

Urbanisation and Automation: How will Automation Change Urban Life?

1. Introduction – Automation & Urbanisation

The *Digital Revolution* (⇒ 2) refers to the ongoing trend of Digitisation, Automation and its tremendous impact on the way we live and work. It will not just change labour but also urban living and cities. In particular, the impact of automation generates opportunities but also creates social, political and urban risks. Two prevalent trends – automation and urbanisation clash and change the world of work, corporations, the economy (towards an *On-Demand-Economy*, ⇒ 7), social classes and urban living. Considering the example of Bristol, as a major city in the UK, it is possible to imagine potential developments, both factors, urbanisation and automation, will increasingly intertwine – they generate a range of futures. To create these different scenarios, significant drivers need to be considered and evaluated. As a starting point, a worst-case and a best-case scenario act as a frame, containing many different possibilities in between.

The concept of *horizon scanning* will be applied to the combination of the two factors of urbanisation and automation. The presentation of strategies to overcome the worst-case scenario serves as an orientation towards a socially fair and sustainable urban life.

2. Automation – how will it affect our lives?

Throughout history, labour and urban living have undergone continual transformations. In the industrial era people started to live in densely populated cities to fulfil work in factories. The *Industrial Revolution* is marked by a creation of jobs, resulting from the invention of machines, which allowed a high-productivity in manufacturing. Since then, machines have steadily replaced jobs that had been performed by humans (Bollegala, 2016). Automated machinery can reduce labour costs and expand productivity at the same time. Nevertheless, new jobs evolved, and sectors shifted. Zysman states that we are experiencing a fourth service transformation – an *algorithmic revolution* (2006). Technological advancements, such as digitisation, artificial intelligence, 3D printing and automation, are the prevalent drivers of. Increasingly, machines, computers and robots can do cognitive work as well as routine and non-routine work – and even work that goes beyond human abilities. In some respects, human labour becomes substituted and redundant as machines can reduce errors, improve quality and speed (Maxton & Randers, 2016; Manyika et al., 2017).

Automation might disrupt traditional industries and people's lives, but as before, the new revolution of automation will also lead to a creation of new jobs and result in a flexibility of work, if it is managed well.

Automation will increasingly affect various human living conditions, directly and indirectly. Technology re-shapes production, consumption, transportation and logistics systems. An implication will be the loss of certain occupations and perhaps an overall reduction in employment. In the UK, losses up to 15 million are predicted over the next twenty years (Frey & Osborne, 2013). Even 40% of all jobs in the UK (and 47% in the USA) are threatened by automation (ibid). In particular, half of the middle-class jobs are expected to be replaced, especially in the fields of logistics, haulage, financing, (repetitive) service-sector, food-service, retail trade, production, administration (Manyika et al., 2017). 702 job types are threatened to vanish over the next two decades (Maxton et al., 2016). Jobs which include “personal care, creativity, dexterity, perception, social intelligence, and originality” are rather safe (ibid). Occupations involving high levels of skills and education (well-paid) as well as those requiring “dexterity, repetitiveness, creativity, or physical presence” (low-paid) are likely to prevail (ibid).

The process of automation started in the industrial era, but the pace varied and will vary in each industry sector (ibid). The situation causes indirect effects such as a fall in real wages in the UK and unstable under-employment contracts, also called zero-hours contracts (Maxton et al., 2016). As the term *socio-economic* indicates, the economic status also determines a (⇒ 8) social (in)stability. Nevertheless, automation has the possibility (⇒ 4) of a new orientation within the world of work and consumption and foster lives of everyone. It is crucial that a transition should be (⇒ 9) managed politically to assure everyone benefits from automation, but as the predictions rather suggest, social disparities and inequality in society and cities as Bristol will exacerbate, if the status quo of the use of automation continues to be within current economic and political models.

In Bristol, the city council acknowledges the risks and chances by formulating a *One City Plan*. It involves influential people of the public and voluntary sectors as well as leaders of 150 business for a joint project to “solve key challenges such as driving economic growth for everyone” (Bristol City Council, 2017).

