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»FUTURE 4.0«

DIGITIZATION OF ECONOMY AND SOCIETY

A CHALLENGE TO LABOUR AND EDUCATION

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OVERVIEW

I. INFORMATION FOR TRAINERS
1. DIGITIZATION AND INDUSTRY 4.0
2. HISTORICAL EVOLUTIONS
3. TECHNOLOGICAL CHANGE
4. SOCIAL CHANGE BY DIGITIZATION
5. THE POLITICAL SHAPING OF CHANGE
6. EDUCATION FOR DIGITAL MATURITY
II. NOTES ON THE USAGE OF THE TRAINING MATERIAL
III. TRAINING MATERIAL

- -

I. Information for Trainers

1. Digitization and Industry 4.0

Language assistants such as Alexa or Siri, fitness bracelets, which send health data to an app on our mobile phone, autonomic unmanned aerial vehicles, electronic patient documents, forks, which control eating behaviour, automatic face recognition, pick by light systems, RFID chips („radio frequency identification “), 'Internet of things', abolition of cash money, Uber, Sharing Economy, algorithmic decision making („machines evaluate humans “), Big Data – these and further phenomena appear as precursors of a new era, which is generally headlined with the term **„digitization“**. Thereby developments are suggested which revolutionize the future of economy, society, politics and culture – and are already present for a long time. However, what does digitization stand for?

In a technological point of view it may be defined as a technique of electronic rendition of objects, events or analog media like books on the basis of digital entities. The term also stands for digital representation and processing of information and communication. On the other hand the term digitization is acknowledged with adoption of information- and communications technology within nearly all ranges from economy and society, which is entitled „the digital revolution “.

This is involved with the employment of so-called disruptive technologies. That is, by innovations and/or new procedures, so far common products or services are superseded off the market. E.g. have taxi apps and Uber pushed back the influence of taxi centers. The existence of the online encyclopaedia Wikipedia again has the consequence that expenditures for print of other lexica are not any longer manufactured (so of Brockhaus). By the online shipping resellers like Amazon the structures of the book market have changed, for as much as publishers lost clearly at influence.

Digitization in particular is to change industrial production of goods. It concerns to couple individual production steps with information and communication technologies to interlace them digitally and/or to link between humans, material objects and Internet applications. The idea behind it is to facilitate a kind of 'self-organized' production, where humans and machines will cooperate as perfectly as possible: „When components independently communicate with the production plant and arrange their repair on demand or reorder production material, when humans, machines and industrial processes smartly interlace themselves, then we may speak of 'Industry 4.0'.[1]

For this kind of interplay between humans, networks and/or self-acting objects, the formulation **'Internet of Things'** has evolved. Objects are equipped with sensors, which seize data and, if accordingly programmed, are able to trigger actions and/or dispose humans to get involved. Prominent example for that kind of behaviour is the 'intelligent', interlaced refrigerator, which is for instance able to indicate that more milk needs to be bought. Also, self-driving cars, an umbrella, which recognizes weather changes, the use of algorithms at the financial market or with the selection of job applicants, the prognosis of criminal offence or the evaluation of a person's credit worthiness: No more only fantastic ideas, but more and more reality. Goals are the increase of efficiency and profit in value creation as well as the increasing precision of customer analysis by exploiting an increasing amount of data. Aspects of energy conservation and sustainability also play a role– not least with 'smart facility management'. Hence, on digitization and employment of artificial intelligence large hopes are set. Expected are sales profits in a billion range, innovation boost and stimulation of economic growth.

The word- creation **'Industry 4.0'** has been developed within the context of debates with participants from politics, science and economy about digitization in production. Which was initially called 'Cyber-Physical Systems' changed to 'Industry 4.0', when the *'Promotion Group of Communication of the Union of Research in Economics and Science'* introduced this term in their suggestions of implementation in 2012.[2] In 2013, the German trade associations BITKOM, VDMA and ZVEI founded the 'Platform Industry 4.0' in order to implement and develop the 'high-tech strategy 2020' of the German Federal Government. Starting from 2015 the circle was extended by participants from enterprises, trade unions, science and politics. The Credo of the strategy pursued with 'Industry 4.0' reads: „Retaining Germanys future as a location of productivity“[3]. Introductory to the aforementioned 'recommendations for action' it reads self-confidently: „Germany is that industry 4.0 country No. 1 in the world. We intend to hold and develop this position during the coming years. Germany spurs the international development within the range of digitization and shapes the dialogue. The platform 'industry 4.0' has a large portion of this success.”[4]

Whether the German economy actually has reason to regard itself sole lead in terms of digitization of production may be controversially discussed from a European and international perspective. After all, since that time there are also international co-operations being exerted, such as with France or China.

The assertion of an 'industry 4.0' seems to imply the existence of the precursor versions 1.0, 2.0 and 3.0. The buzzword tries to tie in with foregoing development stages of industrial society. However,

1 Bundesministerium für Wirtschaft und Energie
2 Promotorengruppe Kommunikation der Forschungsunion Wirtschaft - Wissenschaft, Ittermann et al.

