Invisibility by Design

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Any manuscript can be endlessly improved, and this one is no exception. It is my hope that younger generations of scholars will find some ideas here that they will be willing to develop further. I also hope that undergraduate students who are entering the job market will derive inspiration from the book's critical engagement with the popular idea that the digital economy represents a more inclusive mode of production.

Labor and Gender in Japan's Digital Economy

Spike Jonze's *Her* tells the story of a man who falls in love with the operating system of his computer. Set in a future in which efficiency is expected not only in work relations but also in intimate affairs, the film depicts the life of a lonely man who earns a living cultivating his clients' personal relationships. As an employee of BeautifulHandwrittenLetters.com, Theodore Twombly writes personal correspondence that develops, maintains, strengthens, or mends his clients' relationships. Making a living from technologically enabled deceptions—recipients do not know that he is the one writing the letters—Theodore takes the next logical step and purchases a cutting-edge operating system to satisfy his own emotional needs. He finds that the operating system, Samantha, is supremely more adept and efficient than his ex-wife in meeting and even anticipating his desires. In the end, however, it is Samantha that breaks Theodore's heart. His world collapses when he learns that Samantha has cultivated 641 other love relationships.

The relationships between young women and digital technologies I explore in this book uncannily resemble the love affair between the operating system and its users in Jonze's film. In Japan, young women have turned to digital technologies in search of opportunities to develop fulfilling do-it-yourself (DIY) careers, but the life spans of those careers were tied to the profitable life cycles of the particular

technologies women used to develop their entrepreneurial endeavors. What is more, unpaid labor remained central to the projects young women were able to pursue in the digital economy. The "girly" photographers, net idols, bloggers, online traders, and cell phone novelists this book explores turned to digital technologies to valorize (and make visible) their uncompensated (and invisible) labor. Building on their examples, this book develops the argument that individuals' refusal to accept unfulfilling work is just as important as technological developments in driving innovations in capitalist accumulation. While digital technologies have seduced women by promising them meaningful careers, they only expanded the practice of extracting profits from women's unpaid labor. This multi-sited ethnography aims to uncover how digital technologies absorb human labor and make it invisible.

The boundary between humans and machines is an enduring theme in science fiction. Unlike *Her*, which portrays the relationship between the protagonist and the operating system as one that moves from seduction to betrayal, works of science fiction commonly conceptualize the relationship between humans and machines in terms of liberation and subordination.[1] Beyond the reels of Hollywood, we often look to technology to liberate us from soul-crushing work and question whether technological advances will subordinate our unruly creativity to an algorithmic rationality. We tend to view the relationship between humans and technology as one that is inevitably structured in hierarchy. Developments in intelligent machines, however, are reconfiguring how we interact with technology. Owners of Sony's robotic pet Aibo, for example, learned to communicate with their units, which—being years ahead of anything in the field of robotics—could express over sixty emotional states. When Sony suspended the manufacturing of its Aibo pets and stopped producing replacement parts for the existing units, owners felt desperate to save their robotic companions that had become part of their lives.[2] Evidently, humans are able to cultivate intimate relations with technologies, and they in turn are able to seduce humans. Not unlike the Aibo pets, digital cameras, cellular phones, and the internet enticed women in Japan with promises to enable them to sidestep the discriminatory hiring practices in the traditional labor market and develop new careers in the digital economy.[3]

In Japan, the digital economy evolved in parallel with the deregulation of the labor market. Because women had long been excluded from salaried employment and were thus able "to move more easily on the shifting sands of precarity" (Morini 2007, 40), they played a key role in mediating these concurrent developments. By embracing and promoting entrepreneurial approaches to career building, however, women have also advanced the dismantling of

Japan's unique system of lifetime employment. By shedding light on how the digital economy has harnessed inequalities in the local labor market, this book illuminates how technological developments are shaped by and shape their socioeconomic contexts. Women's investment in building meaningful careers drove the development of the digital economy. This economy, in turn, helped internet entrepreneurs innovate new practices to extract value from labor without actually employing workers. Susan Leigh Star and Anselm Strauss have argued that to understand how a particular infrastructure reproduces inequalities, we should look for invisible workers—those whose work is not formally recognized in the development and maintenance of that infrastructure (1999).[4] As my case studies demonstrate, Japan's digital economy was built on young women's invisible labor.[5]

In the not-so-distant future of Jonze's *Her*, computers respond to both human commands and human desires. They flatter, console, comfort, and seduce, but in the end, they also reassert their own logic of machinic efficiency. Just as the protagonist's new operating system was able to compute incomparably faster than humans, she was also able to handle many more social interactions with speed and finesse. Jonze's film portrays the subjective experience of living in a world where humans and machines increasingly fuse together in relationships that the popular dichotomy of liberation and subordination cannot explain. *Her* is not a story of the age-old anxiety about machines turning against humans but rather one about the duplicitous character of digital technologies. It reveals how digital technologies employ design principles such as interactivity and efficiency to seduce their users into believing that they can help them attain a more fulfilling life. Digital technologies evolve constantly, however, and, as Jonze's film poignantly demonstrates, it is not merely feedback from users that guides this evolution. Technological and socioeconomic environments also shape the advancement of digital technologies.

In the late 1990s and early 2000s, young women in Japan found themselves in a situation similar to the one depicted in the film. In a context in which a long economic recession further marginalized women from career-track employment,[6] digital cameras, cell phones, and the internet seduced women by promising them opportunities to develop meaningful DIY careers. In the midst of hiring freezes and rising unemployment in the regular economy, young women exuberantly projected their ambitions onto digital technologies. They anticipated that these technologies would democratize the labor market, ensure an equitable distribution of the (now digital) means of production, and eliminate discrimination from the world of work.[7] My research on "girly" photographers, net idols, bloggers, online traders, and cell

phone novelists, however, reveals that, more often than not, the digital economy that emerged alongside these careers used women's labor as the engine of its own development. Its ability to harness women's pursuit of DIY careers drove its rapid expansion. Tracing how young women's (often romantic) engagement with digital technologies unfolded and unraveled, this book inquires why the overwhelming majority of the women who ventured to build careers were not able to transform their projects into lucrative employment.

The Digital Economy

Manuel Castells observes that during the 1990s, business owners began incorporating the internet in their operations to increase their competitiveness, which facilitated the expansion and commercialization of the internet. These developments, in turn, inspired the emergence of e-businesses, which he describes as "any business activity whose performance of the key operations of management, financing, innovation, production, distribution, sales, employee relations, and customer relations takes place predominantly by/on the Internet or other networks of computer networks, regardless of the kind of connection between the virtual and the physical dimensions of the firm" (2001, 66). In this book, I refer to such e-businesses as the digital economy. Japan's digital economy was a few years behind that of the United States, but the gap between the two countries closed quickly due to two unique developments in Japan: unprecedented advances in the area of cell phones and discriminatory employment practices in the traditional labor market that drove a massive supply of workers to seek better employment opportunities in the emerging digital economy.

The Japanese access the internet primarily through their cell phones, which allows them to spend significantly more time online than their counterparts in North America (Ito, Matsuda, Okabe 2005).[8] In the early 2000s, using the internet via cellular phones also paved the way to the seamless commercialization of the internet. Cell phones are not shared like desktops are, which made online authentication easy. Internet providers in Japan very quickly developed the technologies to meet consumer demand for mobile access.[9] By March 2006, about 90 percent of cell phone users were accessing the internet from their phones, and the number of mobile internet users had reached almost 80 million. The development of the internet for the mobile platform, in turn, expedited the growth of the digital economy.

The availability of a massive pool of workers frustrated with their prospects in the traditional labor market and ready to build DIY careers also played a pivotal role in expediting the development of the digital economy. This is

ironic given that online companies are notorious for their ability to operate with an extremely lean workforce. While the Honda Motor Company employed 208,399 employees in 2016,[10] Japan's most popular online retailing platform, Rakuten, employed only 14,845 people in 2017.[11] Other online platforms kept their workforce even leaner. In 2017, mixi (the largest social networking platform) had only 720 employees, DeNA (one of the largest retailing and gaming platforms) employed 2,400 employees, and GREE (the most popular gaming platform) employed just 1,429 people.[12] The very fact that the CEOs of these online companies are among Japan's wealthiest entrepreneurs suggests that these firms were able to develop business models that extract value from labor without actually employing workers.

Online platforms generate surplus value from the brand names they develop. Brand values translate into stock prices and attract advertisers to place ads on online platforms. Brand names also entice users to online platforms. Adam Arviddson argues that the unpaid labor of consumers is instrumental to building brands, as consumers supply ideas for brand development and promote brands by using them (2005, 2008). In a similar fashion, online companies draw on their users to both develop and maximize their brand values. Livedoor and Rakuten—established by Japan's two most famous internet entrepreneurs, Horie Takafumi and Mikitani Hiroshi—illustrate this point.[13]

One of Japan's first online companies, Livedoor, grew out of a web consultancy business Horie established in 1995.[14] He launched Livedoor—a platform that hosted personal web pages and diaries—in 1996 while he was still an undergraduate student at the nation's top university, the University of Tokyo. In the late 1990s and early 2000s, Horie emerged as an icon representing the limitless possibilities the digital economy offered. Young people found him enormously appealing. He attracted admirers with his defiant behavior, reluctance to wear a necktie, bold criticism of Japan's conservative business establishment, and provocative claims such as "money can buy the soul" (Takeyama 2010, 235). Although Horie himself was not too successful at it, he pioneered the business model of building brand value by pursuing mergers and acquisitions. In 2004, he tried (but failed) to acquire the Kintetsu Buffaloes baseball team, and a year later, he attempted (again unsuccessfully) a hostile takeover of Japan's largest commercial television network, Fuji Television. To increase his company's brand value, he even claimed that he was going to invest in space tourism in a project he somewhat bombastically named the "Japan Space Dream—a Horie Takafumi Project."

