

Technologies of Control

The Construction of the Modern Worker

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Abstract

Technology has an effect on how people live, and how they work. By looking at workplace contestation processes, and the power asymmetries in these, this thesis seeks to answer how technology has constructed the modern worker by imposing docility and reducing avenues for resistance. It is argued, by drawing on empirical examples and a wide selection of academic literature, that technology has been used to create a social discourse benefitting a small group of decision makers. These efforts are traced back to the first part of the 20th century, where Taylorist labor processes, the division of labor, and surveillance in the workplace initiated a process of worker subjugation. Technology, in conjunction with political, economic and cultural resources, was used to create a disorganised and deunionised workforce in the 21st century, one that is unable to meaningfully participate in contestational processes. The consequences of this render the lives of workers increasingly precarious.

Keywords: Technology, Taylorism, power, classes, social construction

Ellinors vise

Ka e det som æ drømme om
at æ en dag ska våkne opp å vite,
at arbeidet æ leve med,
e mykje mykje meir enn det å slite.

Æ drømme om å være fri
i lag med alle folkan som æ like.
Æ drømme om ei anna tid
da ingen folk e fattige og rike.

Æ drømme om at alle dæm
som trekke garnan langt der utpå sjen
skal få ei bedre tid i lag med dæm
som jobbe skift på en fabrikk i byen.

Og dæm som har en liten gård,
nån kyr og ei gjeld dem ikkje klare.
Æ drømme at dæm får en vår
dæm bruke te nå' meir enn det å spare.

Æ drømme at vi får en vår
da undertrøkkinga å jorda stanse.
Ei ny tid kommer sjøl om fjellan står,
og det bli like fint å jobbe som å danse.

by Klaus Hagerup

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1. Introduction

Work permeates our lives. It is the primary reason we attend school, and later the reason for higher education. Only through work do we obtain the means to live. After having dedicated on average an approximate 8 hours a day, for 230 days a year, for the better part of our lives, those who are fortunate receive pensions based on how much we have worked, and how much we have earned. Work is both a social contribution to society as a whole, a way in which we fulfill ourselves, and how we are judged. Work has become a naturalised reality in life. We rarely question it, neither its quantity nor its quality.

The focus of this thesis is on work, mainly from a Western perspective. Work is an important subject for the social sciences, but has received relatively little attention from science and technology studies (STS). The workplace is, as Weeks (2011, p.2) points out, a central area in which people meet politics — it is a space of hierarchical organisational structures, promoting domination and subordination, and a place where important decisions are made as to how energies are being used, and what is produced. Instead of looking at for example processes of innovation, or how innovation and technological development are undertaken, this thesis elucidates how technology and power construct workers. The central thesis is twofold: first, those located closer to decision making processes have managed to accumulate power over a prolonged period of time by using technology in their own self-interest. Second, workers have become subservient subjects through the use of strategically developed technology. This subjugation of workers can be attributed to the establishment of the division of labor, technological machines to facilitate the division of labor, as well as surveillance techniques. By viewing these developments concurrently with power structures I unravel how workers are constructed. This culminates with the research question: *How does technology construct the modern worker?*

The term “the modern worker” seeks to encompass two main attributes. First and foremost is docility and an aversion to resistance. It describes individuals who have accepted the discourse that work is natural, good, necessary, and not to be discussed. It is represented by the conformed masses of workers across the globe. The second attribute is that of precarity, underemployment and unemployment. It concerns the growing number of people who are partially or wholly excluded from the work society. These modern workers are rendered increasingly powerless, and as such are unable to resist change in the labor market.

I explore the construction of the modern worker mainly from a Western perspective. However, the developments in the West have also influenced the rest of the world, and as such one could argue that the thesis refers to global implications. To illuminate the effect of technology on the construction of workers I draw on a wide selection of academic literature, mainly within the fields of STS, international political economy and foreign policy analysis. These sources also provide a considerable amount of empirical examples.

The thesis uses a modified version of a theoretical framework called the Social Construction of Technology (SCOT), which is explained in detail in section 2. By adding issues of power asymmetries to SCOT I am able to give a clearer perspective to how technologies are adopted, while still factoring in cultural, economic and political power, as well as technological legacies. Doing so, however, makes the analysis appear to move towards technological determinism. I contend that it should instead be viewed as soft power determinism. Section 3 provides a thorough background for the analysis in section 4, by examining the developments of work in the first half of the 20th century. First I provide a historical background by explaining the social construction of work with the help of Weber's (2005) book *The Protestant Ethic and the Spirit of Capitalism*. Second, I move to Taylorist mass production, and at how the division of labor and use of surveillance techniques started a process of subjugating workers. Tensions between workers and managers were high between the 1930's and the 1950's, and labor unions played a role in equalising power. They have, however, seen their power and importance diminish in later years. The section culminates in an outline of the political-economic structure of the first half of the 20th century. Section 4 brings the discussion to the 21st century. It starts by describing the power of different classes to give a clearer perspective of the power asymmetries in question, before moving on to the modern division of labor. I contend that workers are experiencing difficulties in two interrelated areas; the polarisation of the labor market, and the increasing avenues for automation. Lastly I show how the use of surveillance technology limits resistance possibilities because of the creation of a culture of self-discipline. I conclude, in section 5, that while technology have been instrumental in constructing the modern worker, the instrument is wielded by a powerful group of elites.

2. The Social Construction of Technology

Science and technology studies is a multidisciplinary field concerned with how social, cultural and political aspects affects the development, design and implementation of technology, as well as our understanding of science, and vice versa. As such it is uniquely located to illuminate how technology constructs the modern worker, because of its intrinsic understanding of technological questions, and ability to employ theories and terminology from other fields of inquiry. Understanding technology is important because the technologies we adopt “influence how people are going to work, communicate, travel, consume, and so forth over a very long time” (Winner, 1980, p.127). STS has introduced multiple theoretical approaches, and in this thesis I will adopt a theoretical framework presented by Pinch and Bijker (1984) called the Social Construction of Technology, or SCOT. As will be evident, however, I still take inspiration from alternative theoretical approaches within the field of STS, mainly technological determinism, as seen fit. Furthermore the thesis is bolstered by the use of Marxist analysis, and consequently includes an analysis of power asymmetries not often used in conjunction with SCOT.

The main proposition of SCOT is that the development of technological artefacts is the result of open contestation between different actor-groups. SCOT importantly asks why some innovations have been adopted, while others have not. The argument claims that we should understand the adoption of technologies as a result of social construction, in contrast to technological determinism, which I will elaborate on shortly. In SCOT, actor-groups define how a technology advantages or poses problems for them, and through a cooperative design process find a solution which is accepted by all the relevant social groups. This component of SCOT is called interpretive flexibility, and speaks of the many different outcomes a technology can have, depending the social circumstances (Klein and Kleinman, 2002, p.29). In Pinch and Bijker (1984) they use the bicycle as an example of this. The bicycle had many different designs, from the wobbly Penny-Farthing, the whimsical Lawson’s bicyclette, to designs more similar to modern bikes. These bikes posed different problems for different actor-groups. Some liked the unsafe Penny-Farthing, as it underpinned a feeling of masculinity, others preferred safety, or speed. But only through continued contestation and redesign was it possible to find a variant of the technological artefact that was accepted by all the relevant social groups. The definition of what is a relevant social

groups is as straightforward as it can be — “The term is used to denote institutions and organizations (such as the military or some specific industrial company), as well as organized or unorganized groups of individuals” (Pinch and Bijker, 1984, p.414). In the case of the bicycle it included the designers, the producers, different types of users such as women, old people, athletes and non-users, as well as marketing people, to mention a few.

After a certain technological artefact has achieved a design that is satisfactory for most groups it has arrived at a process of closure and stabilisation. Pinch and Bijker (1984) suggest two main ways in which this happens; the first is by rhetorical closure, in which it is declared that there are no further problems by the relevant social groups. This means the design is generally accepted as good enough. The second type of closure is closure by redefinition, which happens “when unresolved problems are redefined so that they no longer pose problems to social groups” (Klein and Kleinman, 2002, p.30). The introduction of the air tyre on the bicycle is a good example of this. It was initially ridiculed by racing enthusiasts for being aesthetically displeasing, but when it demonstrated the high speed it was capable of achieving the sports enthusiasts quickly changed their minds (Pinch and Bijker, 1984, p. 427-428). When these aspects have been identified, Pinch and Bijker (1984) suggest that it will pave the way to understand how technology affects the society — in a wider context — around it. It should be noted, however, that technological artefacts rarely stop evolving. Contestation processes continue, as new ideas and aesthetic ideals develop, or improved solutions are found.

There is a weakness with the SCOT approach, however; the lack of concern for how asymmetrical power differences affect the design process, which is something I will deal with in this thesis. If “SCOT assumes that groups are equal”, as claimed by Klein and Kleinman (2002, p.30), then development and implementation of technological artefacts happen in a vacuum not affected by differences in cultural and economic resources, political power, insight into design processes, as well as ability to vocalise concerns and opposition. This premise cannot be accepted as true, and goes contrary to the idea of social constructivism. We must position contestation within the framework society has laid out. This means that some groups are more relevant than others. Klein and Kleinman (2002) struggle with this element of SCOT as well, and suggest the addition of historically established structures to the approach. They define structures as

specific formal and informal, explicit and implicit “rules of play,” which establish distinctive resource distributions, capacities, and incapacities and define specific constraints and opportunities for actors depending on their structural location. Power and its operation are then understood within this structural context. The rules of play that define structures give certain actors advantages over others by endowing them with valued resources or indeed by serving as resources themselves. (Klein and Kleinman, 2002, p. 35)

By not accounting for power asymmetries deriving from historically established structures the SCOT approach is on the cusp of falling down an analytical abyss similar to that of technological determinism. Technological determinism, as Wyatt (2008, p.168) explains it, is not only the notion that “technological change causes or determines social change”, but also that technological development is endogenous to cultural or political influences. The first assumption must be wrong, because it would render society and all its members powerless in the face of technological development. The proposition gives technology the omnipotent power of a god. The second assumption inhabits the same analytical vacuum as the unmodified SCOT approach.

I contend that neither of these are true, and propose we should see technological development and implementation as a continuous, interlacing relationship between the social and the technical. As with the chicken and the egg there is no clear demarcation as to what came first. It is an iterative process of pushing and pulling; of concurrently affecting each other. This echoes Hughes’ (1987, p.51) point of views about technology being “socially constructed and society shaping”. In a classification of technological determinism Wyatt (2008, p.174) places Hughes in a category of “soft determinism”. Wyatt further elaborates by explaining that Hughes’ position is that social constructivism can explain how a technology initially becomes accepted, but that technology can itself become a powerful force for further development. This moves the argument towards technological determinism. Preceding technology does naturally affect expected developments and new technologies; as Newton said “if I have seen further, it is by standing on the shoulders of giants”, or on top of machines in this case. However, I disagree with Hughes’ crux that technology can itself become a central agent for change, and would instead suggest that it is the political power of the actor-groups that use the technology for their own good, to the detriment of others.

