

1 The workplace of the future

Introduction

This chapter is intended as a roadmap to explain what lies ahead for businesses and institutions, given the development of robots, informats and artificial intelligence.

We know that most jobs will change extremely rapidly. Until now, people who are educated have been able to find jobs. In the future, many people will not find jobs even though they are educated (Kessler, 2017). It seems likely that most jobs will be those either at the bottom or the top of the wage scale.¹

Robots,² artificial intelligence and informats³ are destroying bureaucracies and hierarchies. This hypothesis is based on the research of Abd (2017), Wilson (2017), Ross (2016), and Susskind and Susskind (2015).

The second hypothesis on which this chapter is based is as follows: robots and informatization are transferring surpluses from income from employment to investment income. A good deal of empirical research supports this hypothesis.⁴

The hypothesis reveals a paradox: productivity increases, the level of innovation increases, but at the same time average salary levels decline (McAfee & Brynjolfsson, 2017).

In the USA, it is projected that 50 per cent of today's workplaces will be automated and robotized over the next 20 years (Avent, 2016: 1–4). Robotization will take place in all occupations: journalism, teaching, medicine, defence, architecture, dentistry, the service sector, transport, the merchant navy, marketing, industry, etc. (McAfee & Brynjolfsson, 2017). The last major period of automation affected jobs in industry, during which a combination of industrial robots and global wage competition decimated millions of industrial jobs and transferred many jobs from high-cost countries to low-cost countries. It appears that the next round of automation will affect jobs in the service sector. According to two Oxford professors who conducted a major study of more than 700 different service-sector occupations, half of all jobs in the American service sector are in danger of disappearing (Frey & Osborne, 2013). Although robotization is transforming most workplaces, it is also leading to fewer work-related injuries, fewer traffic accidents, better medical diagnostics, and higher quality medical and surgical interventions. Robotization will improve the everyday

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quality of life of sick and disabled people and those who are otherwise in need of care. Deaf people will also find their everyday lives improved by new nano-robots and other disabled people will experience improvements. According to Ross (2016: 42), robotization is a global net benefit.⁵

In an organization such as described above, the old ‘hamster-wheel mentality’ will be replaced by the flexibility of the panther and the feeding instinct. All panther-type organizations will be directly engaged in competition for customers, not only those organizations that are in immediate contact with customers (Susskind & Susskind, 2015). Workers in these organizations may be described as **knowledge workers** and **innovation workers**. They will have completed a long series of specialized educational programmes, including Master’s degrees and doctorates (Trot, 2015: 23; Wilson, 2017).

In a panther-type organization, everyone will be committed, motivated and focused on the customers. These are ‘the survivors’ in the organizations of the future. However, those who do not adopt this attitude will quickly fall by the wayside. In order for the organization to do what it is designed to do, it will be dependent on buying or leasing in many functions. These functions will be performed by the new contract workers, the same people who were employed previously in the organization and existed within its bureaucracy and hierarchy (Shipler, 2005). These people will now be ‘in-sourced’ by the organization on short- or long-term contracts. These new-style organizations may be ‘the company of one’ (Lane, 2011). These will be people who have a high level of expertise within one or a small number of areas, which they sell to one or more businesses. Metaphorically speaking, we might envisage a swarm of insects around a honey pot. These insects compete on cost and expertise in order to land contracts with businesses. We can envisage wage competition strongly depressing the price of their labour because people who want to sell their cutting-edge expertise to businesses can be found everywhere in the global economy (Banki, 2015). Geographical proximity will no longer be a factor when seeking a high level of competence combined with good availability and reliability at the lowest possible cost (Garud et al., 2002; Gaskarth, 2015). The people who will tend increasingly to sell their expertise to businesses through temporary contracts will be members of what is known as the **precariat**⁶ (Standing, 2014a, 2014b). The precariat is a direct and intentional consequence of neoliberal economic ideology (Banki, 2015; Johnson, 2015b: 1).

From the 1970s onwards, the new ideology was dominated by flexibility and competition, which gradually came to permeate all aspects of the social system (Standing, 2014a: 1). Accordingly, risk and insecurity became part of employees’ everyday lives. According to Standing (2014a: 1–4), this development means that millions of workers around the world no longer have stable employment prospects – the neoliberal agenda has created a political monster.

Members of the precariat perform insecure jobs. According to Standing (2014a: 1–4), the precariat is a specific social class that is developing worldwide. Many of its members are frustrated, angry and bitter at the élite who have put them in the positions in which they find themselves.

In the working life of the future, many, indeed very many, people – some estimates suggest 30–40 per cent of the workforce – will lose their jobs (Shipler, 2005; Wacquant, 2009a, 2009b). These people are referred to as the **working poor** (Shipler, 2005). This group consists of low-paid service workers and people on welfare benefits, to mention some groups (Shipler, 2005).

The new panther organizations will be extremely cost-effective and have very high levels of productivity (Murphy, 2016). They will also be good at problem-solving, have little staff turnover, and have creative and satisfied employees (Boxall & Purcell, 2010). These very well-paid employees will find their work meaningful. They will be living out their dreams in the panther organizations, and will have contacts among the precariat who can perform short-term contractual assignments (Brynjolfsson & McAfee, 2011, 2014). This kind of relationship will contribute to securing the future of ‘the company of one’. Within a panther organization, the employees will flourish using their expertise to perform their specialized knowledge tasks (Bruce & Crook, 2015). These employees will be optimistic, positive individuals who will spend much of their working lives in contact with their global competence networks (Reinmoell & Reinmoeller, 2015). Those who do not succeed in making this transformation will have been forced to leave the organization and will number among either the precariat or the working poor.

Knowledge workers and innovation workers will be the relatively privileged employees in the Fourth Industrial Revolution (Murphy, 2016; Trot, 2015: 23). Murphy has, however, omitted the people who missed the bus: the working poor and the precariat. To make this kind of organization possible, with robots taking over many job-related functions and making decisions based on efficient algorithms and artificial intelligence, many or perhaps most people will have to spend most of their ‘working lives’ outside such organizations, existing as sub-contractors working on insecure contracts (Standing, 2014a; Johnson, 2015b).

What is happening at the dawn of the Fourth Industrial Revolution is a total transformation of the nature of income-generating work (Gans, 2016). The driving forces behind this transformation are robotization, informatization, artificial intelligence, and an extreme focus on cost-efficiency due to global competition and growing individualization (Savage, 2015; Wilson, 2017).

The main question that we are exploring in this chapter is as follows: How does the workplace of the future constitute an aspect of the Fourth Industrial Revolution?

In order to respond to this main research question, we have broken it down into three sub-questions:

1. How does the precariat constitute an aspect of the Fourth Industrial Revolution?
2. How do the working poor constitute an aspect of the Fourth Industrial Revolution?
3. How do knowledge workers and innovation workers constitute an aspect of the Fourth Industrial Revolution?

This introduction is visualized in Figure 1.1, which also illustrates how we have structured this chapter.

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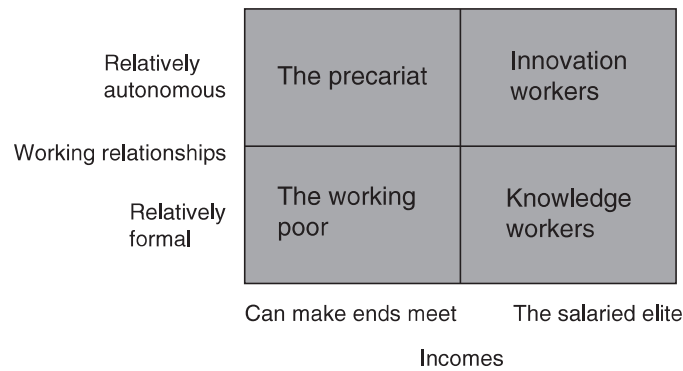


Figure 1.1 A typology of working life in the future.

The precariat

Description

In his research, Guy Standing (2014a, 2014b) has identified a new class that he calls the precariat, which has emerged through globalization, liberalization, and increasing robotization and digitization. This class has the potential to change how businesses are organized in the future and how societies develop (Johnson, 2015b: 1–4). Many activist groups from the precariat have fought for better working conditions, and both pay and job security, so they can plan the future for themselves and their families better (De Sario, 2007: 21–39; Tarrow, 2005; Johnson, 2015b).

The precariat, as the term is used here, is associated with Standing's research (2014a, 2014b), the studies carried out by Johnson (2015a) in Italy and Arnold's studies (Arnold, 2013) of insecure work in Vietnam. Furthermore, we also refer to the studies of Armano and Murgia (2015) of work flexibilization in the USA, as well as Ross's (2009) studies of insecure work in the USA. In addition, we refer to Lodovici and Semenza's (2012) studies of high-skilled youth in Europe who, despite their higher education, have insecure work and expectations of insecurity in future work relations.

We have developed a typology of the precariat in order to gain a better understanding of this phenomenon. We have divided the precariat into four types. We term the first type the **underemployed**. These are people with a good education and relatively long experience from working life. They are exposed to competition in the global economy and threatened by robotization, so their wages are pushed downwards (Arnold & Bongiovi, 2013: 290). The feeling of being excluded makes these people feel frustrated, alienated and angry (Johnson, 2015b). The underemployed are hired on short-term contracts depending on the company's needs. The examples here are many. For instance, an underemployed person could be a young legal professional who takes on extra jobs in the hope of getting a permanent job, but is not rewarded for his or her extra efforts. He or she must wait until a permanent position becomes available. However, when the position

does become available there are hundreds of applicants for the position, who have also taken on extra jobs in order to gain recognition (Standing, 2014a: 33–34).

The second type is a young person with a relatively good education, but who only has temporary underpaid jobs. These young people are skilled but have not had the opportunity to gain experience in the sector relevant to their education. They have been told that it pays to get an education. Consequently, they have completed so-called mid-level higher education, often up to a Bachelor's degree. However, after completing their education they encounter a job market where they are unable to find regular well-paid jobs. We call this type the **underpaid**. These workers are also frustrated and angry, because they had expectations of a good job after graduation, but encountered a reality that was different from what they had been told to expect. Their anger may be explained as a crisis of expectation, i.e. the promises that these people are given when they work extra are merely a *fata morgana* – a mirage, an imaginary hope of a permanent job – because it is more profitable for companies to hire people on short-term contracts than to give them permanent positions.

However, despair does not necessarily lead to political action – it might just as well lead to passivity and apathy. On the other hand, Standing (2014a: viii) says that the rebellion lies in the self-awareness of the precariat as a class: 'Across the world, there is an energy building around the precariat.'