In 2006, a scandal that ensued from falsifying financial statements and violating the Securities and Exchange Law prompted the Tokyo Stock Ex-

change to delist Livedoor. (To raise Livedoor's stock price, the management reported a pretax profit of JPY5 billion [$45,650,000] for 2004 instead of a loss of JPY300 million [$2,739,000].) In 2007, Horie was sentenced to 2.5 years in prison.[15] He claimed that the harsh sentence was an expression of the government's hostility toward venture capital and the new business model Livedoor represented, which was to generate more wealth from the management of the company's brand value than from selling services.[16]

Now with a criminal record, Horie's own brand as "a dotcom tycoon" and "an internet maverick" shifted to "an internet bad boy" and "a corporate enfant terrible." He, however, wasted little time lamenting the loss of his dotcom business. He wrote one self-help book after another (Horie 2005, 2009a, 2009b, 2010a, 2010b, 2010c, 2013). And in 2017, he embarked on a new project involving cattle—a choice I find delightfully ironic given that the very idea of branding originates from branding cattle. This time, Horie brands wagyu—a type of intensely marbled beef that features a uniquely high percentage of unsaturated fats.[17] His goal is to brand wagyu to the point that it becomes the world's most expensive meat—an equivalent of the wine produced in Domaine de la Romanée-Conti of Burgundy, a bottle of which costs anywhere between JPY46,000–1,000,000 ($420–$9,120). Bypassing middlemen and using only social media for advertising, Horie buys wagyu directly from farmers and delivers it to global buyers. He also opened a members-only restaurant named Wagyumafia ("mafia" referring to ex-IT entrepreneurs who Horie partnered with to start his business). Horie, who has never been shy about his ambitions, offered the following comments on his new business: "I'm always thinking how to hack the world" and "With wagyu, I'll make my name known to the world."[18]

Rakuten, an online marketplace established by Mikitani Hiroshi in 1997, was more successful than Livedoor in forging a strong brand name through mergers and acquisitions. After graduating in 1988 from a prestigious university, Hitotsubashi, Mikitani worked for the Industrial Bank of Japan (now part of Mizuho Bank) until 1997, when he left to establish a consultancy firm, Crimson Group. He launched Rakuten the same year. Rakuten is involved in online retailing, credit card services, and banking services that include loans and mortgages. It also operates websites that book hotels and flights, maintains an online securities firm, and manages an online video club. Unlike Livedoor, Rakuten succeeded in creating a new professional baseball team, the Tohoku Rakuten Golden Eagles.

Following the examples of Amazon and eBay, Mikitani is striving to conquer the global markets. In 2005, the company began expanding outside

Japan when it purchased buy.com and Kobo Inc. The company has also acquired shares in Pinterest. In 2012, Rakuten adopted English as the company's official language—a move that the president of the Honda Motor Company, Ito Takanobu, famously called "stupid" (*bakarashii*). Nevertheless, Rakuten has been voraciously buying internet-based businesses from countries all over the world, including China, Russia, the United States, Canada, Brazil, Spain, Germany, France, Indonesia, Korea, and Taiwan.[19] Mikitani is currently the fourth richest person in Japan and the 151st-richest billionaire in the world.

A lasting effect of the dotcom era in the United States, Gina Neff argues, was the recognition that entrepreneurial behavior and venture labor—understood as willingness to embrace risk—can secure economic growth (2012). She notes that successful dotcom entrepreneurs emerged as icons of a new era in which the excitement of new careers in a rapidly expanding field repositioned risk away from something to fear to something to embrace. Neff observes that the media capitalized on successful dotcomers to promote the idea that willingness to take risks had economic value. The ways in which the dotcom sector built on crumbling job security in the United States resembles the ways in which the digital economy in Japan drew on and furthered the deregulation of the labor market. Horie and Mikitani were widely celebrated for their entrepreneurial fearlessness, but their examples were not as easy to follow as the self-help books they published suggested (Horie 2005; Mikitani 2018). They were men and were well connected. Most women in Japan who strove to build DIY careers did not have access to venture capital like Horie and Mikitani, who embodied what Paolo Virno calls the ideology of the possible (2004, 2007). The idea that every internet user is a potential Mark Zuckerberg inspires entrepreneurial individuals to use social media technologies to forge self-brands (Marwick 2013). While these individuals hope to translate their self-brands into meaningful and lucrative employment, social media platforms harness the unpaid labor that internet users invest in self-branding to grow their own brand value.

This book aims to demonstrate the premise that instead of offering opportunities to build careers, the digital economy has obfuscated the meaning of work while expanding the category of worker to all those who use online platforms (and, therefore, labor for the benefit of online companies). In the 1960s, Mario Tronti introduced the concept of the "social factory" to describe capital's tendency to integrate society (i.e., the family and community) into its formal apparatuses of production (1962). More recently, Tiziana Terranova proposed that the internet has emerged as an emblematic apparatus of the social factory (2004). They define the social factory as a mode of accumulation

within which production time is no longer limited to the working day and the place of production is no longer constrained to factories and offices. According to Kathi Weeks, the concept models a condition in which "the relations of production extend beyond the specific employment relation" (2011, 142). Applied to the digital economy, the social factory is another way to claim that this economy extracts surplus value from labor without actually employing workers.

Feminist scholars have made important contributions to developing the theory of the social factory. Mariarosa Dalla Costa and Selma James proposed that focusing on factories and male workers could only offer a skewed interpretation of how capital extracts value from labor. They suggested that the housewife should be included in analyses of capitalism because she helps sustain capitalism by producing a precious commodity—labor power (and the working class). They argued that in capitalist economies, the family, as well as other forms of community, could not be conceptualized as realms that are separate and independent from the factory. Selma James writes, "The community therefore is not an area of freedom and leisure auxiliary to the factory, where by chance there happen to be women who are degraded as the personal servants of men. The community is the other half of capitalist organization, the other area of hidden capitalist exploitation, the other, hidden, source of surplus labor. It becomes increasingly regimented like a factory, what Mariarosa [Dalla Costa] calls a social factory, where the costs and nature of transport, housing, medical care, education, police, are all points of struggle. And this factory has [as] its pivot the woman in the home producing labor power as a commodity, and her struggle not to" (1975, 11). More recently, Kylie Jarrett has suggested that we consider the very history of capitalism as "the history of struggle within and against the social factory" (2018).

Gender in the Digital Economy

Mayuhime, a celebrity trader, claims that she spends only fifteen to thirty minutes a day trading foreign currencies online and earns JPY280,000–300,000 ($2,496–$2,674) a month, more than she made during a forty-hour-a-week job as an "office lady."[20] She also reports that before the birth of her daughter, she could spend up to twenty hours a day trading, earning up to JPY3,000,000 ($27,384) a month. Success stories like hers seduced many women into believing that they too could make money in the comfort of their homes.

The possibility of earning a decent living or, even better, striking it rich, however, was not the only aspect of online work that lured women into the digital economy. Until the late 1980s, when a real estate bubble burst and eco-

nomic growth came to a screeching halt, the Japanese economy was built on what Guy Standing describes as a highly paternalistic form of laborism (2011). Scholars have written about the failure of the Equal Employment Opportunity law to curb the pervasive gender bias in hiring practices and the prominent gender discrimination in Japanese workplaces (Kelsky 2001; Molony 1995; Ogasawara 1998). Furthermore, widespread hiring freezes in the wake of a prolonged economic recession have only narrowed women's opportunities to pursue work they perceive as meaningful. Net idols' willingness to spend hours answering fan mail after a full day of work, bloggers' claims that they loved the "nomad" lifestyles that blogging made possible, and cell phone novelists' insistence that they derived pleasure from their work because they experienced a sense of achievement must be understood in the context of women's growing frustration with their limited opportunities to pursue meaningful careers in the traditional labor market.

The mobilization of women into irregular work was not new in the 1990s. Mary Brinton argues that in postwar Japan, gender served as a readily available criterion by which a reservoir of unskilled labor could be maintained or shut down as business cycles fluctuated (1993). Anne Allison adds that among the most advanced capitalist countries, Japan has the worst gender–wage disparity, and the recession only exacerbated women's vulnerable position in the labor market. She reports that women—along with young men, people with less education, people who come from lower-class backgrounds and single-parent households, foreign migrants, and men in their fifties—are most at risk of becoming irregular workers. Allison writes, "Women make up 70 percent of irregular workers, and their treatment is not much better even in regular employment where—based on the premise of the male breadwinner—they make only 67.1 percent of men's salaries. Approximately 80 percent of working women receive less than JPY3,000,000 ($27,384) a year, 44 percent were paid less than the minimum wage in 2010, and the numbers of professional women remain disturbingly low" (2013, 32).

In his book on the precariat, Guy Standing offers the following observation about women's place in Japan's labor market: "In Japan, the shift to non-regular labor coincided with a rising share of women in the labor force. In 2008, over half of Japanese women were in precarious jobs, compared with less than one in five men. . . . Japan is an extreme case. Gender inequality is a cultural legacy that has fed into a gendered precariat, in which women are concentrated in temporary, low productivity jobs, resulting in one of the highest male–female wage differentials in the industrialized world. In 2010, 44 percent of women workers in Japan were receiving less than the minimum wage.

