ from, say, those in tra-
ditional food delivery systems like the dabbawalla. These new forms of 
valuation that arise in the digital economy constitute the second pillar 
of the spatial architecture of digital capitalism developed throughout 
this book.

Valuation

As I discussed above, location is crucial to the construction of digital 
capitalism because it allows one to pinpoint and track particular ac-
tors, goods, services, and other elements in physical space—and increas-
ingly in real time. The combination of geospatial technologies (such as 
GPS) and digital applications (such as mobile digital platforms) produces 
vast amounts of real-time location data that structure and coordinate 
networks of buyers, sellers, and delivery workers through food delivery 
platforms. However, location alone does not fully explain how food de-
ivery (and myriad other activities, products, and services) have become 
subsumed into the digital economy. To understand this, it is necessary 
to account for how location is involved in the process of valuation, the