Noble (2011) argues that the development of technology is subject to the social pressures put on both the designers and inventors of technology, as well as the adopters and implementers of technology. Actors are influenced “by the currents of the larger society around them and by their particular place in it” (Noble, 2011, p.43). Self-interest, be it in a communal or an individual sense have a factor to play in the development and adoption of technology. We can consequently say that technology is therefore affected by the social world around it. Furthermore, because there are certain people who are closer to the design and implementation of technology they are also more closely located to the source of power.

While Wyatt (2008) alleges that Marx have been understood as a technological determinist, his analysis focuses on the structural constraints in which activities occur. Technology is indeed an important part of this, as I will show throughout this text, but the essence of Marx’s arguments is about power. Technology must be understood as emerging out from the structural constraints, embedded with issues of culture and politics and economics. It undergoes a contestational process between actor-groups until it reaches a closure. But after having reached a point of closure, the continued adaptation of technology is increasingly in the power of those with power. This is reflected In *the Communist Manifesto*, where Marx and Engels (2010) writes that the “bourgeoisie cannot exist without constantly revolutionising the instruments of production, and thereby the relations of production, and with them the whole relations of society”. This quote succinctly summarises the development of technology, shows how vital power structures are, shows the interconnectedness of technology and society, and emphasises how control is maintained.

In other words, this thesis deals with technology as a social construction, but the inclusion of power structures moves the analysis slightly towards soft determinism. However, the determinant in question is not technology itself, but rather political, economic and cultural power.

3. Work in the 20th century

Work, as with technology, is a social construction. The way in which we think about work, perform our work, the importance we place on work, are all contingent on social, cultural, economic and political development. Our relationship with work have changed over decades. Slavery has for the most part been abolished across the world. Feudalism, and its outdated

practices of land holding have disappeared. Speaking of the siesta will elicit groans of disapproval from Western and Northern Europeans. We are no longer self-reliant to farm our wheat, butcher our animals, or churn our butter, but have the pleasure of choosing our wares from well stocked supermarkets.

These are important changes, and critical to understand when discussing work and workers. This section will provide a historical framework to understand the social construction of work in the 20th century. First, I explain how the Protestant Reformation affected the view work in Western and Northern Europe. There is a clear paradigm shift between more traditional economies to capitalist economies in the importance that was placed on work, which is shown in Weber's (2005) studies. Second I will illustrate how the division of labor under the Taylorist labor process transformed our relation to work, and our wages. Technology plays a vital role in this transformation process, and I contend that the adoption of certain types of technology have been a strategic effort to obtain, and maintain, control over workers. I lastly position this in a larger political-economic structure to explain how these changes have become widely accepted.

3.1 The Protestant Ethic

The work done by Weber (2005) in the seminal book *The Protestant Ethic and the Spirit of Capitalism* is located in the intersection of the sociology of economics and the sociology of religion. In it he claims that the Protestant Reformation contributed to the creation of modern capitalism in Western Europe and the United States. Much of the analysis is centered around people's perception of work in a rationalised capitalist system. The study is, according to Weber, "a contribution to the understanding of the manner in which ideas become effective forces in history (in Giddens, 2005, p. xviii). Weber identifies how cultural factors, in this case religion, contributes to constructing a social discourse which affects the way in which we act and think about the world.

It should be noted that Weber by no means claim that Protestantism is the only factor in the creation of capitalism, and even shows how there have been instances of capitalism in other societies, a long time before it became the dominant economic doctrine in the West. However, Protestantism assisted in cementing capitalism in the West by creating a disciplined labor force (Giddens, 2005, p. xi). Much of this is due to what Weber identifies as

the Protestant “calling”. Weber (2005, p.40) explains that with the advent of Protestantism “one thing was unquestionably new: the valuation of the fulfilment of duty in worldly affairs as the highest form which the moral activity of the individual could assume. This it was which inevitably gave every-day worldly activity a religious significance”. Adherence to religious traditions were no longer just a simple act of paying penance and attending church, as it has traditionally been in Catholicism, but required economic participation, frugality and increasing one’s own capital. The Reformation, Weber writes,

meant not the elimination of the Church’s control over everyday life, but rather the substitution of a new form of control for the previous one. It meant the repudiation of a control which was very lax, at that time scarcely perceptible in practice, and hardly more than formal, in favour of a regulation of the whole of conduct which, penetrating to all departments of private and public life, was infinitely burdensome and earnestly enforced” (Weber, 2005, p.5).

In this new Protestant discourse the “only way of living acceptably to God was not to surpass worldly morality in monastic asceticism, but solely through the fulfilment of the obligations imposed upon the individual by his position in the world” (Weber, 2005, p.40). Work became an imperative in order to live virtuously in the eyes of God.

The Protestant “calling” eventually transcended religious practice, and became a cultural norm, a social order — an idea that became an effective force in itself. The continued accumulation of wealth was “thought of so purely as an end in itself” (Weber, 2005, p.18) that it replaced the notion that people work in order to live and enjoy life, with the notion that people live in order to work. This discourse went contrary to earlier, more traditional discourses on labor which often focused on self-sustainability or working just enough to enjoy life. The end result of this change in discourses was that over time wage labor has become accepted “as the only free, normal, healthy, productive and salutary form of labour” (Trotsky, 1920). This creation of a new social and cultural order where wage labour has become naturalised is “the product of a long and arduous process of education” (Weber 2005, p.26). What Weber describes is according to Weeks (2011, p.40) the “primitive construction of capitalist subjectivities”. It lays the groundwork for modern wage-labor relation in a capitalist system, which is also translated into a system of subordination and domination.

In a capitalist wage-labor system subordination and domination are necessities. In *Capital* Marx (1887, p.119-121) provides us with a parable to explain the relationship between capitalists and workers. The capitalist owns the means of production, while the worker owns the labor power. Both possess a commodity desired by the other. When the worker rents out his or her commodity to the capitalist, the worker is no longer in control of how that commodity is used, or what is produced. Employment automatically creates a hierarchy, in which obedience and domination is required and “the right of the employer to direct his or her employees that is granted by the contract, is not so much a byproduct of exploitation as its very precondition” (Weeks, 2011, p.21). According to Weber’s study in *The Protestant Ethic and the Spirit of Capitalism*, workers were culturally indoctrinated for consensual compliance to this system of subordination and domination through their religion — an abstract mode of domination. This “new discourse of work”, Weeks (2011, 54) writes, “is a disciplinary mechanism that constructs subjects as productive individuals”, and the wage-labor relation does not only “produce economic goods and services”, but also “disciplined individuals, governable subjects, worthy citizens, and respectable family members” (Weeks, 2011, p.8).

I will return to the subject of domination, and what Foucault (1995) calls the creation of docile bodies. At this point, however, it is important to take two lessons from Weber’s study. First, ideas have profound effects on society, in ways that can be hard to discern. While this dissertation do not focus on cultural ideas and ideologies, this lesson continue to be fruitful when looking at how technology affects society — and adheres to the assumptions of SCOT. Second, there is no such thing as a natural order of things, instead we must think of social orders as the result of the contestation between different discourses. These discourses are informed by events in the real world, such as the Reformation, or new technological breakthroughs, as well as class struggles. This is in line with Klein and Kleinman’s (2002) modified version of SCOT. Weber’s study show how work such as it is defined by us today is a social construct, and corollary that it is possible to change. It also means that the introduction of technology can assist a discourse in cementing itself, as I show in the section below.

3.2 Taylorist mass production

By explaining how the Protestant ethic contributed to changing people's perspective of work I have also illustrated how important different discourses are in shaping the world. I will continue to explore the historical foundation on which we base our perspective of work by looking at the emergence of the scientific management of production, also known as Taylorism. While Taylorism is only one type of scientific management of production, I will use this term because of its prevalence in labor literature. This labor process has had profound effects on the political power of workers through reorganising how work is done — the adoption of technologies changed the worker's relation to their work. We can identify two main influences of Taylorism. First, the organisation of physical space, either through the introduction of machines or by establishing new production principles. Second, the organisation of governance over workers, through the use of surveillance techniques. These two factors explain how workers' political power have changed over time, and are crucial to the analysis of the construction of the modern worker, and will be discussed in the two subsections 3.2.1 and 3.2.2.

However, Taylorism can only explain power struggles within the workplace. To understand why Taylorist labor processes became accepted as the discursive norm I will tie in what Rifkin (1995) calls the “gospel of consumerism”, as well as the Fordist regime. These are political-economic structures that are important to include in order to gain a full insight into the power relations of different actor-groups in the contestation of technological artefacts. These three interconnected cultural and technical phenomenon appeared in the late 19th century and the first half of the 20th century, and have shaped the way in which we work, perceive work, and why we work in the present day. Jessop (2013) explains that Fordism is often used as an umbrella term, and that it encompasses multiple connotations that can be broken into smaller pieces. We should therefore be careful in using the term. For example, some definitions of Fordism explain how it is a type of capitalist labor process, which is perhaps better explained by Taylorism. Other definitions explain that Fordism is “a macro-economic regime sustaining expanded reproduction (...) based on mass production and mass consumption” (Jessop, 2013). This impinges on the definition of the gospel of consumerism, which was a widespread effort to increase consumption and manage workers' relationship to their wage. I propose instead that Fordism should be understood as the

amalgamation of the Taylorism and the gospel of consumerism, amongst other things. It is a mode of economic regulation which upholds an accumulation regime created by the gospel of consumerism, and promotes Taylorist labor processes. These phenomena are important and interconnected parts of the Fordist regime, yet it is important to draw distinctions between them. I will return to Fordism and the gospel of consumerism, which should be viewed as the political-economic structure in which technological change occur, in section 3.3.

