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The Fourth Industrial Revolution, Human Labor and Human Rights*

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Korea finds itself in the era of disruptive technological transformation known as the fourth industrial revolution(4IR). What impacts will these revolutionary changes cause in our society from the perspective of work and human rights? This study explores previous technological upheavals and concomitant social changes and compares them with the 4IR. The results of this study suggest that the 4IR's impact on work and human rights requires a new paradigm of social innovation that goes beyond current discussions focusing on losses or gains in employment. This new governance paradigm must take into consideration the fact that the transition costs of past technological advances have created new types of vulnerable workforces and this trauma has catalyzed a wide scope of social changes.

Keywords: Industrial Revolution, Human Rights, Human Labor, the Fourth Industrial Revolution, AI

1. INTRODUCTION

The fourth industrial revolution, characterized by multiple overlapping forms of disruptive technological change, is expected to cause a paradigm shift in how businesses, governments, and even societies operate (Schwab and Davis, 2018). Although innovations ranging from nanotechnology to artificial intelligence (AI) are typically portrayed as wonderful opportunities for corporate profits, improvements in citizens' quality of life and the growth of national economies, there is a growing awareness that the future also contains new dangers. The 2018 UN Forum on Business and Human Rights tentatively discussed AI, privacy, and human rights but discussions tended to be siloed among different issue areas. There is also a rich but inconclusive scholarly debate, largely among economists, whether digitalization and automation will create new job opportunities or lead to a jobless future. Although this question is a global one, Korea is one of the world's leading digital economies and is at the vanguard of the promises and perils of the fourth industrial revolution. While the Korean government is accelerating its fourth industrial revolution policy, scholars predict that this paradigm-shifting industrial revolution will also have a significant impact on job and human labor across Korean industries (Ahn and Lee, 2016; Oh, 2018).

These discussions are handicapped by the fact that the human rights impact of the fourth industrial revolution is still in the distant future. Most of the innovative technologies and business models being talked about are emergent rather than empirical realities. However, simply waiting for problems to take root before responding to them is not a realistic option either. Therefore, this paper conducts a comparative historical analysis of earlier industrial revolutions to determine what impacts they had on human rights, especially the rights of workers. Although each industrial revolution is unique, this study searches for underlying commonalities that will help scholars and policymakers to be better prepare for the fourth

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industrial revolution.

In our study, we find that there are important commonalities between past industrial revolutions. First, it is undeniable that each revolution has benefited humanity by increasing the productivity of labor. The authors of this study do not believe that industrial revolutions should be prevented, even if they could be. However, it is also undeniable that the revolutions identified in this study caused tremendous levels of human suffering. In all cases, this suffering was not spread evenly across society but was disproportionately placed on vulnerable populations, such as women, children, and the inhabitants of developing countries. This vulnerability is not simply a structural side-effect of innovative technologies but is a result of deliberate implementation of new business models in permissive regulatory environments. In other words, it appears that these human rights violations are not accidents but the direct consequences of new business models creating new forms of vulnerability in periods of technological flux.

In turn, these violations have led to violent pushback—ranging from the Luddite movement to various forms of workplace agitation—thereby exacerbating the transition costs and causing additional social disruptions. Even relatively successful cases of industrialization, like Great Britain, suffered widespread political and social disruption. Yet, paradoxically, this dialectic of conflict and pushback has helped fuel the progressive emergence of human rights norms—first political and civil rights in the nineteenth century, then the Universal Declaration of Human Rights in the mid-twentieth century, and now the emergence of business and human rights as a distinct field of practice in the twenty-first century.

But rather than simply wait for another repeat of this cycle—a period of new forms of exploitation enabled by innovative technologies that are eventually corrected by an expansion of human rights norms—this paper concludes by calling for the cycle to be preemptively broken. The best way to do this is by integrating human rights practices, especially a focus on the rights of society's most vulnerable members, into the emerging business practices and private sector technologies of the fourth industrial revolution. Indeed, a historical perspective of industrial revolutions demonstrates that the private sector has played a key role in "inventing" new forms of human rights violations. This finding clashes with more optimistic portrayals of corporate actors as human rights friendly (see International Chamber of Commerce, 2017). As pointed out in this paper, one of the key characteristics of the fourth industrial revolution is not just that work is being redefined but that it is also becoming more diffuse, which makes vulnerability more complex and difficult to identify than in previous revolutions. Therefore, a preemptive expansion of human rights norms, which would require political will at the global level as well as close coordination between academia, the private sector, and human rights defenders, is the best way to reap the benefits of the next industrial revolution while mitigating its ill-effects.

2. REVIEW OF CURRENT DEBATES ABOUT THE FOURTH INDUSTRIAL REVOLUTION AND HUMAN LABOR

Technological changes are reshaping multiple dimensions of the global economy and society. As seen in prior industrial revolutions, technological leaps are leading to paradigm shifts (Lasi et al., 2014: 239). As a concept, the fourth industrial revolution grew out of German government's use of the term 'Industrie 4.0' in 2013 for promoting smart manufacturing and the advent of technological convergence (Maynard, 2015). According to

Smit, Kreutzer, Moeller and Carlberg's study on Industry 4.0 (2016: 20),

> The concept takes account of the increased computerisation of the manufacturing industries where physical objects are seamlessly integrated into the information network. As a result, "manufacturing systems are vertically networked with business processes within factories and enterprises and horizontally connected to spatially dispersed value networks that can be managed in real time – from the moment an order is placed right through to outbound logistics.

Alongside mechanization, automation, digitalization and networking, the fourth industrial revolution has come to be applied to the application of new technologies in a wide scope of industries such as artificial intelligence (AI), advanced manufacturing, big data, mobile internet, cloud technology, the internet of things (IoT), robotics, autonomous transport, 3D printing, nanotechnology, biotechnology, materials science, and new energy technologies. These innovations are changing the nature of work and labor in many ways including employment trends and demand for new skills (The World Economic Forum, 2016).

What impact will these changes have on the economy and on the workforce? On the one hand, technological transformation is celebrated for raising global income levels and improving the quality of life through long-term gains in efficiency and productivity. According to this viewpoint, advanced technologies will open new markets and promote economic growth and these positive effects will compensate for the negative costs of the displacement of workers by technology and eventually yield a net increase of decent job opportunities (Schwab, 2016b: 3).