3. Will urbanisation result in a deurbanisation?

Worldwide, a steady trend of urbanisation continues. Megacities are evolved in developed and developing countries. People migrate to urban centres in the hope of better economic chances as well as for cultural and social variety. Cities have become the preferred places to live. Whereas just 15% of a global population of 1.5 billion people lived in cities (in 1900), by 2000, 47% of the global population lived in cities (Girardet, 2004, p. 3). Looking at the future of the world is bound up with looking at the future of cities. Numerous and individual drivers can be identified for the urbanisation trend. Firstly, an internal factor should be mentioned: the reproduction of the urban population itself – in many developing countries fertility rates are still relatively high although in developed countries rates are sometimes below replication levels.

One of the most prevalent factors why people migrate to cities from rural areas might indeed be a pursuit of economic opportunities as cities are “engines of economic power [...] where

great wealth is generated and where most consumption takes place” (ibid, p. 7). Economic growth is self-enforcing due to a well-developed infrastructure, globalisation and *Import Substitution* (policies to favour local products and domestic producers over imported products). Cities offer a superb provision of health, education and multiple other services (ibid, p. 88). Rural areas tend to be structurally disadvantaged in terms of digital connectivity, technological development, mobility, energy supply, cultural offerings, social and health services (ibid). Cities are the centres of political and financial power whereas inhabitants of the rural area tend to have the feeling to be left out (⇒ 8) (ibid).

Bristol can be taken as an example of a growing urban centre. It has the second largest economy in comparison to other cities in the UK and belongs to one of the core cities in the UK. Bristol is also one of the fastest growing cities in England (Cities of Migration, 2015; British City Council, 2015, p 13). As many booming cities, Bristol can be characterized as a city of diversity in terms of culture, population, age and social classes. However, exacerbating social disparities, homelessness, a gap between rich and poor have to be noted, as well. (Cities of Migration, 2015; 100 Resilient Cities & Bristol City Council, 2016). Bristol is the home of a disproportionate amount of young people as well as a forward-looking city (Bristol City Council, 2017b). It takes effort to become a resilient city. Furthermore, it is projected to expand - 2013: 437,500, 2016: 454,200, 2027: 500.000 and 2039: 545,600 (Bristol City Council, 2015, p 13; Bristol City Council, 2017b). The Bristol city council might expect the best-case scenario of the outcome of the enduring automation. The trend of urbanisation will only continue if it is affordable to live in a city - at least for the middle class. Due to a (⇒ 8) loss of jobs of the middle class and a change towards a (⇒ 6) smart city, the city council might want to take efforts to keep socio-economic equality in balance (⇒ 9). Otherwise, an even more widening social gap would adversely affect the social climate and the feeling of belonging in a city (⇒ 8).

Smart cities might prosper and be attractive to well-educated people (*Brain Drain*), but the clear majority of the middle-class will be displaced due to a lack of jobs and increasing living costs. Cities are in danger of becoming an exclusive place for people who benefit from automation. Cities would increasingly be gentrified. Considering this aspect, it might lead to a *deurbanisation*. Digitisation, automation and a better energy supply (for example by locally produced renewable energy) might also improve living conditions in the rural area. As a digital infrastructure exists, rural areas could benefit from a better supply of services, as machines can replace strongly needed specialists. Better digital connectivity would not convey the impression of being left out in the rural country (⇒ 8). The emergence of the (⇒ 4) *Emergent Service Sector* might also foster the local creative, social care and service sector and add to the attractiveness of towns and villages. Introducing a *Universal Basic Income* (UBI) (⇒ 9) carries the opportunity to foster cultural and social life in a town or city. Increased community, creative and social work within a municipality might strengthen the wish of living outside a city (⇒ 4). As the factor labour becomes less significant (as machines have taken over most of the jobs), the main reason why people moved into cities (economic opportunities) is not valid anymore. The trend of working from a *home-office* is likely to continue and to increase, as well (⇒ 4). Employees have no necessity to live close to a corporation’s location anymore. Consequently, it would be more attractive to live outside a city again. Furthermore, traditional industries are shrinking. As most of such industries are located close to big cities there is the

danger that cities experience a similar fortune as Detroit, Michigan, which has suffered from a shrinking automobile industry and deindustrialisation – leaving former factory sites devastated. Social disparities increased tremendously, and Detroit remains divided along economic lines. To manage the impact of a deindustrialisation, promoting flexibility and mobility with public funds might be an answer to urban decay (⇒ 4).