The third category is made up of people with specialist expertise, often at the Master's or PhD level. These people may have had well-paid jobs before being rendered superfluous by robotization, automation, flexibilization, digitization, informatization and so on (Garud et al., 2002). Such people often establish their own businesses: 'the company of one' (Lane, 2011). They use these businesses to sell their expertise to larger organizations. We refer to these people as **knowledge entrepreneurs**. In general, these people are satisfied with their entrepreneurial situations. They are hired on short-term contracts by larger companies, large consultancies or organizations in the public sector. Although knowledge entrepreneurs have a sense of independence and freedom in their daily lives, their incomes are insecure (Lane, 2011: 13–23). They exist like operators of small coastal fishing boats off northern or western Norway. They sit alone in their little boats with their insecure incomes, but none the less they feel that they are leading free and independent lives (Johannessen, 1979). Rates of pay for knowledge entrepreneurs vary, but in general they will earn less than they would have done as permanent employees of the same organizations. Example of knowledge entrepreneurs include IT experts and software engineers. These people tend to work for large organizations on six-month contracts that can be terminated at just a few weeks' notice.

We term the fourth type **vagabond workers**. These workers may be migrants and people with disabilities. They are skilled and educated and differ from 'the working poor'. On the whole, the vagabond workers are satisfied with their working life, because their part-time jobs are better than what they had before. Migrants are often happy to be given the opportunity to get a foothold in their new country; for instance, an engineer from Syria who gets a taxi-driving job, the nurse from Iran who works the nightshift at a hotel or the lawyer who gets a short-term job at a slaughterhouse. In this way, part-time contracts can provide

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migrants with a qualitatively better life. As mentioned, this type also includes people with various disabilities who previously had no work experience but who can now do a meaningful job, although their income might be low; for instance, someone who is visually impaired working in a call centre, and so on.

The four categories of the precariat have in common that their jobs are temporary and insecure, and they are under pressure with regard to rates of pay and employment rights. They also feel alienated.⁷ Quite simply, they feel that their future not only is insecure, but has also been destroyed. The precariat also fear moving down the social ladder to the working poor.

The precariat is not yet a class with a shared ideology. Rather it is made up of isolated individuals who sit on the side-lines of society peering into a world populated by successful people, by the salaried *élite* – a world where people can plan their futures. This successful *élite* envisages this new class encroaching on to their manicured lawns, and accordingly they remain obedient to the government in accordance with the principle of protecting the future.⁸

All members of the precariat struggle to obtain steady full-time work. They also work long hours unpaid to show keenness to the employer, with the hope of being preferred if a full-time permanent job becomes available (which it rarely does). Speaking metaphorically, we might say it is easier for a member of the precariat to win the lottery than to obtain a secure, well-paid, full-time job with good prospects. In addition, most members of the precariat⁹ lack a sense of solidarity with others in the precariat, the trade union movement or a political party. They feel themselves to be excluded by most established institutions. According to Standing, their basic attitude is ‘fuck politics’.¹⁰ Members of the precariat do not see themselves as a social class. They have no collective aims, but simply struggle to make ends meet. It is only when they gain class consciousness as a separate social class that they will come to change the social system (Standing, 2014a: 1–4).

The description above has been developed into a typology, which is shown in Figure 1.2.

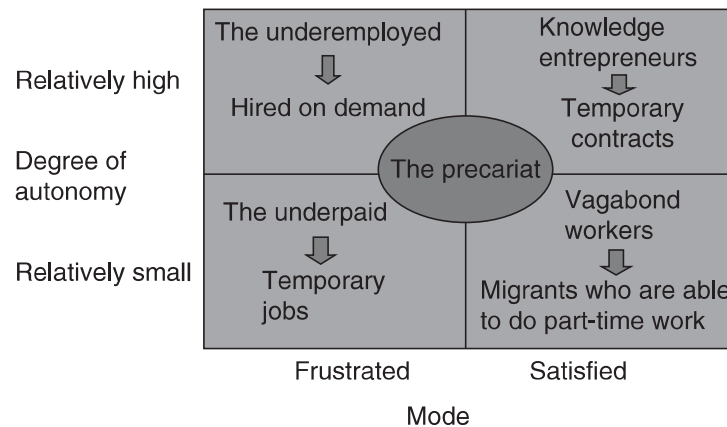


Figure 1.2 A typology of the precariat.

The underemployed

The underemployed go in and out of temporary jobs, and their rights in the labour market are very insecure. They are unable to find jobs that match their education, resulting in existential insecurity (Coates & Morrison, 2016: 134–167). Their broken dreams make them frustrated, angry and at times aggressive. In this frustration lies rebellion, according to Standing (2014a: vii).

Today the proportion of young people with higher education is much greater than in the past. Despite this, Trot (2015: 25–26) says that young people cannot expect to find a job that matches their education. They also have difficulty finding a job they think is meaningful (Coates & Morrison, 2016: 116–134). If and when they get a job, it's often based on a temporary contract and poorly paid.¹¹

It seems to be the case that it is the relatively highly educated, rather than those with little education, who experience the greatest uncertainty in finding a job and job security (Armano & Murgia, 2015: 106). For instance, 40 per cent of the graduates in Spain are in poorly paid jobs one year after graduating (Standing, 2014a: 67). The new generation of European university graduates have not been able to realize the future they had envisioned at the outset of their studies (Mason, 2012: 71). They have also taken out loans which they had planned to pay back when finding a job after graduating; this proves difficult when their present income is much lower than they had planned for (Standing, 2014a: 68). This frustration easily leads to anger and rebellion against the establishment (Mason, 2012: 71–80), i.e. the political, economic, intellectual and cultural élite. These indebted students on low incomes also belong to the emerging group of debt-laden home owners. One of the consequences of the situation described is the obedient and disciplined worker hired on a part-time basis and on contract (Lazzarato, 2012: 7).

You're free as long as you can pay your debts, writes Lazzarato (2012: 31). Thus, the underemployed are willing to do any jobs that are available (Coates & Morrison, 2016: 187–217). Those who are highly educated are also willing to do non-paying jobs, so they can get a 'foot inside the door' of large companies – for instance, by means of non-paid or poorly paid 'internships' (Perlin, 2011: 36). These young people had been promised that when they graduated their dreams would be realized (Ainley, 2016: 1–3). In other words, they have been grossly misled; one might even say that a whole generation has been deceived, says Ainley (2016). If and when these young people are given contracts, they are often of only a few months' duration. When their contract runs out, they have to go back to the unemployment office (Armano & Murgia, 2015: 102).

These highly educated young people see their expectations shattered. Although their contracts may give them a high degree of autonomy, their future income is uncertain. Consequently, one might characterize this autonomy as 'fake autonomy' (Armano & Murgia, 2015: 106). This may be explained by the fact that these workers have limited access to welfare benefits, because these benefits are often dependent on being permanently employed.

The underpaid

Every country in the world has its underpaid workers. In the USA, many of the underpaid can be found in the Rust Belt. Historically, these workers can trace their roots back to the days of the New Deal. The lives of these workers have become insecure through work flexibilization, which is a direct consequence of globalization. The underpaid in the American Rust Belt have been unable to compete with the lower wages of Chinese and Mexican workers. Consequently, jobs in the Rust Belt have disappeared or become insecure. At the same time, the power of the unions has been diminished (Varga, 2015: 46). Similar developments have also been taking place in all the other industrialized countries from the 1970s onwards.

Through globalization, the underpaid have joined the ranks of the precariat. They feel betrayed by the political and financial élite. They are desperate and angry, but have nobody else to vent their frustration and anger on than the élite, who have warmly expounded on the benefits of globalization, free trade agreements, and the free flow of capital and labour. Among others, this concerns workers in the American Rust Belt, Wales, Greece, Spain, Italy, France and other countries (Abrahamson, 2004). The underpaid can also be found in the service sector in big cities (Abrahamson, 2004: 49); their wages have been forced down in the competitive world of globalization. These workers are often immigrants or domestic migrants who take poorly paid jobs. In the EU, social dumping has greatly contributed to swelling the ranks of the underpaid.

The knowledge entrepreneurs

The third type in our precariat typology is the knowledge entrepreneurs. These are people with a higher education, but who cannot get or do not wish for permanent employment (Ikonen, 2015: 84). They belong to the so-called ‘self-employed society’ (Ainley, 2016: 38). They often have short-term contracts, making their conditions of employment temporary and uncertain (Du Gay & Morgan, 2004). They are freelancers who are independent and work whenever they want or need to. As a rule they don’t belong to a trade union. In the USA alone, this group of workers constitutes as many as 54 million people.¹² There are many websites that cater to the employment needs of freelancers, such as Field Nation, Upwork, HourlyNerd, Toptal, Work Market and PwC Talent Exchange, to name just a few.¹³

Many of the knowledge entrepreneurs can be found in big cities (Abrahamson, 2004: 49), where they often operate as ‘the company of one’ (Lane, 2011). As a rule, they are often employed on temporary and insecure contracts. Their dreams are often linked to becoming innovation workers and knowledge workers, and hopefully thus becoming one of the salaried élite (Standing, 2014b: 14). Becoming a knowledge worker or innovation worker is the knowledge entrepreneur’s opportunity for upward social mobility.

On the personal level, the uncertainty of contract work requires a great deal of stamina and self-discipline (Ikonen, 2015: 83–90). The hypothesis is that the

more insecure and less predictable the future, the more people will aim to become knowledge entrepreneurs because they can thus take responsibility for their own future by establishing businesses. However, only a few can make a living out of working as a knowledge entrepreneur. Therefore, they alternate between their own businesses and temporary contract jobs in large companies (Ikonen, 2015: 83). For some, the solution is to move to the big cities because the opportunities for temporary contracts are better there (Ikonen, 2015: 84–85). Domestic migration, however, is not an option for everybody (Tolonen, 2005). This may be partly explained by the fact that, when life is uncertain and insecure, having a local home-base reinforces one's identity and security (Bolanski & Chiapello, 2017).

The knowledge entrepreneur has to deal with areas of responsibility that were formerly the responsibility of the employer, such as working hours, taxes, social security costs, responsibility for job security and so on. The point being made here is that knowledge entrepreneurs do not necessarily have the freedom normally associated with entrepreneurs. This is where the term 'entreployee' (Pongratz & Voss, 2003) may be justified. The knowledge entrepreneur is both an entrepreneur and an employee (Pongratz & Voss, 2003: 6–8).

The vagabond workers

The vagabond workers are relatively well educated, but they often have a disability or are migrants. They take on low-paid jobs, but are nevertheless satisfied because the alternative is so much worse (Banki, 2015: 66).

The vagabond workers distinguish themselves from the working poor with their higher level of education. However, there are also many migrants among the working poor with a low level of education.

The work situation of the vagabond workers is characterized by a very high level of uncertainty. They are often in a waiting position. They are waiting for new contracts, waiting to 'advance' to becoming knowledge entrepreneurs and waiting for their children to join the salaried elite. However, the opportunities for upward social mobility are very low for this group (Standing, 2014b: 166).

After World War II, wages and wage increases constituted the strongest "contract" between employers and employees. This led to stable conditions and a working class that accepted flexibility of employment conditions and global competition, because expectations of better pay could always counterbalance the disadvantages of work flexibilization (Rothkopf, 2009, 2012). Most political parties in Europe and the USA have accepted and worked for this social employee contract, thus reinforcing this development, which has also been supported by the middle class.