With the introduction of advanced machinery and the invention of the assembly line there was a need for scientific understanding of how to produce efficiently. New technology allowed production to no longer be in the hands of skilled artisan laborers, working in small scale production, but instead use workers as just “another input into the production process, no less subject to the logic of economy and the discretionary powers of management than any other input” (Rupert, 1990, p.442). Introduction of new technology required a reorganisation of both the location of machinery, and the organisation of work (Mokyr, 1992; Lam, 2006). Taylorist mass production provided a labor process which reduced unnecessary and unproductive actions made by workers, reduced wasteful spending on resources, and recommended widespread standardisation of both tasks and goods produced (Jessop, 2013). In Kanigel’s (1997, p.1) words the Taylorism is the “application of scientific methods to the problem of obtaining maximum efficiency”, and an extension of Adam Smith’s division of labour. It was based on breaking work into different tasks, and looking at improving each component of the whole, as well as labor slowdowns (Maier, 1970). It did also require constant observation and monitoring of workers by their managers, in order to ensure they did the right tasks, in the right order, and in the right time frame. Taylorism, and subsequent scientific management alternatives, have been credited for a large increase in productivity, and although it was initially an American experience, it was quickly adopted in one form or another in other industrialised countries too (Kanigel, 1997; Maier, 1970).

This section looks at two of the most important outcomes of introducing Taylorist labor processes to workplaces, connected to the division of labor. On the one hand we can identify a direct effect on workers through the ordering of space and introduction of machines. I will show how careful planning and implementation of automation reduced the political power of workers, to the benefit of decisionmakers. Doing so also strengthened the power of business groups in contestation over which technologies should be implemented, and how they should be designed. Consequently it created and maintained a power structure

of domination and subordination. The second issue I deal with is the surveillance of workers, and how this affects their behaviour. I turn to Foucault to explain that through surveillance in the workplace it is possible to create a culture of self-discipline. The outcome of such a culture is docility, and reduced power to contest technological artefacts.

3.2.1. The division of labor and machinery

Both Karl Marx and Adam Smith have warned about the potential consequences of the division of labor, and their arguments are seemingly prophetic; they were made before the advent of Taylorist labor processes, but are still more than relevant. Smith, while generally seen as a proponent of the division of labor, worried about the effects on workers “confined to a few very simple operations, frequently to one or two” (Smith, 2007, p. 602). Smith continues to explain that limiting human activities in this way will also limit their capacity to think and solve new problems, and with some harsh words posit that workers will generally become

“as stupid and ignorant as it is possible for a human creature to become. The torpor of his mind renders him not only incapable of relishing or bearing a part in any rational conversation, but of conceiving any generous, noble or tender sentiment, and consequently of forming any just judgement concerning many even of the ordinary duties of private life...The uniformity of his stationary life naturally corrupts the courage of his mind... It corrupts even the activity of his body, and renders him incapable of exerting his strength with vigour and perseverance in any other employment than that to which he has been bred. His dexterity at his own particular trade seems, in this manner, to be acquired at the expense of his intellectual, social and martial virtues. But in every improved and civilised society this is the state into which the labouring poor, that is, the great body of the people must necessarily fall, unless government takes some pains to prevent it.“ (Smith, 2007, p.603)

Smith’s sentiment communicates an understanding that although the gains in productive efficiency caused by the division of labor is great, it has negative consequences for the people who are incorporated into “the machine”. What Smith describes in the paragraph above is a society in which menial work have been made necessary, and how that type of work in turn contributes to constructing the working class. The working class consists of people who

Smith sees as less politically apt, because they are not presented with the ability to exercise political decisionmaking in their workplace.

Smith's ideas reflect much of Marx's theory about the alienation of workers. The division of labor was beneficial to the manager and the capitalist as it removed the workers from having an overview of the production, and knowing how to produce the whole product, instead of just parts of it. This gave managers control of the product, and made the workers as interchangeable as the gears in the machines (Marx, 2005, p.182-183). Through organisational restructuring in the workplace by implementing new labor processes based on the division of labor, as well as new machines, workers were "no longer the masters of their tools, products or productive relationships" (Winner, 1978, p.38-39). Organisational changes such as these have been used to maintain domination over workers, and Noble (2011) and MacKenzie (1996) go so far as to argue that obtaining and maintaining domination over workers have always been the primary goal of capitalist production systems. By introducing new manufacturing technologies, the labor force underwent a process of "deskilling", where the new machinery substituted the skills of trained workers. "Work that had previously been performed by artisans was now decomposed into smaller, highly specialised, sequences, requiring less skill, but more workers, to perform", Frey and Osborne (2013, p.8) writes.

Taylorist labor processes were not met by workers with much sympathy. Noble (2011) recounts the labor movements resistance against Taylorism in the US, which they saw as exerting too much control over their work. During the Second World War union membership rose "from nine to fifteen million", and labor unions "had developed considerable political muscle" (Noble, 2011, p.21-22). Their main grievances were wages and job security, but the unions also identified deskilling and downgrading of jobs as important issues to contend over. In many cases the labor unions prevailed during this time, possibly due to the aforementioned immense political power they had managed to garner. "[B]etween 1945 and 1955, there were over forty-three thousand strikes, idling some twenty-seven million workers" (Noble, 2011, p.25). However, the "Red Scare" in the US would eventually play a hand in dismantling the labor unions. The "Red Scare", also known as McCarthyism, was the fear of communist influence on American society. Since the labor unions had in many cases socialist ties, they were placed under suspicion. In 1947 the Taft-Hartley Labor Act became law, and restricted the political power of labor unions, as well

as making it illegal for unions and union members to have communist affiliations. Furthermore, according to Noble, the law

outlawed closed shops and sympathy strikes, encouraged state right-to-work laws, permitted unfair labor practices suits against unions, and gave the President emergency powers to end strikes and impose an eighty-day "cooling-off period" of compulsory arbitration. The legislation hampered organizing efforts, and threatened labor activists and union leaders with fines, law suits, injunctions, indictments, and imprisonment. Predictably, the new law was characterized by labor leaders as the "slave labor act"; the [United Mine Worker's] John L. Lewis called it "the first ugly savage thrust of fascism in America." (Noble, 2011, p.28)

The law was sponsored by General Electric, Allis-Chalmers, Inland Steel, Chrysler and the National Association of Manufacturers. The power of the labor unions to affect which technologies were implemented, the wage of workers, to ensure job security and on production efficiency was slowly lost, to the satisfaction of business. Control was returned to the hands of the owners of capital.

The alienation and deskilling of workers is far from incidental. MacKenzie (1996) writes that the introduction of machines by capitalists have been strategical efforts to replace workers who have previously been invaluable to the production process with machines. With the fall of the labor unions this only intensified, spurred on by the adoption of automation and production machines that were easier to use. By introducing these increasingly advanced machines businesses were able to reduce the labor force employed, while simultaneously reducing "the margin of worker wages, discretion, judgment and power" (Noble, 2011, p.36). Not only were the number of workers reduced, but those who were employed were increasingly unskilled. In the two decades after the Second World War management saw increasing control over their labor force, while unions became mere shadows of their former self. Ricardo (1987, p.267) summarises these efforts well in *The Principles of Political Economy and Taxation*, when he writes that "the opinion entertained by the labouring class, that the employment of machinery is frequently detrimental to their interests, is not founded on prejudice and error, but is conformable to the correct principles of political economy"

The efforts outlined by Marx and Smith show how the division of labor not only remove workers from decision making, but how the “internal administrative elite whose perceptions and interest may diverge from the broader membership” (Klein and Kleinman, 2002, p.38) co-opts the contestation of technical design. Discourses are shaped by actor-groups made up by business owners to the detriment of worker actor-groups. A famous example of this comes from Winner’s (1980, p.124-125) influential article about the politics of artifacts. In it he explains that a manufacturing plant in Chicago purchased expensive machinery which produced a product of lower quality than the skilled workers at the plant. These new machines were manned by unskilled workers, which were easy to replace. The skilled workers who had been members of a labor union, on the other hand, lost their jobs, and their ability to affect the relation to their work. This investment by the business was made to ensure political power stayed with the owners of the business, and not with the workers. Here we see a clear example of how unmodified SCOT fails to explain the adoption of certain technologies. Two different groups disagreed as to the reasoning of the adoption, but one group forced their decision through to the disadvantage of another. There was neither a rhetorical closure, nor a closure by redefinition, but rather a closure by influence or power. Similar stories are common, and according to MacKenzie (1996, p.38) strikes have been an important reason for introduction of new machinery in businesses. Threats such as this make workers more compliant and docile in the long run because they are shown the price of exerting political power.

The political power which comes with the division of labor and consequently the introduction of machinery and organisation of the workplace has been identified by more than just capitalists. Maier (1970) presents a thorough discussion about how Taylorism was used or viewed by different political ideologies in the early 20th century, from fascists, communists and capitalists. Lenin was, for example, an admirer of how politically powerful the Taylorism was, and viewed it as paramount to create a temporary socialist dictatorship. Scott (1998, p.162-163) writes that in that “respect, Lenin joins many of his capitalist contemporaries in his enthusiasm for Fordist and Taylorist production technology”. There were no illusions as to how the working class were being constructed and directed towards consensual compliance in other words, from either side of the political spectrum.

As we can see, far from being politically neutral, technologies have political clout. Winner (1980) explains this by showing examples of how technology can either be designed

or arranged in order for a specific outcome to be achieved. These can be intentional or unintended decisions, but creates spaces in which certain activities are either limited or encouraged. Another way in which technology exerts political power is by being more compatible with certain types of power structures than others. The example Winner (1980) keeps returning to is the use of nuclear power. Without a centralised bureaucracy which can provide security, safety and efficient distribution of power, it is near impossible to even consider nuclear power as a viable energy source. Nuclear power needs an authoritarian power system. This stands in stark contrast to solar power, which can far more easily be disseminated to individuals. This is not to say that solar power has to be a democratic technology, it can still be centralised through a bureaucracy, but the way the technology is designed makes it easier to disseminate widely.

Mass production and the division of labor in the Taylorist labor process are both authoritarian in their own right. As discussed capitalism requires a culture of domination and subordination. Technologies that are more finely attuned to authoritarian power structures thus also benefits in a contestation process. This section has shown that “different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness (Winner, 1980, p.127). This is an aspect that is not represented in unmodified SCOT. We can see, however, that by adding power asymmetries to the analysis it gives us a clearer picture of how technology affects the society, in a wide context.

3.2.2. The power of surveillance, and how to foster docility

What I have shown so far is that the division of labor and introduction of certain types of machinery have immense and direct impact on workers' political power, and subsequently their contestational influence. Through deskilling and standardisation of tasks workers were made less politically affluent. However, it is equally important to mention the indirect, or hidden impact the division of labor can have on workers. An important aspect of the division of labor was, as I have mentioned earlier, monitoring and observation of workers. I will use the term surveillance, as it allows my analysis to continue into the 21st century. To explain how surveillance affects the power structures in the workplace I will first introduce Bentham's idea of the Panopticon, before leaning on Foucault's (1995) theory of governance and the creation of docile bodies. While Bentham's Panopticon and Foucault's creation of

docile bodies are in the strictest sense related to prison systems, they are equally valid when talking about the workplace.

