Digital Labor

Kylie Jarrett

DIGITAL MEDIA AND SOCIETY SERIES

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Acknowledgments

Digital Labor was researched and written through a series of lockdowns during a global pandemic. These were emotionally challenging times as our worlds shrunk and became riddled with new fears and challenges. The book inevitably bears the traces of the isolation and anxieties of this context. It also bears the traces of the forms of solidarity and meaningful digitally mediated exchanges that were a feature of this grim period. It is these elements of lockdown life I wish to take with me as we (hopefully) emerge from under the shadow cast by Covid and which I want to acknowledge here. I am, of course, very grateful to all my colleagues whose insights have shaped my research and who have been instrumental in the making of this book, not least as it depends so much upon their excellent empirical studies. As with most things in this pandemic, though, these traditional considerations must temporarily take a back seat as I recognize the personal connections that have made the labor of this book possible.

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Now more than ever I am grateful to have all these people in my world to help me live a rich life even when locked in my house.

Kylie Jarrett

1
Defining Digital Labor

Adorned in the teal livery of Deliveroo, Thiago Cortes rode his bike onto the quays running along the River Liffey in Dublin's city center one late August night in 2020. It was about 10.30 and the streets were quiet as a Covid-19 pandemic lockdown was in effect. Considered an essential worker, platform delivery riders such as Cortes were one of the few signs of life in the city. Like many other international students, Cortes worked for Deliveroo to meet the high costs of living in Dublin, riding his bike through the wet and windy city streets as a self-employed contractor for an average of €10.50 an hour, but sometimes for less. He had just completed what was likely to be his last delivery of the night and his fiancée expected him home as usual about 11 p.m. He was not to arrive. As he attempted to turn onto North Wall Quay, he was hit by a car traveling at speed. The car, its driver, and passengers then fled the scene. Despite being rushed to hospital, Thiago Cortes did not survive his injuries (Lynch 2020; Malekmian 2020). A few nights later, friends and fellow Deliveroo riders held a vigil both *in memoriam* and as a protest about the unsafe conditions experienced in their work, holding the platform to account. Deliveroo rejected this call, claiming that riders were "at the heart of Deliveroo and we prioritise rider safety" (Pollak 2020). At the same time, a crowdfunding campaign was set up on GoFundMe to raise money to repatriate Cortes's body to Brazil.

Directly across the Liffey from the site of Cortes's tragic death – and indeed spilling out onto the north side of the river – is the area of Dublin known as the Silicon Docks. Formerly the city's working port, and so associated with

heavy industry, commodity trade, and blue-collar working communities, the area is now home to a significant number of the world's largest, and most famous, digital media companies. Lured by low tax rates and economic incentives, multinational companies such as Google, Facebook, Airbnb, and Amazon all have headquarters in Dublin's docklands (Jarrett 2021). Working in the towers of glass and steel that now comprise the Docks area is a range of full-time and well-paid engineers, programmers, marketing specialists, and game designers, along with a raft of less secure workers involved in content moderation, customer support, or software localization. State supported industry incubators foster digital technology startups in the docks who take advantage of the proximity to large, successful multinationals. Nearby co-working spaces also host freelance web designers, influencers, and podcasters, working their hustle in creative, entrepreneurial careers.

The morning after Cortes's accident, and not far from these centers of enterprise, I was scrolling through social media platforms when I spotted a news story about the incident. I clicked through the link onto an online news platform to read more just as a friend, also horrified by the news of another vulnerable worker being harmed, sent me a WhatsApp linking to another story about the incident. I spent time over breakfast clicking in and out of various applications, platforms, and news sites. In doing so, I was being put to work by the same social media platforms that reside in Dublin's docklands. Each click of a link, each moment spent reading a particular item on a feed, each time I reacted to a friend's post, I was generating data about my likes and interests that could be used to target advertising to me, which could be aggregated into marketing databases, or used to train algorithms and artificial intelligence. By engaging with the horrible story of a vulnerable worker's fatal industrial accident, I was

creating the product upon which the economics of social media companies pivot: user data.

Unofficial “ghost bicycle” memorial to Deliveroo rider Thiago Cortes on North Wall Quay, Dublin. Source: Author’s own.