The growth of temporary labor also contributed. Women's wages in regular (permanent) jobs are 68 per cent of men's, but in temporary jobs they are less than half of those paid to men" (2011, 71).

It is not surprising that in this context, many young women turned to the digital economy. If work available to women was always already precarious, many women surmised, it should at least involve activities that are fulfilling, purposeful, and enjoyable: in short, meaningful. In a context in which the idea of "good work" (Kalleberg 2013), or what I call here "meaningful work," was inextricably linked to the system of lifetime employment,[21] young women contributed an important insight to ongoing discussions about the changing landscape of work by proposing that work could be meaningful even if it did not guarantee job security.[22]

In the advanced capitalist world of the postwar period, social citizenship—understood as recognized membership in society—was anchored to permanent (i.e., salaried) employment (Castel 1996).[23] Similarly, in postwar Japan—where a Fordist economy secured growth by integrating mass production, mass consumption, and a Keynesian welfare system—management and labor collaborated to produce competitive products for global markets (Vogel 2006). In this context, companies cultivated a system of lifetime employment, in which employees spent their entire life working for the company that hired them right after they graduated from school.[24] In exchange for their loyalty and willingness to adopt a lifestyle devoted to work, employees were rewarded by a family wage, opportunities for skill development (which was specific to the company), job security, health insurance, and pension benefits (Abegglen 1958; Cole 1972; Nakane 1970; Rohlen 1974; Vogel 1965).[25] Scholars also noted that only one-third of the population benefited from this system because only large and midsize firms were able to maintain such benefits (Cole 1972; Kelly 1986). Even more relevant is the fact that women were overwhelmingly excluded from the system of lifetime employment (Brinton 1993; Cole 1972; Ogasawara 1998; Rohlen 1974).

By the late 1980s, economic growth had faltered, and the collapse of a speculative real estate bubble pushed the country into a long recession. While employers strove to preserve the postwar labor contract, they had no choice but to freeze hiring of new employees into lifetime employment. Scholars use such terms as *freeters* (irregular workers)[26] and *NEET* (Not in Education, Employment, and Training) to theorize how the breakdown of the postwar contract between management and labor has affected young people's employment prospects. This literature suggests that young people are incorporated into a labor reserve—formerly made up of women—from which a volatile economy

satisfies its demand for inexpensive labor (Genda 2005; see also Brinton 2010; Driscoll 2007; Kosugi 2008; Mōri 2005; Toivonen 2013; Yoda 2006). The young women I discuss in this book might see their lives faithfully reflected in this portrayal, but they also do something that labor sociologists do not seem to fully appreciate: they actively seek ways to move forward by developing careers as photographers, net idols, bloggers, online traders, and cell phone novelists—examples I analyze in this book.

A story related to me by Wakabayashi Fumie, an online trader, suggests that young women who pursued careers refused to accept their labeling as members of an emerging precariat. I asked Wakabayashi what activities being a "stock market critic" entailed—the job title printed on her business card she gave me.[27] An astute observer who obviously sensed my initial skepticism about DIY careers, Wakabayashi responded with an anecdote. While completing paperwork to pay a parking ticket, she was unsure about what profession and workplace to enter on the form. After the officer in charge heard what she did for a living, he nonchalantly dismissed her: "It sounds like you are unemployed. Just write *unemployed*." Statistically speaking, many of the women whose stories I present in this book fall under the categories of freeter or NEET, but they do not see themselves as representatives of a new underclass. Rather, they embark on building careers to project themselves into the future in ways that they see more meaningful than the wage labor available to them in the conventional labor market. Yet by promoting the idea that job security should not be the main criterion to determine what makes work meaningful, young women have catalyzed the erosion of salaried employment.

When I asked women what kind of work they would characterize as good work,[28] they commonly discussed work that was meaningful (*imi ga aru shigoto*). When pressed to explain what that meant more precisely, however, my interlocutors enumerated characteristics that did not always align into a coherent definition. Rather, discussing meaningful work was a segue to engage the idea that employment can be meaningful even if it is not guaranteed for a lifetime. Although the system of lifetime employment started crumbling in the 1990s, the ideal of job security continued to exercise a powerful hold on discussions about work, social utility, social recognition, and individual dignity. Women who turned to digital technologies played a pivotal role in facilitating debates about meaning in work because their DIY careers were built on the assumption that economic criteria should not dominate discussions of work. In this book, I interpret women's commentaries on meaningful work as critical reflections on Japan's gender-stratified labor market and pervasive gender discrimination in the realm of work—characteristics of the lifetime

employment system that, contrary to women's hopes, did not disappear with the breakdown of this system.

The central argument I engage with and expand on in this book is that individuals' search for what they describe as meaningful work drives innovations in capitalist accumulation. I draw on Karl Marx's idea that labor plays an important role in developing the means of production and increasing productivity, even if only involuntarily. Marx saw workers' militancy over the length of the working day as critical to the process of industrialization. The struggle of workers to shorten their work hours carved inroads in the mechanization of production (Marx 1992).[29] The Italian Autonomists, such as Mario Tronti (1962), Paolo Virno (2004), and Antonio Negri (1991), developed Marx's insight further by arguing that it would be a mistake to attribute too much power to capital and assume that it is able to curb workers' resistance. Rather, it is the workers who invent the social and productive forms that capital has no choice but to adopt. For instance, Sylvere Lotringer suggested that in Italy, the service sector (driven by immaterial labor) expanded from the early 1970s as a result of "the Italian workers' stubborn resistance to the Fordist rationalization of work" (2004, 11).[30]

Something similar happened in Japan when women turned to the digital economy, which developed a new approach to extracting surplus value from labor. Andrew Ross describes this approach as generating profits from labor without actually employing workers (2012). Owners of online platforms, essentially, continue innovating Marx's labor theory of value, which rests on the observation that capitalists produce surplus value by paying workers only for socially necessary (not surplus) labor time (1992). Owners of online platforms generate profits not by undercompensating workers for their labor, but by dissociating what internet users do online from the idea of labor. As I discussed in the previous section, internet users generate actual profits to platform owners not only by consuming advertising or producing "data commodities" but also by increasing the brand value of online platforms via their use of these platforms (Arvidsson 2005, 2008). Higher brand values, in turn, translate into higher stock prices. For instance, Facebook became a publicly traded company in 2012 with a whopping initial public offering (IPO) of $104 billion.[31]

Labor in the Digital Economy

The past decade witnessed a sharp rise in scholarly publications about digital labor (Andrejevic 2012, 2013; Arviddson and Colleoni 2012; Aytes 2012; Caraway 2011; Dyer-Witheford 1999, 2005, 2015; Dyer-Witheford and de Peuter 2009; Fuchs 2014; Fuchs and Fisher 2015; Hesmondhalgh 2010; Huws 2003,

2014; Irani 2015a, 2015b; Nakamura 2014, 2015; Ross 2012; Scholz 2016, 2017). Drawing on empirically grounded research, this book contributes to this scholarship. It demonstrates that the development of digital economies depends on locally specific systems of inequalities these economies harness for their growth. In postwar Japan (1945–90), for instance, gender served as the main source of flexible labor, so it is not surprising that women's labor was instrumental to the development of the digital economy. The Japanese case highlights the relevance of feminist scholarship on nonstandard forms of labor to theorizing digital labor. This section aims to demonstrate this point while also offering an overview of the literature on digital labor.

This literature evolved as scholars tackled the question of whether Marx's labor theory of value was helpful for understanding how owners of online platforms extracted surplus value from digital labor. Marx developed his labor theory of value by building on the observation that the labor time of the worker can be divided into socially necessary labor time and surplus labor time. He defined socially necessary labor time as "the labor-time required to produce any use-value under the conditions of production normal for a given society and with the average degree of skill and intensity of labor prevalent in that society" (1992, 129). Necessary labor is a concept Marx also used to refer to the labor time necessary to reproduce labor power. He writes, "I call the portion of the working day during which this reproduction takes place [i.e., the reproduction of labor power] necessary labor-time, and the labor expended during that time necessary labor; necessary for the worker, because independent of the particular social form of his labor; necessary for capital and the capitalist world, because the continued existence of the worker is the basis of that world" (1992, 325).

Surplus labor, on the other hand, is the part of the worker's labor time that is not necessary for the reproduction of labor power. In Marx's words, "During the second period of the labor process, that in which his labor is no longer necessary labor, the workers does indeed expend labor-power, he does work, but his labor is no longer necessary labor, and he creates no value for himself. He creates surplus value, which, for the capitalist, has all the charms of something created out of nothing" (1992, 325). It is during surplus labor time that surplus value is produced, which the capitalist keeps as profit or reinvests as capital.

This idea that value is inherently connected to labor is the starting point for scholars who view the online activities of internet users as labor. Christian Fuchs, for instance, argues that the three characteristic features of the relationship between capital and labor (coercion, alienation, and appropriation)

are all present in digital labor (2014). Specifically, individuals are ideologically coerced to use the commercial internet if they do not want to be isolated and deprived of information.[32] Internet users are also alienated from the "data commodities" they produce online, as they have no control over how platform owners use these commodities. Lastly, owners of online platforms sell platform users to advertisers, thus appropriating surplus value from them.