3 Promotorengruppe Kommunikation der Forschungsunion Wirtschaft - Wissenschaft

4 Promotorengruppe, S. 3. The example shows: Markets, even so-called new markets, do not emerge due to the simple match of supply and demand as it is emphazised by the neoclassical approach. It results from arrangements and negotiations and are 'produced' by political decisions, networks and information. Markets are socially constructed.

other than insinuated, the term 'industry 4.0' does not add up to historical designation. It rather means a project, which is directed towards the future. It transports the vision of the intelligent, smart factory: the digitization and networking of production flows, the inclusion of customers and partners, as well as the ability to customized production according to individual demand, a highly efficient, time saving, possibly self steering production.

Therefore the catchy term is also understood as marketing concept: „The so-called Fourth Industrial Revolution, to which the number refers, is characterized by individualization (even in the mass production) and/or hybridization of products (coupling of production and service) and the integration of customers and business partners into processes of business and value- creation. Substantial components are embedded systems as well as (partly) autonomous machines, which move without human control into and by environments and make decisions independently, as well as developments such as 3D-printers. The network integration of technologies with chipped articles leads to high-complex structures and cyber physical systems (CPS) and/or what we call the 'Internet of Things'.[5]

For this reason 'Industry 4.0' stands for an economical and socio-political programme. It is thereby more than just a marketing term, like some descriptions suggest.[6]

2. Historical Evolution

What however characterizes industry 1,0 – 3.0 ? They can be summarized with the headings 'steam engine', 'assembly line work' respectively 'automated mass production' and 'computerization'.

The invention and introduction of the steam engine and the use of water power provided for the **First Industrial Revolution**. Starting point was Great Britain of the second half of the 18th Century. To the place of manual work or the loom propelled by human strength the machine came. Factories replaced the manufactories. Of crucial significance was the textile industry. The first railways developed, steamboat lines, coal mines and heavy industry arose.

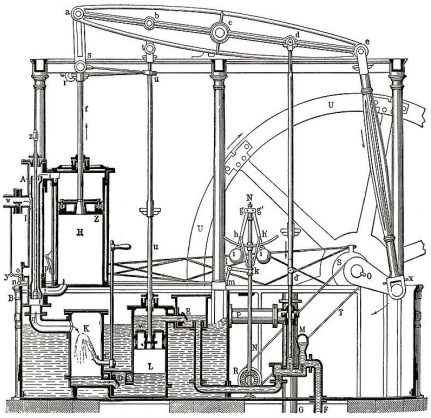


Image: Wikipedia[7]

Industrial manufacturing changed with the discovery and propagation of electricity. It received a new quality. Chemistry, pharmaceutical and electrical industry and mechanical engineering developed. The

5 Bendel

6 As example see ibid.

7 https://commons.wikimedia.org/wiki/File:Dampfma_gr.jpg

production of automobiles arose. Work was being further automatized. In particular in the automobile industry worker stood at assembly lines and performed mostly only one activity – as a kind of 'carnal addition' to the machine. A mentor of this management strategy was Frederick W. Taylor (1856-1915). Mass production of such kind increasingly coined the mode of production. A most prominent example for this are the Ford plants, where cars are produced. **'Industry 2.0'** can't be dated uniformly for all countries. Generally the transition to high industrialization (Germany, France) is set for the 1870 years. A relation between „second industrial revolution “and „mass production“ is made rather particularly for Great Britain and the USA. These developments began in the 1920 years.

The industrial society supplied its energy requirements from the utilization of fossil sources such as coal and later mineral oil. Therefore it is also referred to as 'the fossil age'.