At first glance, the experience of Thiago Cortes, the Silicon Dock’s tech industry entrepreneurs, and me as a social media user seem to have little in common. The unsafe, low-paid, and marginalized work of a migrant student working for a delivery platform seems far removed from the clean, well-compensated, culturally esteemed careers of Facebook or Google’s white-collar workforce. These kinds of labor are even further removed from me distracting myself by doomscrolling Twitter at the kitchen table. Yet Cortes, Google’s programmers, and I are all engaged in what has become known as digital labor; work that has emerged since the transformation of society, culture, and economics

by networked computerization. This book is about all these kinds of workers and the work they do. Its goal is to provide a critical overview of the defining characteristics of this form of labor and the challenges and pleasures it offers those who undertake it. It asks: How is such work compensated and managed? What makes such work desirable – or merely necessary? What are the negative consequences of how this work manifests and how do workers negotiate those dynamics? Its primary question, though, is: what does digital labor look like? However, as the divergent experiences of myself, Cortes, and the Silicon Dock's privileged programmers already flag, identifying commonalities between the many forms that digital labor can take is no easy task. What unites their experience and allows us to speak of their activity under the same umbrella? Is it even possible to talk about digital labor as if it was a single form of work?

To respond to these questions, the first challenge for this book is in defining what we mean by "digital labor". At first glance, that should be an easy task. The term is in common use. According to Google's Ngram Viewer which captures the relative increase in references to the term within the Google Books data set, there has been an exponential rise in its use since 2009. The study of digital labor is also a growing field of academic inquiry as the continually expanding array of publications addressing the topic attest. It also has international recognition. I belong to the European Network on Digital Labor, for instance which is affiliated with the International Network on Digital Labor. That you have picked up this book with the title *Digital Labor* speaks to a relatively wide recognition of the term and some conceptualization of the general field it describes. The term "digital labor" clearly has some legibility.

The increase in use of the term shown in the *n*-gram also indicates something more. It suggests that there has been the emergence of a type of labor that is somehow distinct from precursor forms, so much so that it warrants its own nomenclature. This can be tied to the growth of companies and sectors that are native born to digital environments – such as social media platforms and online retailers – and the transformation of existing industries through computerization. As Tim Jordan (2020) argues, while still recognizing the continuing importance of economic practices that do not involve computers or code, it is possible to distinguish a significant component of the global economy that pivots on information and communication technologies. The form and size of this sector are difficult to define, not least because there are many overlapping, parallel, and intersecting economic fields. However, he argues that there is a distinct area of economic activity that can be called the digital economy which has its own, quite specific processes and practices. These processes may not only be present in this sector, but their particular organization is part of what comprises it as a distinct field. With work being such a crucial part of any economy, some of these distinct features inevitably relate to how work is organized, managed, and exploited. Mapping the specificity of these processes within the emerging digital economy is at the core of this book.

Recent European data concretely demonstrate the growing importance of work in the digital economy and thus the importance of understanding it better. In a 2018 survey of 14 European countries conducted by the European Joint Research Centre, it was estimated that an average 10% of the adult population had been involved in some kind of work for digital platforms, with 8% being involved in this work frequently. About 2% of workers in the study were earning more than 50% of their income through this kind of

labor (Pesole et al. 2018). Another 2016 survey of five European countries found widespread engagement with digital platforms to make money, whether that be through hosting on Airbnb, selling goods on eBay, or as "crowdworkers" for intermediating platforms. The data showed that 9% of the UK and Dutch adults in the sample, 10% of the Swedish, 12% of the German, and 19% of the Austrian had engaged in some kind of paid work for digital platforms (Huws, Spencer, and Joyce 2016). Importantly, these figures do not factor in all the workers formally employed by digital companies or creative freelancers in the digital media industries, or those working in various other guises in the sector. As this industry has grown – which will be talked about more below – so has its workforce in both primary and subsidiary roles. Given the growing significance of digital work revealed by even these limited statistics, it seems increasingly important to not only understand the digital economy but also the kinds of labor it involves.

But despite its wide brand recognition and economic significance, the term "digital labor" is ill defined and used to categorize and typify an almost bewildering array of activities, professions, and roles across a diverse range of sectors. Alessandro Gandini (2021) has pointed out that the term originated in the early 2000s to interrogate critically the exploitation of unpaid user activity within the emerging digital industries and to validate the incorporation of this kind of work into economic analyses. The more recent applications of "digital labor" to describe work mediated by digital platforms (which Gandini insists is a distinct category because it is paid work) or roles within the digital media creative industries have only emerged over time. Because of this over-extension, Gandini (2021: 370) argues that the expression "has acquired some kind of genericity, becoming a sort of umbrella term that is increasingly

delinked from its origins as a critical Marxist stance on labour and value." He notes that "digital labor" has become an "empty signifier," a term hollowed out of any distinguishable critical or analytical purpose.