All members of today's precariat are motivated by the dream of joining the salaried elite (Coates & Morrison, 2016: 23–59). The salaried elite are made up of people with secure, highly paid, permanent jobs. They continue to believe in the social contract between employer and employee. However, our point is

simply that the salaried élite will also be crushed and decimated by the millstones of globalization (Standing, 2014b: 14–28).

The vagabond workers are low paid and often hired on contracts that favour the employer to the disadvantage of the worker. These contracts, which Standing (2014b: 165) calls ‘zero-hour contracts’, provide extremely high flexibility of the work situation for employers. In addition, the vagabond workers are often excluded from the social benefits that the salaried elite, the knowledge entrepreneurs and the underemployed have established.

Sub-conclusion

The sub-research question we have examined in this section is: How does the precariat constitute an aspect of the Fourth Industrial Revolution?

After World War II and up to today we have witnessed a development that may be described thus: from jobs without education, to education without jobs. Previously, education provided a gateway to the middle class, whereas the situation today suggests something different. This situation may be summarized in the following statement: ‘Globalisation is making the middle class of the “old” industrialised nations poor, whereas in the world’s emerging industrialised nations, we are witnessing the opposite trend – the middle class is growing strongly.’

Among the challenges facing those with higher education today, robotization has taken over many traditional work operations. This development is increasing in strength, and is affecting most middle-class jobs. This has had a negative effect on the number of middle-class jobs available, and is contributing to an erosion of the middle class.

Not only is the precariat experiencing uncertainty about their employment situation, but there is also much to suggest they are also experiencing existential uncertainty. This may be related to the following type of question: ‘What is the point of a higher education when we meet insurmountable difficulties in getting a job that matches our education?’ Thus, the precariat is characterized by both economic and social deterioration.

The precariat is also subjected to a special form of blackmail: either they accept an insecure and poorly paid job, or they end up unemployed without any particular form of economic security network. This development leads to, on the one hand, subordination and obedience (which is perceived as a weakening of their autonomy), and, on the other, to a feeling of frustration and anger concerning one’s life situation.

The wages levels of the precariat are constantly under pressure. New migrants and other unemployed workers compete for the same jobs and push wages down further. In addition, the precariat is put under pressure by workers in low-cost countries.

Among other things, the growth of the precariat may be seen as a result of the increasing flexibilization of the labour market and the new global division of labour. In this context, the flexibilization of the labour market means that it is easier for an employer to terminate an employee.

There is a vague line between temporary employment contracts and temporary entrepreneurial income. This vague line also means that most people do not

manage to come to grips with the new uncertainty that is developing in the workplace. One explanation for this lack of understanding of the workplace's uncertainty may be linked to the identity of the entrepreneur. The entrepreneur perceives him- or herself largely as the author of his or her own success, and thus does not regard the new working conditions as the reason for his or her relatively low income.

The working poor

Description

The working poor can be found in every country in the world today. They work in factories, on farms and in the service industry, such as the hotel industry and other sectors. These workers are largely 'invisible'. They can be illegal immigrants or unskilled workers who have lost their jobs and do part-time jobs for several employers.

The working poor are invisible in the sense that they are rarely included in official statistics. They balance on the edge of poverty, but manage to keep their heads above water, often because they have several jobs. There are many who need these part-time jobs, which often only amount to two or three hours per day. These mini-jobs are in demand and therefore competition forces wages down further. The working poor also compete with imported goods and services from low-cost countries in Asia and Africa, which pushes wages further down. The working poor thus struggle against the feeling of hopelessness, and are forced to take bad jobs at bad wages. In terms of economic survival, they are constantly moving towards the bottom and almost falling into poverty. The working poor also constitute the future labour reserve, and they are willing to do any job for low wages so as not to sink deeper into the swamp of poverty. Shipler (2005) describes these people's lives in the USA. However, they may also be found to the same extent in Europe (Grain et al., 2016).

These workers sometimes work in full-time jobs for poor pay. In addition, they may have one or more part-time jobs just to scrape by (Allen, 2004: 216). They are 'forced to work any job no matter how dirty, embarrassing or dangerous, in fear of losing the benefits' (Ainley, 2014: 3).¹⁴

The working poor are mainly migrants with poor education, but many of them are nationals. For example, in India 90 per cent of all workers are hired on informal contracts in poorly paid jobs.¹⁵

The working poor also struggle with the fact that many of them do not have citizenship in the country where they work, only a residential permit. This excludes them from many of the democratic processes, and their rights are often severely limited. They are also faced with the prospect of having to leave the country in which they live and work. Consequently, they often try to become 'invisible' by ducking under the radar of the public authorities.

As a result of their low income, these migrant workers end up living in ghetto-like areas where rents are very low. Banki (2015: 68–69) also refers to instances of these workers in Thailand, where poorly paid Burmese migrants may be found in certain geographical areas. Altogether, there are about two million Burmese migrants living

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in Thailand (Banki, 2015: 72). Arnold (2005: 319–340) also shows how these Burmese workers live under very poor conditions. He makes the point that the workers keep the costs down for the global companies operating in these areas.

In other countries, such as Russia, many factory workers are so poorly paid that they are unable to cope with the wages they receive (Morris, 2012). In the post-Soviet period, worker solidarity has been greatly weakened, contributing to the deterioration of wage levels (Morris, 2012).

The working poor can be found doing the lowest-paid jobs in the service industry, such as cleaning jobs in hotels. We also find the working poor doing jobs in the restaurant industry at the bottom of the pay scale. With the rapid growth of robot technology, it is most probable that many of these jobs will also become redundant, and that pay will be further reduced for those remaining (Ross, 2016: 39–40).

We have developed a framework to illustrate the working poor (Figure 1.3). The framework also shows how we have organized this sub-chapter.

Analysis and discussion

In this section, we discuss the elements in the above framework.

Drivers towards the bottom

The emergence of the working poor in Europe may in part be traced back to the Hartz reforms in Germany. The Hartz reforms were a set of recommendations on the reform of the German labour market submitted in 2002 by a committee led by Peter Hartz (hence the name of the reforms). The recommended changes were

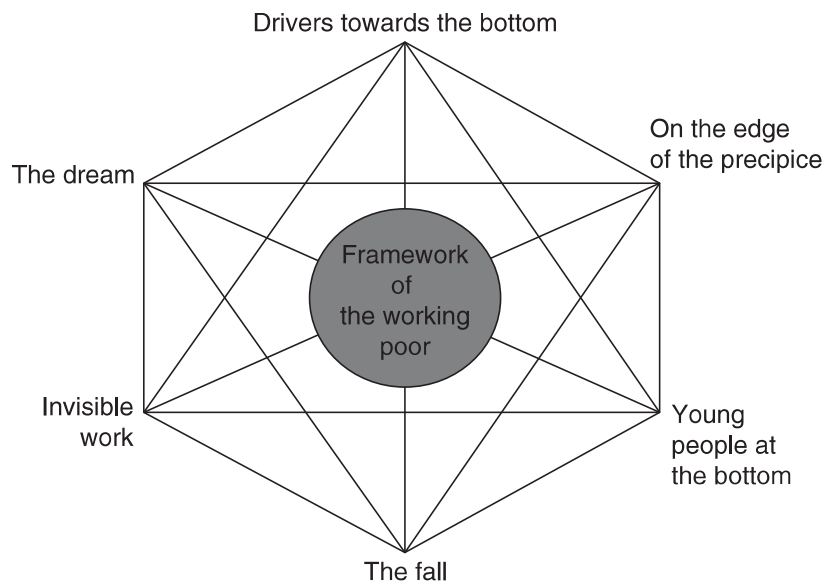


Figure 1.3 A framework for the description of the ‘the working poor’.

gradually phased in up until 2010 as part of German labour market policy. The committee proposed ten innovation modules to streamline and increase the flexibility of working life. The various innovation modules were introduced as Hartz I to Hartz IV. In particular, Hartz II led to so-called mini-jobs¹⁶ becoming a part of German working life. The Hartz reforms also resulted in many new job centres being established around the country. The aim of these was to get more workers to take the so-called mini-jobs.

Hartz IV was implemented in 2005. This largely concerned the coordination of social welfare benefits. This resulted in a lower level of social welfare support overall, on average about 391 euros per month in 2013. In addition, unemployed workers were obliged to take any job offered to them, including the mini-jobs.¹⁷ If the unemployed person did not accept the mini-job offered, they lost their 391 euros in welfare support. However, before an unemployed worker could receive any social welfare benefits, they had to document that they had used up all their savings first. When the unemployed worker takes up a mini-job, his or her social welfare benefit is withdrawn.¹⁸ This led to minimum wages in Germany spiralling downwards. Consequently, wages in general were pushed down and there were more people having to do several jobs in order to support themselves and their families. These developments help partly explain the emergence of the working poor in Germany. Although unemployment has fallen sharply in Germany after the introduction of the Hartz reforms, there has also been a very high increase in the number of the working poor during the same period.¹⁹

It is a common assumption that we identify with our work. Furthermore, the assumption is that we create our identity through our work (Reich, 2015: 133). However, this assumption is challenged in the case of the working poor and parts of the precariat, especially the underemployed and the underpaid. Work does not contribute to the identity of the aforementioned groups. It is the dream of a better future that creates their identity. When both parents have several mini-jobs, and yet barely manage to keep the family away from poverty, they do not see work as a place where they can realize themselves. They work only to keep the wolf from the door. In deep contrast, there is an ever-increasing number of rich people: the very rich (Dorling, 2015). Some of these very rich do not work, but live off their wealth. Others work, but have an incredibly high income compared with the working poor (McGill, 2016).

In the past, poverty has usually been linked to unemployed and sick people. In many countries, these groups get food and shelter from charities. Nowadays, there is an increasing tendency for the poor to include even those who work hard because they are unable to support themselves on the small income they receive. These poor people are not lazy. They are not work-shy. They often have more than one job, but still remain poor (Grain et al., 2016).

There are many reasons for this trend. One is that global neoliberal ideology exploits competition between workers, forcing wages down. Political apathy is a second reason. The low numbers of trade union membership is a third reason. Robotization of working life is a fourth reason. Lack of education is a fifth reason.

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In 2013, there were 47 million poor people in the USA. This means that every seventh American (about 14 per cent) lives in poverty (Reich, 2015: 134). Reich writes that, between 2010 and 2013, wages for the 20 per cent lowest paid in the USA fell by 8 per cent. Of those who worked more than a normal work-day, yet were under the government-defined poverty line, half received food handouts from various charities (Reich, 2015: 134).

How could so many workers over such a short period of time suddenly be worth so little in terms of wages? The answer is that globalization increased competition – pushing down wages. Companies wished to reduce costs, so they outsourced to low-cost countries. Company operations were moved in part or in their entirety to low-cost countries. For instance, American companies were moved to Mexico, German companies were moved to Poland and Romania, and labour-intensive companies in the west were moved to China and India. The most recent developments show a relocation of jobs from China to Bangladesh and Myanmar. The result of the above examples is that competition forces down wage levels. This has also led to unemployment, uncertainty and an increase in the number of working poor.