The Panopticon was a model for a prison designed by Jeremy Bentham, based on the idea that the threat of constant surveillance would encourage prisoners to behave in a desired way. It was designed so that the prisoners, each having a separate cell in a circular building, were unable to communicate with each other, but all cells were observable from a watchpost located in the middle of the prison. The prisoner “is seen, but he does not see; he is the object of information, never a subject in communication” (Foucault, 1995, p.200). The guard — or sovereign — in the watchpost would be able to observe all the prisoners, but they would never know whether or not they were being observed. The power of the Panopticon comes from the fact that the prisoners assume they are being observed at all time, not that they are literally being observed; “power should be visible and unverifiable” (Foucault, 1995, p.201). Ansonge (2011, p. 75) writes that “the Panopticon represents a very neat blueprint and vision of an institutional order entirely organised around ocular surveillance”. Actions deviating from what the sovereign saw fit would ensure disciplinary actions. By learning that deviant actions corollary lead to disciplinary actions, prisoners would adopt self-discipline to reduce this risk. Ansonge (2011, p.67) asserts that the Panopticon is a “power relation characterised by self-discipline in light of the constant possibility of surveillance”. Continued and sustained self-discipline would in turn cement itself as a social order for how to act.

Foucault (1995) used the Panopticon to explain how physical design could be used to increase political power of the designers through a “stubborn policy of repression, education and organisation” (to borrow a quote from Trotsky [1920]), in much the same way Weber explained how the Reformation lead to a change in discourses pertaining to work. Arguing that there are similarities between the Panopticon and the Taylorist workplaces requires little imagination. As Kanigel (1997) writes about Taylorism, it was based on the constant observation of workers and their tasks, and how to improve them. Managers, efficiency experts and economists entered what had previously been the arena of low skilled manual workers, to oversee their every move. “Through Taylor’s scientific management approach, workers were under constant surveillance by a manager with a stopwatch — not just measuring, but also judging, prying and intruding” (Sprague, 2007, p. 1). This equals the gaze of the sovereign in the Panopticon. Through organising the workplace in a certain way,

workers are submitted to conditions where they are both disciplined, and must exert self-discipline.

When Foucault (1995) writes the creation of docile bodies his description is of striking similarity to improving the efficiency of a production line. The body could be understood as something that can be transformed and improved through docility, and by subjection to the needs of the sovereign. Through discipline, improvements in “movements, gestures, attitudes, rapidity” were possible, the virtuous result of them an increase in “the economy, the efficiency of movements” and the internal organization of the body (Foucault, 1995, p.137). Discipline was different than violent coercion, because it required a willing subject and an agreement as to what the goals of the discipline were, and the utility it increased. Again, Weber’s consensual compliance have a large role to play; discipline is underpinned by a social and political structure and cultural regimes. Furthermore, discipline did not only improve skills, but formed “a relation that in the mechanism itself makes it more obedient as it becomes more useful, and conversely” (Foucault, 1995, p.138). Foucault continues by explaining:

“Thus discipline produces subjected and practised bodies, ‘docile’ bodies. Discipline increases the forces of the body (in economic terms of utility) and diminishes these same forces (in political terms of obedience). In short, it dissociates power from the body; on the one hand, it turns it into an ‘aptitude’, a ‘capacity’, which it seeks to increase; on the other hand, it reverses the course of the energy, the power that might result from it, and turns it into a relation of strict subjection. If economic exploitation separates the force and the product of labour, let us say that disciplinary coercion establishes in the body the constricting link between an increased aptitude and an increased domination” (Foucault, 1995, p.138)

The way discipline is induced on the public is through what political scientists would call nation-building techniques: through schools, religious arenas, the military, the workplace and hospitals. Discipline is permeated through cultural regimes, and focal points for domination. The goals of these localities is, according to Foucault (1995, p.143), to curtail groups and concerted actions by groups, establish disconnected arenas for individuals, and then gather information on the individuals which can be analysed in order to better govern them. In the

workplace this means the creation of functional sites of observation and supervision; observing “the worker’s presence and application, and the quality of his work; compare workers with one another, to classify them according to skill and speed; to follow the successive stages of the production process” (Foucault, 1995, p.145). By doing so the sovereign not only enforce regulations and authority, but “exerts a moral influence over behaviour”, and starts treating “actions in terms of their results, introduces bodies into a machinery, forces into an economy” (Foucault, 1995, p.210)

The creation of discipline is the art of governing through analysis and supervision, regulating by demarcating localities in which certain activities can take place, and others can not. Discipline is the application of schedules and time management, a temporal control over activities. By removing distractions and socialisation in the workplace (for example) it is possible to shape — construct — people into governable objects, and define what it means to be a citizen, and how one must act to be a good citizen. The utopia of the disciplined society is that of a perfectly governable body of docile citizens, where every action is observed and scrutinized by that visible and unverifiable power structure of which every individual by necessity is part of. Surveillance is a technology designed to control.

One example of this, besides literal supervision in the workplace, came out of during the 1960’s in the US, when tensions with the Soviet Union was high. To reduce the likelihood of communist influences “over 25,000 private industrial firms had come under (...) Pentagon security regulations, specified in a Department of Defense manual on how to handle classified materials, check employees, supervise visitors, issue identification badges, and conduct surveillance” (Noble, 2011, p.29). This was part of the effort to further reduce the political power of the labor unions, and came as a concerted effort by both business and government to impose a type of morality on citizens and workers.

There are clear similarities between Weber and Foucault, in that discipline can be seen as “a regulation of the whole of conduct (...) earnestly enforced” (Weber, 2005, p.5). Discipline is also shaped and incorporated through “a long and arduous process of education”, as Weber (2005, p.26) claims the Protestant ethic was. Without giving due attention to discipline-making techniques and the construction of disciplined bodies it is all but impossible to explain the structural constraints under which we all toil. Klein and Kleinman’s (2002) modified SCOT approach, in other words, make the analysis of the social

construction of technology acutely attentive to Foucauldian disciplinary techniques, and even allows the incorporation of structural meanings to the adoption of technologies.

This section has shown that two essential elements in the Taylorist labor process have been integral in constructing the modern worker. On the one hand the division of labor, the introduction of new machinery and the organisation of workplaces have diminished the political power of workers in the first half of the 20th century. This has strengthened existing power structures between the worker and business owners, and increased social differences. On the other hand, surveillance has made it necessary for workers to exhibit self-disciplining behaviour. The fear of sanctions against unwanted conduct has constructed a culture of docile bodies, which continue to be reproduced. With this in consideration I believe it is clear that Taylorism can be said to be a first step in creating the modern worker. This historical recounting will continue to be relevant, since discourses are built on the discourses that came before them. However, economies have changed much in later years, and I will discuss how we can extrapolate the lessons from the beginning of the 20th century, and use them in examining work and power structures in the 21st century, in section 4. Before doing that, however, I need to address briefly why we work, why workers have accepted these discourses, and how docility has become legitimised.

3.3 The Fordist regime

While my review of Taylorism explains how technology and science have been used to increase productivity, reduce noncompliant behaviour and construct a certain type of worker, it fails to explain why workers have accepted these changes. In many cases the Taylorist labor process has been detrimental to the political power of workers. Kanigel (1997) and Maier (1970) claim that the First World War is paramount to understand why more efficient labor processes were adopted and accepted. However, this fails to explain why Taylorist labor processes continued to develop and be implemented after the First World War, and why it was widely accepted. By asking these questions, I am ultimately also asking why people work. This is something that needs to be addressed, but I will do so only briefly.

The Protestant ethic illuminates how work became central in our lives and that the wage relation has become naturalised. However, with increased mass production, capitalists found themselves unable to sell enough goods because demand for them was low. The

frugality that had been advocated in the Protestant ethic was “deeply ingrained”, according to Rifkin (1995, p.19-20), and did not allow mass production to continue at the pace the producers desired. In order for businesses to sell more there needed to be a considerable shift in culture; consumption needed to be viewed as a virtue, not a vice. Businesses quickly realised that what had been considered luxuries at one point had to be reshaped into necessities for the poorer classes (Rifkin, 1995, p.21). It was necessary to coordinate workers’ relation to their wages; the public needed to be re-educated to buy more. This is what Rifkin (1995) calls the gospel of consumerism.

This was done by a widespread marketing efforts to change the psyche of the public, by focusing on the feeling of being left behind, and a glorification of modernisation. Marketing and advertising became more important for businesses, and words such as “fashion”, “modern” and “old-fashioned” appeared in the market. Consumption promulgated different types of identity that were more or less desirable. Some goods were rebranded — Coca Cola went from being a medicine to being a soft drink —, while others went through extensive marketing campaigns in order to be desired all year around, such as maple sirup. “In less than a decade”, from the mid-1920’s, Rifkin (1995, p. 22) explains that “a nation of hardworking, frugal Americans were made over into a hedonist culture in search of ever-new avenues of instant gratification”. This discursive change cannot be said to simply be the result of direct indoctrination of the public by businesses, however. Oudshoorn and Pinch (2003) emphasise that human relations and identities were only partly delineated by businesses, and call attention to the fact that the public themselves were participating in defining what should be consumed, and gave symbolic meaning to consumption. The public was in other words relevant actors in a contestation process. The success of the gospel of consumption is due to a cooperation between businesses and the public, and although it facilitated the expansion of production, it also created a much needed space in which to exercise independence and shape identities. However, these identities and related actions were not allowed to sway too far from the leading discourse. I contend that this is partly be due to the creation of docile bodies, as argued by Foucault (1995). Klein and Kleinman (2002, p.41) also emphasise this when writing that “industry is generally likely to have greater influence in shaping an artifact than retail consumers because retail consumers are typically atomized and unorganized”. Consumers can be said to participate in a contestation process over which goods should be adopted, but due to their disorganised nature they play a less important role than businesses.

Again we see that certain social groups are more relevant than others, because they are more powerful.

The gospel of consumerism had immense economic consequences, and for some economists was taken as a proof that people are insatiable, and that there will always be wants in the market — supply creates demand. With this in mind it is easy to imagine that the economy will continue to grow eternally (c.f. Solow, 1956). The gospel of consumerism also made previously non-economic activities into avenues where the public could participate in the economy. “Consumption, rather than savings alone, emerged as an essential economic practice”, Weeks (2011, p.49) writes when summarising the changes that the gospel of consumerism brought with it, “nonwork time was recognized as an economically relevant time, time to create new reasons to work more”. Through advocating increased consumption businesses and a disorganised public cooperated in creating a social discourse in which the end result was an increased ability for businesses to govern the labor force’s use of their wages, and extract value from customers.

