

Mimicking Firms: Future of Work and Theory of the firm in a digital age

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It is well acknowledged that technology has created much disruption and continues to do so. The Internet has globalised digital services and connectivity has brought about low coordination costs resulting in the rise of firms that coordinate information rather than selling goods and services such as Uber (car sharing), AirBNB (accommodation sharing) and Facebook (content sharing). The Internet is evolving from merely a tool or a medium of communication into a pan-geographical space of its own, with its own citizenry and with information and data exchange as its the primary good. Digital technology has led to the accelerated development of 'superstar firms'. These pan-geographical tech giants, operating with the ability to arbitrage on every regulation, can shift revenues as easily as shifting virtual servers as well as move information and data around to leverage on every kind of technology located anywhere in the world. Even as Amazon buys up physical stores like Whole Foods, the Internet is now coming out of the box, creating social-cyber-physical objects out many things from white goods to doors, from clothing to trains.

As the world moves to adopt more technology such as AI, edge and machine learning algorithms, questions are being asked about the traditional factors of production that were constructed in the pre-Internet days. Such inputs such as capital, labour, technology, the role of the firm and the economic ecosystem they operate within are showing weaknesses in their ability to adapt to some of the changes.

Future of work. Scholars and policy makers are espousing greater fears about technology that is automating work and eliminating jobs, despite the absence of a clear estimated impact of technological progress on job losses. Job automation estimates vary widely; according to the World Bank, 7 to 47 percent of jobs in the United States are at risk of being automated (WDR 2019). Using a task based approach, the OECD estimates the job automatibility of jobs for 21 OECD countries is at 9 percent (Arnt et al, 2016). Some scholars have proposed that work will move to more judgement and empathy-based work. Autor, Levy and Murnane (2003) studied the change of work content by analyzing changes in labor input towards various tasks. They found that the labor input into work requiring more routine tasks declined between 1970 and 2010. On the other hand, Deming (2015) showed the growing importance of social skills in the U.S. labor market between 1980 and 2012. Indeed, since 2001, the share of occupations intensive in nonroutine cognitive and socio-behavioral skills has increased from 33 to 41 percent in advanced economies (WDR, 2019). Others have proposed that AI and tech are complementary and technology would be more productive as a result of extended intelligence. For example, vast improvements in the efficiency of machines used for metal cutting and processing in the 1970s led to increased productivity of machinists, operators and other workers in the industry (Acemoglu and Restrepo, 2018). Acemoglu and Restrepo (2018) refers to this

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facet of automation advances as the 'deepening of automation', since it is intensifying the productive capacity of existing machines.

The changing nature of work due to the advent of technology and AI is currently framed as the substitution of jobs (labour) with technology. Such neoclassical economic approach does not fare well in much of today's industries of hybrid digital and physical assets nor industries that are fully digital (Keen, 2001), where production functions may not exist and products exhibit increasing returns to scale. Instead, we argue that as technology and connectivity become more pervasive, another phenomenon is at play that creates a more nuanced role of the relationship between technology, the firm and labour.

Less workers, more gigs. Forbes report that in the US, more than a third of the workforce (55 million people) have given up being the traditional worker and opted for 'freelancing' i.e. contributing to the 'gig' economy². Such 'gigs' are flexible arrangements between the worker and the firm and they are often contracted as independent contractors or consultants, tasked to complete a project or work for a certain period of time (Friedman, 2014). Worldwide, the total freelancer population is estimated at around 84 million, or less than 3 percent of the global labor force of 3.5 billion. The relationship between the worker and the firm is changing and there are concerns about lower wages and higher economic risks for the workers, particularly income stability and traditional forms of employment protections including pension plans, health insurance and paid leave (WDR, 2019). However, increasing opportunities for these flexible types of work enable more women to participate in the labor force, and may provide additional income to smooth earnings fluctuations for secondary earners (WDR, 2019).

More gigs, more entrepreneurs. Gigs and entrepreneurial activity are co-related (Burtch et al, 2018). Studies have argued that entrepreneurial activity increase in the gig economy because of the availability of slack resources that can be directly re-used for entrepreneurial activities (Agrawal et al. 2015, Richtnér et al. 2014). Additionally, it has also been suggested that the potential entrepreneur, unburdened by constraints in resources, may exploit new opportunities serendipitously (George 2005, Shah and Tripsas 2007, Voss et al. 2008). In other words, gig-economy employment may encourage entrepreneurship because there are sufficient resources to do so, since they have some financial security, and yet have greater flexibility with their time (Swarns 2014), and could potentially re-use the resources they employ to fulfill their gigs (Greve 2007, Kerr et al. 2014, Shah and Tripsas 2007).

We propose that the rise of technology, strongly correlated with more gig workers and the rise of entrepreneurialism is not a coincidence, but a subtle trend where the global labour force attempts to 'corporatise' itself i.e. worker-becoming-a-firm that is owner managed, either through independent contracting or entrepreneurship, in the effort to increase opportunities for acquiring more resources, whether financial, human or social capital. As a logical extension of this argument, the individual's attempt to corporatise could therefore be construed as an institutional

²<https://www.forbes.com/sites/brianscudamore/2018/05/09/how-the-gig-economy-is-fueling-a-new-type-of-entrepreneur/#8d995806e117>

hack to acquire resources from technology and AI. If so, it would be necessary to revisit the notion of the firm and its relationship with labour.