Despite higher economic growth as a result of enhanced productivity, the potential risk of digital technologies should not be downplayed because they may replace human workers faster than they create new employment. Indeed, current scholarship has been dominated by attempts to quantify the impact of new technologies on employment. Studies have focused on three points; a) the increase or decrease of tasks in terms of 'manual versus cognitive' or 'routine versus non-routine (Autor, Levy, and Murnane, 2003); b) the automatability of occupations according to classifications (Frey and Osborne, 2017); and c) the possibility of job polarization due to changes in demand for skills across industries. On the last point opinions are especially divided, with some scholars claiming that employment polarization and job losses is already happening (Autor, 2015; Katz and Margo, 2014; Goos, Manning, and Salomons, 2014). Other scholars are more cautious, suggesting that the risk of job elimination from technological advances may be overestimated (Arntz, Gregory, and Zierahn, 2016; Nedelkoska and Quintini, 2018).

Despite the debates over the impact of disruptive technological changes on human labor, we should note that most scholars agree that there will be an inevitable social adjustment cost. Although the scope and magnitude of the impact or the length of the transition time may vary depending on variables including economic and social conditions, there is consensus that disruptive technological changes will significantly affect the most vulnerable populations in industrial societies. For example, even the relatively moderate empirical estimation of automatability by computerization by Arntz et al. (2016) is accompanied by a frank admission:

> Low qualified workers are likely to bear the brunt of the adjustment costs as the automatability of their jobs is higher compared to highly qualified workers. Therefore, the likely challenge for the future lies in coping with rising inequality……

> ……the high risk of job loss by low-qualified workers, as most scholars point out, should be noticed because it implies that the relatively vulnerable low-wage workers are likely to take the burden of social cost during an industrial transformation (Arntz et al., 2016: 4)

The decreasing numbers of jobs for low-skill and low-qualified workers and growing competition for limited job opportunities between other categories of workers not only reduces their working opportunities but also potentially weakens their working conditions and labor rights.

The wave of impending disruptive technological and industrial changes is likely to deepen social inequality and increase concerns about worker's rights. This study argues that these developments need to be approached as part of a techno-social transformation rather than studied in isolation as a change in work patterns. A pure economic perspective loses sight of the human costs of this transition. Even if the jobs displaced by the fourth industrial revolution are mathematically balanced out by new job creation elsewhere in the economy, this process will be extremely painful for affected workers. This process has happened before, often with terrible consequences. Our historical review of prior industrial revolutions will demonstrate the necessity of a new framework to effectively address these complicated issues from the perspective of human rights.

3. THE INFLUNECE OF PREVIOUS INDUSTIRAL REVOLUTIONS ON HUMAN LABOR AND HUMAN RIGHTS

Disruptive transformations of human societies started first with the Neolithic revolution. The shift from a hunting society to an agricultural society had a profound impact on people from the perspective of human labor and human rights. On the one hand, the period witnessed massive productivity gains, resulting in the explosion of the human population known today as the Neolithic demographic transition (NDT) (Bocquet-Appel and Bar-Yosef, 2008). On the other hand, there is growing awareness that the transition came at a great human cost. Shard (1974) points out that, in exchange for increased agricultural output, men were forced to be disciplined groups for endless hard labor governed by village councils. Unlike the pattern in a pre-Neolithic society, they could not form temporary groups for hunting but had to be permanently organized. The enforced conformity to the principles of agricultural society significantly eroded people's independence at work and also increased the length of the working day (see Sahlins 1979: 21). Children were driven to work while their social status were usually constrained within their family class. The disappearance of women in collaboration with men for hunting and fishing on cave paintings implies their marginal status in an agricultural society (Shard, 1974: 169). Despite an overall growth in human populations, this period was characterized by a decline in the quality of life at the individual level due to pollution, dietary changes, and endemic diseases caused by new productive(production?) techniques (Akkermans and Schwartz, 2003: 78-9; also see Latham, 2013).

As with all economic revolutions discussed in this paper, the Neolithic disruptions affected everyone but some were winners and others were losers. Although industrial revolutions are complex and multicausal processes—the exact causes of which are still being debated—they ultimately arise from human agency. Choices were made by groups of people that had short-term and long-term consequences for health, labor patterns and interpersonal

power relationships. In particular, the Neolithic revolution heralded a shift from egalitarian hunter-gatherer groups to new societies marked by steep inequalities in wealth and power (Buzan and Little, 2000: 153).

Although the Neolithic revolution is rarely mentioned in contemporary debates about workers' rights, the event is important because it reminds a modern audience of the sheer scale of transformative changes possible through new technologies and productive techniques. Whereas many of us can relate to the lifestyle of ancient city-dwellers and farmers and share many of their concepts, such as private property, government, social classes and even the practice of living in a fixed dwelling, the lifestyles of pre-Neolithic peoples are alien and distant by comparison. This level of transformation is possible again in the future. It has been argued by some scholars that new digital and biomedical technologies are on the verge of causing a similar rupture in the human condition—perhaps even heralding the 'end of human beings' as conventionally understood.[1] Although the fourth industrial revolution may have Neolithic-like transformative potential in the long-term, contemporary technological changes are best understood in the short-term by comparing them to the first industrial revolution in the eighteenth century.

3.1 The First Industrial Revolution

For thousands of years after the Neolithic revolution, most human labor was dedicated to agricultural work, which created a surplus sufficient to support small populations of specialized administrators, warriors, and skilled manufacturers. This model was incrementally improved through the creation of new farming methods or improvements in governance in various parts of the world but was relatively static until its disruption by the development of steam power. Machines allowed faster rates of production and the use of coal effectively tapped vast reservoirs of stored energy, but also altered the relationship between actors involved in major industries and led to the disruption and replacement of the peasantry by the working class. Large scale investment on fixed capital equipment catalyzed the distinction between capital and labor as well as the specialization of labor by industry or occupation (Deane, 1965: 157). As we will see below, this process was also marred by human rights violations and culminated in pushback.