Nevertheless, automation might offer opportunity for a sustainable and socially fair urban living, if it was managed politically (⇒ 9). Of course, there are strategies which could reduce the impact of a loss of occupations on urbanisation, as for example providing sufficient social housing. In the case of Bristol this seems to be a challenge, as problems to supply the current demand have already existed. At least 18,800 affordable homes are predicted to be needed between 2016 and 2036 (Bristol City Council 2017, p. 2). Moreover, “the explosion in house prices pushes out residents. There is little social housing – from roughly a third of Bristol’s housing in the 1980s, it is now just 20%” (Gilling, 2018). The market itself might not provide social housing and solve the housing affordability crisis on its own. Otherwise, cities might lose their authenticity, culture and diversity to automated cities and corporations (⇒ 6, ⇒ 7).

4. Flexibility of work and social classes?

The world of work will tremendously change in terms of quantity, structure and quality. The number of worker needed will likely diminish overall. The quality of work will be different. Although both lower and upper class jobs will change it is especially middle-class jobs that will be affected (Manyika et al., 2017). The term *socio-economic* status illustrates the intertwinement of social and economic factors. An economic change consequently implicates changing social classes, as well. Change will also bring new jobs and shifts towards the creative, social care and cultural sector.

Increasing automation might lead to softening class boundaries. In the UK such a trend can be already be seen. A new social class has emerged belonging to the *Emergent Service Sector*, including 19% of the British population (Savage et al., 2013, p. 230). Emergent service workers seem to contradict the term socio-economic as they receive a “poor economic capital, though with reasonable household income, moderate social contacts” but a “high emerging (but low highbrow) cultural capital” (ibid). Mostly, they are young and live in cities – consequently, Bristol is likely to have a strong *emergent service sector*. Typical occupations comprise “bar staff, chefs, nursing auxiliaries and assistants, assemblers and routine operatives, care workers, elementary storage occupations, customer service occupations, musicians” (ibid, p. 232). The jobs are associated with the mentioned creative, social care and cultural sector. The new, emerging sector might correlate with the process of automation. Consequently, the trend of a growing number of people having low economic but high cultural capital might extend further and weaken prior class boundaries. The new trend might also overspill to towns and villages on the long-term scale.

The rising significance of the creative, social care and cultural sector for people to find jobs could be encouraged by cities and towns to face a flexibility of work. It would also add to the attractiveness of a city/town. Cities like Bristol could react to the phenomenon by providing

community services and social housing. Promoting a non-profit sharing economy might serve the social trends most adequately. As economic capital of the middle class diminishes, it is reasonable to share the consumption of resources which are difficult to afford and whose usage does not require a possession. It also helps to establish a resource-friendly and carbon-free economy. Cities could support (⇒ 9) community-led enterprises and local economy.

Due to current advances in digital technologies, most work by humans is done in front of a machine. The trend of working from a home-office has already been promoted by many corporations. It allows a better work-life-balance and self-determination. Furthermore, it encourages employees to work from different places. Employees would not be dependent on a city – and its urban difficulties, like traffic and pollution. As employees would be more balanced and healthy, they are able to do better jobs. Therefore, corporations might think about promoting home-offices more frequently and improving working conditions. Encouraging home-offices could reduce (⇒ 3) urban risks and contribute to a flexibility of work.

Technological advancement and flexibility of labour go hand in hand. Increasingly, technology and the provision of online platforms, such as Uber or AirBnB, have enabled a shift. This is popularly known as the 'gig' or *On-Demand-Economy* (⇒ 7).