In addition to the above developments, automation, digitization, artificial intelligence and robotization have affected the entire labour market. One of the consequences is that many middle-class work operations have been taken over by robots with artificial intelligence, thus pushing middle-class workers into lower-paid service jobs (Reich, 2015: 134). Thus, several factors are forcing down wages, resulting in the wages of the working poor coming under pressure.

The number of low-paid workers belonging to a trade union in the USA is very low. This applies to hotel workers, restaurant workers, workers in retail sales and fast-food chains, and so on (Reich, 2015: 134–135). In the Nordic countries, minimum wages and the number of workers belonging to a trade union are higher than in the USA, and in a number of countries in southern Europe such as Spain, Greece and Italy (Gratton, 2011: 105–133). This means that we have not yet seen a large growth of the working poor in the Nordic region.

On the edge of the precipice

It's not a question of the working poor lacking ambition, commitment, dreams or the desire to work. It is rather that they are paid too little for the work they actually do, so they are unable to support themselves and their families. In the first decades after World War II (1945–1990), a poor person in the USA had approximately a 50 per cent chance of climbing up the social ladder to the middle class. Today, in stark contrast, it is highly probable that a poor person will remain poor (Reich, 2015: 139).

The new poor, the working poor, are also recruited from the many who dropped out of secondary school, i.e. they are unskilled. In the past, they could find jobs in industry, agriculture, the service sector, transport, the roadworks industry, the construction industry, on ships, and so on. Today, these avenues of

employment are largely closed to these people because such jobs require vocational training. In addition, many of the jobs are now automated and taken over by various types of robots. The unskilled workers can now find jobs in the retail industry, fast food chains, and other places where wages and the level of trade union membership are low. But even in these sectors, robotization and artificial intelligence have taken over a number of work operations previously performed by unskilled workers.

There is a low awareness among the working poor concerning the benefit of joining a trade union to ensure higher pay (Shipler, 2005), partly because they come from poorly educated families (Grain et al., 2016). The young working poor even risk competing with their parents and grandparents for the same jobs. Even though their parents had a poor education, they could at least find jobs in industry, such as the car industry in Detroit. The assembly line technology, which was the distinctive feature of Fordism and industrialization, has now spread throughout the world. The ‘global assembly line’ today is located in various regions according to a logic of costs, quality, competence and innovation. The factory jobs in Detroit’s automotive industry disappeared to the low-cost countries. Working in the retail trade for poor pay was an option for those who could no longer find a job in the automotive industry. However, former factory workers might find themselves competing with their own sons or daughters for the same poor pay (Ainley, 2016).

In the UK, Germany, France, Belgium, Spain, Greece, Italy and other western European countries, the same trend, as described above in the USA, is taking place, i.e. the emergence of the new poor underclass, the working poor (Gratton, 2011: 105–133). When steel production moved from European countries such as Germany, France and Belgium to China and other low-cost countries, many former industrial workers were made redundant. Other jobs at the same wage level were hard to find. After a period of time, when welfare support was lost, these unskilled workers joined the ranks of the working poor. Simultaneous with this trend, youth unemployment has increased in most EU countries (Armano & Murgia, 2015: 102–117). Many young people seeking work have tried their luck in other EU countries and, although some have been successful, most have joined the working poor (Banki, 2015: 66–79).

Today, a large part of the younger generation are having to struggle with economic exclusion. Their fathers and mothers lost their jobs in the factories and failed to find similar jobs. Their grandparents have moved back ‘home’, because pension funds were decimated during the last major economic crisis which started in the autumn of 2007 (Reich, 2015: 139–141). Fear of the future, fear of the unknown and the shame of failing to meet the challenges posed by the global economy characterize parts of the working poor (Gratton, 2011: 110).

At the same time as this psychological description becomes a reality, another psychological factor is on the rise. It is becoming ever more important to stand out from the crowd. Narcissistic self-presentation is becoming part of contemporary youth culture. The reason for this is straightforward. Young people believe this gives them the best opportunity to stand out from the crowd and

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be in a position to secure a better future (Gratton, 2011: 111). How have so many ended up on the edge of the precipice – staring down into the abyss of poverty?

The neoliberal global capitalism that started in the late 1970s must take a significant part of the blame for the fact that many young people today believe they may suffer poverty in the future (Atkinson, 2010). Poverty is spreading like an epidemic, not only in poor countries, but in the heart of the rich industrial nations. This trend has led to the claim that neoliberal globalization ideology is making the middle class poor. One could paraphrase this and say that globalization makes rich nations poorer and poor nations richer. Bubbles and economic crises are eroding the savings of millions of people. It's not only those who dropped out of school who end up joining the working poor, but also the unskilled industrial workers, the skilled industrial workers and craftsmen, because robotization forces even more workers into unemployment. At the same time, the middle class are being pushed into poverty because artificial intelligence is taking over many of the typical middle-class work functions. The retirees who lost their savings due to economic crises have also joined the army of the poor.

Young people at the bottom

At the bottom of the labour market we find the young people who dropped out of school. These young people never completed a trade education, such as carpentry, electrical engineering, plumbing, and so on. They wash cars, do part-time jobs in shops when there is demand, sell burgers in MacDonald's and other fast food chains. They help you find what you want in the big store chains and wash your windows. They often live at home, even though their peers have long since established a family (Shipler, 2005).

Some of them may manage to climb out of this economic hole; however, few will achieve this. It is those with talent and strong motivation to lift themselves out of poverty who will move up the social ladder. But, most of these young people will remain in poverty the rest of their lives.

It is not the alcoholic, the drug addict or the lazy person we are talking about here. The young people who have joined the working poor do the best they can. Their parents did the best they could too. Both groups are held down in poverty by a system that is served by having workers who are willing to work for a pittance. They do not try to change the structures that hold them where they are (Gratton, 2011). These are the apathetic young who are tired of political promises and empty promises. They don't trust politicians who are interested only in improving their own lot, and that of their children.

The fall

Young people who have become the working poor, their parents and their grandparents are not only poor, but also socially excluded from participating in the wealth they see around them (Chomsky, 2016a, 2016b). The sense of social

exclusion is the sense of having been ‘left behind’, of having been left out in the forest to die. The Ancient Greeks used social exclusion to punish their political opponents. Such a punishment is so extreme that death may seem a better alternative, as shown by the example of Socrates. Socrates chose to drink a glass of poison rather than be banished. The absence of contact with others, with the society one is part of, is the punishment borne by the poor. Punishment for what? They are being punished for not living up to society’s expectations regarding ‘education, education, education’ (Wakeling & Savage, 2015). Those who do succeed in becoming educated will, however, still find it difficult in the Fourth Industrial Revolution to secure jobs that correspond to their level of education (Wakeling & Savage, 2015). The few people who manage to educate themselves out of the working poor will end up in the precariat (Standing, 2014a).

The working poor live in their own residential areas. They shop in their own low-price stores. However, they are very aware of this separation from the rest of society (Monbiot, 2016: 9). Social exclusion is a form of loneliness that affects all age groups, but possibly it is greatest among the young working poor. Monbiot (2016: 10) writes: ‘Ebola is unlikely ever to kill as many people as the disease of loneliness.’ It is the social isolation and exclusion from the community, ‘the disease of loneliness’, that affects many around the world. We cannot manage on our own. That is why poor young people and other poor people seek to form a community together. However, this also reinforces the feeling of being excluded from the wealth of the gluttonous society. In addition, this community at the bottom of society reinforces social imbalances and reproduces poverty. The speed of the social collapse we see in the case of the precariat and the working poor can be compared with the rapidity of the spread of innovations. Those on the lowest rung of the social ladder who can be regarded as part of the working poor no longer have the dream of educating themselves for a trade or profession to support themselves in the future. Their dream is essentially linked to becoming rich and famous (Monbiot, 2016: 10). But, this will remain only a dream. Their lives are visible to others only when they take part in movements that will change the structures that hold them down. They will remain invisible until they begin to claim more of society’s economic surplus.

Invisible work

Much of the cotton that clothes are made from is picked by underpaid workers in poor countries. The health of these farm workers is also often affected by the poison that is sprayed on the fields to ensure maximum profits from the cotton plantations (Chomsky, 2012, 2016a, 2016b). After the cotton is classified and packed it is sent to countries such as Bangladesh, where new invisible underpaid workers produce clothes from the raw cotton. Thus, people don’t ‘see’ these workers when they buy suits or dresses in western stores. The clothes are labelled, given a brand name – and it is the quality and price that are in focus. The price is the most essential factor. The price is kept low

because the wages of the workers who make the clothes are extremely low. These workers in the global economy are the invisible poor workers (Hochschild, 2016: xi). The global production chain makes the poverty invisible for those who contribute to pushing prices further down when they buy products such as shoes or dresses.

In the industrialized world that largely buys these cheap clothes, many workers who previously worked in the domestic textile factories have been made redundant. The models who display the clothes such as dresses, suits, shoes, however, match the ideas the buyers have about the aesthetic (Stewart, 2016: 130–148). This presentation and advertising of the clothes make the workers behind these clothes even more invisible. A similar global production chain exists for most industries, including the food industry (Otis & Zhao, 2016: 148–169).

It is not only in the cotton and clothing industry that we find the invisible poor workers. Many businesses have seen the benefits of sending some of their operations to low-cost countries, for example to Bangalore in India. This may be part of their financial, informational, information technology (IT), sales or human resources (HR) operations. In those countries where operations are exported to low-cost countries, the pressure to reduce wages is also increased. The reason is straightforward. Global competition pushes down wages throughout the whole of the global production chain. This problem is very widespread. More than 50 per cent of all the Fortune 500 companies have outsourced much of the work to low-cost countries that they previously performed domestically (Poster, 2016: 87–113). The invisible workers are one of the factors that impact the future workplaces in the industrialized countries.

What is not shown when the poor workers in the global value chain are made invisible? What is hidden is, among other things, the structural constraints. Coercion and oppression need not be linked to personal relationships. Coercion and oppression, and in part violence, can be found in the structures created by the global value chain. However, one cannot mobilize anger and aggression against structures. Therefore, we often see frustration taking irrational directions, and leading to arbitrary violence and other social manifestations that seem completely irrational.

The prices of the goods we buy in the west often do not reflect the work effort that produced them. Prices reflect only how far down wages can be pushed to increase profits. Yet 50 years ago we could see the whole value chain in our local towns and villages in the factories and on the farms. During this period, trade unions were more effective in negotiating pay conditions whereas today this has become very difficult globally. Today, we are buyers of goods produced by poor workers in countries such as Bangladesh. We have become more concerned about the price of the goods than the conditions the workers who produce the goods work under. In the past, we could talk to the boss at the factory and respond through a trade union. Today, the workers in Bangladesh are unable to talk to, for instance, the boss in Wal-Mart or other chains. They notice only that their wages are reduced or when they lose their jobs because production has moved somewhere else, such as Mozambique, Zaire, Angola, Myanmar, or other low-cost countries. The global

value chain makes what was once visible to everyone in the factories into invisible work in, for example countries like Bangladesh and Myanmar.