(1) Major Victims – Factory Workers, Children and Women

As with the Neolithic Revolution, the transition to industrial societies affected everyone but some groups paid a disproportionate price. Industrialization negatively impacted pre-existing social groups, such as landed aristocrats and yeomanry, but it also created new forms of vulnerability. Especially during the early stage of industrialization, factory workers experienced a loss of power and human rights violations. For example, the use of machines allowed the work of skilled artisans to be replaced by segmented and simpler tasks that less skilled or unskilled workers could perform (Frey and Osborne, 2017). Although a demand for factory workers also gradually increased to keep pace with the change of manufacturing processes, the commodification of labor and poor working environments of these factories were hardly acceptable to workers who had previously worked at home or in a small

[1] For example, imagine the impact on job markets if memory or cognitive implants or genetic engineering radically upgraded some workers but remained unavailable for others. For an introduction to posthumanist and transhumanist ideas see Ranisch and Sorgner (2014).

workshop with thick personal relationships (Mantoux, 1961: 409). Moreover, factory workers rarely had the chance to become a master of a workshop, which was what many workers wanted to become. The widening gap between capitalists and laborers was a watershed moment and accelerated the struggle between these two emerging groups (e.g. Ishay, 2008).

Within the working class, the plight of children and women in the era clearly demonstrates how unprecedented technological changes may drive the most vulnerable social groups to bear the social costs of transition unless the consequences of these transformations are comprehensively treated as social and political agendas within a human rights framework. Moreover, it must be noted that these human rights violations were not accidental side effects but an integral part of the process. Humphries (2012: 6) claims that "Child labor was a major contributing factor in Britain's industrialization." Regarding the prevalence of child labor during the period, two main reasons may account for it. First, the early textile factories had an insatiable demand for labor (Nardinelli, 1980). Second, the relative productivity of children was increased by the division of manufacturing process alongside mechanization (Humphries, 2012). For example, in spinning mills, children's nimble hands could efficiently replace adult labor in tying broken threads (Nardinelli, 1980). Under these circumstances, child labor, especially pauper apprentices, were perceived to be a practical alternative to fill the gap in the labor force by factory owners. It should also be noted that the early employment of young children not only provided additional labor to factory workshops but also freed their mothers to participate in factory work (Ishay, 2008: 165).

Child labor was not only cheaper than adult workers but also relatively easier to manage. Under the parish apprentice system, children from poor families had no choice but to be sent to factories for forced labor. It was not a coincidence that this result was aligned with the interests of both of parishes and manufacturers. The parishes anxiously wanted to reduce their paupers and the manufacturers desired to take advantage of the apprenticeship system. Apprentices were bound to work for the factory for at least seven years. They worked under inhumane conditions and were usually paid only one-third to one-sixth of an adult's wage, or even only provided with food and lodging (Mantoux, 1961: 410-411, 413).

The exploitation of parish apprentices eventually came to the attention of British society and humanitarian concerns led to the establishment of "the Health and Morals of Apprentices Act 1802", also known as the 'the Factory Act of 1802'. However, the Act did not effectively diminish the prevalent human rights abuses. Manufactures, who were opposed to the legislation, skillfully circumvented the Act by hiring children and adolescents without apprenticeships by taking advantage of its vague terms and light penalties (Mantoux, 1961: 470-473).

A substantial reduction of child labor in the textile industry only occurred around the 1830s. For instance, compared to the percentage of children employed in the cotton and flax industries in 1816 and 1835, the children under the age of 10 decreased from 6.8 to 0.3 percent and from 6.5 to 0.4 percent. For children under the age of 13, the percentage decrease from 20 (estimated) to 13.1 percent and 22.7 (estimated) to 13.5 percent.[2] What factors may account for it? Had British society become more aware of the human rights of these pitiful children between these years? In fact, these changes appear to have stemmed from the influence of technological innovation on human labor and human rights. First of all, as steam powered machines replaced water powered machines in remote locations, factories could move back into towns where adult workers were easily recruited (Nardinelli,

[2] See Nardinelli, 1980: 746. Table 3. Child labor in 1816 and 1835.

1980:744); Second, the operation of those machines was more suitable for adults rather than children (Pinchbeck, 1969: 102); Third, self-acting spinning mules diminished the demand for children (Nardinelli, 1980:746); Lastly, under these circumstances, the enforcement of the Act of 1833, which regulated the working hours of children, factory hygiene, education for apprentices, etc., further deteriorated the merits of child labor (Pinchbeck, 1969: 102).

In other words, the rise and fall of child labor in the labor market during the early industrial revolution was fueled by technological transformation and changing business models. Although the Act of 1833 and subsequent legislation was established to protect children from abusive forced labor, these regulations came late and were not effective until the economic rationale of using child labor had already shifted. Moreover, the changing demand in labor markets now led to the sufferings of another vulnerable group, women, who did not yet have adequate social and legal protection.

Pinchbeck (1969) contends that manufacturers shifted to the use of women laborers for several reasons; Unlike children, who were protected by the Act of 1833, the regulation on working hours was not legally applied to women until the Act of 1844; Moreover, even though the rate of women's wages was lower than that of men, women workers were perceived by factory owners as more obedient and easier to manage. Women were also placed in the unhealthiest workplaces, such as worsted mills using wet spinning where they had to endure a constant spray of water from the machines and breathed filthy air while sitting in wet clothing for an entire day. These wet and ill-ventilated working environments were detrimental to their health. Many of these women did not have any other choice because, as Pinchbeck (1969) points out the reality that "many women were forced to earn their own livings, and that the great majority of those so employed were single women and girls who could not be supported at home" (Pinchbeck, 1969:107). These situations demonstrate how innovative technologies catalyzed new types of human rights abuse during socio-economic transition. It is also an emblematic example of how the most vulnerable groups bore a disproportionate proportion of these costs.

(2) Pushback – The Labor Movement

Technological advances had a substantial impact on most laborers, i.e., men as well as relatively more vulnerable children and women. During this period, the response of workers to economic and social changes focused on their own interests, such as campaigns by male workers to safeguard their jobs and working conditions, but these efforts ultimately contributed to the improvement of human rights in British society through their politicization.

While artisanal jobs were increasingly transformed into segmented factory tasks using machines, the entry of children and women into the factory labor market was perceived to be a danger to many men, who pushed back by seeking to limit their participation. The Act of 1847, which restricted the working hours of women and adolescents to ten hours a day, reflects this attitude. Although male workers and their leaders publicly asserted that they supported the bill to protect the rights of women labor, Stearns (2007: 78) argues that "many male workers hoped to gain better wages for themselves by limiting competition from women." Even though workers wanted job security and better working conditions rather than a structural change of society (Mantoux, 1961; 440), the intensifying economic division and inequality alongside industrial transformation shattered social stability. The workers' claim to ask more secure job opportunities, less rigorous labor principles, safe and healthy workplaces, and higher wages was gradually shifted out of the workplace into a more general social and political struggle.