While I disagree with the narrow application of the term that Gandini advocates, he is right to argue that using the term requires specificity and that it is necessary to look beyond specific work activities or outputs in defining it. This still leaves us with the question: what on earth does "digital labor" refer to? Obviously, this must be answered before we can even get to the critical summary of its salient characteristics which is the purpose of this book. This introductory chapter then will answer this question and identify a working definition of "digital labor" that will be used in the following pages. In doing so, it will examine and discard a range of options before zooming in and contextualizing the definition it will adopt for the remainder of the book. It will then outline the analytical lenses that will be used to interrogate the bounded set of work practices that it will call "digital labor."

Digital? Labor?

A common sense understanding of the term would link "digital labor" to work activity which involves digital technology. The clue is in the name, right? But this would cover a vast range of occupational practices. Despite their many differences in terms of location, social status, labor mechanics, economic function, products, contractual arrangements, required skill sets, and worker profiles, the work of designing games, word processing, operating a mining excavator, or using a computerized industrial sewing machine could all arguably be defined as "digital labor." While these occupations differ markedly, all involve manipulation of some kind of digital system at some point.

In fact, given the diffusion of computational systems throughout all industries, it would be difficult to find a worker today who was not, in some way or other, using a digital tool throughout the course of the day. To use the manipulation of computerized tools to set the parameters of this study would expand its scope to cover almost all kinds of labor and be utterly unworkable.

If defining the field by focusing on the tools does not serve, we could also categorize work by the nature of the product it produces; it would be considered digital labor if it produced a digital commodity. This would encompass all work that produces games, websites, or social media content, and so be reflective of how the term is commonly used. But if we follow the full length of the value chain, this definition might also include miners whose manual labor in mining minerals such as coltan ultimately leads to the production of our digital devices (Fuchs and Sandoval 2014). If, instead, we worked with a definition that limited the category to direct involvement in the immediate production of a digital technology, this definition would then exclude platform workers such as Ola Cabs drivers, Deliveroo riders, or Handy cleaners who do not directly produce a digital product. However, these are the kinds of workers overtly associated with the term today. In this instance, the scope is both too broad and too narrow.

Another approach would be to consider only those industries that have been substantially transformed by digitization. It is useful here to draw on the description of “transmedia work” by Karin Fast and André Jansson (2019), which they describe not as a series of jobs or tasks but as a widespread social condition in which everyday expectations about media access and activity have had a transformative effect on the ways work – and society – is conducted. This includes traditional or everyday tasks such as sharing files or keeping in contact with an employer that have been

reshaped by media systems. By this definition, though, we can include in the pantheon of transmedia workers the builder whose primary activity involves manual, non-digital activity but for whom there are firm expectations about mobile media access and whose work faces constant interruption from phone calls, texts, and messages on a variety of platforms. This builder's labor is profoundly transformed by digital technologies and yet they would fall outside of what is typically meant by the term "digital laborer."

To narrow this down, it would perhaps be desirable to include in our definition only those forms of work that have been *profoundly* transformed by access to and use of digital technologies. But as already noted, digitization has transformed almost all industries and almost all work practices. Such a definition would also need to include the printing industry workers explored by Shoshanna Zuboff (1988), whose everyday work activities and institutional hierarchies were fundamentally altered by the computerization of the factory. It would also need to include the farmer, who now manages their dairy herd through microchips and automated milking systems, and the mechanic whose assessments of engines are managed by digital machines. An argument could of course be made for including only types of work which cross a particular threshold for the degree of transformation. The question then becomes where that threshold would lie – a difficult line to draw in the absence of longitudinal empirical evidence about all workplaces documenting degrees of change. Yet again, this approach to defining the terms of this book would quickly become unworkable.

It might be possible to define the term by correlating it with a particular set of occupational conditions. However, there is still a remarkable diversity within each single digital labor sector in terms of work activity, products, and