The firm as a market for labour

Business and economics literature often refer to the theory of the firm as the theory of why the firm should exist; where the boundaries are between the firm and the market for all manner of resources; what transactions are internal and what are market based; the structure and organisations of the firm; its formal and informal relationships; actions and performance of firms (Kantarelis, 2007; Coase, 1937; Garicano & Hubbard, 2008).

The firm itself, is often seen as a “black box” with no existing theory to explain how the aggregation of workers objectives within a firm are squared with the profit maximising view of the firm (Jensen and Meckling, 1976). Indeed, scholars have claimed that much of the material on the theory of the firm are centred around the theory of markets in which firms are an *actor*. This is problematic as it takes the ownership structure of the firm as exogenous and ex ante to the market when in fact, there are 2 markets - that which the firm interacts with, and that which is within the firm.

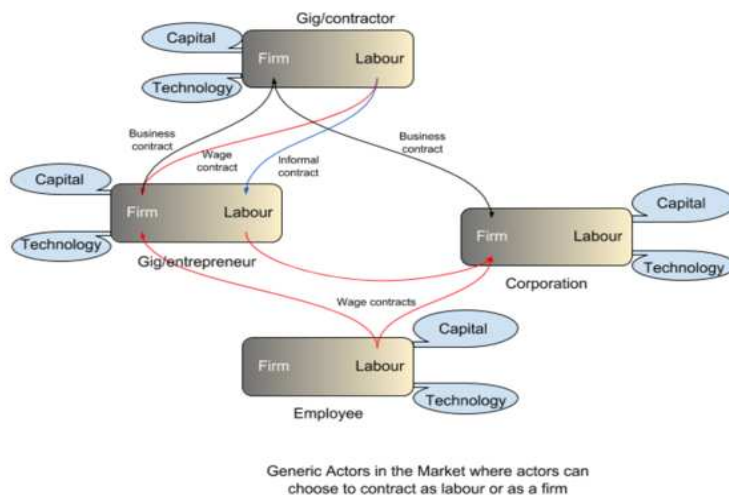
As Jensen and Meckling (1976) puts it,

The firm is not an individual. It is a legal fiction which serves as a focus for a complex process in which the conflicting objectives of individuals (some of whom may “represent” other organisations) are brought into equilibrium within a framework of contractual relations. In this sense the “behavior” of the firm is like the behavior of a market; i.e., the outcome of a complex equilibrium process. We seldom fall into the trap of characterizing the wheat or stock market as an individual, but we often make this error by thinking about organizations as if they were persons with motivations and intentions. (p.311)

Since the firm is a multitude of contracts with the owners of labor, material and capital inputs and the consumers of outputs, why is it assumed that technology is a resource of only firms? In acquiring technologies and AI bots of the future, why might the firm be the only actor owning such a resource? Within the firm’s internal market, technology could be owned by workers (much like a smartphone or a laptop could be, if not provided by the firm). A natural argument would be that the current structure of markets and the economy privileges the firm as the owner of capital, technology and labour. However, with the rise of digital platforms and lowered coordination costs, we argue that the boundaries between the firm and labour are increasingly blurred with workers ‘mimicking firms’. Today, firms with a variety of corporate ownership structure from an owner operated contractor to a startup and an independent consulting firm is commonplace. Mimicking a firm gives a worker certain privileges - the ability to solicit capital, acquire technology and contract further labour as assistance - all resources that are set within a legal framework and an institutional structure that accord a multitude of benefits, but also encompass risks. Consequently, we argue that creating a dichotomy between business

contracts with independent contractors (as firms) and wage contracts (as labour) would be unhelpful. Workers can be entrepreneurs and contractors (with business contracts) as well as contract on wages and they should be able to choose the contract to suit their circumstances. In such cases, what is needed is better approaches towards understanding firms, the diversity of ownership structures so that the equivalent of social insurances can be set in place for owner managers of such firms as well as the way such owner operators can acquire capital, debt and technology as they improve their 'human' capital. Hybrid forms of an actor in the marketplace (whether as a firm or as a worker) suggest a new approach to the understanding of work through business and wage contracts (Jensen and Meckling, 1976). Indeed, there is an urgent need to re-evaluate the role of the firm and labour markets within the firm as well as outside of the firm. From the perspective of technology, a hybrid actor that can be both firm-like and labour-like may be socially optimal particularly from the perspective of resource acquisition. In particular, it enables the resources generated by technology and AI to be appropriated by both the firm as well as by the hybrid worker/firm, much like the way workers already own their own smartphones, laptops and various technologies. Early papers have proposed multiple ownership and production function models where individual ownership of resources are not only possible, but encouraged in some community models (Shapely and Shubik, 1967). Technology and AI under the ownership of a hybrid worker/firm actor could drive innovation in more optimal ways including a market for consumer AI or consumer tech that could support better work and productivity of firms. In short, externalising technology to labour markets within the firm might be

an alternative model to primary technology input into firms from outside markets.



Future of work, Future of the Firm, Future of Tech Ownership

Our paper argues that technology and AI have been framed narrowly based on existing concept of the firm as the only means of appropriating resources from technology. We posit that the rise of the gig economy and entrepreneurialism is the move of

workers mimicking firms to acquire resources necessary to create more effective contracts for work, and therefore position themselves to appropriate the same technological resources. We suggest that it is necessary to investigate the future of work as part of the future of firms and their ownership structure, and consider both business and wage contracts as "work". More research is needed to identify and investigate the institutional structures that bind the nested relationships of internal and external labour markets for firms.

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