The abolishment of the Statute of Artificers 1563 in 1814, which had previously controlled the number of skilled workers by imposing a seven years compulsory apprenticeship on anyone to exercise a trade in Britain, helped fuel the labor movement in conjunction with increasing job losses and the deteriorating economic status of skilled workers. On the surface, this decision was made to alleviate the suffering of apprentices, but in reality it was attributed to the desire of industrialists to secure more docile and cheaper labor forces for their factory work (Mantoux, 1961; 452-453). Skilled workers violently resisted this situation through their trade unions. The Luddite movement, which began in Nottingham in 1811 during the economic downturn of the Napoleonic Wars, symbolized a radical struggle against machines and automation (e.g. O'Rourke, Rahman, and Taylor, 2013). In response to the rise of tensions between labor and capital, employers opted to equip their factories with advanced manufacturing machines operated by unskilled or less-skilled workers rather than accept collective bargaining with skilled tradesmen. Eventually, these early labor movements were pushed underground by the harsh repression of the British government using the Combination Act 1799, which prohibited trade unions.

Notwithstanding their limited impact in the short-term, these early labor movements raised the political awareness of the British working class. Although they were increasingly dissatisfied with long hours of work and deepening economic inequality, British society did not provide them with a proper political channel to relieve this social pressure (Ishay, 2008). While unprecedented political unrest continued, the threat of revolution, aggravated by the French Revolution of 1830, drove the British political elites to reluctantly approve the 1832 Reform Act (e.g. Acemoglu and Robinson, 2000). Even though the bill partially allowed male suffrage, it changed the direction of the labor movement in Britain away from physical demonstrations to a political campaign that ultimately led to universal suffrage. In other words, the voice of suffering workers began to influence politics outside of the workplace and led to the establishment of economic and social policies based on the widening of voting rights. This demonstrates how technological changes and their impact on workers led to an important shift in the domestic political system.

The Chartist movement during the 1830s reflected the changing social demands of workers even though it was repeatedly rejected by the British parliament. The Peoples' Charter in 1838 contained six political reforms espoused by the working class; Adult male suffrage, the secret ballot, no property qualification for Members of Parliament, the payment to them of a salary, equal electoral constituencies, and annual parliamentary election (Checkland, 1964; 349). In his analysis of industrialization and universal suffrage, Congleton (2004: 301) contends that "industrialization tends to increase the number of interest groups and their overall membership by reducing organization costs, increasing their effectiveness, and increasing the demand for interest group services." In light of this, he argues that industrialization can catalyze a remarkable political reform like universal suffrage by empowering those interest groups (Congleton, 2004: 283). This suggests that the fourth industrial revolution, even though it creates new threats for vulnerable populations, may also create the potential for emancipatory changes in society.

The early industrial revolution in Britain is an example of an industrial transformation promoted by technological innovation creating immense transition costs which were displaced onto the most vulnerable social classes. The relentless violation of workers' rights drove them to resist social injustice and economic inequality in the form of a labor struggle. However, when the ruling political elites and capitalists responded to the labor movement with ruthless suppression it changed the nature of the labor struggle. Workers' demands

originally focused on better work and living conditions but then grew into a larger call for the social reform and an equal society. The first industrial revolution was not simply an economic problem, but a social one. Even though our contemporary political and civil rights, especially universal suffrage, emerged in this period, they came at a high cost.

3.2 The Second Industrial Revolution

The second industrial revolution, which occurred around the late nineteenth and the beginning of the twentieth century, saw the massive expansion of the scale and scope of industrial production by extensively applying innovative technologies to a wide range of industries such as railroad, water supply, telegraph networks, and steel (Mokyr, 1998). The invention of electricity and internal combustion engines accelerated the use of mass production systems. Although a major portion of the labor force was still employed by relatively small factories during this period (Mokyr, 1998), the growing importance of the economies of scale and productivity laid the foundations of economic globalization. Hence, the second industrial revolution saw a growing number of workers integrated into the international labor market centered on factory-based mass production systems. This intensification of the factory system in the second industrial revolution created a unique and highly specific form of exploitation centered on the scientific management of human groups, especially in the context of the assembly-line.

(1) Major Victims – Factory workers

Under these circumstances, 'Taylorism', a philosophy of scientific management promoted by Frederick Taylor (1919) caused a notable change in industrial work and labor. Taylor argued that the principle object of management should be to maximize productivity and to minimize cost. According to this view, the highest performance of individual workers could be achieved through motion and time studies which sought to eliminate wasted or inefficient motions. In essence, Taylorism was an attempt to rationalize the workplace and root out traditional forms of labor, which was often characterized as laziness. This systemizing of work would allow a firm to outcompete all other firms, thereby allowing the firms' workers as well as its owners to reap economic benefits.

Litter (1978: 1) analyzes the three main pillars of Taylorism as the division of labor, the bureaucratized structure of control over task performance, and the redefinition of the relationships between workers and the organization. Broadly, Taylorism sought to reduce the agency of workers by reconfiguring information flows away from workers and towards an emerging class of professional bureaucratic managers. By inducing Darwinian-like competition among the workers, managers could exert stronger control and generate greater productivity.

Reflecting on this change, Braverman (1974) points out the dehumanizing consequences of scientific management. The spread of scientific management promoted the separation of planning and work in the capitalist mode of production. The separation of mental work from manual work eventually resulted in the handover of control over labor process from the workers on a shop floor to the management in a planning department. Thus, workers were increasingly treated as cogs in a machine.

> This dehumanization of the labor process, in which workers are reduced almost to the level of labor in its animal form, while purposeless and unthinkable in the case of the self-organized and

> self-motivated social labor of a community of producers, becomes crucial for the management of purchased labor (Braverman, 1974: 62).

Therefore, unlike the erosion of workers' physical security that had characterized the first industrial revolution, the exploitation of workers that took place in the second industrial revolution was a more subtle form of dehumanization that used scientific methods to create steep inequalities of information, power, and agency in the workplace even though the physical dangers of the first industrial revolution were lessened.

(2) Pushback – International Worker's Rights

Pushback during the second industrial revolution took the form of socialist and workers' rights movements. Unlike the first industrial revolution, where most activism occurred within the nation state and sought local redress, this second wave of protest was international in scope and broadly targeted the deep inequalities of power, information, and life opportunities that characterized early industrial societies. Ultimately this pushback led to two key successes.