Due to the continuation of depressing wages and hiring fewer people to work as a result of increased automation in the early 20th century, much of the public lacked the funds required to meaningfully participate in the mass consumption advocated so strongly by the business community (Rifkin, 1995, p.24). In order for this system to work — and it didn’t during the Great Depression for example — there needed to be an understanding and a relationship between the gospel of consumerism and the Taylorist labor process. Jessop (2013) suggests that the Fordism regime played this role. Fordism can be understood as a social mode of economic regulation in which “an ensemble of norms, institutions, organizational forms, social networks and patterns of conduct” guide economic activity in a way which does not contradict itself (Jessop, 2013). This regime includes labor unions, competition between private businesses, the organisation of businesses, marketing, the nuclear family, the banking system, as well as interventions, regulations, and welfare from the state.

The Fordist regime had some interesting effects on workers the years following the Great Depression, which could partly explain why workers accepted new machinery. The Economic History Association (2016) estimates that the average number of hours worked decreased from approximately 60 hours in 1890, to 39.2 in 1988. The increased productivity meant fewer hours a week, at approximately the same wage levels, for more people. This

trend was negotiated with the assistance of the labor unions under the banner of “sharing the work” (Rifkin, 1995). At the same time, particularly after the Second World War, women entered the labor market in large numbers, increasing labor market participation immensely. States saw minimum wage legislation, and wage increases were increasingly indexed to productivity growth (Jessop, 2013). The discourse that had carefully started with the Protestant ethic, where people were increasingly reliant on wages to cover the necessities of life, had become so cemented that it was no longer any alternatives in much of the Western world. Accordingly, in “the twentieth century, all work that was not [waged] labour disappeared from economic and social analysis” (Standing, 2014a, p.964). These changes must be viewed as positive for workers, and is a good example of a closure by redefinition. The issues that arose in the workplace as a result of the introduction of new technology and new labor processes were alleviated by an increase in leisure time, as well as the possibility of exploration of personal identities.

While the subject of this dissertation is analysing how technology construct the modern worker, this is impossible to do without also introducing the idea of a compliant consumer. Without one, there cannot be the other, because they are inexorably tied together. The Janus face of the citizen consists of the compliant worker on the one hand, and the compliant consumer on the other. This is where Pinch and Bijker’s (1984) unmodified SCOT approach would fail to be able to explain why technological artefacts are implemented. With the introduction of historically established structures, discourses, and social orders, we can finally see the full picture. In summary, we see that the Protestant ethic naturalised the wage relation. Taylorism increased productivity, but reduced the contestational power of workers. The gospel of consumerism constructed a reason to work, by increasing consumption. Fordism, in turn, was the economic regime that held these pieces together, ensuring cohesion. These are non-negotiable “truths” which have been adopted by the public and naturalised. Weeks (2011) writes that any discourse trying to refute this social order are generally discarded as facetious and unserious. These are valuable insights for the analysis in section 4, as they form a historical backdrop on which I can explain post-Taylorist tendencies, and as such elucidate how compliance is constructed in workers.

4. Post-taylorism and the modern worker

The issues I have dealt with up until this point have outlined the historical creation of the wage relation and why we work. My claims are that through continued efforts business have managed to shape discourses to their own benefit. The reason is partly due to the co-option of the contestation process over which technological artefacts should be adopted. This in turn has further affected later contestation processes, and lead to a spiral in which workers have less and less political power.

The structure in which these events have taken place is important, as argued by Klein and Kleinman (2002), and far from static. The developments I have outlined all took place in the beginning of the 20th century. Taylorism and Fordism disseminated throughout much of the industrialised world nearly equally, with only small regional discrepancies. Using SCOT terminology we could argue that the relevant social groups in each different locality were generally in agreement as to the adoption of the system. This may partly have been affected by the economic, political and military hegemony of the US after the Second World War (Ikenberry, 2004; Rupert, 1990; Walter, 1993), if we are to believe Keohane (Keohane, 1984; Axelrod and Keohane, 1985) and other neo-liberal institutionalists. Hegemony has a standardising effect on societies. Those left outside the hegemony, such as the Soviet Union and China, followed their own sets of systems, as the relevant social groups dissented from the Western proposition. However, contestation over economic, political and social systems have continued. I will try to give a brief, fair summary of some of the main changes that have happened without going in too much detail.

After the Second World War the allied nations of the West created system for international financial and commercial dealing, called the Bretton Woods system. The Bretton Woods system was partly based on Keynesian economics, and promoted the welfare state, monetary management, flexible exchange rates and the pegging of currency to gold (Ruggie, 1982; Ravenhill, 2011). Whilst the Bretton Woods system have received some criticism, there is general agreement that it increased the standard of living in the West. Due to lacking and much needed reforms to the Bretton Woods system, to advance it to the later parts of the 20th century, U.S. President Richard Nixon decided to revert the convertibility of the US dollar to gold in 1971 (Ravenhill, 2011). This was by most accounts the final nail in the coffin for the system. The economic boom experienced during the time of the Bretton

Woods system ended with the oil crisis in 1973, and economic stagnation took its place. This can be said to have spurred the popularity of the neoliberal capitalist economic doctrine. Neoliberal capitalism promoted, as outlined by the Washington Consensus, strict fiscal policy discipline, tax reform, trade liberalisation, less state intervention and economic deregulation, amongst other things (Pech, Theodore and Brenner, 2012). Both the US and Europe have experienced deunionisation (Acemoglu and Aghion, 2001; Belman and Monaco, 2001) as a result of these changes, and corporations have increasingly employed workers on a temporary or part-time basis (Standing, 2014b). We could call this political-economic restructuring post-modern, or post-fordist.

Simultaneously production processes have also diversified. In Japan Toyotism has taken the place of Taylorism. This type of lean-manufacturing has emerged as one of the prevailing labor process theories, and have been adopted in everything from hospitals to schools, and manufacturing plants. Labor processes have also globalised, spreading the division of labor across multiple countries depending on their comparative advantages, such as lack of environmental regulation or low salaries. Now more than ever manual laborers are alienated from the end product they produce. The service industry has boomed (Frey and Osborne, 2013), as increased efficiency in the primary and secondary economies have produced surplus labor, creating new types of jobs that were never expected. Economic inequality has grown, alongside unemployment and underemployment (ILO, 2016). This is what I call the “post-taylorist society”. Post-taylorism is a term void of any meaningful definition. It simply suggests a time after Taylorism. It encompasses all of the changes outlined above, while not giving a clear indication as to where we are headed. This section will deal with the post-taylorist society, and how labor processes alongside the introduction of modern technology constructs the modern, compliant worker. A worker which is haunted by the ghosts of Weber, Ford and Taylor.

First I will elaborate on the issue of political power through the description of classes. I tie this in with SCOT terminology, to show how some actors are more powerful than others, and subsequently how they have more power to direct contestation processes over which technologies to adopt. Second, I will look at post-taylorist labor processes, and how vulnerable many workers are of automation efforts. Underemployment and underemployment leads an increasing number of people into precariousness, which only weakens their political position. Thirdly, I continue to look at the use of surveillance at the workplace, and how this

has been improved with information technology. This section is important in order to fully explain how relevant this issue is today for everyone, from factory worker to office worker. The avenues of resistance are slowly shrinking, leaving workers increasingly less relevant.

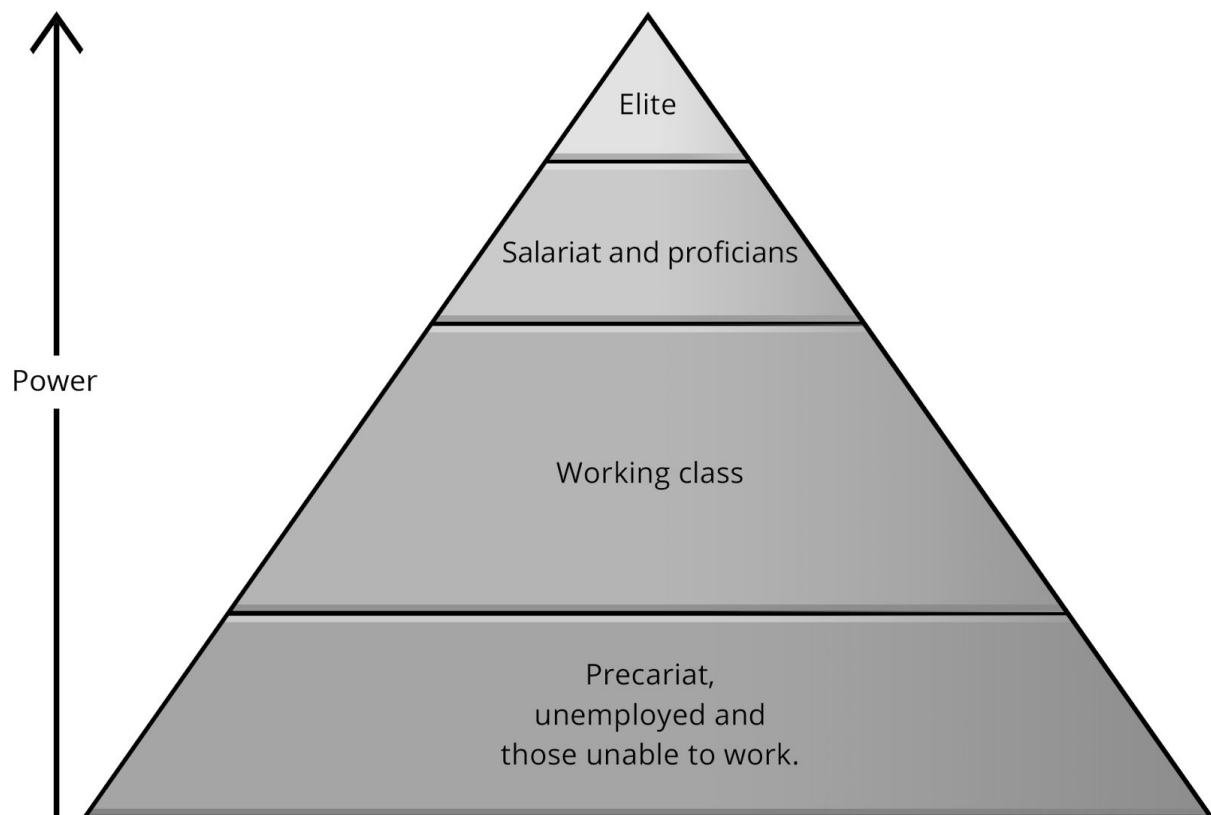
4.1 The political power of classes

We cannot assume that all social groups are equally relevant when discussing the adoption of technology, contrary to the claims of the early SCOT approach. Different groups have different resources, be they cultural, economic or political. This shapes the way in which consensus making is formed. To understand the powerplay in question it is necessary to explain the configuration of power between different actor-groups. One way of doing this is by viewing members of actor-groups as members of classes.