According to Fuchs, digital labor includes productive activities that are "required for the existence, usage and application of digital media" (2014, 4).[33] In his view, factory workers differ from internet users only because they manufacture tangible products, while the latter produce "data commodities," such as social relationships, profile data, user-generated content, and transaction data (2014). Trebor Scholz expands Fuchs's definition of digital labor to include such activities as the performance of self on social networking platforms (e.g., Facebook), crowd-sourced labor (e.g., Amazon's M-Turk), fan labor and in-game labor (e.g., Sherlockology, Galactica.tv; see Chin 2014; Jenkins, Ford, and Green 2013), data labor (e.g., Wikipedia), and on-demand labor via online labor brokerage firms (e.g., Uber, Lyft, TaskRabbit) (2017). Some might balk at the suggestion that we conceptualize the labor of Uber drivers as digital labor. I agree with Scholz, who emphasizes that the digital economy makes possible work secured via such online platforms as Uber, Lyft, or TaskRabbit, and the labor expended by Uber drivers, for instance, accrues profits to the owners of these platforms.

Unlike Fuchs and Scholz, who draw on a production-centered conceptualization of value,[34] others argue that production has become diffuse to the point that it makes more sense to use theories of exchange to conceptualize value. These scholars reject the idea that online activities such as searching for information, updating one's Facebook page, or posting book reviews to Amazon, can be interpreted as labor. Adam Arvidsson and Elanor Colleoni suggest that digital labor cannot be exploited because something that is free cannot be exchanged (2012). David Hesmondhalgh, on the other hand, proposes that financial compensation is not the only meaningful form of reward for work, and it is problematic to consider work "done on the basis of social contribution or deferred reward" as "activities of people duped by capitalism" (2010, 278). He stresses the point that various reasons motivate people to pursue unpaid labor; some enjoy creating something new, while others welcome the opportunity to build new relationships. I would be more inclined to agree with this position if affiliations of identity did not structure the pathways of individuals to regimes of paid and unpaid work.

In the late 1990s, the young women who became net idols created their

web pages not because they were seeking meaningful work, at least not initially. They turned to the internet to have fun, to make friends, and to experiment with new life projects. Yet as new infrastructures began evolving around their activities, which included net idol ranking sites, banner advertising, and an online net idol academy, their workload significantly increased. A net idol recounted in an interview that she felt she had two full-time jobs. After she returned home from her day job, she began her second shift, which involved updating her web page and responding to the thirty emails she received from her fans every day. Another net idol attributed her health problems to mounting stress she experienced as she juggled a full-time job and a net idol career. When she developed uterine fibroids and nearly had her uterus removed—an issue she discusses openly on the "about me" section of her website—she realized that she had to try to transform her digital labor into a day job or give up her net idol career.

An online celebrity trader regaled me with a similar story. She told me that she kept a cat figurine (*maneki neko*), which is believed to bring good luck to its owner in Japan, in her living room. To boost the power of her good luck charm, she kept fresh lemons around the cat figurine. Over time, the compulsive refreshment and increasingly meticulous arrangement of lemons around the cat grew into such an elaborate routine that her young daughters came to believe that real cats lived on lemons. Clearly, the development of DIY careers encroached significantly on these women's private lives. Photographs portraying the apartments of online traders make this point equally compellingly. A trader called Mayuhime includes photos of her apartment in her trading tutorials. These pictures portray her doing chores in the kitchen while simultaneously following movements on trading charts on eight computer screens mounted to the largest wall in the living room. These images suggest that developing careers requires not only significant labor investment but also the subordination of spaces of sociality and life itself (what the living room represents) to the pursuit of DIY endeavors (Mayuhime 2010a).

These vignettes shed light on why I find it difficult to conceptualize women's investment in becoming photographers, net idols, bloggers, online traders, and cell phone novelists outside the realm of work. The women I interviewed worked extremely hard to excel in what they were doing. Even if they initially turned to the internet to have fun, the romance was soon over. Women flirted with the new opportunities the digital economy opened for them, but as internet entrepreneurs developed new infrastructures around women's endeavors, they also made them competitive and significantly more labor intensive. Women soon realized that if they did not want to abandon

their projects, they had to make a commitment. They had to invest time and energy into transforming their projects into careers. The digital economy seduced women into providing their labor by offering them the hope that they could develop meaningful careers.

The fact that their online activities were not readily recognized as labor does not mean that women did not experience these activities as labor. I propose to contribute to the literature on digital labor by highlighting the tendency that in different social contexts, different affiliations of identity are used to determine whose labor will be recognized as productive labor. This is also true the other way around. Segments of the population whose labor is traditionally less valued—because, for instance, commercial alternatives to that labor had been stymied (Schor 1993)—are more likely to be mobilized to forms of labor, such as digital labor, that are not compensated with salary or wage.[35]

I agree with Lilly Irani (2015a, 2015b) and Trebor Scholz (2017), who argue that online systems of microwork, such as Amazon's Mechanical Turk, contribute to eroding systems of job security. Yet I also see the dangers in proposing that all forms of digital labor should be recognized as productive labor and financially compensated. I agree with Susan Leigh Star and Anselm Strauss that it could be counterproductive to make all forms of work visible, as visibility can create new opportunities for surveillance and, ultimately, more work for the worker (1999). I, too, fear that demanding compensation for each creative contribution internet users make will only further capitalism's tendency to commodify human relationships. That said, Star and Strauss make a pertinent point when they claim that it is important to expose the politics that underwrite the decisions to not recognize certain activities as productive labor and the arbitrariness of the criteria that are used to measure the productivity of labor. That is, like the ways in which patriarchal ideologies serve capitalists by conceptualizing housework as the labor of love (i.e., nonproductive labor), owners of online platforms also benefit from not recognizing the online activities of internet users as labor. The case studies I present in this book demonstrate that gender structures the opportunities individuals have in Japan to transform their unpaid labor into lucrative employment.

The continuity between digital labor and the nonstandard forms of feminized labor available to women in Japan's traditional labor market was an important factor in making DIY careers appealing to women. I propose that we take this continuity more seriously to understand the new labor regimes digital economies are developing. The burgeoning literature on nonstandard forms of labor—e.g., emotional labor (Hochschild 1983), immaterial labor (Lazzarato 1996), affective labor (Hardt 1999), reproductive labor (Federici 2012),

articulation labor (Star and Strauss 1999), intimate labor (Boris and Parreñas 2010), care labor (Tronto 2013), phatic labor (Elyachar 2010), and hope labor (Kuehn and Corrigan 2013)—reflects the fact that capital increasingly strives to derive profits from activities it does not recognize as productive labor. As the growing scholarly investment in identifying new genres of labor suggests, the prominent scholarly response to this trend was to expand the category of productive labor.

In this book, I use the term *digital labor* as a broad umbrella term to describe labor in the digital economy. I propose that affective labor has emerged as the dominant form of digital labor, for it is this genre of labor that most seamlessly traverses the line between visibility and invisibility. The rise of the digital economy has made the ability to prevent invisible labor from becoming visible the key strategy of value extraction. Scholars commonly view affective labor as synonymous with post-Fordist labor, but they identify different occupational identities that inspired the making of a post-Fordist workforce. While some see the creative worker as the paradigmatic figure of an affective workforce (Lazzarrato 1996; Virno 2004), others view the housewife as the model that served as a template to consolidate an affective labor regime (Dalla Costa 2015; Fortunati 1995, 2007). Kylie Jarrett suggests that online platforms transform their users into what she calls "digital housewives" who perform unwaged labor "generating surplus value for increasingly monolithic media companies like Google and Facebook by providing for free the content that animates these sites as well as the reams of data that can be sold to advertisers" (2018). As such, feminist theories of domestic labor are helpful to understand how surplus value is extracted from labor in the digital economy.

The tension between drawing on literature on domestic labor and engaging scholarship on creative and cognitive labor is central to Michael Hardt and Antonio Negri's definition of affective labor. To theorize post-Fordist labor, Hardt and Negri borrow the concept of immaterial labor from Maurizio Lazzarrato (1996), which they define as "labor that creates immaterial products, such as knowledge, information, communication, a relationship, or an emotional response" (2004, 108). They identify intellectual and affective labor as the principal forms of immaterial labor and define affective labor as "labor that produces or manipulates affects such as a feeling of ease, well-being, satisfaction, excitement, or passion" (2004, 108).[36] Building on my observation that the figures of the creative worker and the housewife are integrated in new occupational identities such as the "girly" photographer, the net idol, the blogger, the online trader, and the cell phone novelist, I highlight that in the past two decades, the digital economy destabilized the boundary between af-

fective labor and intellectual labor.[37] In fact, strategically recognizing or not recognizing this boundary has emerged as the primary strategy for platform owners to generate profits.

The digital labor that "girly" photographers, net idols, bloggers, online traders, and cell phone novelists performed was simultaneously affective and intellectual. For example, the competition was fierce among cell phone novelists to publish their novels in book format. To increase their chances of success, they were required to tirelessly improve their writing skills and assertively promote themselves. Authors spent countless hours communicating with their readers about plot development as well as issues (sometimes painfully personal ones) that their readers wished to share. When publishers had hundreds of excellent novels to choose from, resourceful promotional skills and accommodating behavior were often what it took to get the most "likes" on the platforms that publishers consulted when considering which novels to publish. While writing a novel required the investment of intellectual labor, the feminized affective labor of communication was also indispensable for developing a career as a cell phone novelist. Owners of cell phone novel platforms, in turn, derived revenues from this unpaid labor. The feminized affective labor that aspiring novelists invested in developing their careers was instrumental to the formation of communities that platform owners sold to advertisers.