The first was the establishment of the first interstate labor organization, the International Labor Organization (ILO) in 1919, shortly after the conclusion of World War I. It is noteworthy that the governance of ILO is based on the Tripartism model in which the workers and employers of member states have an equal voice with governments. On the one hand, this organization was compensation for the working classes' contribution to the war effort. On the other hand, it was a countermeasure by capitalist countries to prevent the spread of socialism triggered by the 1917 Bolshevik Revolution in Russia, which demanded the political and economic equality of workers and rebelled against the deepening gap between labor and capital (Rogers et al., 2009). Since the establishment of ILO, workers' rights began to be discussed at a state level.

The second accomplishment was the 'The Universal Declaration of Human Rights' in 1948. It consists of a preamble and two sets of fundamental rights: civil and political rights and economic, social and cultural rights. Furthermore, both sets of rights were adopted by the General Assembly of the United Nations (UN) as 'the International Covenant on Civil and Political Rights' and 'the International Covenant on Economic, Social and Cultural Rights' in 1966. Although often seen as a reaction to Nazism, this human rights revolution was driven by much deeper socio-economic forces. According to Ishay, it was the result of the human suffering of the first and second industrial revolutions:

> The rights to a free education, to work, to safe working conditions, to public health care, to form free associations and trade unions – all core clauses of the Covenant on Economic, Social and Cultural Rights – originated in the filthy and hazardous conditions of European and American mines and factories (Ishay, 2008: 144).

Once again, therefore, we see a process whereby technological transformation and new business models created new opportunities for profit and generated exploitative practices that triggered backlashes, best exemplified by the emergence of Communism in the early twentieth century but also Keynesian liberalism in the 1920s. Also, the globalization of production and trade also helped propel the matter of workers' rights from a domestic issue of the sovereign state into an international agenda.

3.3 The Third Industrial Revolution

The third industrial revolution, which was triggered by the oil shock in early 1970s, witnessed the growing use of Communications Technology (ICT) and automation to enhance productivity. Hence it resulted in the increased capabilities of industries (Jesen, 1993). However, the relationship between human labor and innovations in this period tended to be complementary rather than substituting because the technologies of the third industrial revolution were not advanced enough to effectively substitute most tasks outside of the assembly-line, especially in the domain of human intellectual labor. Nevertheless, technological innovation and consequently accelerating economic globalization sharply increased the size and weight of Transnational Corporations (TNCs) and brought about the rapid globalization of international labor markets.

(1) Major Victims – Supply Chain Workers and Communities

Although the complex origins of globalization are outside the scope of this paper, it is important to note that successful pushback against poor working conditions in the developed world was only a partial victory because businesses in the developed world were able to leverage ICTs to move overseas in their search for cheap supplies of labor, weak regulations, and new markets. Although this process is known as the third industrial revolution in the developed world, in developing countries it unleashed a process was more reminiscent of the first industrial revolution. The anti-sweatshop movement in the 1990s, which was triggered by the labor exploitation of TNCs such as Nike, highlighted how the erosion of global labor and environmental standards through the off-shoring of production was a dark-side of globalization (Nolan, 2005; Mosley and Uno, 2007). The consequences of these exploitative practices are highlighted by the 2013 Rana Plaza collapse in Bangladesh. In this tragic accident, 1,135 people were killed and approximately 2,500 were injured when the workers of five garment factories for 31 western multinational apparel brands were ordered to return to work in a building that had shown signs of structural failure just one day earlier (Chowdhury, 2017: 1). In this way, globalization led to the export of exploitative labor practices throughout the global supply chain.

(2) Pushback – The UN Guiding Principles on Business and Human Rights

Once again, innovative methods of exploitation triggered pushback. Labor movements took advantage of advancing communication and transportation technologies, like the mass media and later the internet, to forge transnational ties with nongovernment organizations and champion for the rights of workers and indigenous people. In this period the concept of business and human rights emerged as a distinct category of human rights activism. The enhanced awareness of workers' human rights and public pressure on businesses served as a catalyst to develop international corporate human rights responsibility principles and guidelines in UN. The UN Global Compact, which stipulated the principles for responsible business, was announced in 2000. The UN Guiding Principles on Business and Human Rights (UNGPs) were announced in 2011. The UNGPs are important because they consist of three pillars; a) the state duty to protect against human rights abuses b) the corporate responsibility to respect human rights with due diligence and follow-up mechanisms c) the need for greater access by victims to effective remedy, both judicial and non-judicial. With their emphasis on corporate human rights due diligence in practice, the UNGPs also recommended the establishment of 'National Action Plan on Business and Human Rights'

by state governments. By August 2020, twenty-two states have produced a NAP on business and human rights and twenty-three states are currently developing one (UN OHCHR, 2020). Nevertheless, it cannot be ignored that

> Some indeed view NAPs as a convenient fig-leaf for governments' reluctance to adopt policies that might be construed as putting business at a competitive disadvantage, or as a forum in which corporate lobbying will trounce meaningful progress under the banner of "multi-stakeholderism." (O'Brien et al., 2015: 9)

It is an inescapable fact that these international efforts were taken only after vulnerable workers already paid a great cost. Unfortunately, Korea does not even have a NAP on business and human rights yet.

3.4 The Fourth Industrial Revolution

Despite the emergence of a human rights regime in the late 1940s and the crystallization of a business and human rights regime in the 2010s, corporate human rights violations continue to be a problem and more work needs to be on the implementation of existing regulations and guidelines. Yet, the fourth industrial revolution raises the possibility that we may be on the verge of another great shift in business practices that alter existing patterns of work. As we have seen, previous industrial revolutions have altered the nature of work (from hunting and gathering to farming), its location (cottage to factory), or both (sweat shops in developing countries). Each reconfiguration of labor and space has resulted in greater global productivity, but these shifts also created new forms of exploitation and new vulnerable populations. As discussed previously in our literature review, the fourth industrial revolution is still unfolding, and scholars are fiercely debating its quantitative impacts on employment. But what about qualitative impacts on the nature and location of work? What vulnerabilities may emerge as a result?