Standing (2014b, p. 12-13) argues that we can identify seven different groups of classes. At the top of the power pyramid (see figure 1, below) is the elite, a small number of very rich people that in later years have colloquially been known as “the 1 percent”. In all likelihood “the 0.1 percent” may be a better description of them. They are the members of Forbes’ list of billionaires, sporting such personalities as Bill Gates, Warren Buffet, the Koch brothers, the co-founders of Google, and the descendants of the founder of Walmart. With their vast fortunes they have access to the media, sometimes as part-owners, control huge lobbying machines, can financially support politicians, and can decide to support research and development projects that benefits themselves. Below the elite is the salariat, which grew during the Fordist era, based on Keynesian principles. They are in stable full-time jobs with pensions, paid holidays and benefits. They constitute the middle class, and are employed by “large corporations, government agencies and public administration, including the civil service” (Standing, 2014b, p.12). The salariat feel safe in the world of work, and maintains a privileged position of security, even though the membership of the salariat have been dwindling in later years (Autor, 2015). In company with the salariat we find a small group of proficians, a portmanteau of “professional” and “technician”. They lack the job security of the salariat, but have highly marketable skills, and find high paying jobs as consultants or independently. While their lives can exhibit traits of precariousness at times they are nonetheless safe due to their highly specialised skills. The traditional working class, for which the welfare state was created, are located below the salariat and the proficians. In the

West their numbers are dwindling, but they are still numerous in countries providing cheap manufacturing labor. Their wages are oftentimes determined by piece-rates or time-rates; effort-for-money epitomised. The labor movements of the Fordist regime were designed to defend the working class through collective bargaining. However, as I will discuss, deunionisation have left them more vulnerable than ever. Lastly, Standing (2014b) argues, the three groups we find on the bottom of the power pyramid is the precariat, the unemployed, and those unable or unwilling to work. I will not describe the two latter groups, as they are self-explanatory.

Figure 1: The pyramid of class power



The pyramid of class power gives a visual indication to the relative power of different classes, and the size of their membership.

The precariat is another portmanteau, consisting of “precarious” and “proletariat”. Standing (2014b) uses it to describe a class-in-the-making comprised of people with few securities. Its members have “minimal trust relationships with capital or the state” and “has none of the social contract relationships of the proletariat, whereby labour securities were provided in exchange for subordination and contingent loyalty” (Standing, 2014b, p.14). Some

identifying characteristics of the precariat is temporary jobs, and part-time jobs. In Japan alone “over a third of the labour force was in temporary jobs” (Standing, 2014b, p.25). This produces precarious incomes, often leading to difficulties planning ahead. It also increasingly means, because of strict regulation of unemployment and underemployment in many countries, that many do not have access to welfare services. To receive you must provide. While some, like the proficians, have chosen this route by their own volition, many more are forced into the precariat unwillingly. This is assisted by the creation of more part-time jobs, which have “helped conceal the extent of unemployment and underemployment”, writes Standing (2014b, p.26), before explaining that this is partly how some economies, such as the German, have maintained the illusion of high employment. The creation of the precariat can be linked to what Autor (2015) have dubbed the polarisation of the labor market. In both the US and the EU we see a decrease in workers employed in middle-income jobs. Between 1993 and 2010 Autor (2015, p.14) writes that “middle-wage occupations declined as a share of employment while both high-wage and low-wage occupations increased their shares of employment over this 17-year period”, in the EU. Standing (2014b, p.41) presume that at least a quarter of the adult population in many countries are in the precariat.

Simultaneously as the precariat is growing, deunionisation is affecting the working class, making collective bargaining harder. I have already discussed deunionisation after the Second World War in section 3.2.1, and this trend have continued. Acemoglu and Aghion (2001, p.229-230) find that in 1980 “24% of all private sector workers were unionized. By 1990... only 12% of private sector workers were unionized.” Equivalent numbers in the UK start at 54%, and drop to 38%. This steep drop in union membership happen at the same time as neo-liberal politics come into play in the West, and Acemoglu and Aghion (2001) points to both Thatcherism and Reaganomics as important factors for deunionisation, but also identify that the legal framework to diminish the power of unions, such as the Taft-Hartley Labor Act (Noble, 2011), were already in place before the election of Thatcher and Reagan. Deunionisation affects the political sway of the working class. Without centralisation and organisation it is hard to mobilise the political, economic and cultural resources available to the working class. This leave them vulnerable to the decision making of the elite.

However, Acemoglu and Aghion (2001) also explain that technology can have a large role in the deunionisation of workers, because of the polarisation of the labor market. Frey and Osborne (2013) explains that as routine tasks are increasingly being automated or

simplified, it is possible to delegate that type of work to high-skill employees, which are still required to complement technology with abstract and creative tasks. A job which previously took enough effort to finish to justify the hiring of a person, or a group of people, can now in many cases be done as a far less time consuming task. When this is the case it makes no sense to hire multiple lower-skilled workers, and the result is that a small group of workers have an increase in routine tasks they do assisted by technology, alongside their high-skill tasks (Autor, 2015). This is described as “skill-biased technical change”, which negatively affects workers willingness to join unions. Acemoglu and Aghion’s (2001) argument is that unions exist to provide a good to different workers by wage compression. Low-skilled workers gain by being in a union with high-skilled workers, as the high-skilled workers are invaluable for the production of goods and services. They have bargaining power. However, because high-skilled workers are not reliant on a union in order to obtain high incomes, they are likely to leave unions for their personal benefit. Without proper bargaining power it is unlikely that unions survive, the end result being that workers deunionise. In other words, the increasing difficulty of operating modern technology which requires high levels of skills also affect the survivability of unions. This in turn leaves workers increasingly vulnerable to undesired changes, since a defragmented labor force is less likely to organise effective opposition. Acemoglu and Aghion (2001) also argue that where unions are successful in resisting new technologies with a skill-bias, businesses may encounter large productivity gaps in comparison to deunionised businesses. If a business can not sustain high enough productivity, at low enough prices, it will fail to be competitive in the market place. In other words, if deunionisation is widespread it will increase the likelihood of deunionisation across larger sectors.

What does this mean for consensus making in a contestation over the adoption of new technologies? SCOT deals with relevant social groups, but as I have alluded to multiple times some relevant social groups are more relevant than others. Klein and Kleinman (2002) identify four types of resources which plays an important role in obtaining relevancy: economic, political and cultural resources, as well as technological legacies. The two first resources are the most intuitive. Economic resources allow actor-groups to purchase new machinery, hire consultants and experts, engage in lobbying and have a direct line of communication with designers of technical artefacts. Returning to the example of the bicycle, Klein and Kleinman (2002, p.43) point out that the working class could not afford bicycles

when it was a nascent technology, and as such they were rendered irrelevant. Political resources are linked to economic in most of the Western world, but are also shaped by the organisational structure of the state. In a study by Gilens and Page (2014, p.575) they find that when “the preferences of economic elites and the stands of organized interest groups are controlled for, the preferences of the average American appear to have only a minuscule, near-zero, statistically non-significant impact on public policy.” The precariat and the masses of non unionised workers do not have the political power to challenge the elite, be it in matters of public policy, or on issues of technological implementation.

Cultural resources are important, as Weber’s Protestant ethic have already made clear. We can identify them in two different ways; as a resource to be used in the workplace, or as a resource to be used outside the workplace in the consumer society. Meyer and Rowan (1977) argue that organisations can seek legitimacy through the institutionalisation of rules, or what they call “myths”. These institutionalised rules are based on preconceived interpretations of efficiency and good practice, and may conflict with issues of efficiency or job quality. Because they are culturally located they lend legitimacy to certain actions or perceptions. These myths can have their origin from any number of practices, and in capitalist businesses can take the form of workers loyalty or subserviency to their superiors, passed down as a result of continued domination and subordination. Challenging these myths can be difficult, but unions have long been both a source for myths, and a way for workers to dismantle adverse myths. Cultural resources can also be the result of marketing. As shown above in my discussion of the gospel of consumerism, marketing can shape the way we perceive an issue. In SCOT terms this means actor-groups can be compelled to accept a closure by redefinition through the use of marketing, for example. Klein and Kleinman (2002, p.45) show that consumers are often shaped by advertisers which seek to expand production and company growth. The control of marketing machines not only gives cultural power to certain groups, but it also means access to participate in discourses. Without the ability to make your voice heard, it is unlikely it will be. As with economic and political resources the elite is better located to promote their agenda; especially with the decline of unions.

The last resource Klein and Kleinman (2002) identifies is technological legacies. They suggest that the implementation of earlier technologies can have an impact on the outcome of adoption of new technology. This could be because the old technology has some negative or positive cultural connotation, and discourses are able to attach themselves to

these. Alternatively, it needs to be compatible with other types of technologies. For example, new machinery must be compatible with the old machinery, as well as how power is distributed through a plant. A more recent problem in the world of software could be database compatibility. Software that is unable to communicate with other software will have a harder time being adopted. This echoes issues of path-dependency, as discussed in innovation studies. “At any point in time many new ideas emerge, but only those that are well adapted to the contemporary selection environment are likely to be applied and form the basis for continuing adaptation and improvement” (Fagerberg, Mowery and Verspagen, 2009, p.432). This can favor any actor-group in a contestation process.

These power asymmetries can be said to create a loop. On the one hand, as I have shown in section 3.2, adoption of technology in a certain way increases the power of elites and decreases the power of the lower part of the class pyramid. As their power increases, the elite are able to adopt even more technology. With every rotation through the loop it is less and less likely that adoption of new technology will meet resistance, or that any resistance is capable of actually changing a decision. Power is supported and underpinned by technology, but does not derive from it. The following section will look closer at the evolution of labor processes and the effects of automation, before continuing to explain how control is maintained with the use of surveillance.

4.2 Modern labor processes and automation

The means of production have changed markedly since the early 20th century, but the Taylorist goal of optimising the efficiency of production has not. Lean-production have transformed labor processes to the benefit of highly educated workers. This development reverses many of the issues that Smith and Marx were worried about with the division of labor. However, most of the world are still toiling under Taylorist labor processes, which are becoming increasingly vulnerable to automation. Increased automation and labor saving techniques leads to a surplus of labor, and unless workers have the ability to retrain their skills to suit the new economy underemployment and unemployment will become a problem for an increasing number of people. Decreasing job security leads to increased precariousness, and diminish avenues for resistance. This section describes how the political-economic structure with the assistance of technology constructs docile workers.