The dream

All the young people that Shipler (2005: 231–235) talked to had a desire to continue their studies by going to college, because they knew it was the only way to get out of poverty. Many of their parents were unemployed, so they knew what poverty was in practice.

Most of their parents did not have a trade. Sixty per cent of the children Shipler interviewed wanted to be lawyers so they could help people. The ambitions and dreams of these teenagers (aged 12–14 years) were clearly evident. When asked where they thought they would be in 10 years, almost all of them answered that they saw themselves as doctors, lawyers, dentists, archaeologists, and so on. The vision of the future was bright and positive for them. However, the reality 10 years after they were first asked about their dreams was something quite different. Ten years later, most of them are now are poor young people without educational qualifications or work (Shipler, 2005: 233–242). Everything is possible until one's dreams are crushed in the meeting with reality.

The politicians have expressed a vision that all young people should get an education so that they can cope with the emerging economy. The new economy, no matter what we call it, will be characterized by the use of robots, informatization, digitization and computerization of work. In addition, value creation will be spread over the globe.

If nations are to succeed in such a situation, they must develop a focused strategy. China developed such a focused strategy in the late 1980s²⁰ for foreign investment in China. Bangalore in India has also developed such a strategy. They aimed to become world leaders in the software industry. However, in the process of transformation that we are now in, it would not be the right strategy to depend on the market for domestic development. We have seen the consequences of such a neoliberalist strategy in Wales and in West Virginia (the Rust Belt in the USA). The results are disappointing. Unemployment is high, pay levels poor and the level of education also poor (Ross, 2016: 42–43).

Sub-conclusion

The question we have investigated in this section is: 'How do the working poor constitute an aspect of the Fourth Industrial Revolution?' The short answer is: those who drop out of school in the west enter the ranks of the working poor. These people will be socialized into poverty. Through their defeats and failures at school, they have learned to become losers, the future working poor.

The working poor perform work that is essential for others so they can enjoy their lives and live in abundance. Social mobility is threatened by these new structures. The working poor are structurally locked into a poor existence,

without much opportunity to climb up the social ladder from their first job and upwards in the wages hierarchy.

Unemployment statistics are no longer as relevant as they were in the past. Unemployment may be low, but the working poor can barely live off their wages. The trends of more part-time jobs, mini-jobs and the flexibility of working life have created a new underclass below the precariat. They have jobs and are thus not included in unemployment statistics, but find it hard to get by despite having more than one job.

The more detailed answer to the question we have examined in the section is linked to the shifting of economic and social tectonic plates. The factors that will change the workplace of the future are automation, informatization, digitization, robots and informats. This shifting of economic tectonic plates will destroy the old economic and social continent, and create a new continent with completely new social structures.

This development creates new jobs in the industrialized world, even though the entrance fee in terms of expertise is high. Behind these new jobs, however, is a global value chain where invisible workers make this possible. The new continent consists of robots that perform work functions that were previously carried out by many workers. Productivity increases with the new technology. This applies not only to industry. For instance, in hospitals, robots are being developed for diagnosis, medication and operations, and to function as nursing assistants and nurses. Some businesses have developed receptionists in the form of holograms connected to a digital system. This development, however, demands more engineers in the software industry, which places the jobs of nurses and nursing assistants in the risk zone.

In the service industry, which employs millions of people in the west, we find hotel receptionists, restaurant workers, childcare workers, home helpers, cleaning workers, and so on. These workers are meeting strong competition for their jobs on many fronts, such as from immigrants and unemployed people. Consequently, wages are squeezed and working conditions worsened. This constitutes part of the structures that are creating the working poor.

The globalization of the workforce has led to global competition forcing down wages. When wages are forced down, profits increase for the few. This means that the numbers of the poor will increase, whereas the few become richer and richer. We will experience the economy being divided into four parts: first, the super-rich, also referred to as the 1 per cent class; second, the salaried élite consisting of the knowledge workers and innovation workers; third, the precariat, who will probably constitute the largest part of the workforce; and, finally, we have the working poor. There is much to suggest that those receiving welfare support will be forced into mini-jobs, as a consequence of measures such as the German Hartz reforms mentioned above. In this way, the working poor will increase in number.

The cocktail of lower pay, higher unemployment, rising profits and more innovations will most likely lead to continual stock market bubbles and economic crises, both large and small. These crises will spread extremely quickly

due to new technology. This will be particularly true of the new robotic systems that will control financial transactions. The rate at which these crises will spread will lead to instability and insecurity for everyone, but it is the working poor who will suffer poverty, whereas the wealthy will merely suffer limited adversity.

It is not new technology that causes millions of workers to lose their jobs and end up in the ranks of the working poor. It is solely an intentional political act that is the cause of this development. Robotization could, if desired, have resulted in increased productivity and value creation being shared by more people. In this way, poverty could have been abolished and working hours reduced. Many people could have had a better life with robots, informats, digitization and informatization. What is happening now is that we are creating a global underclass: the working poor. It is possible that a cocktail of frustrated groups within the precariat and the working poor will contain sufficient explosive force to change political structures in most societies.

The innovation worker and the knowledge worker

Description

Peter Drucker (1999a, 1999b) describes knowledge workers as those who use their intellectual abilities to perform their work. Florida (2002) takes this a step further and describes knowledge workers as the creative and innovative class. Lessard and Baldwin (2000) take a different perspective and call knowledge workers ‘net slaves’ who are victims of the new technology. Sennett (2006) regards knowledge workers as ‘the new spirit of capitalism’. Knowledge workers are thus difficult to define, and they constitute a multi-faceted group. What is common to this group is that they develop, transfer and work with symbols. In essence, knowledge workers are either employees in organizations or else they perform work activities for organizations in other ways, such as consultancy work or contract work. In some cases, there may be an unclear boundary between knowledge workers and knowledge entrepreneurs. What distinguishes the two groups is that knowledge workers generally have permanent well-paid jobs, whereas knowledge entrepreneurs are often hired on temporary, insecure contracts.

Innovation workers and knowledge workers belong to the salaried élite, the well-paid section of salaried employees. Both innovation workers and knowledge workers adhere to the idea that only a postgraduate education, such as a Master’s or PhD, can ensure a good job in the future, i.e. they believe such an education is necessary in order to be successful.

One of the results of globalization is that companies have realized that creativity, expertise and innovation are the new competitive parameters (Case, 2016). Profit relies heavily on businesses being able to bring creativity and innovation to the market (Bleuer et al., 2017; Xie, 2017; Zhao et al., 2017). This is where innovation workers emerge as being the solution to a problem. The problem is that businesses are unable to compete on costs, so therefore they must compete on innovation.

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Education in the global economy has become a commodity in line with other commodities. Thus, in the future, the quality, brand and reputation of educational institutions will be given greater emphasis. This will result in an increased emphasis on the ranking of educational institutions – that is to say, students from the best universities will be given more opportunities in their working lives (Savage, 2015: 221–257). Universities are popping up like mushrooms around the world. In China alone there were approximately 300 universities with 20 million students in 2008, and in that year, 6 million students graduated.²¹ This only reinforces the tendency towards gradation of educational institutions around the world. The consequences for graduates are obvious. The graduates from the less prestigious universities will have fewer opportunities in the job market, whereas graduates from the top universities will have the best opportunities. Savage (2015: 221) clearly states: ‘universities are affecting future careers’.

The time is past when higher education itself opened all the doors for future career opportunities (Savage, 2015: 290–296). First, the length and depth of an education are important. A Master’s or PhD is becoming a necessary condition to be being an innovation and knowledge worker. However, this alone is not sufficient. A decisive factor is the reputation, and hence the quality, of the university where one earns one’s degree. The élite universities open doors for those who want to be innovation workers and knowledge workers with future dream jobs. These will eventually join the salaried élite, helping to maintain the reproduction of social inequality (Savage, 2015: 222; Wakeling & Savage, 2015a). The mediocre and poor universities provide opportunities for those who will be knowledge entrepreneurs and will thus belong to the precariat.

We have visualized the innovation worker and the knowledge worker in their future roles in Figure 1.4.

Analysis and discussion

In this section we discuss the five elements in the above framework.

Pyjama-workers

Innovation workers who have relatively autonomous working lives are as likely to work in their pyjamas, and from their beds, as in the office (Tapia, 2009). This suggests that flexible working will become more in demand than work–life balance. Innovation workers will be able to manage their own working and leisure time. For an innovation worker, being at work is not the same as being at the office. Being at work means being engaged in a task, and then it is less important whether one is lolling in bed or wandering around the garden in one’s pyjamas. It is all about the product – not about clocking in at the office. The industrial logic in the minds of many managers hinders innovation processes, however, because these managers want to control and manage their workforce. It is very likely, however, that this kind of management style will soon be past its sell-by date.

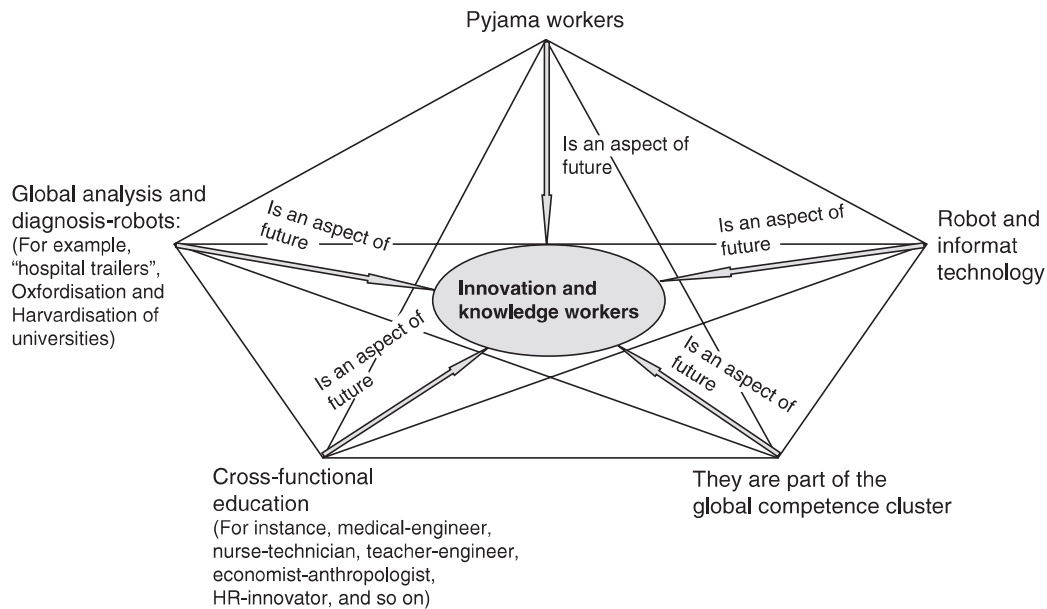


Figure 1.4 A framework for future innovation workers and knowledge workers.