Regimes of affective labor are always embedded in locally specific systems of inequalities, a key structuring principle of which is gender. To stress this point, I use the term *feminized affective labor* when I refer to what Hardt and Negri call affective labor. For reasons that closely resonate with mine, Silvia Federici also departs from the notion of affective labor and describes the activities women invest in creating and maintaining relationships as reproductive labor (2012). I prefer "feminized affective labor" over "reproductive labor" because the latter helps explain only how owners of online platforms generate profits from sociality, not from content provision.

At the same time, I propose that distinguishing various gendered forms of labor from one another will also help make invisible labor visible. For instance, I will use the concept of emotional labor—an employer's expectation of its service workers to offer service with a smile, that is, to personalize a relationship that is not personal (Hochschild 1983)—when I specifically discuss labor in the service industries. And I will engage the notion of phatic labor (Elyachar 2010) when I analyze how owners of online platforms build and expand infrastructures by harnessing the labor of internet users who invest in building relationships online. Lastly, I preserve the concept of affective labor for discussing labor that integrates intellectual and feminized affective labors.

By conceptualizing affective labor as synonymous with creative, cognitive, and intellectual labors, I stress that this genre of labor almost always contains a component of feminized affective labor, which is not true in reverse.

In sum, eroding the line between paid, visible labor and unpaid, invisible labor is a key strategy to generate surplus value in the digital economy. Investigating this strategy is pivotal to shedding light on the ways in which digital labor is reconfiguring Japan's labor markets. An equally prominent way in which digital labor drives the deregulation of the domestic labor market (one I will discuss in several chapters) is by reconfiguring the country's human capital regime. In postwar Japan, the system of human capital development regulated access to the benefits of economic growth.[38] In the wake of the recession, however, this regime was redefined as a means to identify new sources of economic expansion. As employment security became more difficult to attain, individuals began developing human capital in novel ways to foster what Rosabeth Moss Kanter defines as "employability security" (1995). Kanter offers this concept to theorize the labor conditions of software developers. Like film professionals in the United States, software developers are employed on a project-to-project basis. As such, they have only their reputations and networks of contacts to rely on to find new employment. Kanter writes, "Employability security is based on a person's accumulation of human and social capital—skills, reputation, and connections—which can be invested in new opportunities that arise inside and outside the employee's current organization" (1995, 63). Kanter sees the labor conditions of software designers as a model for the future of work. As job security is disappearing, she concludes, it is only in their employability that individuals are able to experience a sense of security.

In the postwar period, educational credentials played a key role in regulating access to job security. (For women, the relationship between educational background and employability was much less straightforward.) As the system of job security breaks down and the digital economy normalizes nonstandard work arrangements, investment in education is no longer believed to be the privileged pathway to lucrative work. Billionaire technologists such as Steve Jobs, Bill Gates, Michael Dell, and Mark Zuckerberg are often referenced to make this point. In the epilogue, however, I will revisit and contest the idea that formal education no longer matters in the digital economy. That said, it is true that the development of DIY careers does not demand the same type of human capital development that the system of lifetime employment required. Acquiring new skills in the digital economy (e.g., photography, writing, and trading) and using social media technologies as tools of self-branding have emerged as alternative ways to develop employability security.

Alice Marwick has studied how young internet entrepreneurs use social media technologies to construct "self-for-work self-presentations" to market themselves as brands and celebrities (2013, 5). She observes that internet entrepreneurs embark on developing new businesses by using social media technologies as tools of self-branding. They transform themselves into salable commodities hoping to appeal to potential employers or, even better, to attract venture capital to develop lucrative entrepreneurial projects. Others, like Trebor Scholz (2017) and Andrew Ross (2012), observe that owners of online platforms extract surplus value from the unpaid labor that internet users invest in generating an online presence. My case studies of net idols, bloggers, traders, and cell phone novelists trace how platform owners derived profits from the labor these women expended to develop new skills and online personas with the hope that their investment would lead to lucrative careers. Kathleen Kuehn and Thomas Corrigan theorize this form of unremunerated labor as hope labor—"un- or undercompensated work carried out in the present, often for experience or exposure, in the hope that future opportunities may follow" (2013, 19).

Methodological Considerations I: Techno-social Assemblages and Technological Duplicities

In the film *Her*, the operating system seduced the protagonist into believing that the perfect lover could only be a machine. Similarly, one of the most famous net idols in Japan, Nakamura Toyomi, describes her encounter with the internet as a life vest that appeared in front of her as she was struggling to stay afloat and reach the shore that was nowhere in sight. Because her acting career had failed to take off, she thought she would "write the script of her own life" and create "the theater of her own self" online.[39] The internet seduced her into believing that the career she was unable to attain in "real" life would be achievable in cyberspace. Like the operating system in *Her* that eventually revealed its duplicitous nature, the internet also betrayed Nakamura, whose story I will tell in chapter 2. Other chapters will tell similar stories of relationships between young women and digital technologies. Unlike *Her*, however, I contextualize these relationships to offer portraits not only of young women but also of Japan in the late 1990s and 2000s, the development of Japan's digital economy, and the transforming landscape of work.

The relationships between young women and digital technologies did not, of course, evolve in a vacuum. In the context of the net idol trend, for instance, net idols, their fans, Nippon Telecom and Telegraph (NTT), internet entrepreneurs, and technologies (including web page hosting services, net idol ranking sites, an online net idol academy, and so forth) have formed what

I conceptualize as a techno-social assemblage. Similar techno-social assemblages emerged around "girly" photographers, bloggers, online traders, and cell phone novelists. Within the five techno-social assemblages I analyze in this book, actants/participants formed relationships that the metaphors of seduction and duplicity describe more adequately than the metaphors of domination and resistance.

As I said previously, the internet seduced women into believing that digital technologies would enable them to develop DIY careers. NTT, however, was unwilling to give up its monopoly position, and the exorbitant fees of internet service stalled HTML development. The rudimentary architecture of the web pages that net idols were able to code or, eventually, rent narrowed and streamlined the diverse aspirations these women brought to this career. Ranking sites further seduced net idols to invest in building relationships with their fans in exchange for votes, and in turn, net idols seduced their fans into believing that they genuinely cared about them. In exchange, fans helped net idols develop new skills (such as photography in Nakamura's case) by serving as supportive audiences.

Unlike Bruno Latour, who chronicled the perspectives of all actants that were involved in the failed Aramis project (1996),[40] it is beyond the scope of my work to document the motivations of all participants that constitute the five techno-social assemblages I analyze in this book. Instead, I focus on the relationships between young women and digital technologies. While striving to maintain this perspective, I highlight that agency had a distributive quality within the techno-social assemblages this book examines.

The concept of assemblage arose to counter the tendency in the social sciences to conceptualize social structures and organizations as totalities and organic wholes. Manuel DeLanda argues that such metaphors as organism and the body cannot model the complexity that characterizes contemporary societies or social phenomena (2006). The problem with these metaphors is that they focus on relations between the parts and the whole, the latter of which is conceived as a seamless totality or an organic unity. Within any organization that is understood as a totality, the relationships between the parts are conceptualized as relations of interiority. Building on the work of Deleuze and Guattari (1987), DeLanda argues that unlike totalities, an assemblage is an entity whose properties emerge from the interactions between the parts that constitute the assemblage. In other words, an assemblage does not possess an organic unity. Instead, its component parts may be detached and plugged into a different assemblage, in which these component parts will interact differently.

Within the techno-social assemblages that emerged around "girly" photographers, net idols, bloggers, online traders, and cell phone novelists, I analyze young women's engagement with digital technologies without fixing them in preconceived roles. More specifically, I do not limit my conceptualization of these women as users (instead of producers) of technologies. I recognize that innovative use shapes the development of technologies just as much as design schemes and regulatory practices do.[41] At the same time, the actants that constitute an assemblage interact with each other in contexts that predate these interactions. I use "context" to refer to gendered patterns of labor market participation, the economic recession, and the concomitant deregulation of the labor market and the telecommunications sector. By saying that these conditions predate the emergence of the techno-social assemblages I analyze, I am not suggesting that they were not changing.

In late 1990s Japan, in a social context in which labor market deregulation further marginalized women from salaried employment, digital technologies promised women opportunities to sidestep the discriminatory hiring practices in the traditional labor market. While digital cameras were promoted as tools of emancipation that enabled women to take charge of their representation, blogging platforms invited women to discover and develop their talents.[42] Clearly, we have come a long way from Marx's classic conceptualization of the relationship between workers and machines as irreconcilably antagonistic. According to Marx, workers have no choice but to fight industrial machinery, as machines devalue human labor and make workers disposable (1993). Similarly, E. P. Thompson observes that in industrial operations, machinery meant labor discipline, as machines functioned as powerful supplements to the timekeeper (1967).

Design principles such as efficiency, interactivity, and upgradability are key to why I see duplicity in digital technologies. And, in fact, improving these properties has long been a crucial concern to designers of technologies. Innovators of industrial machinery, for instance, strove to optimize productivity by modulating the ontological difference between humans and machines. One such example is Norbert Wiener, whose work improved machinic control over the pace of work by enabling machines to assess the effects of their operation and adjust their performance accordingly. Feedback loops transferred to machines such attributes of human intelligence as the capacity to adapt and learn. Marrying machinic efficiency and human intelligence was also at the heart of Ohno Taiichi's project to develop the Toyota Production System. A key aspect of what is now called Toyotism (also described as post-Fordism, lean production, just-in-time production, or flexible accumulation) was what Ohno called

"automation with a human touch." Ohno allowed workers to operate various machines and adjust the pace of the assembly line to an optimal speed. As such, he redefined the workers from obedient operators of machines into active participants in production. By integrating the worker to become a part of the feedback loop, the Toyota system transformed the antagonistic relationship between humans and machines that characterized the Fordist era into an affective relationship (Dyer-Witheford 2015).[43]

The workers at Toyota's car plant and the young women whose stories I tell in this book epitomize the same trend. It is increasingly difficult to theorize the relationship between humans and machines as a relationship of antagonism. Marx notes that with technological developments, labor will lose control over the production process. He writes, "The worker's activity, reduced to a mere abstraction of activity, is determined and regulated on all sides by the movement of the machinery, and not the opposite. The science which compels the inanimate links of the machinery, by their construction, to act purposefully, as an automaton, does not exist in the worker's consciousness, but rather acts upon him through the machine as an alien power, as the power of the machine itself" (1993, 693). Interactive technologies, such as Web 2.0, are designed to absorb labor and make it invisible. They conceal human labor by fusing humans and technologies into such productive entities as the internet.