(1) The Emergence of New Victims – Producer Consumers "Prosumers"

We suggest that one prominent example of the challenges created by the fourth industrial revolution is the 'gig-economy,' which is already having a major impact on social inequality and labor rights. The gig economy includes a variety of temporary jobs, increasingly mediated through digital technologies, including *crowdwork* and *work on-demand via apps* (De Stefano, 2016: 1). Although optimists argue that work-on-demand via online platforms enable participating workers to have more flexibility and freedom in choosing their tasks and working time, and may substantively contribute to improving both economic efficiency and workers' autonomy (Lobel, 2017: 53), the emergence of new social challenges force us to reconsider such an optimistic estimation. First, the invisibility of workers in crowdwork permits a commodification of human beings and a dehumanization of their activities because these transactions usually happen through virtual system without human contact (De Stefano, 2016). In other words, it is easier to violate the rights of a worker who is just a digital tag on a screen.

Second, the flipside of the gig-economy's flexible working hours and life-style is employment instability and income insecurity which decreases workers' real autonomy rather than increasing it. Moreover, the global nature of the labor market on many digital gig-platforms intrinsically intensifies competition among workers (e.g. Berg, 2015; Smith and Leberstein, 2015; De Stefano, 2016). This may result in another race-to-the-bottom in the

digital era where workers face deteriorating compensation despite long hours of on-demand work. According to Berg's (2015) study of *Amazon Mechanical Turk* workers in U.S. and India, almost a quarter of total working hours were spent on unpaid tasks and the average pay for each working hour was between USD 1 and 5.5. Friedman (2014) also demonstrates that most gig workers in the U.S. earn much less than their counterparts with equivalent education in traditional employment.[3] Moreover, gig workers structurally lack the ability to negotiate their pay conditions because a digital platform creates a simple take-it-or-leave-it contract between a company and an isolated individual worker.

Third, notwithstanding how labor protection and social safety nets are usually perceived to be the principle part of economic, social and cultural rights in many countries, these basic rights are not applied to most gig workers due to their employment status. Gig workers are categorized as independent contractors rather than employees under many current labor laws. In this regard, gig economy platforms contend that they only provide virtual platforms allowing an individual service provider (like a driver with a spare seat) to meet someone who needs a service (a person needing a ride), and hence they do not have the duty to cover the costs for traditional employment benefits. In this way, gig employment virtually shifts the risks of business and economic fluctuation to vulnerable individual workers who lack state protection (e.g. Friedman, 2014; Berg, 2015; Aloisi, 2016; De Stefano, 2016; Lobel, 2017). This ambiguity between worker, customer or even volunteer is best exemplified by the case of Joshua Brown, who died testing Tesla's autonomous car in June 2016. Although a paying customer, the Tesla enthusiast was engaged in online and offline promotional activities for the company. Moreover, the autopilot feature installed in his car regularly uploaded data to company servers, allowing the company to incrementally improve their product. So, he died while informally testing an unproven technology for a company that described him as "a friend."[4] It seems likely that future generations will look back at gig workers as we remember the textile workers or factory workers of earlier industrial revolutions—the unfortunate victims of progress. But their suffering is not inevitable.

Notable progress, represented by the UNGPs, has been made in international human rights mechanisms for workers. Nevertheless, we need to recognize that they are mostly based on the core premises of the first, second, and third industrial revolutions: a) there is a distinctive boundary between employer and employee in business activities, and b) machines cannot replace human-specific labor areas in the near future. However, the technologies of the fourth industrial revolution suggest that these well-known assumptions are losing their legitimacy. The changing nature of work and labor demand, and the blurring lines between employer, employee and consumer in the gig economy suggest that a new paradigm of technological transformation can paradoxically erode the framework of current international business and human rights mechanisms. Moreover, like previous revolutions, new coercive and exploitative capabilities are often subtle and justified as a positive feature by the powerful groups implementing these changes. For example, child labor was once defended as healthier than compulsory schooling (William Senior, 1837: 19, 25). Therefore, it is urgent to critically engage with the fourth industrial revolution's qualitative changes to labor, not just its aggregate impact on employment.

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[3] See Friedman, 2014. p.178-179.

[4] Solomon, B. (2016, June 30). Tesla Autopilot Enthusiast Killed In First Self-Driving Car Death. Retrieved February 9, 2019, from https://www.forbes.com/sites/briansolomon/2016/06/30/the-first-self-driving-car-death-launches-tesla-investigation/

4. CONCULSION

Given the fact that Korea is emerging as the vanguard of the fourth industrial revolution, our historical survey of previous industrial revolutions highlights several important dynamics. First, new technologies and business models, even if they help humanity in the long-term, place a heavy burden on the shoulders of the most vulnerable people. These vulnerable populations are created through a combination of new capabilities or business models and a gap in government regulations or policy. For example, the condition of workers under the laissez-faire attitude of the British government in the early industrial revolution demonstrates how a late response to disruptive technological transformation may result in considerable suffering. Second, these gaps in protections were fixed retroactively because of violent political and economic contestation by disadvantaged groups. This dialectic, however, is highly inefficient because it creates adversarial relationships and conflict. Why is it necessary for events like the Luddite movement and the Seattle WTO protests to make business activities more humane?

Although labor movements have historically played a key role in driving change, our analysis of the fourth industrial revolution suggests that the blurred boundaries between consumption and production may erode the efficacy. For example, the widespread exploitation of consumers as data producers seems outside the boundaries of traditional trade unionism. For that reason, we suggest that universal human rights may be a more flexible basis of action in the fourth industrial revolution because they are universal and apply to everyone regardless if their classification as a consumer, worker, or somewhere in-between. Preemptively applying human rights norms and practices to the early stages of the paradigm shift, especially emerging business models, may allow us to prevent another round of social suffering and conflict.

Moving forward, research is the key for finding a path forward. Identifying and preemptively protecting vulnerable populations, the core principle of a human rights approach to development, is required to forestall social disruption and conflict cycles. Questions about the overall employment impacts of new technologies are important but they must be supplemented by more critical investigations of the political, social, and economic consequences of emerging forms of work. The report on artificial intelligence, automation, and the economy of the U.S government is a good example of this. Pointing out the costs of the adjustment process due to labor market disruption by AI-driven automation, it emphasizes the importance of timely follow-up measures to deal with these changes, for instance, expanding job-driven training and lifelong learning, strengthening social safety net, modernizing tax policy in response to the possibility of deepening inequality (Executive Office of the President of the United States, 2016).