contractual relations that make this a challenge. To cite only one example of such typologies, in their study of work associated with digital platforms, Jamie Woodcock and Mark Graham (2020) describe a range of different forms: taxi and delivery work; domestic and carework; microwork; online freelancing. These forms differ markedly in relation to the required activity, skill levels, and their outputs. Labelling images for a company through Amazon Mechanical Turk is very different to driving a cab for Didi or building a website for a client contracted via Upwork, yet they are all instances of platform labor. These types of work also differ in terms of their relationship to geography, with Woodcock and Graham emphasizing the difference between work that is "geographically tethered", such as delivery services, to those that can span global geography, such as microwork for Fiverr. Perhaps more importantly, they also map the difference in how work is governed in each of these forms, exploring levels of control in terms of space, time, autonomy to set rates, capacity of work to be captured as data, barriers to entry, potential for repeat transactions, and degree of explicit coordination (2020: 63–9). Other theorists use different terminology and different categories to describe similar phenomena but also provide slightly different definitions and descriptions: Valerio de Stefano (2016), for instance, refers to "crowdwork" and "work-on-demand via app," while a study for the European Parliament Committee on Employment and Social Affairs differentiates only between platform-mediated work that happens offline and online (Forde et al. 2017). There are important differences across even this narrow range of digital labor activities that make it difficult to find the set of occupational characteristics that can be used to define the field.

Beyond these pragmatic questions, there is also the very fraught question of whether all activity that occurs in the

digital economy – and which is usually conceptualized under the term “digital labor” – can be defined as “labor” at all. As will be discussed further in chapters 2 and 3, many digital laborers are engaged in forms of self-employment or self-exploitation that place them outside of definitions of “labor” if that term is limited to work that is value creating and exploited by an employer. This is also a question regularly raised about unpaid work such as user activity on social media platforms. The absence of contractual relations, compensation, and coercion may suggest this is not labor. Much of user labor is, arguably, fun and so is more akin to play than work (see Kücklich 2005; Scholz 2013). There are also more complicated arguments about whether user activity is actually value generating because it is the labor of others such as marketing department employees and coders who parse the raw inputs from users into a money-making commodity (Bolin 2011; Meehan 1984). It has also been argued that value is actually generated in the stock market and not in user activity at all (Arvidsson and Colleoni 2012). An even more abstract argument is that social media platforms are, in fact, generating revenue from exploiting the natural resources of user affects and energies rather than being engaged in productive activity – exploiting rent – and so users are not engaged in value-producing labor (Caraway 2011; Pasquinelli 2009). Along with various colleagues, I have argued against such positions and made the claim that digital media users *are* engaged in value-generating labor (Jarrett 2016a; see also Andrejevic 2002; Fuchs 2008, 2009, 2014a; Fuchs and Sevignani 2013; Kücklich 2005; Scholz 2013), but nevertheless this persistent, unresolved question becomes another complication in defining “digital labor” for the purposes of this book.

With these various perspectives in mind, I am going to take guidance from Gandini and begin by providing some

precision in my terminology and theory, not least so I can make my way through the tangled contradictions outlined above and find an object to focus on for this book. To do so, I will continue to draw on a commonsense usage of the term, but one informed by the literature in popular and academic fields of inquiry, to define the scope of what is in and what is outside my definition. By necessity, these boundaries will be relatively arbitrary and open to debate, and I certainly wouldn't propose them as the only way to define "digital labor." They will, however, limit the scope of the kinds of activities, workers, and workplaces across which I will be tracking commonalities in this book.

Labor context

My first intervention is to restrict the scope of the inquiry to "digital media industries." By this term, I mean the obvious sectors: the (in)famous multinational social media and technology companies such as Google, Amazon, or TenCent; the software, games, and creative sectors; and the Web 2.0 or social media sector, which includes its vast unpaid workforce of users. This term also includes platforms that broker various kinds of employment because, even if the specific labor activities they broker may neither be media work nor use digital technologies, the mechanisms that create the labor relationship on the platform rely on digital media platforms to exist and, effectively, create content.

The use of the term "media" here may be misleading due to its long associations with audio-visual entertainment and news industries, or "The Media." I use it here, though, to refer to mediating communication systems, and so it encompasses industries and labor involved with software, websites, platforms, apps, or the creation of content or data for these systems. This way, we can include coders

building web-based health diagnostic systems, for instance, as part of the digital labor community, even though we would hesitate to call them part of “The Media.” But we can also include factory workers employed by or subcontracted to Amazon as they are doing work for an online retailer within the digital media platform ecosystem, as well as data-center technicians sustaining the cloud infrastructure owned by digital media giants.