David Harvey sees today's artificial intelligence as emblematic of capital's tendency to incorporate the mental capacities of laborers into fixed capital (2018, 97). An episode from the *Star Trek* series titled "Dead Stop" persuasively visualizes this idea.[44] Severely damaged in a minefield, the Enterprise arrives at an ominous repair station. The fully automated station offers to repair the ship, asking for a payment the crew finds reasonable. The repairs begin, and all is going well until a crewmember disappears. The crew discovers that the station abducted the crewmember and integrated his synaptic pathways into its computer core to enhance its processing speed and flexibility. Indeed, a humanoid brain has always been a part of the bargain as evidenced by the station's sizeable collection of humanoid species. After rescuing the kidnapped crewmember, the Enterprise manages to break free from the station and detonate it. While the station explodes in cathartic fireworks, the last scene shows the duplicitous AI entity beginning to make repairs on itself. The episode's visual representation of human brains plugged into a system—detached from the actual bodies the computer has no use for and does not care for—captures the concept of interactive technologies absorbing and concealing human labor.

Technological agency can be understood as the power of industrial ma-

chinery to set the rhythms of work or as the ability of intelligent machines to replicate the flexibility of the human brain. It can also be thought of as self-causality in technologies or, in the conceptualization of Bernard Stiegler, the capacity of technologies to self-organize into systems (1998, 43).[45] In the Japanese context, Hamano Satoshi proposed a similar argument when he theorized Japan's internet as an ecosystem (2008). By examining the architectural designs of various online platforms, he concludes that the architecture of the internet cannot be conceived of in a singular form. Rather, online platforms develop their own architectures as they compete for internet users. These architectures, in turn, emerge into an ecosystem. They communicate and learn from each other. By emphasizing that individuals are able to exploit the differences among particular platform designs, Hamano begins developing a critique of what has evolved in recent years into a quickly growing body of scholarship on algorithmic modes of regulation (Gillespie 2014; Lanier 2011; Pasquale 2015; Striphas 2015).[46] I find Hamano's conceptualization of the internet as an ecosystem helpful in mapping how net idol sites inspired the development of blogging and cell phone novel platforms by plugging one component part of a techno-social assemblage into another.

Methodological Considerations II: Virtual and Actual Selves

The idea for this project emerged between 2001 and 2003 while I was conducting fieldwork for my first book about television dramas and young women. Many of my interlocutors were discussing the internet with contagious enthusiasm and suggested that I should study it. I was tempted, and although not ready to give up my project on commercial television, I began having conversations with young women about digital technologies. Over the past sixteen years, I have continued following young Japanese women's engagement with digital technologies. I formally started fieldwork for this project in 2010 and conducted structured interviews with forty-three women. For the chapter on the cell phone novel trend, I also interviewed editors who were responsible for acquiring cell phone novels to be published in book format, a software engineer who supervised the design of the largest cell phone novel platform, and an employee who worked for the content department of the largest cell phone novel platform. Out of the forty-three women, I interviewed eighteen women multiple times. This book anchors each chapter to the stories of two to four women who had emerged as icons of the trends the chapters focus on. In addition to interviewing them, I also reviewed their online diaries, blogs, novels, self-help books, and trading tutorials. Finally, I read countless interviews pub-

lished with internet entrepreneurs and platform designers online or in weekly and monthly magazines.

While many of my interlocutors—especially net idols, bloggers, and cell phone novelists—shared online a wealth of information about their anxieties and fantasies, many of them evaded questions about their family backgrounds. They cited issues of privacy, but it seems to me that withholding personal information was also a strategy for these individuals to model their public personas after the image of the self-made entrepreneur. This image was indispensable for women to give lectures, maintain blogs, and publish books about how to develop DIY careers. Adopting the image of the self-made entrepreneur also explains why stories of misfortune—often dramatized for maximum impact—dominated the responses women gave to my inquiries about the motivations that led them to build DIY careers. They commonly identified bankruptcy of parents, loss of employment, laid-off husbands, and divorce as reasons that prompted them to embark on building DIY careers. Their stories also circulated widely in the media and seemed very popular, perhaps because they dissociated female DIY entrepreneurs from perceptions that they were selfish and greedy individuals. Anthropologists have compellingly demonstrated the complex relationships between actual and virtual selves in contexts such as *Second Life* (Boellstorff 2008) and *World of Warcraft* (Nardi 2010). I found that female entrepreneurs in Japan strategically navigated the gap between virtual and actual selves in pursuit of building successful careers.

As many of my interlocutors were reluctant to reveal information about their class backgrounds, I relied on my interpretations of the information they shared with me in dialogue along with my observations about my interlocutors' use of language and especially women's language (Inoue 2006), behavior, dressing style, choice of meeting place, and commentary about other DIY entrepreneurs. I also took notes on inconsistencies in my interlocutors' public personas.

For example, an online trader who was reputed to have generated a fortune from online trading was late for our first meeting. She explained that she missed her train connection and had to wait twenty minutes for the next train. It was she who suggested that we meet in downtown Tokyo, but the train schedule suggested that she came from a remote suburb, which she later confirmed. She promoted herself as a trader who was able to buy a house using the income she earned from online trading. The fact that she purchased the house in a tucked-away suburb was information she withheld, perhaps to avoid compromising the credibility of her success story.

Another online trader gave me a business card that sported a fancy downtown location for her office address. Later, I learned that it was a common practice to print fictitious addresses on business cards to suggest that someone's entrepreneurial endeavors were successful. On yet another occasion, I offered to go to an interlocutor's office. She told me that meeting in a café would be more convenient because the air conditioning in her office was being fixed. That may have been true, but having read numerous self-help books, I was curious whether my interlocutor had indeed rented an office.

Since many of my informants were reluctant to share information about their family backgrounds, I use the category of class with the caveat that creating DIY careers meant crafting new selves, which involved strategically withholding, deemphasizing, dramatizing, or completely rewriting one's class background. Gender and class intersect in complex ways in Japan, which also makes it difficult to theorize the linkages between gender and labor precarity through the lens of class. An issue that complicates an intersectional analysis of gender and class is that women's class status is commonly determined by their fathers' and husbands' employment (Brinton 1993; Fujiwara-Fanselow 1995; Ishida 1989; Ishida and Slater 2010; Roberts 1994). Yamada Masahiro asserts that, contrary to expectations, the recent rise in the number of women who marry late or decide to remain single did not change this situation. Yamada coined such terms as *parasite singles* and *stranded singles* to argue that young women tend to stay with their parents well into their thirties waiting for the right man to marry—a man who earns enough to smoothly transition them from their parental homes to married life (1999, 2007, 2016).

While women have been steadily supplying flexible labor in Japan for decades, my book demonstrates that beginning in the late 1990s, women were also mobilized to mediate labor market deregulation. Women turned to the digital economy to better their and their families' class status, but very few of them succeeded. Despite the fact that these women drove the development of the digital economy, their numbers are disproportionately small among the most successful internet entrepreneurs. Most net idols disappeared without a trace, and most "girly" photographers did not become professional photographers. The percentage of female traders among professional traders remains perplexingly small, and to gain visibility in the crowd of twenty-eight million bloggers (on Ameba, which is Japan's largest blogging platform) is a formidable task, if not impossible. Neither can the market support the hundreds of thousands of cell phone novelists who aspire to become professional writers. In spite of this, the few women whose stories (and the stories of their often short-lived careers) I present in this book were

able to keep a powerful ideology alive—the ideology of the possible, which has inspired millions to try to develop DIY careers. The overwhelming majority of these entrepreneurial individuals did not succeed; ironically, they ended up facilitating the devaluation of salaried employment and the crumbling of job security.

Chapter Overviews

Focusing on the so-called girly photography trend, chapter 1, "Disidentifications: Women, Photography, and Everyday Patriarchy," introduces readers to the dominant discourses of gender and labor in Japan. These predominantly patriarchal discourses constituted the context within which women were struggling to develop their careers. Stressing that women's photography centered on portraying relationships, photography critics—mostly men—interpreted the genre as a project to reconnect social relationships that were unraveling during the long recession. Women photographers, however, rejected this interpretation. They argued that they turned to photography to expand the zones of subjectivity from which they were able to draw new forms of labor and new sources of pleasure. This chapter demonstrates how women photographers articulated a feminist critique of labor, gender, and technology that foreshadowed the struggles of the net idols, bloggers, online traders, and cell phone novelists who followed in their footsteps to build careers in an economy that depended on women's invisible labor.