Yet, the gig economy and the erosion of traditional work opportunities are just the tip of the iceberg. This historical survey showed how practices enabled by new technologies and business models did not always correspond with existing categories or conceptual frameworks. This means that each revolution transformed business and redefined exploitation in ways that challenged contemporary norms. Such gaps are profitable, but they are also potential sources of exploitation. For example, many of today's digital platforms, by harvesting our data, effectively turn us into unpaid producers. Is this exploitation? Current debates about measuring job losses or gains cannot capture the nuances of new threats or the fact that the very concept of a "job" is being revolutionized. This means that human rights scholars also need to revolutionize their thinking. What does the "right to work" mean in a

digital future? Concepts originally derived from the first industrial revolution will need to be updated before they are applied to the fourth one. Especially, the traditional focus by human rights activists on stopping physical threats to bodily integrity may need updating in the fourth industrial revolution, which is characterized by complex new threats to mental agency (Soh and Connolly, 2020).

Finally, tackling this issue will require global governance, not top-down regulation. The role of the state as the primary protector of human rights has struggled to keep pace with economic globalization and complex transnational issues since the 1970s. This gap has been increasingly filled by the rapidly growing capabilities of TNCs (Wettstein and Waddock, 2005). As indicated in our historical survey, the first and second industrial revolutions took place at the national level but the third and fourth were international. Today, faced with unprecedented technological changes, the role of governments and international organizations, especially coordination between them in a holistic approach is more critical than ever. The gap in protections is global in scope and requires a global response. Fortunately, the UN human rights regime is a universal instrument that can facilitate global responses. The expanded use of multi-stakeholder initiatives involving governments, NGOs, the UN, and private companies may be the best platform for resolving potential crises before they reach critical mass. Technological revolutions invariably impose a transition cost to a society, but we should not repeat the mistake of earlier revolutions and place this burden on the most vulnerable members of our societies.

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REFERENCES

Ahn, Shang He, and Min-Hwa Lee. 2016. “Fourth Industrial Revolution Impact: How It Changes Jobs.” *Korean Academic Society of Business Administration* 2015: 2344-2363.

Akkermans, Peter MMG, and Glenn M. Schwartz. 2003. *The Archaeology of Syria: From Complex Hunter-gatherers to Early Urban Societies (c. 16,000-300 BC)*. Cambridge: Cambridge University Press.

Aloisi, Antonio. 2015. “Commoditized Workers: Case Study Research on Labor Law Issues Arising from a Set of On-Demand/Gig Economy Platforms.” *Comparative Labor Law and Policy Journal* 37: 653-690.

Acemoglu, Daron, and James A. Robinson. 2000. “Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective.” *The Quarterly Journal of Economics* 115(4): 1167-1199.

Arntz, Melanie, Terry Gregory, and Ulrich Zierahn. 2016, *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis*. OECD Social, Employment and Migration Working Papers, No. 189. Paris: OECD Publishing. https://www.oecd-ilibrary.org/social-issues-migration-health/the-risk-of-automation-for-jobs-in-oecd-countries_5jlz9h56dvq7-en

Autor, David H. 2015. “Why Are There Still So Many Jobs? The History and Future of Workplace Automation.” *Journal of Economic Perspectives* 29(3): 3-30.

Autor, David H., Frank Levy, and Richard J. Murnane. 2003. “The Skill Content of Recent Technological Change: An Empirical Exploration." *The Quarterly Journal of Economics* 118(4): 1279-1333.

Berg, Janine. 2015. "Income Security in the On-Demand Economy: Findings and Policy Lessons from a Survey of Crowdworkers." *Comparative Labor Law and Policy Journal* 37: 543-576.

Bocquet-Appel, Jean-Pierre, and Ofer Bar-Yosef, eds. 2008. *The Neolithic Demographic Transition and its Consequences*. Dordrecht: Springer.

Braverman, Harry. 1974. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York: Monthly Review Press.

Brynjolfsson, Erik, and Andrew McAfee. 2014. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York, London: WW Norton & Company.

Buhr, Daniel. 2017. "Social Innovation Policy for Industry 4.0. Friedrich-Ebert-Stiftung." Accessed July 20, 2018. https://library.fes.de/pdf-files/wiso/11479.pdf.

Buzan, Barry, and Richard Little. 2000. *International Systems in World History: Remaking the Study of International Relations*. Oxford; New York: Oxford University Press.

Brunhild, Gordon, and Robert H. Burton. 1967. "A Theory of "Technical Unemployment": One Aspect of Structural Unemployment." *American Journal of Economics and Sociology* 26(3): 265-278.

Checkland, Sydney George. 1964. *The Rise of Industrial Society in England, 1815-1885*. The Great Britain: Longman Group Ltd.

Chowdhury, Rashedur. 2017. "Rana Plaza Fieldwork and Academic Anxiety: Some Reflections." *Journal of Management Studies* 54(7):1111-1117.

Congleton, Roger D. 2004. "Economic Development and Democracy, Does Industrialization Lead to Universal Suffrage?." *Homo Economicus* 21(2): 283-311.

Deane, Phyllis M. 1979. *The First Industrial Revolution*. Cambridge University Press.

De Stefano, Valerio. 2016. "The Rise of the Just-in-Time Workforce: On-Demand Work, Crowdwork, and Labor Protection in the Gig-Economy." *Comparative Labor Law and Policy Journal* 37(3): 461-471.

Ford, Martin R. 2009. *The lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future*. The U.S.: Acculant Publishing.

Frey, Carl Benedikt, and Michael Osborne. 2017. "The Future of Employment: How Susceptible Are Jobs to Computerisation." *Technological Forecasting and Social Change* 114: 254-280.

Friedman, Gerald. 2014. "Workers without Employers: Shadow Corporations and the Rise of the Gig Economy." *Review of Keynesian Economics* 2(2): 171-188.

Goos, Maarten, Alan Manning, and Anna Salomons. "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring." *American Economic Review* 104(8): 2509-26.

Humphries, Jane. "Childhood and Child Labour in the British Industrial Revolution." *The Economic History Review* 66(2): 395-418.

International Chamber of Commerce. 2017. "3 Ways Business Is Promoting Human Rights." Assessed November 27, 2017. https://iccwbo.org/media-wall/news-speeches/3-ways-business-is-promoting-human-rights/.

Ishay, Micheline. 2008. *The History of Human Rights: From Ancient Times to the Globalization Era*. Berkeley and Los Angeles: University of California Press.