The focus on digital media industries is partly driven by its logic centrality to questions of *digital* labor. But it is also because this sector has been at the forefront of broader socioeconomic changes within the global economy and the changes to work that follow from them. To understand the emergence of digital labor thus requires sketching out the place of digital industries and technologies within the form of capitalism that emerged in the latter half of the twentieth century. There are many variations of this history across the globe that depend on the specific conditions and particular state of development of different places. Nevertheless, the story of socioeconomic change in the hegemonic, global North tells a useful story that exemplifies the increasing economic centrality of the digital and contextualizes some of the forms of labor we will see throughout this book. What immediately follows is a very sketchy but still quite lengthy socioeconomic history – which by necessity must reduce complex and entangled histories to a sentence or two – and which will take us quite some way from our central concern of digital labor. However, this history shows the evolution of some of the economic structures of the economy, and the digital media sector specifically, which directly influence the shape of the work it entails.

This narrative will begin in the 1970s as the economic fabric of the global North began to fray. The long boom of the twentieth century had been driven by the twin engines

of mass production and a social compact relating to wages and economic security that enabled mass consumption. This logic was epitomized (if never quite actualized) in the idealized Fordist factory, where assembly lines of de-skilled but relatively well-paid and securely employed workers generated a raft of consumer goods that they were then in a position to purchase – a virtuous circle of production and consumption. Wage compacts between employers and workers, often brokered by relatively strong trade unions, and a broad social welfare safety net, funded by high taxation, sustained markets and enabled the emergence of new consumer domains as employment and wealth was spread. To keep the capitalist machinery ticking over, industry and society were focused on creating, shoring up, and innovating in relation to consumer demand (Harvey 1990).

By the 1960s, this mode of life and industry began to wobble as a youth-led counterculture began to reject the rigid modes of work associated with Fordism, but also began to query lives lived through consumption (Frayssé 2015). More importantly, though, consumer demand in the global North began to weaken as markets became saturated. The creation of global demand – expanding the consumer base – became necessary to continue growth. However, the relatively newly industrialized nations which were targeted as emerging markets also began to compete against global North companies for production activity. By the start of the 1970s, the mass production/consumption system in the global North became untenable, suffering from what became known as the “stagflation crisis.” The ugly portmanteau refers to the dual problems of *stag*nant economies and rising in*flation*. The effects of this shaky economic context were exacerbated by the “oil shock” of 1973 in which Oil Producing Exporting Countries (OPEC) announced an oil embargo on a range of nations in

response to their alleged support for Israel during the Yom Kippur war. The costs of production rose sharply as this vital component of almost all industry became scarce and thus more expensive.

The response to this economic crisis in the global North was to shift from focusing on demand to focusing on innovation in production: supply-side economics. Computerization and, in particular, digital communication systems were enrolled to produce greater efficiencies in production and transport and, importantly, flexibility in productive activity. The post-Fordist factory, typified by shorter production runs, more specialist goods, and a shift to economies of scope (selling fewer goods at a premium rather than masses of cheap goods) began to take shape. The emerging production technologies powered by computerization and electronic advances also enabled the widespread mobilization of the just-in-time production processes pioneered in Japan in the 1960s and 1970s. This model disaggregates the production chain so, rather than a factory producing all the components that comprise its final product, contributing components could be purchased elsewhere as needed, linking firms in extended supply chains (Tsing 2009). This allowed companies to shed inventory as well as elements of production – and the workers employed there – leading to leaner, more efficient corporate structures. What had once been the work of a single factory was outsourced to other, typically smaller, independent companies who, because they were typically in competition with other similar firms, offered lower wages and less secure conditions for workers. Computerized communication also allowed for organizational management across space and in real time to manage this distributed production. This also facilitated the offshoring of a significant amount of the global North's already outsourced manufacturing activity to emerging economies

in the global South to take advantage of lower wages and often more lax regulatory environments. The effects of outsourcing and offshoring on workers in the global North were profound as downward pressure was applied to wages and employment became insecure.

Another element of the renewal of capitalism since the 1970s was the financialization of the economy. Rather than being entirely defined by their products and profit, companies themselves became commodities, floating on global stock exchanges (also facilitated by advances in communication technologies). They thus became targets of mergers and acquisitions by, sometimes predatory, companies speculating on abstract valuations rather than a commitment to the firm, its products, or its workers. Providing value for shareholders began to drive companies, leading to further rationalization of the labor force and bolstering efforts to increase productivity through more offshoring and outsourcing. Companies bought entirely with a view to profit were often restructured, broken up, and/or repurposed, creating insecurity for workers. With the "priority to sustain the confidence of investors, employers . . . were no longer in a position to promise lifelong careers to their employees" (Feher 2018: 18).