In general, mobility and flexibility could be supported by the public sector. Many newly unemployed will require help for reorientation and training. Firstly, a dynamic open-for-all education/trainee programme, oriented on the future demand of jobs, could be a possibility to manage a transition towards new developing sectors and jobs (Frey, 2018). It is likely that new jobs will be created by technological advancement. So, people would need to move where the technology is pointing (ibid). Accordingly, relocation assistance funded by the public sector could encourage mobility – former low-paid employees could not afford to move to another city otherwise (ibid). The traditional industries are shrinking. As most of the industries are located close to cities, people would have to move to where new occupations are created.

The Bristol Local Plan acknowledges the need of emerging industries and suggests that “start-ups and the growth of micro and social enterprises will be promoted” (Bristol City Council, 2018, p. 46). Seemingly, Bristol might be able to cope with the change of work (⇒ 5).

5. Bristol - can it cope with the change of work?

Bristol will (⇒ 3, 6) change in the future. Different questions and aspirations go hand in hand with the development of a city. How can aspirations like: promoting collaborative working, fostering ownership of future priorities, citizen shaping the future of the city as well as promoting prosperity and wellbeing through innovative forms of financing, employment and sharing resources “that value local social and natural capital” be realised (Bristol City Council, 2015, p. 6)?

Looking at the status-quo, Bristol is a prosperous city, whose “economic strength comes from knowledge-rich businesses and entrepreneurial activity, particularly high tech, creative and digital industries” (Bristol City Council, 2015, p. 6). Consequently, Bristol’s economy matches with future sectors and has already changed from traditional industries to resilient areas of

work. This corresponds with the fact that there is “a lack of access to lower skilled occupations, with over 45% of claimants looking for work in the retail sector” (Bristol City Council, 2015, p. 22). Automation has already replaced local retail jobs to a vast extend. It is likely to continue reducing the demand of labour. Accordingly, 45% of claimants had to downgrade from middle-class to lower-class. Bristol has a highly skilled workforce and 40% of all jobs are located within or around the city centre (Bristol City Council, 2018, p. 47).

The city council has ambitious plans to transform Bristol into “a leading European city for innovative industry, enterprise, culture, environmental quality, lifestyle and urban design, reinforcing its status as a European Science City and Green Capital” (Bristol City Council, 2018, p. 16). Bristol has acknowledged the change of industries and tries to be “attractive for investment in the industries of the future” (ibid). To avoid a similar development as cities as like (⇒ 3) Detroit had to experience, such an approach is a fruitful prevention of unemployment and exacerbating social discrepancies in a city. Nevertheless, it might not make up the existing and predicted loss of occupations. Therefore, further measurements are encouraged to be taken (⇒ 9).

6. Bristol becomes smart – is it smart to be?

Bristol is on the way to being a smart city. Such ambitions are explicit in the *Bristol is Open* plan. It is a joint venture between the University of Bristol and Bristol city council to provide research and development initiatives which will lead to a development of a smart city, highly affected by the ‘*Internet of Things*’. The project involves partners from “large telecom and software companies, small hi-tech start-ups, public service delivery organisations, academics and others” (Bristol is Open, 2018). By now, Bristol has become the smartest city in the UK (Cabot Institute Blog, 2018).

Accordingly, small sensors (including smart phones, GPS devices) carried by inhabitants will connect into three new networks in the centre of Bristol and generate information “about many aspects of city-life, including energy, air quality and traffic flows” (Bristol City Council, 2015, p. 16). The generated data will be accessible on an open data portal. “The project is particularly enabling Bristol to be reflective by developing an environment for new technologies to be tested, and allowing partners to learn” (ibid). Becoming a smart city can be identified as a major driver of city-change. Bristol has prospects of becoming a smart city that welcomes initiatives of digitisation and automation.