Toyotism, or lean-production is one direction in which the scientific management of production have taken. It was, as the name indicates, a development which took place in Japan. Rifkin (1995, p.96-97) explains lean-production by juxtaposing it with Taylorist mass production and more traditionalist artisan production. The latter required skilled professionals to produce a good to the specifications of the consumer. This required time and a high level of knowledge, and was highly inefficient. Mass production, on the other hand, used skilled professionals in the design of a product, but unskilled workers to produce it with the help of machines and standardised equipment. It was highly rigid, and hard to change, and unlikely to give consumers a customised product. Lean-production combines the positive aspects of these two types of labor processes, while avoiding the downfalls. Production is done in multi-skilled teams which participate in every part of the production, from design to completing the the product, in conjunction with automated machines. The machines they work alongside with can be seen as augmenting their work, making it increasingly efficient. By implementing these changes an MIT study found that Toyota “took 16 hours to build a car in 4.8 square feet of workspace per vehicle per year, with .45 defects per car. At GM-Framingham it took nearly thirty-one hours in 8.15 square feet with 1.3 defects” (Rifkin 1995, p.100).

Contrary to Taylorist labor processes lean-production is far less hierarchical, due to the worker’s intimate knowledge of, and participation in, the production process. This contributes to two things; the dealienation of workers, and the re-skilling of workers. When Marx (2005) wrote about alienation it was because workers no longer could see the whole of the product being produced. They became just another machine. In lean-production, however, workers of every type ideally take part in the entire production process. This also means that the employees in businesses that use lean-production are encouraged to increase their skills and share their knowledge: the labor force is re-skilled, which corollary means they are more valuable to the businesses. Lean-production have transformed what was previously manual labor for many unskilled workers, into a high prestige job with high requirements — for a few. Employees engaged with lean-production labor processes are members of the salariat, not the working class. This is an example of polarisation of the labor market. Manufacturing jobs, in particular in the West, have traditionally been a source of middle income for low skilled workers. These workers are increasingly being reallocated “to low-income service occupations” (Frey and Osborne, 2013, p.3).

Lean-production does have some considerable benefits for a few number of workers, and may elevate those fortunate enough to be hired, but this labor process is hardly representative for most of the world. Previous Secretary of Labor in the United States and famed economist, Robert Reich, have equated most modern corporations with military bureaucracy. The “chain of command runs from the top down, with less and less room for independent decision-making at the lower levels of the command structure”, Rifkin (1995, p.94) explain. Standardisation of tasks and goods mean that absolute control is necessary, as I have discussed in section 3, and continued deskilling attempts are made. In many ways labor processes in the early 20th century is very similar to the early 21st century, in particular in countries where labor power is still cheap. Continued adoption of increasingly advanced machines is paramount to continue to reduce the cost of labor power, and at the same time continue the de-skilling process. I will explain how this is done by first showing an example from Southeast Asia, before moving on similar situations in the West.

In a report from the International Labor Organization, Chang, Rynhart and Huynh (2016) assert that 9 million people across Southeast Asia work in the textile, clothing and footwear industry. The female share of these exceeds 70% in most countries. While these 9 million workers are still dwarfed by the output from China, they are important sources of income both for the states in which the business are located, and for the workers. Vietnam exports textile, clothing and footwear amounting to 36.9 billion USD, and the industry accounts for over 87 percent of Cambodia’s manufactured exports (Chang, Rynhart and Huynh, 2016, p.1). These businesses are far from worker friendly, and an example from Cambodia show that workers often experience “discriminatory and exploitative labor conditions” (Human Rights Watch, 2015, p.4). Human Rights Watch (2015) reports situations where production targets are higher than workers are able to produce, forced overtime without extra pay and few or no rights to sick leave.

These workers are vulnerable to automation efforts, such as 3D printing of clothing, and fully automated textile factories. Chang, Ryan and Huynh (2016) contend that due to falling prices of textiles, clothing and footwear in the West combined with a slow increase in wages in the Southeast Asian countries businesses are looking towards technological improvements to reduce manufacturing costs. This echos the events in Winner’s (1980) article, when he explains why the manufacturing plant in Chicago decided to implement machinery which could reduce the need for skilled workers. Strategic adoption of machinery

continues to happen. With recent developments in modern technology it is possible for consumers to customise their products to their individual needs, requirements and desires. Through either imputing specifications online, or by getting their bodies scanned, it can give them a product which is as customised as the artisan of traditional economies could provide, but produced in a highly technological factory, running nearly automatically. Not only does this give the customer increased satisfaction, but with modern machines it is possible to reduce the cost of manufacturing by reducing the number of workers. This is a trend which has already started. “In 2016, Adidas successfully tested a fully automated shoe factory (also know as “Speedfactory”) using 3D technology and robotics in Germany” (Chang, Ryan and Huynh, 2016, p.5). Another Speedfactory is planned to open in the US in 2017. The labor processes in these automated factories is more similar to lean-production, and would therefore employ far fewer people than in traditional factories, and require employees with high levels of education. Efforts like this are detrimental to low skilled workers, because they will that experience their source of income disappears. Again we see two different groups disagreeing as to the adoption of technology, but the decision benefiting the owners of the business is passed. Not by a closure of redefinition, or a rhetorical closure, but through the use of power.

Automation can have the same effect on other sectors too, including those in the West. In the US there are an estimated 1.8 million truck drivers, which have their employment challenged by self-driving cars (Roberts, 2016). Self-driving trucks have already been implemented in the mining industry in Australia (Gollschewski, 2015), and distribution centers in ports, moving containers from boats to trucks or trains are increasingly becoming fully automated (Cowen 2014, p. 98). Amazon have started using automated robots called Kiva for logistical purposes in some of their warehouses, and by doing so requires far fewer workers to handle their goods (Brynjolfsson and McAfee, 2014, p.32). The effects of automation, and the speed at which it is improving is so great that Frey and Osborne (2013, p.44) have claimed that “47 percent of total employment is in the high risk category” of being automated in the U.S. “relatively soon, perhaps over the next decade or two”. Similar numbers have been found for Norway (Pajarinen, Rouvinen and Ekeland, 2014), Australia (Committee for Economic Development of Australia, 2015), Sweden (Stiftelsen för strategisk forskning, 2014) and the UK (Frey and Osborne, 2014), to mention a few. These jobs include

both manual labor jobs, and white-collar jobs, such as accountants, administrative assistants, and lawyers.

There are some challenging issues regarding these trends. On the one hand, lean-production labor processes are making work more equitable. It reverses many of the problematic aspects of Taylorist mass production. By doing so it can increase the quality of life of many workers currently working in subpar circumstances, such as the ones outlined from Vietnam and Cambodia. However, it simultaneously removes many jobs, leaving a greater number of low-skilled workers without a steady source of income. In a society where the wage relation has been solidly cemented this can be catastrophic. On the one hand there are beneficial outcomes to increasing automation, but they only benefit a few. On the other hand, increasing automation leaves droves of people in progressively more precarious situations.

This is visible in the statistics. While the International Labour Organization (ILO, 2016) anticipate that the unemployment rate globally will only increase moderately in 2015, there is an increase of involuntary temporary and part-time jobs. This type of underemployment, where workers want to work more but are unable to find a job, is expected to continue to decrease. In Europe part-time and temporary jobs account “for a disproportionate share of employment creation, increasing its share in total employment to over 22 per cent in 2015” (ILO, 2016, p.55). Part-time and temporary workers are 20-40 percent more likely to be poor, and have reduced access to social security. This amplifies the income gaps between workers and the elite. In the US “49 percent of part-time workers would prefer to work more hours at their current wage”, and only 47 percent would have to borrow or sell something to pay for an unexpected expense of 400 USD, according to the Federal Reserve Board (Gabler, 2016). Furthermore, there is an increasing number of discouraged workers. These are previous people that have dropped out of the labor market, and are unlikely to return. The Organisation for Economic Co-operation and Development (OECD, 2016) reports that the number of discouraged workers in the European Union in 2000 were 521,000, which has grown to 1,504,000 in 2013. Much of this is likely due to the recession.

These are beneficial situations for the elite, on multiple accounts. First, increasing demands for jobs will lower wages, making it increasingly easy to hire cheap labor. Second, for those who are willing to upgrade their technology it means they will have fewer people to

to fire, and the use of temporary and part-time jobs make it easy to terminate contracts. Third, productivity growth will increasingly go to companies and their managers, as they have fewer employees.

What I have shown here in this section is that technologies are being adopted for a purpose, to be used in specific situations. Let us return to Winner's (1980) typology of authoritarian and democratic technologies. Winner claims that nuclear power needs centralised power in order to work, while solar panels can work as a disseminated, pluralistic and democratic technology. This is key to understanding why some technologies are adopted, while others are not. The Protestant ethic naturalised the wage relation, which lay the groundwork for capitalist subjectivities. In a wage-labor society subordination and domination are necessities, subsequently there needs to be hierarchical control; authoritarianism. If these are the structural constraints in which technological development occurs in, and research and development is financed through those who have capital, then it should also be expected that technologies designed to maintain authoritarianism receive superior funding, and are increasingly likely to be adopted. Given an assumption that technology is socially constructed, combined with power asymmetries in the real world, we can presuppose authoritarian tendencies in the development, design and adoption of technologies, in order for them to maintain the established discourses.

4.3 Surveillance

Recent advances in information and communications technology (ICT) have revolutionised the art of surveillance. The ICT revolution has meant that cheap cameras have been installed in both public and private spaces, social networking and computer use make collecting statistics on people easy, and advanced algorithms and databases transform this data into something analysable. Bentham's Panopticon may not have been an architectural success, but its legacy of observation stands stronger than ever. This also gives new credence to Foucault's (1995) observations about surveillance, discipline, and the creation of docility. In this section I focus on surveillance as a technique for coercive control over workers which can be used to increase work efficiency, exclude deviant individuals, and arrest unwanted behaviour. Surveillance in the workplace is an authoritarian technology, used in hierarchical organisations to control subordinates (Ball, 2010, p.89). However, surveillance can also be

seen as a “form of caring”, Allen, Coopman, Hart and Walker (2007, p.175) contends, that can be used to protect “the many from the disruptive, lazy or incompetent few”. While this is true in theory, I have elected to discount this perspective due to the aforementioned deunionisation processes and the corrosion of labor laws under the neoliberal political-economic structure. Surveillance unquestionably gives more power to those who control it, and without effective measures to equalise power, I want to assert that surveillance as a form of caring will ultimately transform into coercive surveillance. In this I agree with Ball (2010, p.89) who writes that “surveillance is always applied for the benefit of the business, and hence is not politically neutral”. Neither will I deal with issues of ethics, privacy or legality, which while important have been covered well by others (c.f. Allen et.al., 2007; Ansoorge, 2011; Sprague, 2007). This section will continue to elucidate how power is maintained in the hands of few by making people into governable objects with the help of technology, as well as how the use of surveillance technology can transform individuals.