And so with financialization and supply-side innovation came the restructuring of the labor market – often supported by neoliberal state policy and deregulation – intended to enable more flexibility in hiring practices. The full-time, permanent job that had typified the Fordist era began to cede to more contingent, irregular labor contracts, including temporary, part-time, and subcontractor relations. These contracts allowed new temporalities in and organization of work to emerge, mapped onto the fluid industrial dynamics of the post-Fordist period (Harvey 1990; Standing 2016). For many workers, work itself also became fragmented into

independent tasks or a series of varying gigs, demanding from them an increased flexibility and adaptability to circumstances and labor routines. As the twenty-first century has rolled out, the formal, permanent, contracted job has continued to decline in importance, with an International Labour Organization (ILO) report in 2015 finding that less than one in four jobs today follows this pattern. Additionally, persistently declining productivity across the globe has led to suggestions that increasing numbers of the world's workers will never be enrolled in the standard labor force.

Information intensive industries

The key to the economic transformation roughly sketched above was, arguably, digitization. Certainly, the innovations of the post-Fordist factory were materially enabled by it. But digitization also allowed for rapid production and circulation of materials and products in an "informational form" that has sped up and made more flexible the circulation of capital across the globe (Davis and Stack 1997). Additionally, the focus of economic activity has arguably moved from the manufacturing of material goods toward the production, manipulation, and distribution of knowledge, both in immaterial form – e.g. a patent or data stream – and when instantiated into an information-rich consumable – e.g. a game device or television program. Computerization has thus entrenched and increased the importance of white-collar labor. By comparison with the nineteenth century, today proportionally "fewer individuals manipulate *things*, more handle *people* and *symbols*" (Mills 1951: 58, original emphasis). This shift from secondary to tertiary industries – from manufacturing to service economies – is perhaps best understood as a change in which elements of value are understood to originate rather

than a wholesale change in the amount of activity in each sector. Across the globe, manufacturing and primary industries continue to enroll a significant number of workers – particularly in lower-income countries – and continue to contribute substantially to national productivity (ILO 2020; OECD 2019). Nevertheless, industries "characterized in general by the central role played by knowledge, information, affect, and communication" (Hardt and Negri 2000: 285) have grown in importance in high-income economies, bringing increasing attention to – and privileging of – services and creative sectors, and rearranging other sectors in their image (Moulier Boutang 2011).

Media industries are right at the heart of the shift toward an innovation-led, information-rich economy. The twentieth century was typified by the growing importance of industries producing the symbolic content of goods: advertising, marketing, design, and media. These industries did not escape the transformations of the 1970s. As David Hesmondhalgh (2007) describes, creative and cultural industries also underwent a process of commodification in which media corporations became reconceptualized as assets to be traded on stock markets. They were, therefore, also at the mercy of mergers and acquisitions, with some of the largest mergers of the period occurring in this sector: Warner Communications (which had already been taken over by Kinney National Services) merged with Time in 1989 to become one of the world's largest media groups. This also meant that media companies and their workers were impacted by the processes of asset stripping, restructuring, and outsourcing that were a feature of the last few decades of the twentieth century, as well as some media firms becoming globe-spanning mega-corporations, structured to maximize shareholder value.

In the 1990s, the internet emerged as another arena for the creation of cultural content. Initially conceived as a distributed communication system for military and civic purposes, the internet soon became home to a range of sites hosting political discussions and interpersonal engagement. From 1991, it also became home to commercial sites when the US National Science Foundation lifted the semi-official ban on such activity. A crucial point in the economic history of the internet was, however, the introduction of the Mosaic browser, which made easy, and thus popularized, access to the World Wide Web. Through this browser, the internet developed the kind of critical mass that indicated its potential as a site of commerce (Kenney 2003). This led to a dot.com boom where, supported by rivers of money from venture capitalists and investment firms, digital native startups began to emerge, particularly online retailers and community platforms. Various “old media” companies also began claiming space on the internet. They began developing portals and hubs as sites for both commerce and play, often drawing on a repurposed content from their offline products. A business model adopted by many of these sites, and in particular those with some longevity, was centered on advertising revenue. Echoing an approach familiar from broadcasting, access to sites was made free in exchange for user data and exposure to promotional material. In particular, the ability to collect direct data on audience engagement, from page views to click-throughs, was an extremely valuable innovation, overturning the vague mechanisms for capturing audience data used within the broadcast sector. Consequently, the first ads through which a user could click began appearing in the mid-1990s (McStay 2010).

As is the way with booms, the investment frenzy of the dot.com moment came to a sudden end. In 2000, the technology index the NASDAQ collapsed, taking with it not