Furthermore, the city council indicates that digital “connectivity is vital to the city’s economic performance and in ensuring that economic growth is inclusive and benefits everyone” (Bristol City Council, 2018). One needs to be careful to limit the scope of the complexity of automation. Digital connectivity will neither reduce automation’s impact on employment nor be inclusive and beneficial for everyone - if it is not managed well. Being a smart city bears a huge potential, but risks need to be taken into account. Correspondingly, the process towards an incorporation of the *Internet of Things* should be monitored. The *Internet of Things* refers to a connectivity of physical devices using “embedded sensors, actuators, and other devices that can collect or transmit information about the objects” (Bauer et al., 2014). The collection of open data can be

analysed and used for optimising services, products and processes. A smart city uses information and communication technologies to enhance and develop the municipal infrastructure, city services (as energy, building, water, sewage, traffic), social inclusiveness and green growth using open data. It also bears huge potential as the “*Internet of Things* will be the most important source of growth [...] over the next several years—more important, for example, than trends in wireless computing or big data” (Bauer et al., 2014). The *McKinsey Global Institute* estimates that the *Internet of Things*’ influence “on the global economy might be as high as \$6.2 trillion by 2025” (Bauer et al., 2014). Consumer, healthcare, and industrial segments might possibly be affected (ibid). *McKinsey Global Institute* encourages that customised supply can be achieved efficiently by machines and “outweigh challenges” (Bauer et al., 2014).

The approach promotes an impression of a “technocratic mode of urban governance which presumes that all aspects of a city can be measured and monitored and treated as technical problems” (Kitchin, 2013, p. 9; Hill, 2013; Haque, 2012). It conveys the impression that a city would be manageable if only we had sufficient data. Though, urban risks cannot be solved by technical solutions as a city does not include specific knowable and definable parameters. The social dimension cannot be reduced by applying technological solutions, particularly. Social problems might even exacerbate because of *Big Data*. Furthermore, the responsibility of ethical and accountability concerns cannot be left to *Big Data* (Kitchin, 2013; Haque, 2012). In terms of responsibility, cities of the future need to be planned to be worth living in. If too much responsibility is in the hands of a smart city techno elite, there will be the risk that it “can deaden and stupefy the people who live in its all-efficient embrace” when it is not shaped by its inhabitants but corporations who are in charge of smart services and *Big Data* (Sennet, 2012).

Bristol city council and the *Open Bristol Plan* could pay special attention to new urban risks evolving from being a smart city:

On the one hand, smart-cities are dependent on software which has to function properly and cannot be hacked or be infected by a virus (Kitchin, 2014, p. 11). On the other hand, freedom to privacy can be threatened due to constant surveillance (ibid). Finally, corporations’ influence on a city like Bristol will rise. Some of the strongest supporters of a smart city development are big businesses (“e.g., IBM, CISCO, Microsoft, Intel, Siemens, Oracle, SAP”) (Kitchin, 2013, p. 2). One can speak from a “corporatisation of city governance” (Kitchin, 2014, p. 1). As *Nokia, InterDigital & NEC* are main industrial drivers of the *Bristol is Open* plan, it bears the risk that Bristol will be “captured and overtly shaped by corporate interests for their own gain” (Kitchin, 2014, p 10). The promotion of the *Bristol is Open* plan exemplifies how a “smart city agenda and associated technologies are being heavily promoted by a number of the world’s largest software services and hardware companies who view city governance as a large, long-term potential market for their products” (Kitchin, 2014, p. 10). This is also stated in the *Bristol is Open* plan, as companies “at the leading edge of many technologies are keen to innovate, to test and deploy with us, and to see how their equipment works in a truly open environment” (Bristol is Open, 2018). Consequently, “a neoliberal political economy and marketisation of public services wherein city functions are administered for private profit” can be made out (Holland, 2008; Kitchin, 2014, p. 10). This might also cause a monopoly position on providing public services by players of the private sector (Hill, 2013; Kitchin 2014, p. 10).

Such a dependency on corporations cannot easily be undone or diverted (Bates 2012; Kitchin 2014, p. 10).