The major changes that have happened with surveillance take place in office jobs with so called “dataveillance”, but before explaining the importance of dataveillance I will briefly show how Taylorist observation techniques in factories have evolved. Perhaps the best example of the power of modern technology is in Shenzhen. Shenzhen, in southern China, located just above Hong Kong, has in the later years become one of the largest production hubs in the world. It is a factory-town, where most of the 6 million people living there are employed by large corporations producing most of the information and communications technology we use on an everyday basis. These workers are living in a literal Panopticon, fuelled by technology. Where in the early 20th century businesses had to hire supervisors to ensure workers completed their tasks at a sufficient efficiency, this is now done with the help of cameras. With the help of advanced algorithms and analytical tools — developed by the US military — every action, movement and behaviour of the workers are analysed (Standing, 2014b, p.229). It should come as little surprise that Western businesses engage in similar conduct. Both Walmart and Amazon, two of the largest logistics companies in the world, use monitoring technologies to extract as much productivity as possible from their warehouse workers (Head, 2014). Tasks have been broken down and measured in seconds. Those who are unable to finish a task in a given time are reprimanded, and may find themselves without a job. The physical strain on the workers are incredibly harsh, and there have been instances where their well being have been ignored for the benefit of productivity. Judging the

“efficiency of movements”, as Foucault (1995) called it, is no longer the job of a person, but has been transformed into the job of a machine. Using the data from the algorithms workers are judged, categorised, classified, and compared to each other. Some will receive disciplinary training to improve their efficiency, while those who are deemed unfit will be fired. The cold calculating machine has made the guardsman superfluous in the Panopticon, and rules the factory with an iron fist.

Similar measures — using ocular surveillance — are less effective in the service industry, because it is impossible to use the same types of algorithms to analyse the quality of non-physical labor. However, the machine is increasingly involved in determining the effectiveness in the service industry too. According to the American Management Association (2016) two thirds of American employers monitor internet connections, 45 percent track the keystrokes of their employees, and 45 percent monitor phone calls. Standing (2014b, p.237) also mentions that employers increasingly have the ability to view their employees through webcams and GPS. 50 percent of employers in the US have technology that will examine the content of their employees emails and computer files, looking for indications of actions that goes against the will of the business (Sprague, 2007, p.3). This is what is known as dataveillance, the gathering of personal information and habits through electronic means, and logging this data in databases in order to make the information analysable (Ansorge, 2011, p.69). Dataveillance have many rationales from a business perspective. For example, it seeks to protect the property rights and the patents of a business, and reduce the chance of corporate espionage. However, it can also identify disparaging statements about the leadership, and is being used to gauge the efficiency of each employee, and as such categorise them accordingly. The data collected is also increasingly being used to identify which employees communicate with each other (Allen et.al., 2007). This can have adverse effects for collective bargaining, because as I argue shortly workers under such surveillance will be inclined to display tendencies of self-discipline.

In most of the United States the relationship of employment is regulated by an “employment-at-will doctrine”, which means that “both the employer and the employee may terminate the employment relationship at any time, with or without cause” (Sprague, 2007, p.20). This means that the data collected about employees can easily be used to sanction unwanted activities, without the need to provide a reason. Sprague (2007, p.21) show that this happened almost immediately after the introduction of the e-mail as an office tool, and write

that “employees were fired for using it inappropriately”. The American Management Association (2016) reports that 28 percent of employers have fired workers for misusing their e-mail. Due to the deunionisation in the US, and the lack of having to provide a reason for firing a worker, this places employers in a privileged position of power. Similar trends are taking place in multiple European countries where neo-liberal policies are depreciating worker’s rights and unions.

When everyone is under constant surveillance it creates a power relation between those who are being watched and those who watch. One article show how referring “to the company as “they” in emails rather than the more inclusive “we”” can be viewed as a sign of discontent (The Week, 2015). Workers will quickly learn by observing the what is under surveillance “what kind of behaviours the employer expects or values (Ball, 2010, p.93). The decision for what makes an action immoral is not up to contestation. Workers are not able to affect what the watchers look for, because that happens behind closed doors. The use of surveillance technology, in other words, fall far outside of the scope of SCOT. There have been reports of some types of resistance to surveillance, either by finding gaps in what is monitored or by using surveillance tools to “watch the watchers”, particularly in call centers, but these forms of resistance have been futile and had little impact on the technology. Ball (2010) also point out that in industries with low union density this resistance is both less effective and less frequent. Due to the lack of options for resistance to the adoption of the technology workers do not participate in those contestation processes either, because of the weakening of labor unions and labor laws.

4.4 Contestation in the 21st century

What does these findings mean for the SCOT approach? When looking at relevant social groups in a contestation process it is important to note three things: First, their power — economic, political, cultural — relative to other groups. Second, how the political-economic structure constrains or encourage certain discourses. And thirdly, how some contestation processes have reached closure at an earlier moment, and is therefore cemented. Only small adjustments are likely to happen. These issues need some elaboration.

First, the political-economic structure in which contestation takes place is important because it defines what types of actions can take place, how a common good is defined, and

the tools available for relevant social groups in a contestation process. The Fordist regime included labor unions as an important institution, which allowed it to perform an important role. By introducing new policies and laws that made labor unions less relevant or weakened their position they lost their relevancy. Furthermore, cultural discourses can influence definitions of common good and morality. This gives credence to some interpretations over others. The interpretive flexibility is constrained by existing discourses.

Second, as I have shown throughout the text, the political power of different relevant social groups is important. Noble (2011) describe the disputes between labor unions and business managers after the Second World War, and clearly claims that labor unions did have the ability to shape discourses during that time. However, after they had been weakened, through the use of legal and cultural approaches, business had little resistance. Disorganised workers pose little threat against an organised business community. The assumption made by SCOT that only relevant social groups can participate in contestational process is valid, however, the groups it includes is too wide. By rendering certain groups less powerful, their relevancy also diminishes.

Lastly, previous contestation processes can have an impact on future contestation processes. By introducing Taylorist observation in the early 20th century workers have become accustomed to certain trends in the workplace, for example. Replacing the supervisor with a camera is not a drastic change, and could potentially be seen as welcoming; workers would no longer have a person literally breathing down their necks. Technological implementation certainly does depend on earlier technologies, as alleged by technological determinists, however I assert that this is because workers become accustomed to the technology, and small adaptations to it is increasingly likely to be accepted. The contestation over whether or not to implement surveillance technology was a discussion that was held long before the introduction of advanced ICT. Surveillance have not only become the status quo, but accepted as a necessity (Ball, 2010). The increase in surveillance technology have been gradual. There are no examples of a society which went from not observing workers at all, to Shenzhenist surveillance practices over night. The slow evolution of technology is partly what makes it possible for the elite to increasingly adopt technologies of control.

This leads us back to the arguments made by Marx and Smith about what the division of labor does to workers. Smith (2007, p.602) worries about their ability to even participate meaningfully in decision making due to the nature of their work. Through developing how

we work we change our relation to work. Foucault (1995) argues that we create a culture of self-discipline, as discussed. Through self-discipline we produce docile bodies, more obedient and more effective. Surveillance have for the most part become accepted. Allen et.al. (2007, p.182) show that 58 percent of respondents in their interviews agreed that surveillance was “necessary to reduce employee dishonesty and noncompliance”. Those who disagreed did “not come forward and complain about or question the company’s rule. If they did, they could lose their job” (Allen et.al., 2007, p.191). At the same time, the precariat and the unemployed do not have an option to dissent in a wage society. If they have the option of getting a job — even a temporary one — and thus accepting subordination, or staying underemployed or unemployed then they have to take the job or continue to live in life threatening poverty. This is not technological determination, but rather the result of a massive project of social engineering — it would be more fitting to call it political-economic determinism. The methods and policies of the workplace have been designed, as Foucault (1995, p.172) claims, to “transform individuals; to act on those it shelters, to provide a hold on their conduct, to carry the effects of power right to them, to make it possible to know them, to alter them.” It is not the technology which determines the evolution and adoption of new technology, but rather those who sit comfortably on the power over decisions. Klein and Kleinman (2002, p.41-42) ask when examining contestation issues over new technology why the few people that resist a discourses have been ineffective. The answer, it seems, is that their voices have either been muted, or they have lost the ability to resist.

5. Conclusion

This thesis has discussed how technology have constructed the modern worker through a social constructivist lens. I have addressed issues of power asymmetry in the adoption of technology, how technology can be used for increased domination and subordination, and how both the working class and the precariat have experienced a decrease of power in contestation processes. My findings can be summarised in six points.

First, the political-economic structure in which contestation processes occur constrains or encourages certain interpretations of a discourse. Second, some groups are more relevant than others in contestation processes, leaving a majority of people without a voice. Third, contestation is resolved through political, economic and cultural power. The tools of

contestation are varied, and can be in the shape of legal resources, marketing, coercion, or strikes, to mention a few. Fourth, by being in control of contestation processes it is possible to affect future contestation processes, and as such cement power in one place. Fifth, technology can be used to strengthen contestational power. This has been the case with the division of labor and the alienation of workers, as well as diminishing avenues of resistance through surveillance. Sixth, discourses are capable of constructing social relations.

These points contribute to creating a worker which is either docile, and will therefore not participate in any meaningful resistance against adverse adoption of technology, or a worker which is rendered unable to resist because of lacking power. Technology plays an important role in constructing the modern worker, but only as a tool for the powerful elite located behind the design and implementation of technology. By advocating authoritarian technologies decision making is increasingly being centralised, and the effect of this is the increasing exclusion of workers and the precariat.

Having determined with some certainty that use of technology affects the way people work, think about work, and how people (do not) resist changes in the labor market, an interesting avenue for further research would be to look at how technologies can be re-democratised. Computers and the Internet, as well as 3D printing and solar cells have spurred discussions of democratic technologies, and how workers may regain control over the means of production. How would an economy with parallel modes of production look? What benefits and disadvantages would it have? How will technology continue to change work relations in the near future? How would alternative technological solutions be organised? It is crucial that we address questions about work and its development, particularly in the face of increasing automation.

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