What characterizes the innovation worker is that he or she is extremely connected in social networks. These workers largely belong to the millennium generation, those born between 1977 and 1997. We find them to a large extent in major global businesses such as Deloitte, Cisco, Bell Canada, Jetblue, Google, Apple, NASA, Facebook, Proctor & Gamble, Nike, Lockheed Martin, and so on (Meister & Willyerd, 2010). These people are extremely committed to what they are working on. Their social life is largely their work, and they are what may be termed ‘über-connected’ (Meister & Willyerd, 2010: 122–124). The businesses where innovation workers work largely use social media to develop their reputation (consumer brand) (Meister & Willyerd, 2010: 123). In the future, it is the reputation of the business that will be a key factor in its success. Therefore, it is crucial how the business is perceived by the outside world. The same goes for the innovation worker. His or her reputation is his or her trademark.

In the global knowledge economy, the office of the innovation worker and the knowledge worker will be wherever they happen to have access to their digital technology. This technology may be embodied in a smart phone, laptop, robot computer, ‘holographic machine’, nano-technology, etc. (Avent, 2016). He or she can thus work lying in bed in pyjamas, or at a café bar.

As a rule, the innovation worker will want to work at ‘third places’, not at the location of the actual business, nor at home, but at a third place, such as a holiday cabin, a coffee shop, a hotel, on the train, at the airport, on the beach or on a hiking trip in the Alps, and the like. The pyjama workers work where they are most creative, and this is rarely at a fixed office location from 9 to 5.

It is important to note that, although innovation and knowledge workers are creative and skilled, their success is often linked to the team they work with (Grant, 2014). In the global knowledge economy, this team is spread out across the globe. Consequently, innovation and knowledge workers often work in global competence clusters.

This insight will most probably lead to hiring and problem-solving processes for innovation workers and knowledge workers, veering away from the employment of individuals and towards hiring entire teams. It may also be imagined that teams are used in the innovation process, without actually employing the team. This process may be called ‘crowdsourcing’, a term introduced by Howe (2006). Specifically, this means that businesses, such as Lego, Procter & Gamble and Boeing use ‘the wisdom of crowds’ (Suro-wiecki, 2005) to solve problems. Grant (2014) also found this to be a success factor in his research. The teams may be located in the global space in global competence clusters. Global competence clusters are not geographically located in one place, but are spread over the global social network. They come together when there is a problem that they have special talents to solve. Global competence clusters may be imagined as being activated in response to a specific problem. The problem is then solved by the global competence cluster working in unison. Once the problem has been solved, the specific global competence cluster is dissolved.

A controversial proposal, but certainly a realistic one, is that innovation and knowledge workers will have a preference for electing their own leaders. There are already businesses where the head manager is appointed by the board, whereas the middle managers are elected from and by the employees. Meister and Willyerd (2010: 224) refer to W.L. Goore & Associates, where the head manager allows employees to elect their own middle managers. An important criterion for being elected is for you to have shown that you are a team builder and that you can make the team work effectively. In the example mentioned above, several selection criteria were used and analysed to select the leader. One of the benefits of this approach is reported to be a very low turnover of staff in the business (Meister & Willyerd, 2010: 222–226).

Robot and informat technology

Our assumption is that jobs and careers in the future will be under pressure due to many factors. The two most important factors are probably global competition and new technology.

Global competition will most probably lead to the greater part of jobs being affected. In this context, average wages will be reduced, although productivity will increase radically (Avent, 2016).

Productivity will be greatly increased due to new technology (Abd, 2017; Wilson, 2017). The new technology, consisting of robots, artificial intelligence, informats, nano-computers, analysis and diagnostic machines will take over parts of, and in some cases entire functions and processes of, jobs previously carried out by people (Wilson, 2017; Zhao et al., 2017). This is not a case of 10, 20 or

30 per cent of the jobs, but as high as 50–80 per cent of jobs being taken over by the new technology, such as robots and informats.²²

The extent of robotization will vary from country to country. Countries that produce robots and sell them on the international market will be able to increase employment. In this context, Ross (2016: 40–41) mentions countries such as South Korea, Japan and Germany. Low-cost countries, such as China and other countries, will be the most vulnerable to this development. However, these countries will also be able to adjust to robotization, but will have to make great efforts to retrain workers, and reform their educational systems to a large extent. If unskilled workers are going to have any hope of getting a job, they will have to retrain to do jobs such as robot operators, robot technicians, robot engineers, robot designers, and so on.

Developments in low-cost countries may be compared with what happened to industrial jobs in the industrialized countries at the end of the twentieth century. One may imagine, for example, that the Chinese leadership could take a dual approach. They continue with their low-cost industry, while focusing on skills development in robot technology (Ross, 2016: 40–41). This may be achieved because the influx of people into urban areas is very high in China and supported by government policies. Urban growth in China has greatly increased in recent decades: in 1950, 13 per cent lived in urban areas, but by 2015 this had risen to 50 per cent. Chinese government policy is to increase this to 70 per cent by 2025.²³ This development will enable competence building, while retaining low costs on labour-intensive industry jobs.

Thus, the Fourth Industrial Revolution is not only making itself visible in the industrialized countries but also in those countries that are in the process of industrialization. If labour wages increase in China, one can imagine that China will subcontract and outsource work to countries such as Bangladesh, Zaire, Angola, Mozambique and other countries in Africa. The beginnings of such a strategy have already started (Gaskarth, 2015; Swider, 2015; Otis et al., 2016). Interesting in this context is the fact that the industrial wage in some Chinese companies (March 2016) is on a par with the industrial wage in southern European countries.²⁴

When labour costs increase, while robot technology is becoming cheaper because of mass production, more and more of industrial production and service production will be robotized. This will also force low-cost areas to transform to robot technology, which will open up the opportunity for countries such as China and Germany to educate the workforce, so it can adapt to the great transformation of work and economy.

Robots don't demand pay rises; on the contrary, they get cheaper and cheaper, because they are mass produced. Robots don't go on strike, so they are easy to manage. Robots don't criticize, so they are easy to lead. Robots don't have cultural hang-ups, so they don't generate social and emotional tensions. These are some of the factors behind the great transformation, the transformation of the workforce over a relatively short period through robot technology. This will apply to both industrialized countries and those that are in the process of industrialization.

They are part of a global competence cluster

The security, predictability and safety of permanent jobs in the industrial society will most likely disappear either completely or in part in the Fourth Industrial Revolution (Standing, 2014a; Varga, 2015; Wang, 2015). Innovation and knowledge workers will not need to adhere to a nine-to-five workday – a trend that will eventually spread to the entire workforce (Gratton, 2011: 196). When everything is changing, how can you succeed when you don't know what will be required of you in the future? There are three areas that will determine who succeeds and who fails. The first is their intellectual capital, which concerns the level of education. For the innovation and knowledge workers, this will require a Master's degree or PhD. However, a high level of education is only one necessary condition to achieving success. There are two other sufficient conditions that need to be in place if one is to succeed in the Fourth Industrial Revolution. One factor is social capital, which concerns the social network you are part of and how tightly knit the relationships are that you have in this network. The other factor is one's political capital, i.e. how close the ties are that you have to the person(s) who makes decisions that may affect your future. It is the system composed of these three factors that will be crucial to one's success, when all known work is transformed into something new and unknown (Kessler, 2017).

The rules of the game change when everything is transformed into something new and unknown. Consider companies such as Uber, Google, Instagram, Microsoft, Apple, Cisco, IBM, SunTrust, and so on. These companies behaved strategically, had an extreme customer focus and were capable of extreme change. However, the most important thing about these companies was that they changed the rules of the industry. This is what Christensen terms disruption (Christensen, 2016).

All the job experience we have gained is collapsing. Our future colleagues do not necessarily work at our place of work – they can be scattered around the world in global competence clusters. We do not necessarily have a fixed place of work to go to, but use locations such as coffee shops and the social areas in fitness centres to get in touch with our colleagues in the global competence clusters. Possibly, owners of fitness centres will identify this trend and install small and large office units and canteens.

A large Gallup survey has shown that only 32 per cent of employees are committed to their jobs (Meister & Mulcahy, 2017: 228). This implies that in the future employers should seek those who have talent and also a strong commitment to an idea. We also know with certainty that robots will eliminate bureaucracies and hierarchies. Consequently, when designing workplaces, one should think of functions rather than positions. The innovation worker and the knowledge worker can manage themselves, and do not need intermediaries to set the agenda for their work processes. On the other hand, there will still be requirements regarding which results should be delivered and when.

Workplaces built in the industrial era, with their bureaucracies and hierarchies, will be subjected to transformation. If they are not changed, they will be crushed by the new technology (Arnold, 2005; Bennis et al., 2012). The new organizations and new jobs will most probably be functionally, not hierarchically, organized. The new jobs will be organized in relation to people with talent, with ideas about what makes them feel passionate. Those who are not passionate about an idea will have no place in organizations of the future. The future organization of the workplace will crystallize into an emphasis on the organization's meeting with the customer, the user, the patient, the student, and so on. This design, based on experiences gained from meeting customers and users, will promote a front-line focus and will downplay the past functions of bureaucracy and hierarchy in the industrial society.

Cross-functional education

Robotization not only eliminates bureaucracies and hierarchies, but also changes the professions of knowledge workers. Susskind and Susskind (2015) say this will apply to doctors, nurses, teachers, accountants, architects, priests, consultants, lawyers, and others.

The nature of their work will be completely different from in the pre-robotized society. Robots and artificial intelligence will shatter both the form and the content of the traditional knowledge professions. If such an assumption proves to be correct, the question is: 'What will the content of the knowledge workers' jobs look like when robots take over many of their functions?' The robots referred to here are those driven by artificial intelligence and informats that, in addition to having artificial intelligence, are interconnected globally so they have access to the latest information and research results.

The positive aspect of this development is that industrial robots have created more jobs than they have destroyed.²⁵ For instance, this applies to welding robots, which require many substructures. The construction of these provides many developmental jobs in the outlying regions of Denmark, says chief economist Allan Lyngsø Madsen of Danish Metal.²⁶ Madsen's analysis is as follows:

If automation results in an increase in productivity of 15 percent, then employment will fall by 7 percent within the first three years. However, in the long term, employment will increase because the company will become more competitive and more orders will eventually be placed.²⁷

However, the weakness of such an analysis is obvious. If everyone were to do the same as Danish metal, and use more industrial robots, then this will only increase competition overall. The benefits of increased productivity in such a situation will not lead to more sales and more employees, but to increased global competition. This may be likened to standing up from your seat at a football match so as to see the game better. The first few who do this will see the game

better, but when everyone does the same then the advantage will be lost. Thus, Madsen's analysis is erroneous in the global competitive economy. Exactly the same reasoning may be used regarding the fact that competition from robots and artificial intelligence eliminates many of the functions that knowledge and innovation workers perform today. Therefore, it is crucial that the education system be reformed to meet these needs before robots make the current education system redundant.