If Bristol continues to transform the city into a smart city without a reflection of political risks, local politics will serve as an example of *post-democracy*. Privatisation and an entanglement between the public and private sector lead to a reduced political influence of citizens (Crouch, 2004). "A post-democratic society is one that continues to have and to use all the institutions of democracy, but in which they increasingly become a formal shell. The energy and innovative drive pass away from the democratic arena and into small circles of a politico-economic elite" (London School of Economics and Political Science, 2013). Automation und digitisation bear such a political risk as control and production facilities increasingly lie in the hands of corporations. They can offer smart services or oversee automated processes. As the revenue will still be the same (or even higher) neither does it need to be shared with employees (as they were replaced), profit will be significantly higher. However, it would have been money which should have gone to the middle-class earners.

All in all, it might be a prejudice that *smart* also signifies improvements for a city in social and political regards. Becoming smart means, on the one hand, a loss of jobs because technologies can work more efficiently than people who have done the job before. On the other hand, it might bear a growing influence of the private sector in local governance, policies, culture and public spending – which are relevant factors in shaping a city. Technology and data can be advantageously used for city improvements, nevertheless these data and technologies could be complemented with a variety of other instruments, policies and practices that are sensitive to the various ways in which cities are designed and function (Kitchin, 2013, p. 10). Such institutions could vary in its scope and extend (⇒ 9). *Big Data* and smart cities also encourage new economic-forms as an *On-Demand-Economy* (⇒ 7).

7. On-Demand-Economy – the future?

Traditional industries transform to be increasingly consumption-oriented. *On-Demand-Economy* is a flexible form of a company (often a start-up) which is reacting with a well-measured supply to the demand of consumers in real time. It is often mentioned in connection with a *sharing economy*, where supply is shared by private individuals and collaboratively consumed. Due to *Big Data* and smart-services a company can respond flexibly to the demands at a certain time and even predict patterns of consumption. There is a shift in supplying from inside-out ("You take what we make") to outside-in ("We seek to understand your problems and will surprise you by solving them") (Gulati, 2013). As the consumer expects to receive goods fast and of good quality, economies had to adapt accordingly. The change in consumer expectations leads to a change of management of business/start-ups.

Bristol city council is acknowledging these tendencies and promotes start-ups among different sectors (Bristol City Council, 2018, p. 46). Consequently, it will change cities. It is surveyed that 62 percent of cities are in favour of a sharing economy – Bristol is likely to be among these (Rainwater et al., 2017). By now, it has affected goods of all kinds (Amazon), transportation (Uber), entertainment (Netflix, Spotify), living (Airbnb) and food (delivery services). *On-*

Demand-Economy is characterised by uncertain working conditions, lack of social benefits and low-paid salary but also by its workers' independence (Manjoo, 2015). On the other hand, *On-Demand-Economies* have to expect less loyalty from its workers and consumers (Rajamaran, 2017). *On-Demand-Economy* is threatened to be overwhelmed by automation, as well. Since then, Amazon has tried to introduce drones and Uber self-driving vehicles, but both face legal issues (ibid). The effect on cities is multidimensional. Airbnb causes housing problems in major cities as people buy apartments to rent them on Airbnb instead of living in it themselves. This aggravates existing housing problems (\Rightarrow 3). Social problems are caused as former employees are replaced – as for example taxi drivers or cashiers (\Rightarrow 8). In terms of social equality, it could be fruitful to introduce legislation that limits growing influence of *On-Demand-Economy* on cities and which fosters social inclusiveness.