Chapter 2, "The Labor of Cute: Net Idols in the Digital Economy," explores how internet entrepreneurs harnessed the online diaries of net idols to develop banner advertising that enabled them to package the fans of net idols and sell them to advertisers. I conceptualize the net idols' production of cuteness as feminized affective labor and claim that the digital economy has effectively expanded the practices through which value is extracted from women's unwaged labor to spaces beyond the domestic sphere. I stress, however, that net idols did not uncritically embrace this logic. Instead, they used digital technologies to develop employability security. I conclude that women's unpaid labor remains central to a society in which labor precarity generates a robust demand for feminized affective labor, a situation resonant with the ways in which women's unwaged labor in the home was instrumental to maintaining economic growth in the postwar period.

Chapter 3, "Career Porn: Blogging and the Good Life," examines the role of blogging in reconfiguring dominant perceptions of work. In the early 2000s, a growing number of blogging platforms and blog tutorials accompanied the rapidly increasing number of bloggers. Blog tutorials promoted blog-

ging as a new pathway to DIY careers and the good life while criticizing lifetime employment for compromising individual freedom. By doing so, these tutorials made the dismantling of the system of lifetime employment more acceptable. Blog tutorials also helped blogging portals recruit online content providers, predominantly women, who were not paid for producing blogs. By presenting blogging as an activity that belonged in the realm of play rather than work, blogging platforms effectively foreclosed opportunities for bloggers to earn an income from producing online content. At the same time, these platforms grossed massive revenues from selling the community of blog writers and readers to advertisers.

Chapter 4, "Work without Sweating: Amateur Traders and the Financialization of Daily Life," explores the women trader trend. These women, estimated to number in the hundreds of thousands, were reputed to garner wealth from trading foreign currencies on online trading platforms. In reality, however, amateur traders found that it was easier for them to develop careers as experts of online trading than to become professional traders. The examples of women, who emerged as figureheads of online trading, illustrate that publishing trading tutorials and giving lectures have proven to be more sustainable and lucrative sources of income for women than trading itself. This chapter brings into dialogue interviews with celebrity traders, an analysis of their portrayals in the media, and an examination of how securities firms harnessed the feminized affective labor of women to expand the financial market. I argue that the financial sector mobilized women traders to mediate a transition from a culture of saving to the financialization of daily life.

Chapter 5, "Dreamwork: Cell Phone Novelists, Affective Labor, and Precarity Politics," explores how young women rejected their mobilization to underpaid or unpaid service work by turning to the digital economy to build careers as cell phone novelists. Most authors of cell phone novels were young women, many of whom previously earned a living from pursuing dead-end service jobs. Cell phone novels document alleged personal stories of suffering that arise from unrequited love, teenage pregnancy, rape, bullying, social injustice, or incurable disease. The vast production of these novels, I argue, testifies to the growing number of young women who tried to develop careers they perceived as meaningful. But while cell phone novel platforms made enormous profits from advertising, only a miniscule minority of authors were able to earn a living from writing cell phone novels.

Lastly, the "Epilogue" situates the trends the book documents into the broader context of similar developments that unfolded in other parts of the world. It highlights the duplicitous character of the digital economy that re-

casts online platforms as solutions to problems with work. In the late 1990s and 2000s, young Japanese women's search for meaningful work revitalized the postwar era's preoccupation with economic growth and attachment to work-oriented lifestyles. Through their struggles to access meaningful work, women have articulated a critique of gender discrimination in the realm of work. Ironically, however, women's investment in building meaningful careers has also foreclosed the possibility of reflecting on the unwavering belief that rapid economic growth is the best way to secure socioeconomic vitality and individual well-being. That is, women's "love affairs" with DIY careers forestalled the possibility of developing postproductivist imaginaries and postwork alternatives.

Notes

Introduction: Labor and Gender in Japan's Digital Economy

1 Examples include *Blade Runner* (1982), *The Terminator* (1984), *The Matrix* (1999), *I, Robot* (2004), and *Wall-E* (2008).

2 Sony resumed production of Aibo at the end of 2017. The new Aibo features more advanced artificial intelligence capabilities than its predecessors. It develops its own personality over time and is able to recognize different members of the family. It interacts in more nuanced ways with family members who pet it more often.

3 Guy Standing makes a distinction between waged workers and salaried employees. The concept of wage worker refers to piece-rate and time-rate laborers, while the concept of the salaried employee refers to workers who receive not only their monthly salaries and yearly bonuses but also benefit from company-specific training, pension plans, health insurance, sick leave, and paid holidays (2011). The salaryman (*sararīman*) in Japan is what Standing calls a salaried employee. In this book, I adopt Standing's distinction between salaried and waged workers.

4 Brian Larkin remarks that infrastructure studies tend to focus on the materiality of infrastructures (2013). Infrastructure studies are less compatible with my approach to the internet, as this literature reinscribes a dichotomous relationship between humans and technologies. By contrast, I stress that humans are central to the development and maintenance of infrastructures.

5 See Marie Hicks's insightful analysis of how the British computer industry lost its edge by excluding women from technological innovation (2018).

6 Scholars agree that the recession began around 1990 after a real estate bubble burst in the late 1980s (Yoda 2006). There is less agreement, however, on whether the recession ended in the late 2000s or in the early 2010s. Joseph Stiglitz argues that during the 2010s, per capita economic growth in Japan has been stronger than in the United States, Great Britain, Germany, and Australia (2015). This means that inequality is still less pronounced in Japan than in some other advanced capitalist countries. What seems difficult to question, however, is that employers used the recession as an excuse to streamline their workforce, which has affected young people, and especially women, more than any other segment of the population.

7 I agree with Ursula Huws, who argued that the notion of "labor market" can only be used for contexts characterized by "corporatist politics, historically strong internal labor markets, considerable employer investment in training and tightly defined occupational demarcations, and a welfare system closely linked

to employer-based plans" (2014, 36). Japan fits this characterization. Furthermore, the highly structured character and unique culture of the labor market in Japan also justifies using the concept of the labor market in the Japanese context. This structure and culture evolved in the postwar period when large and midsize firms hired their employees straight out of school and for a lifetime (Cole 1972). Schools employed job counselors who cultivated relationships with particular firms and helped students find employment. See Mary Brinton's discussion of how this mediation between schools and employers started breaking down in the wake of the recession (2010).

8 As in the United States, the first generation of internet architecture was developed by researchers in Japan. The founder of the internet in Japan, Murai Jun, lamented that the lack of government funding was conducive to the rapid commercialization of the internet (Murai et al. 2008). The first IP network (JUNET) was launched in 1988 to facilitate communication between computer specialists working at Keio University, Tokyo Institute of Technology, the University of Tokyo, and Iwanami Publishing Company. In 1993, Internet Initiative Japan Ltd. and AT&T JENS started a commercial internet service. Nippon Telegraph and Telephone (NTT) quickly followed suit and emerged as the dominant internet provider in the 1990s offering a dial-up (ISDN) service, which was up to 64 kbit/s. Throughout the 1990s, the subscription fees were so high that after 11:00 p.m., when NTT offered a flat-rate service, the volume of internet traffic increased conspicuously. Service charges decreased only after the government deregulated NTT by separating the company's mobile, landline, and internet services in 1999. Although cable television operators began offering broadband products in the late 1990s and Tokyo Metallic Communications Corporation started offering Asymmetric Digital Subscriber Line (ADSL) service in 1999, the internet was still expensive, and internet infrastructure was not on a par with that of other advanced capitalist nations. Mori Yoshirō's "e-Japan" initiative in 2001 was a policy initiative to address this problem. In 2001, SoftBank started a price war by offering a 12 Mbit/s ADSL service for a monthly subscription fee of about $30, while NTT's slower ISDN dial-up service cost twice as much. By 2004, Japan had developed the best cost-to-performance ADSL service in the world.

9 In 1993, NTT DoCoMo (Do Communication Mobile) introduced the personal digital cellular (PDC) system. In 1999, NTT launched i-mode, which was the first commercial internet service that used cellular phones as end terminals. Two other carriers, KDDI (au) and J-Phone (which was acquired by Vodafone and then by SoftBank), started offering similar services shortly after NTT launched i-mode. By the mid-2000s, i-mode by NTT DoCoMo, EZweb by KDDI (au), and Vodafone Live by SoftBank emerged as the major mobile internet service providers.

10 See Wikipedia, https://en.wikipedia.org/wiki/Honda; Rakuten, http://global.rakuten.com/corp/investors/financial/indicators.html, both accessed May 30, 2018.

11 See Rakuten, https://global.rakuten.com/corp/about/overview.html, accessed May 30, 2018.

12 See Mixi, http://mixi.co.jp/company/; DeNA, http://dena.com/intl/company

/overview/; GREE, http://corp.gree.net/jp/en/corporate/summary/, all accessed May 30, 2018.

13 The digital economy evolved in a context that scholars theorized as financialization (Krippner 2011) and rentier capitalism (Harvey 2014; Piketty 2014). These concepts refer to a shift in balance in the mode of accumulation from wealth accrued from labor to wealth generated from capital. According to Thomas Piketty, capitalists responded to the rising price of labor by developing new strategies to extract surplus value from capital. The problem with investing in assets (e.g., real estate, companies, financial constructs, intellectual property rights, brands, etc.), Piketty observes, is that it channels investment away from innovation, which drives the creation of new jobs (2014).

14 See Wikipedia, https://ja.wikipedia.org/wiki/ライブドア; https://ja.wikipedia.org/wiki/堀江貴文; YouTube, https://www.youtube.com/watch?v=Exvg0_9MqKc, all accessed May 30, 2018.