If policy-makers choose to ignore what is happening to knowledge and innovation workers, then their policies will have fatal consequences for the education system, the professions and economic growth (Susskind & Susskind, 2015). It is not hard to understand the new developments that are emerging. The challenge is to get rid of ideas from the industrial society about how to manage and organize work. In addition, it will be a challenge to change many of the educational programmes so that they take into account the ever-increasing use of robots, informats and artificial intelligence.

Changing these mental models will be the hardest of all the tasks. The point is, however, that, if we do not change our ideas from the industrial society, the knowledge society's robots will change our perception of these ideas. Either we must plan our future ourselves, or there are other forces that will make us an obedient tool of their interests. 'Plan or be planned for,' said Ackoff (1989). This applies more than ever today.

Innovation and knowledge workers are experts in their field of study. What should we do with their expertise if a robot with its artificial intelligence coupled with all available knowledge in the global space (informats) can do the same, but with higher quality and safety, and lower costs?

In the near future, users will be able to come into contact with robots that have this expertise at a lower cost and higher performance. This will not necessarily happen overnight, but will be more like a cascade of incremental innovations. Each of these innovations will, like the killer whale, take a small bite from the profession's previous field of operation. Slowly but surely, robots and informats with their artificial intelligence will take over many of the professional tasks that are carried out today, for instance, the tasks of doctors and nurses in the medical profession. In the future, hospitals will become workplaces for engineers just as much as they are for doctors. Doctors and nurses will need a multi-education, i.e. they will possess engineering skills as well as having knowledge of anatomy and diseases. On the other hand, the hospital-engineer will also be educated in anatomy and diseases. Slowly but surely, the lawyer, architect, teacher, economist and HR leader will become assistants of their former assistants, i.e. the robots. In such a scenario, all of these professions will need to include robot technology in their education. Future educational programmes may thus be designed for the medical-engineer, the nurse-technician, the teacher-engineer, the economist-anthropologist and the HR-innovator, to mention just a few.

The future will not resemble the past for innovation and knowledge workers, but will be greatly impacted by the use of robots and informats. Thus, new ways of thinking, new educational programmes, new models and new mental tools will be needed.

Knowledge professions, such as the medical, legal and architect professions, will be greatly affected by the use of robots and informats. The expert has knowledge and experience. Much of this knowledge can be digitized and used in artificial intelligence systems. The same goes for some of the expert's experience. However, not all types of experience can be digitized. We do not yet have the means of digitizing the type of experience known as tacit knowledge. However, in the future this may become possible, using artificial intelligence. This would create a situation where robots and informats would also be able to learn from their experiences. This would pose further challenges for many professions that would have to rethink what is the purpose of their activities.

Companies that had to close down or were bought up for various reasons all have something in common: they ignored what was happening – new developments. They were not future oriented, i.e. they did not think from the future and back to the present. Instead, they thought from the past and then extrapolated the past into the future, i.e. they used history to look forward. The death rate of organizations is high in the knowledge economy. Of the Fortune 500 organizations that have been established since 2000, 51 per cent have closed down (Wang, 2015).

The workplace of knowledge and innovation workers is changing at an unbelievably fast rate. Changes involve where you work, how you work, whom you work with and when you work, and are taking on completely different forms than in the industrial society. Due to robots and informats, future organizations are learning machines that change in step with changes in the outside world. To achieve this, both big and small organizations must organize themselves to be flexible and change quickly. We can say that tomorrow's organizations must be able to change so they can create their own future. The leaders who are able to do this must also encourage their employees to be change agents, and focus on the use of new technology (Bratianu, 2015; Case, 2016).

Apart from pay, knowledge and innovation workers consider flexibility more important than anything else when considering a job offer (Meister & Mulcahy, 2017: 12). To achieve this, there has been a reinvention of goals, results and performance management that has taken another form. The knowledge worker wishes to have full flexibility in relation to where he or she works, when, how and with whom. To achieve this, he or she is willing to enter into contracts concerning what will be delivered over a specific period of time. This may be termed 'performance management', where it is the goals and results that are essential, not where you have your office. This development is already taking place in companies such as Adobe, IBM, General Electric, Microsoft, Accenture and Cisco, to name just a few (Meister & Mulcahy, 2017: 52). Furthermore, the knowledge professions are changing to such an extent that it is becoming more and more common for team intelligence to be crucial, not the individual's performance (Gant, 2014).

Global analysis and diagnosis robots

Traditionally, the patient visits the doctor when he or she doesn't feel well. However, by this time a threshold may already have been exceeded, so that the

doctor will need to prescribe medication, with the possibility that this may have side effects. However, if we imagine that everyone has access to a ‘diagnosis machine’ – let’s call this an online informat – then this would change the doctor’s work to a great extent. The diagnosis machine will, at a very early stage, be able to provide a report of any disease that is developing and give guidelines on what the individual must and can do to prevent or mitigate the course of the disease. One can further imagine small, mobile hospitals, which we will call ‘hospital trailers’, filled with technology that can diagnose, medicate, and make simple and complicated interventions. In such a future, the giant hospitals will become a thing of the past. They will become monuments from the industrial age, when size meant success. Today, an important argument is that large hospitals are needed because they provide a meeting place for all the skills that are needed, and that size means it is possible to buy expensive machines. In the near future, these skills will be found in informats. The informats will have more skills than all of the doctors put together in a large super-hospital. If the informats are mass produced, both of the main arguments concerning the need for large hospitals will not be applicable.

If we envisage this kind of future, our gigantic hospitals will be worthless as health-promoting institutions. We use the expression ‘hospital trailers’ to emphasize that size in the knowledge society is not a recipe for success. The Fourth Industrial Revolution will develop robotized and specialized small units that take account of customers’ geographical location rather than the system’s need for gigantomania.

The development of small robot systems that can carry out medical functions is already under way. Pacemakers and insulin pumps are two examples. At the University of California in San Francisco, they have their own robot that prints prescriptions without making errors. The normal rate of error among pharmacists is approximately 1 per cent per year, which for the USA amounts to approximately 37 million small and large errors in the handling of prescriptions (Steiner, 2012: 155). Similar robotization is occurring within reading, synthesis, hypothesis development and hypothesis testing of medical research (Susskind & Susskind, 2015: 49).

Using robots and informats in the future, a situation may be imagined in which, when the patient contacts a nursing-technician, it will be possible to carry out most examinations, diagnoses, medications and prescriptions. The medical profession in such an imagined reality will take on completely different roles. Among other things, it would allow the education of doctors to be more orientated towards the development of new knowledge, and not just the application of existing knowledge.

One can also imagine a new type of ‘barefoot’ doctor – a new profession whose education will provide them with medical, psychological, communications and technological competence. This new profession will function where today’s doctors practise. Medical education will in such an imagined scenario have the possibility of becoming more research orientated, by contrast to today’s medical education which focuses on research only to a limited extent.

The professions, businesses and organizations that do not adapt to new technology will disappear within the space of a few years. The new technology will be made up of robots, informats and artificial intelligence. In the Fourth Industrial Revolution, people will learn to live side by side with robots and informats that will have a greater logical intelligence and a much larger megamemory. The first mass production of robots will probably occur in relation to the care of elderly people. This will of necessity come about because elderly people (65+) will soon account for a third of the population. In the future, there will not be enough nurses or resources to take care of all elderly people needing care. Consequently, robots of various types will perform parts of elderly care that are provided today. Japan has the longest life expectancy in the world, and consequently the oldest population. The development of robots has been given priority in a number of Japanese companies, such as Toyota, Honda, Tokai Rubber Industries and AIST. Today, Japan leads the world in the development of robots. This applies to both nursing care robots and industrial robots. The next step we will see in the development of robots, says Ross (2016: 16–18), will be robots that are capable of emotional and social interaction.

However, there are several people who are critical of this development, including MIT's Professor Sherry Turkle. She questions the role of conversation in such a robotization, saying that the transfer of knowledge from the elder to the younger generation will also be jeopardized (Turkle, 2016). There is a possibility that the older generation will be able to transfer their skills to robots and informats. In this way, experience will not only be transferred, but also stored and used. The point that Sherry Turkle overlooks is that conversation and experience transfer can go through robots to the younger generation. With such a development, you will not lose the experience of elderly people, and conversation's art can be learned via an intermediary – the robot who converses with the elderly care patient. As the elderly population in the USA and Europe grows similar to the Japanese, the demand for care-taking robots will explode (Ross, 2016: 19).

The USA, Germany and Japan dominate the market for high-tech medical robots. If we also take into account South Korea and China, we have the five countries that produce and consume most robotic systems (Bond, 2013). The development of these robots is shown in sales statistics. In 2013, 1300 surgical robots were sold. This represented 41 per cent in value of the total sales of industrial robots. In the USA, more than one million people have undergone operations performed by robots, and the number is increasing yearly by 30 per cent (Ross, 2016: 32). This indicates that the use of robots in medical applications may currently be in its infancy but it will soon explode (Xie, 2017). In addition, medical robots will be able to reach places inaccessible to human surgeons, for example at the neuron level in the brain (Goldberg, 2000).

If the developments as described above stay on track, we will see the emergence of 'hospital trailers' sometime between 2023 and 2045.

The development towards 'hospital trailers' will become a reality when two factors are present:

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1. When nano robots see the light of day. These will be extremely small but will be able to carry out the diagnosis and medication of various diseases and measure blood pressure, blood sugar, detect the first signs of cancer tumours, as well as identify various threshold values that are important to keep under control.
2. When singularity occurs, i.e. when artificial intelligence becomes equal or better than human logical intelligence (IQ).

It is argued that singularity will occur between 2023 and 2045 due to Moore's law,²⁸ 'cloud computing', machine learning, 'telorobotics' and 'data analytics' (Ross, 2016: 26–27; Goldberg, 2000).

Sub-conclusion

The question we have investigated in this section is: 'How do knowledge workers constitute an aspect of the Fourth Industrial Revolution?'

Education is only one necessary condition for obtaining a good job. It is also important that one has attended one of the more prestigious universities. However, education is not enough. The sufficient condition is the reputation capital that you have. If you are known to be skilled in idea development, this will become your reputation capital. If you are skilled in executing ideas, then this will become your reputation capital. If you deliver products/services well above the average of the required parameters, then your delivery capacity will be your reputation capital, and so on. In the global economy, education, which university the individual has graduated from, his or her talent and his or her personal reputation are all factors that will secure a job as an innovation and knowledge worker.

When robots and informats take over some of knowledge and innovation workers' functions in organizations and institutions, this will lead to five obvious consequences.

First, *the bureaucracy* will partially disappear because the functions of the bureaucracy will be digitized and taken over by robots.

The second consequence is that *hierarchies* will change their form and character. The bureaucracy was an important component of the organizational hierarchy of the industrial society. When the functions of bureaucracy are taken over by robots, this means that the hierarchy will also be eroded, together with bureaucracy.

The third consequence is that *management roles* will change. There will be more focus on getting teams and projects to work optimally. At the same time, creating the future of the business will become an even more important task for the manager, because the rate of change will increase sharply.