8. Rising inequality and populism due to Automation

As mentioned, automation needs to be considered in its wider political as well as social context (Mair et al., 2017). Automation might widen the already existing gap between rich and poor even more. In Bristol, average wages are higher than the UK average. Nevertheless, there is a “higher than national average proportion of children living in poverty” (Bristol City Council, 2015, p. 14). A political engagement seems inevitable to manage the impacts of automation (\Rightarrow 9). Otherwise, problems such as unemployment and inequality will exacerbate during the next centuries. “There will also be an unstoppable decline in the rate of conventional economic growth and a wave of robotization in manufacturing and repetitive services” (Maxton et al., 2016). While labour forces lose their jobs, profit will be increased by corporations that automate work. Consequently, profit will go to the top 1% who own (or manage) corporations (Cohen, 2015). So far, automation is managed by the rules and dynamics of a free market and thus, causes unequal opportunities. Producers will only automate jobs if doing so is lucrative. Nevertheless, the remaining jobs would be highly competitive as the supply of workers will greatly surpass the demand – the price of the average income will decrease (Maxton et al., 2016). Losing labour forces and a lower average income will lead to a reduced tax revenue. This will lead to less public spending and a lack of public goods. The need for social security will increase which demands higher spending in social benefits, as well.

If the social gap widens, it will cause political mistrust and disenchantment with politics. During the last few years, an upsurge of populism can be detected worldwide. The nascent trend might also (among other parameters) correlate with an increasing automation. The election of Donald J. Trump and the Brexit referendum might exemplify the trend. Trump has especially been successful in the *Rust-Belt*, former important regions of industry which have suffered from automation by claiming to bring back jobs. Furtherly, 47% of all occupations are at stake in the USA (Frey & Osborne, 2013). Correspondingly, 40% of all occupations are at stake in the UK (ibid). In the future, populist politicians may increasingly mobilise against automation in order to gain political power. According to surveys, 58% of the USA demand that corporations can replace jobs to just a certain number (even when machines could do the job more efficiently) (Gramlich, 2017). 85% would limit automation exclusively to dangerous jobs (ibid). Obviously, the driver of automation cannot be stopped nor be undone.

Technology might lead to greater output and reduction in costs, but it may not benefit society if not managed politically (\Rightarrow 9). Smart cities might prosper and be attractive to well-educated people but the clear majority of the middle-class will be displaced due to a lack of jobs and increasing living costs (\Rightarrow 3). The transition towards automation needs to be managed on the long run to get a positive social and political outcome from automation. Politicians should use the benefits of automation and reduce social costs.

9. Is there an appropriate answer to Automation?

If automation continues to be uncontrolled, probable social, political and urban risks will continue to evolve. Automation can cause an inequality of wealth and unemployment (\Rightarrow 8), but it will contribute to wealth and productivity if the transition is managed politically. Different incentives may be taken into account. They vary in scope and depth. They might also be difficult to implement as the majority of society has not yet seen the relevance of taking profound endeavours. Nevertheless, as the trend of automation and tendencies of unemployment continue - then, a need for such incentives might be seen.

1) Localisation and city-based devolution

Corporations have to become more democratic by promoting collaborative and cooperative ownership models to foster wealth in local communities (MacDonald, 2017). Politicians of Bristol could increasingly try to involve local companies in partnership arrangements and encourage localised supply chains to ensure sustainable occupations in the city region. The existence of a collaborative future plan is appreciable and a first step towards a promotion of local economies. It might serve as a foundation for future collaboration: "By drawing on existing partnerships, strategies and expertise the plan will aim to form a collaborative and place-based approach to resolve city challenges and create a more equal, inclusive and sustainable city" (Bristol City Council, 2017a). Confidently, the city of Bristol will not hide behind platitudes and take concrete measurements. To meet such aspirations, local measurements might include the design of an infrastructure which allows sustainable ways of productions and promotes local and circular economies. A *circular economy* consists of multiple, smaller collaborative systems instead of few growing international corporations. Automation is used to re-integrate waste into the environment and to produce products locally. It would result in a decentralisation of the economy. As the Ellen MacArthur Foundation states, digital technology can empower a transition to a *circular economy*. A circular model might help Bristol to reach its sustainable development and save the city from becoming an exclusive place to live in.

2) Universal Basic Income

As the economic system is disruptively changing and technological innovations continue to advance tremendously, it is predictable that the capitalist economic model is not able to find fair solutions to manage resources and wealth because it is managed by the free market (Dew, 2015). As mentioned, especially managers and leading people of corporations (with a decreased labour force) will profit from automation as productivity is increased but costs reduced in the long run, whereas the middle class vanishes (Cohen, 2015). Then, the capitalist

system would collapse as the state were not able to pay social benefits to the growing lower class.