Jensen, Michael C. 1993. "The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems." *The Journal of Finance* 48(3): 831-880.

Katz, Lawrence F., and Robert A. Margo. 2014. "Technical Change and the Relative Demand

for Skilled Labor: The United States in Historical Perspective." *In Human Capital in History: The American Record*, 15-57. University of Chicago Press. http://www.nber.org/chapters/c12888.

Lasi, H., Fettke, P., Kemper, H. G., Feld, T., and Hoffmann, M. 2014. "Industry 4.0." *Business and Information Systems Engineering 6*(4): 239-242.

Latham, Katherine J. 2013. "Human Health and the Neolithic Revolution: An Overview of Impacts of the Agricultural Transition on Oral Health, Epidemiology, and the Human Body." *Nebraska Anthropologist* 28: 95–102.

Littler, Craig R. 1978. "Understanding Taylorism." *British Journal of Sociology* 29(2): 185-202.

Lobel, Orly. 2017. "The Gig Economy and the Future of Employment and Labor Law." *University of San Francisco Law Review* 51: 73.

Mantoux, Paul. 1961. *The Industrial Revolution in the Eighteenth Century: An Outline of the Beginnings of the Modern Factory System in England*. New York: Macmillan.

Maynard, Andrew D. 2015. "Navigating the Fourth Industrial Revolution." *Nature Nanotechnology* 10(12): 1005-1006.

Mokyr, Joel. 1998. "The Second Industrial Revolution, 1870-1914." *In Storia dell'economia Mondiale*, edited by V. Castronono, 219–45. Rome: Laterza.

Mosley, Layna, and Saika Uno. 2007. "Racing to the Bottom or Climbing to the Top? Economic Globalization and Collective Labor Rights." *Comparative Political Studies* 40(8): 923-948.

Nardinelli, Clark. 1980. "Child Labor and the Factory Acts." *The Journal of Economic History* 40(4): 739-755.

Nedelkoska, Ljubica and Glenda Quintini. 2018. Automation, Skills Use and Training. *In OECD Social, Employment and Migration Working Papers*. Directorate for Employment, Labour and Social Affairs Committee, OECD. https://www.oecd-ilibrary.org/ employment/automation-skills-use-and-training_2e2f4eea-en

Nolan, J. 2005. "The United Nations' Compact with Business: Hindering or Helping the Protection of Human Rights?" *The University of Queensland Law Journal* 24(2): 445-466.

O'Brien, Claire Methven, Amol Mehra, Sara Blackwell, and Cathrine Bloch Poulsen. 2016. "National Action Plans: Current Status and Future Prospects for a New Business and Human Rights Governance Tool." *Business and Human Rights Journal* 1(1): 117-126.

Oh, Ho-Young. 2018. "The Fourth Industrial Revolution and Job Crisis in the Korean Economy." *The Korean Economic Review* 11(2): 93-115.

O'Rourke, Kevin Hjortshøj, Ahmed S. Rahman, and Alan M. Taylor. 2013. "Luddites, the Industrial Revolution, and the Demographic Transition." *Journal of Economic Growth* 18(4): 373-409.

UN OHCHR (The Office of the High Commissioner for Human Rights (The United Nations)) "State National Action Plans on Business and Human Rights." Accessed August 3, 2020. https://www.ohchr.org/EN/Issues/Business/Pages/NationalActionPlans.aspx

United States, Executive Office of the President. 2016. "Artificial Intelligence, Automation and the Economy." Assessed February 10, 2019 https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF.

Peters, Michael A. 2017. "Technological Unemployment: Educating for the Fourth Industrial Revolution." *Educational Philosophy and Theory*, 49(1): 1-6,

DOI:10.1080/00131857.2016. 1177412.
Pinchbeck, Ivy. 1969. *Women Workers and the Industrial Revolution 1750-1850*. London: Frank Cass and Co.
Ranisch, R., and Sorgner, S. L. eds. 2014. *Post- and Transhumanism: An Introduction*. Frankfurt am Main: Peter Lang.
Rodgers, Gerry, Eddy Lee, Lee Swepston, and Jasmien Van Daele. 2009. *The International Labour Organization and the Quest for Social Justice, 1919-2009*. Geneva: ILO.
Sahlins, Marshall David. 1972. *Stone Age Economics*. Chicago: Aldine-Atherton.
Schwab, Klaus. 2016a. *The Fourth Industrial Revolution*. Geneva, Switzerland: World Economic Forum.
Schwab, Klaus. 2016b. "The Fourth Industrial Revolution: What It Means and How to Respond." Accessed March 11, 2018. https://www.weforum.org/agenda/2016/01/ the-fourth-industrial-revolution-what-it-means-and-how-to-respond.
Schwab, Klaus, Nicholas Davis, and Satya Nadella. 2018. *Shaping the Fourth Industrial Revolution*. New York: Currency.
William Senior, Nassau. 1837. *Letters on the Factory Act, as It Affects the Cotton Manufacture*. London: B. Fellowes.
Shard, Diana. 1974. "The Neolithic revolution: an analogical overview." *Journal of Social History* 7(2): 165-170.
Smit, Jan, Stephan Kreutzer, Carolin Moeller, and Malin Carlberg. 2016. *Industry 4.0. - Study for the ITRE Committee*. Brussels: Directorate General for International Policies, Policy Department A: Economic and Scientific Policy, European Parliament. https://www.europarl. europa.eu/RegData/etudes/STUD/2016/570007/IPOL_ STU(2016)570007_EN.pdf
Smith, Rebecca, and Sarah Leberstein. 2015. *Rights on Demand: Ensuring Workplace Standards and Worker Security in the On-Demand Economy*. Washington: National Employment Law Project (NELP).
Stearns, Peter N. 2007. *The Industrial Revolution in World History, 3rd ed*. New York: Westview Press.
Taylor, Frederick Winslow. 1919. *The Principles of Scientific Management*. New York: HarperCollins..
Wettstein, Florian and Sandra Waddock. 2005. "Voluntary or Mandatory: That Is (Not) the Question: Linking Corporate Citizenship to Human Rights Obligations for Business." *Zeitschrift für Wirtschafts-und Unternehmensethik* 6(3): 304-320.
World Economic Forum. 2016. "World Economic Forum Annual Meeting 2016: Mastering the Fourth Industrial Revolution." Accessed May 14, 2018. http://www3.weforum. org/docs/ WEF_AM16_Report.pdf.

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