The fourth consequence of pushing down costs and pushing up productivity is *the elimination of the middle class*, or at least it will be virtually decimated. The logic is simple. The middle class is largely linked to control and communication

functions in organizations and institutions. It is precisely these functions that robots and informats will take over.

The fifth consequence of the developments described above will be *an increasing inequality in income* between the innovation and knowledge workers, on the one hand, and the precariat and the working poor, on the other. At the same time, we will see a greater income gap between the various sectors in the precariat, which we have described above. In addition to this, those who own capital will receive even higher capital income because of the increase in productivity and the reduction in costs due to global competition. The sum of these developments will be an increasing inequality between wage earners. At the same time, we already see a growing inequality between the income of employees and those who live from profits.

Conclusion

This chapter has explored the following question: ‘How does the workplace of the future constitute an aspect of the Fourth Industrial Revolution?’ The short answer is that we are witnessing the development of four types of workers: the precariat, the working poor, innovation workers and knowledge workers. We have structured these four types of workers into a typology. We have described, analysed and discussed each of the four types.

What we can say at a more general level is that robotization will transform all the familiar aspects of our working lives. In only a few years from now, robots will have taken over most of the functions that we currently take for granted as part of our jobs. There will be changes in all sectors. Farming will be digitized and robotized. Already we see farmers using drones to make aspects of their work easier and safer. Tractors will be increasingly self-driven. Drones will monitor how fast crops are growing, identify pests and conduct precision-spraying in order to combat plant diseases.

Many of the same developments will apply to fisheries. Instead of flying drones, we may envisage submarine drones that detect shoals of fish and tell robots on deck how, when and at what depth to cast the nets. The boats will not even need to be crewed in order to return to shore. A completely automated fishing boat is just as realistic a prospect as a self-driven bus. In industry, industrial robots have greatly changed the nature of many jobs. In the service industry, Manchester Airport now has a robot cleaner. We already have robots that care for elderly and sick people.

Hospitals will change character. There will be no need for large hospitals to establish a greater competence environment. Compact ‘hospital trailers’ will be able to carry out diagnosis, medication and surgical procedures, as well as follow up and perform corrective procedures if required.

In the education industry, this will be completely globalized, especially from around 2025 when we will see the emergence of simultaneous interpretation robots that use nano-technology and are implanted in the ear without being visible. When, not if, this happens, we will experience global competition at

university level. In such a scenario, we will truly experience university educational programmes at various levels.

Robots will take care of the growing elderly population, and robots will make life qualitatively better for disabled people. One might ask what type of education young people should embark on today to prepare them for the Fourth Industrial Revolution. The only answer that can be given is that you should take a long education, preferably at a university ranked high on a global scale, and a postgraduate degree such as Master's or a PhD. What field of study you choose is of less importance; the basic rule is that you should do what you are passionate about and good at. If, on the other hand, you want to start your own business in the global economy, you should take a year or two to travel around the world to investigate what's lacking and which problems you want to solve, because all innovation is based on a problem or lack of something.

Whatever you choose to do in the future, new technology will be an essential part of what you will be dealing with. On the other hand, technology is not the most important factor for the young person deciding what to do with their future. It is to learn how to think, which will distinguish the person who is successful from the one who isn't. The reasons are straightforward. In a world where everything is digitized and education is linked to robots, informats and artificial intelligence, the person with a unique competence will be able to think differently, and at the same time understand how others think. It is this competence that will create that which is innovative, and succeed, with both innovations and new businesses. It is these people who will manage 'merging concepts', which are crucial to creating the new that the world has not seen before.

With regard to future education, it is probable that a type of hybrid education linked to classical subjects such as philosophy, creativity and philology will emerge, and capture a large share of the market. Examples of possible hybrids are philosophy, technology and culture, or biology, technology and philosophy. The hybrids will make it possible to merge and create a new synthesis of concepts. This is important because innovations almost always occur at the boundaries between the various disciplines, for instance bio-technology, nano-technology, etc.

A positive development at the start of the Fourth Industrial Revolution is that technology and international trade have resulted in, among other things, 400 million of China's population emerging from poverty, and about 200 million well-off people in the growing middle class in that country, with a similar income to the middle class in the industrialized countries. In addition, the percentage of people in the world living in extreme poverty and suffering from hunger has been greatly reduced.

Despite of these developments in countries such as China, we have witnessed an ever-increasing transformation of the work of millions of people around the world, because of digitization, robotization, informatization and global free-trade capitalism forcing people out of work.

Robotization will most likely crush the middle class in the west, and move them to other parts of the social hierarchy, such as the precariat, the working poor, as recipients of a citizen salary, and in a few cases they will advance to the salaried elite.

There are four scenarios that will probably develop in the Fourth Industrial Revolution. First, there is much to suggest that there will be a development towards some form of citizen salary being paid to a country's inhabitants. Second, one can also imagine a reorganising of the workday from, for example, eight hours to four hours. The third scenario is that we will witness mass unemployment. The fourth scenario is linked to the first three. The fourth scenario is based on the four working groups we have described, analysed and discussed in this chapter.

The fourth scenario sees the development of a whole new structure of working life. A small propertied class, about 1 per cent of the population, will be super-rich. A small percentage will belong to the salaried élite. Then we envisage a large precariat that live from selling their expertise and labour through temporary contracts. At the bottom we have the working poor who will need several temporary part-time jobs just to survive. Outside of this hierarchy, we will have those living on a small citizen's salary. We have illustrated this new social stratification in Figure 1.5.

The trend we are witnessing gives rise to the following question: 'Will we see the development of technologically driven unemployment due to robots, informats and artificial intelligence?' There can be no doubt that it is unskilled workers who are under threat from the technological developments, the first outlines of which we are now seeing. The next important question to investigate is: 'How can we ensure a decent standard of living for those who, for various reasons, drop out of education?'

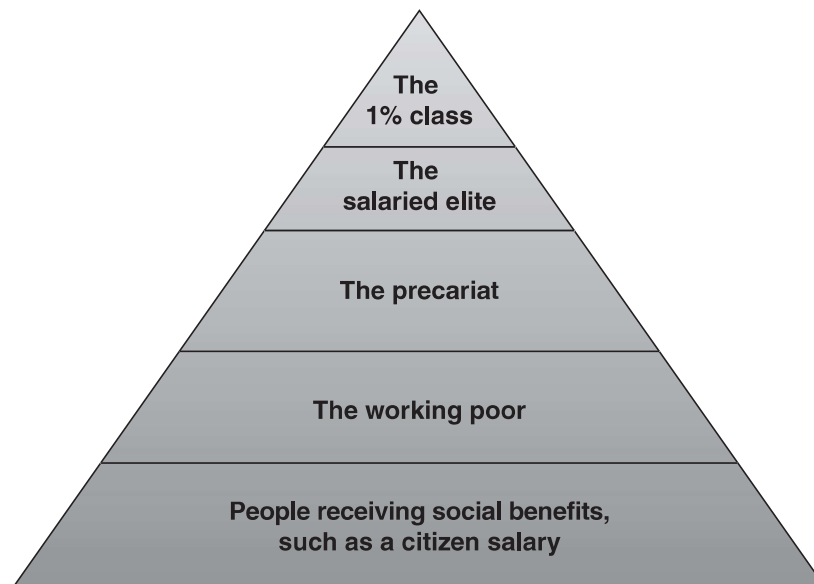


Figure 1.5 The new social stratification in the Fourth Industrial Revolution.

Notes

- 1 The Danish newspaper, *Politikken* (26 February 2017) refers to a report finding that the jobs most likely to proliferate are those with an average monthly pay of DNK 70,000 and those with an average monthly pay of DNK 20,000.
- 2 The word ‘robot’ was created in 1920 by the Czech author Karel Capek in his play *Rossum’s Universal Robots*. The word is an amalgamation of two words: the Old Church Slavonic word *rabota*, which means servitude, and *robotnik*, which is a Czech word for slave. In Capek’s play, robots are a new class of artificial people who are enslaved by humans.
- 3 Informats are robots that are globally interconnected.
- 4 www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford_Martin_Now_for_the_Long_Term.pdf.
- 5 Ross was part of both the Clinton and the Obama administrations.
- 6 The term ‘precariat’ is derived from precarious, meaning insecure/risky. In an employment context, it is difficult for holders of precarious jobs to plan for the future.
- 7 Guy Standing, interview with *Politikken*, 28 August 2016.
- 8 ‘I protect, therefore I obligate.’
- 9 Guy Standing, interview with *Politikken*, 28 August 2016.
- 10 Guy Standing, interview with *Politikken*, 28 August 2016.
- 11 *The Independent*, 14 November, 2015.
- 12 See the report ‘Freelancing in America’ referred to in Meister and Mulcahy (2017: xiv).
- 13 Many of these websites are mentioned in Meister and Mulcahy (2017).
- 14 Quoted in Ainley (2014: 26).
- 15 Renana Jhabvala in ‘The self-employed women’s association of India’ in the reviews, in the first pages of Standing (2014a).
- 16 https://en.wikipedia.org/wiki/Mini_job (date of access: 3 March 2017).
- 17 https://en.wikipedia.org/wiki/Mini_job (date of access: 3 March 2017).
- 18 The description of the Hartz reforms was accessed from: https://en.wikipedia.org/wiki/Hartz_concept (date of access: 2 January 2017).
- 19 https://en.wikipedia.org/wiki/Hartz_concept (date of access: 3 March 2017).
- 20 The strategy was developed around 1988 when Deng Xioping formulated the thesis that China should export to increase the country’s wealth by allowing foreign investors to invest in China. His idea was: it doesn’t matter what colour the cat is as long as it can catch mice. The explanation is that capitalists can invest in China as long as the Communist Party is in control of social development and they can make China into a rich country (Pantsov, 2017).
- 21 By the end of 2004, there were 2236 colleges and universities, with over 20 million students enrolled in mainland China.^[1] More than 6 million Chinese students graduated from university in 2008.^[2] The ‘Project 211’ for creating 100 universities began in the mid-1990s, and has merged more than 700 institutions of higher learning into about 300 universities. Corresponding with the merging of many public universities, has been the rapid expansion of the private sector in mainland China since 1999. As of 2006, private universities accounted for around 6 per cent of student enrolments, or about 1.3 million of the 20 million students enrolled in formal higher education (https://en.wikipedia.org/wiki/List_of_universities_in_China, date of access: 21 February 2017).
- 22 There are numerous indications that robots, informats and artificial intelligence will take over most of the work activities that people now perform. Among those who have written about this development are Standing (2014: viii); Meister and Mulcahy (2017: 189); Coates and Morrison (2016: 23–59); Grain et al. (2016); Ross (2016: 19–32); Bond (2013).
- 23 The figures are from Ross (2016: 41).
- 24 *Politikken* at the end of February 2016.

- 25 *Politikken*, 24 February 2017.
26 *Politikken*, 24 February 2017.
27 *Politikken*, 24 February 2017.
28 Moore's law states that computing power will double every second year.

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