Every citizen, regardless of age, level of income or working status, would be provided with a *Universal Basic Income* (= UBI) “to maintain a functional market economy” (Dew, 2015). A UBI might stabilise economic as well as societal cohesion (as it covers costs of basic needs). It fosters flexibility on the job-market (\Rightarrow 4) and “provide an efficient mechanism for reallocating jobs and resources in the globalized economy, where employers need flexibility to compete on a global scale and employees need support to redesign their careers and occupational choices” (Colombino, 2015). UBI allows people to follow more fulfilling jobs and it creates opportunities to realise each one’s independence (Raworth, 2017, p. 200). Therefore, a UBI could come with a free access to educational platforms and reductions in founding a start-up company (Dörner, 2018). It might allow new specialism and promote community-, creative, beneficial and voluntary work. As economic theory suggests, and empiric studies show, it might have the impact to “eliminate poverty traps” (Colombino, 2015). A UBI could be financed by increased taxation, “redistributing existing social welfare payments, and revenues from public resources” (Dew, 2015). Corporations could start “paying out wages to “virtual” or automated workers which would go directly into the UBI fund” (ibid). But receiving a UBI would replace all current social services as unemployment insurance, pension, Medicare (ibid). “Politically speaking, a Universal Basic Income can be viewed as an investment towards the eradication of poverty [...] paid for with the dividends of progress” (ibid).

3) Redistribution of wealth

A more radical form would be a redistribution of wealth. The rewards of automation would be divided and allow more leisure time and independence for the majority of society (Maxton et al., 2016). A redistribution of wealth can only go hand in hand with a regressing materialism and changing mindset. A transformation of society has already started, as the (\Rightarrow 4) new class of *emergent service workers* shows - a transformation is possible. Ownership “is becoming less important than access, the pursuit of self-interest is being tempered by the pull of collaborative interests, and the traditional dream of rags to riches is being supplanted by a new dream of a sustainable quality of life” (Rifkin, 2014, 18, 19). Wealth is mostly in state control (US National Intelligence Council, 2008). As a public investment, states could increasingly invest in state governed forms of automation. A transition could be managed by higher taxation on corporations (which introduce automation in particular) as they profit most from automation. Bristol could tax automated, local companies and spend the money on social expenditures – if there were national legislation to do this. Consequently, it would not leave all control in the hands of corporations. A more realistic approach would be close to the status quo - just an increase in community enterprises.

4) Community Enterprises & Participation

Community enterprises refer to assets which are beneficial for the community as well as owned by the community. Such community-led enterprises can include different sectors including energy, food, housing and transport. It encourages local food production and supply, digital manufacturing, recycling, bakeries, cafes and cultural venues. As an example, the Bristol city council introduced community buses in Bristol which improve mobility at a

low cost. Also, community-led housing with a shared-ownership can be mentioned (Gilling, 2018). It is a step forward to a socially fair independence as it is not regulated by the free market.

The encouragement of participation in social enterprises is promising, as well. Places as the *Hamilton House* in Bristol serve as a cultural venue. *The Bristol Cable*, registered as a Community Benefit Society, serves as a local media source. Making community assets more visible, strengthening stakeholders' position, distributing responsibility to think about enterprise development and creating new opportunities for partnership - might all be worth supporting. The Bristol city council supports the growth of micro and social enterprises (Bristol City Council, 2018).

All in all, a sustainable transition towards a digital society needs to be managed and requires plans and strategies, infrastructure - as neutral, digital (sharing) communication-platforms - with transparency, cooperation and participation. Politicians could stress those aspects that the majority of society can identify with. Such arguments could be: more wealth, freedom and inclusivity by a managed automation. But so far, the vision of integrating the return on capital in social service has not appealed to the public, yet (Dörner, 2018). A prevalent question should be: "Is the purpose of the economy to maximize the profits of money-seeking corporate robots or the health and well-being of living households?" (Korten, 2015, p. 99).

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