15 See Jun Hongo, "Horie handed 2 1/2 years: Upstart Founder of Livedoor Facing Real Time in a Cell," *The Japan Times*, March 17, 2007, accessed May 30, 2018, http://www.japantimes.co.jp/news/2007/03/17/national/horie-handed-2-12-years/#.V4GepVfqqno.

16 Today, Line Corporation—a Japanese-Korean internet business that developed line messaging services and the Naver Japan search portal—operates the Livedoor blog service and IPS.

17 Wagyu comes from crossbreeding four different breeds of cattle. What is known as "Kobe beef" is one variety of wagyu.

18 See Aya Takada and Hiromi Horie, 2017, "Japan's Internet Maverick Has New Global Target: $180 Steaks," *Bloomberg*, October 15, https://www.bloomberg.com/news/articles/2017-10-15/japan-s-internet-maverick-has-a-new-global-target-180-steaks.

19 See Rakuten, http://corp.rakuten.co.jp/about/overview.html; Wikipedia, https://ja.wikipedia.org/wiki/三木谷浩史; https://ja.wikipedia.org/wiki/楽天, all accessed May 30, 2018.

20 Interview with Mayuhime posted on Mayuhime's web page, http://mayuhime-fx.com/, accessed October 1, 2018. The term *office lady*, or OL, is appropriated from the English language and refers to young women who hold non-career-track positions in the context of white-collar employment.

21 Jacques Donzelot demonstrates that whereas discussions of what constitutes meaningful work commonly emerge from criticisms of exploitative employment practices, employers often appropriate these discussions to improve the productivity of their workforce. Donzelot interprets the discourse of pleasure in work in 1970s France as a new management strategy to address the high social costs borne by the persistent pursuit of productivity in advanced capitalist economies. He remarks, "While work had hitherto been seen as serving the satisfaction of needs, these needs had themselves been multiplied by the frustrations inherent in work, thereby paradoxically accentuating the need not to work" (1991, 253). The discourse of pleasure in work, Donzelot concludes, aimed to neutralize this

problem by recoding work as a site where economic and social needs can both be satisfied.

22 Meaning in work, of course, was also discussed outside the context of lifetime employment. Dorinne Kondo observes that in a small, family-owned confectionary factory where she conducted her fieldwork, workers did not consider work simply as a means to an end. Rather, they saw work as an activity that enabled them to belong to a community while also allowing them to realize their own human potential (1990). Beyond the criteria of belonging and self-determination, however, different workers interpreted the idea of meaningful work differently. The owners of the company saw their work as meaningful because it enabled them to fulfill their duties to their families and "derive a sense of their own competence" (1990, 277). Male workers, on the other hand, saw work as a means to reinforce their masculinity. Kondo also observed a strong connection between work for wages and perceptions of social utility, which—in addition to financial necessity—put enormous pressure on people to work.

23 Paul Roquet suggests that in the period of rapid economic growth, background music that helped increase the productivity of employees was in demand. In the recessionary period, however, the demand shifted to ambient music that imparted a sense of security and sensory cohesion (2016).

24 Within this system, promotion is based on the length of tenure with the company (*nenkō*), which made it difficult for employees over thirty to change jobs. This was because it was less expensive to hire new employees who had just graduated and could be trained to acquire the specific skills the company needed.

25 William Kelly noted that mass middle-class society was more of an aspirational ideal than a reality; only one third of the population had access to lifetime employment, which secured one's position in the middle class (1986).

26 *Freeter* is a hybrid of the English word *free* and the German word *Arbeiter*. It refers to young people who drift from one short-term job to another.

27 Her Japanese-language Wikipedia entry describes Wakabayashi as a "financial/investment critic (*kabushiki hyōronka*), day trader, and tarento." The business card Wakabayashi gave me said that she was a stock market critic, while her books introduce her as "trader and financial advisor" (*torēdā*, *fainansharu adobaizā*). See Wikipedia Japan, http://ja.wikipedia.org/wiki/%E8%8B%A5%E6%9E%97%E5%8F%B2%E6%B1%9F#cite_note-11, accessed on May 30, 2018. Yamamoto called herself "money advisor" (*manē adobaizā*) (2009b) and "chief fund manager" (*chīfu fando manējā*) (2007b).

28 When discussing what constitutes good work, scholars offer such criteria as job security, protection against economic downturns, good pay with annual increases, opportunities for promotion, the possibility of advancement to better jobs, access to fringe benefits such as health insurance and pension plans, a pleasant work environment, a sensible balance between life and work, flexibility in scheduling work, recognition of merit, the ability to make decisions about one's work conditions, the importance of autonomy, the ability of workers to achieve

self-actualization, and the ability to experience one's job as interesting, challenging, and meaningful (Kalleberg 2013; Scholz 2017).

29 I take this insight from Kathi Weeks's work (2011).

30 Similarly, Luc Boltanski and Eve Chiapello also see the discussion of meaning in work—articulated as a humanist critique of alienation in work—as a transformative force in the realm of work (2007).

31 See Investopedia, http://www.investopedia.com/ask/answers/111015/when-did-facebook-go-public.asp, accessed May 30, 2018.

32 Trebor Scholz argues that in the United States, the disappearance of public spaces and a media-generated culture of fear (stranger-danger) force young people to socialize online (2017, 88). danah boyd makes the same argument. She observes that teens spend time on social media because parents generally discourage them from spending time with their friends in public (2014).

33 Ursula Huws questions the conceptualization of digital labor as cognitive or immaterial labor, stressing that a growing proportion of digital labor is actually low-paid and menial labor (2003, 2014). Similarly, Ayten Aytes suggests that the expanding practices of crowdsourcing erode the line between industrial and cognitive labor, as crowdsourcing is contingent on work organization and a division of labor that is akin to industrial production (2012).

34 These scholars ask what kind of labor is expended, what kind of commodities are produced, and what means of production are used in processes of extracting surplus value.

35 Juliet Schor argues that in the absence of commercial alternatives to the housewife's labor, women's time became an artificially undervalued resource in the United States. What Schor describes for the United States unfolded in a similar fashion in Japan (1993).

36 Hardt writes, "Health services, for example, rely centrally on caring and affective labor, and the entertainment industry and the various culture industries are likewise focused on the creation and manipulation of affects. To one degree or another, this affective labor plays a certain role throughout the service industries, from fast-food servers to providers of financial services, embedded in the moments of human interaction and communication. This labor is immaterial, even if it is corporeal and affective, in the sense that its products are intangible: a feeling of ease, well-being, satisfaction, excitement, passion—even a sense of connectedness or community" (1999, 96).

37 Hardt and Negri write that intellectual labor is "labor that is primarily intellectual or linguistic, such as problem solving, symbolic and analytical tasks, and linguistic expressions. This kind of immaterial labor produces ideas, symbols, codes, texts, linguistic figures, images, and other such products" (2004, 108).

38 Developed by rational choice theorists in the 1960s, human capital was a theory to assess the relationship between education and employment security (Becker 1964). Emerging from the economics of education, the theory of human capital aimed to measure how investment in education and training affected the kind of employment one was able to attain.

39 Follow-up email communication (May 17, 2016).

40 Aramis was a project to develop a system of personal rapid transit in France. The planning of the project started in 1969, while the actual implementation began in 1974. The project aimed to do away with the automobile by developing a train system that was able to break up into individual cars, which then would go separate ways to transport their passengers to their destinations. The idea was to develop a system of personal rapid transit that was as intimate and personalized as a taxi but as secure and inexpensive as public transportation. Latour asked what roles such factors as technological feasibility, economic viability, and social acceptability played in the failure of the project.

41 Lisa Parks and Nicole Starosielski stress that while the owners of infrastructures are usually public entities or private companies, infrastructures emerge out of negotiations among such nonhuman and human actants as "design schemes, regulatory policies, collective imaginaries, and repetitive use" (2015, 5).

42 In a different context, Melissa Gregg has discussed how new media technologies increase the workload of salaried professionals by transforming work into an intimate experience. She suggests that the imperative to be connected normalizes a style of work that bleeds into spaces of nonwork and reinforces associations between technology, flexibility, mobility, and freedom (2011).

43 Katherine Hayles (1999) and Rosi Braidotti (2013) have discussed how the decreasing distance between humans and machines affects humans.

44 *Enterprise*, Season 2, Episode 4. See IMDb: Ratings and Reviews for New Movies and TV Shows, http://www.imdb.com/title/tt0572198/, accessed May 30, 2018.

45 Stiegler suggests that capitalism accelerates cycles of innovation that, in turn, create distance between culture and technics. As a result, technics start following different rhythms of evolution, emerging into technical systems that Stiegler defines as "stable interdependencies at a given time or epoch" (1998, 26). Similarly, Gilbert Simondon theorized the relationship between humans and machines via critiquing Marx, who he viewed as too unyieldingly attached to the problem of labor. Such an inflexible focus on labor becomes an obstacle to grasp the transversal relations between humans and machines (2017). Unlike Marx, Simondon sees the real source of alienation in the fact that human beings see themselves as superior or inferior to machines rather than existing in equality alongside machines (2012). I would be more sympathetic to this claim if human beings existed in equality with one another in the first place.

46 Tarleton Gillespie observes that algorithms are represented as impartial and objective, but they always encode the value judgments of their designers (2014). Similarly, proposing that authority is increasingly expressed algorithmically, Frank Pasquale asks why search engines do not consider whether restaurants give their workers health benefits in ranking restaurants (2015). See also Chun 2008, 2013; MacKenzie 2006; Manovich 2013; Parisi 2013; and Striphas 2015.