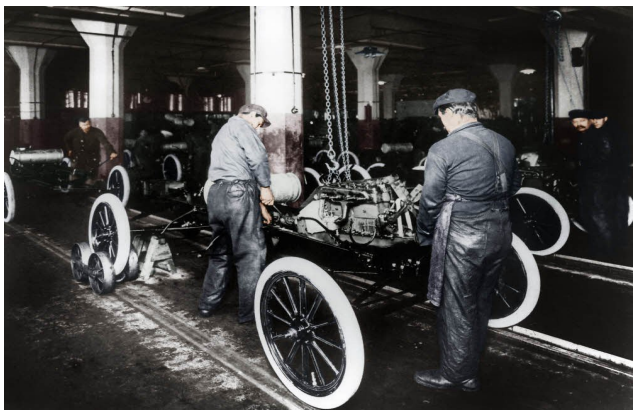


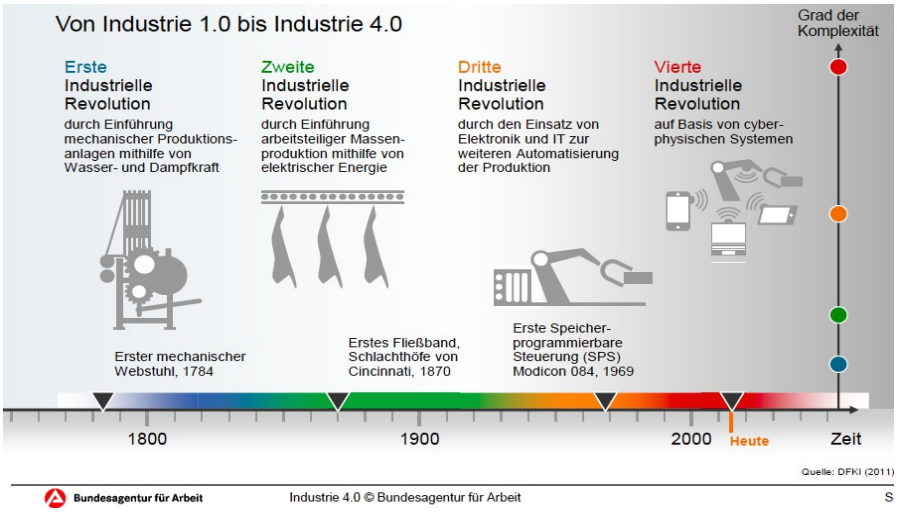
Image: Andreas Stedtler[8]

Finally, **'Industry 3.0'** is set for the 1970s until approximately 2010. One calls this phase also 'the digital revolution' or 'the microelectronic revolution'. Basis for this is the invention of the transistor (1947), the microchip and the microprocessor (1971). Production was being further automatized by gradual computerization of operational sequences. Also the innovations in the automobile industry and the concept of the Lean Production introduced in the 1980 years by Japanese car manufacturers illustrate this („holistic production systems “). Also the financial sector was, among other things, promoted by digitization, further developed and sustains a special position in the economic structure. The invention and expansion of the Internet at the beginning of the 1990 years facilitated for the exchange of information in unforeseen extent and for the use of information technologies in economy, politics, administration, culture and environment.

Image: Ulrich Häßler, Bundesarchiv/Wikimedia Commons

8 https://www.mz-web.de/politik/fabrik-der-daten-in-ilsenburg-steht-eines-der-modernsten-werke-europas-24258944

'Industry 4.0' ties up to Lean Production and continues to develop it. Interlaced systems offer more transparency and thus the possibility of purposeful avoidance of wasting. The main objective of this concept is the optimization of production flows.



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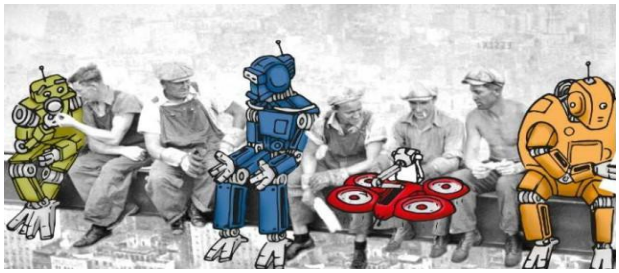
Within the politico-economic project 'industry 4.0' mainly technological developments are focused. This triggered debates about the social aspects of this „Large Scale Transformation“[9]. Among other things the question about the changes for the work of humans in the digital age became focused. To what extent is it valid to adapt to the change? Which new protection standards are to be developed, that would correspond to the new conditions? For this purpose the **„Dialogue Process Work 4.0“** was initiated in April 2015 by the Federal Ministry for work and social affairs.

In intercommunion with representatives of different interest groups (trade unions, enterprise, federations etc.), it was intended to thematize 'good work' under conditions of digitization and to negotiate leeway for shaping the upcoming conditions, concerning new forms of organization of work („Desk sharing“, „Crowdworking“), flexibilization, work compression and dissolution of boundaries in conflicting aims with the protection of employee rights, stability, time sovereignty, health and social security of the working. Further topic fields are the monitoring of employees and protection of their privacy, aspects of downgrading or deskilling and the loss of options of action as well as the question, whether jobs to large extent would be omitted or replaced by others. For this purpose, at the end of 2016 there was published the „White Paper Work 4.0“. The considerations made therein are not only targeted to working sphere, but include also the consequences of digitization for the entire society.



9 According to the process described by Karl Polanyi in his work „The Great Transformation“ reffering to the industrialisation in England in the 18th until the beginning of the 20th century, see Polanyi, 1977

Industry and work 4.0 are therefore not to be regarded in a technological horizon alone. However, central questions in the politico-economic initiatives by federal government and trade associations, concerning a new arrangement of economy, culture, politics and society due to digitization, remain unanswered. They represent a challenge also for the socio-political education. For a start it seems wise, to differentiate, very simplified, between different view levels:

1. the technological change, as it materializes by employment of artificial intelligence, algorithms, robotics and 3D print,
2. the social change, as it is evoked by use of digital technologies – is it, among other things, by change of work and thus changing requirements of qualifications, is it by a prognosticated high unemployment, by changing lifestyles, communication behaviours and consumption patterns,
3. the political controlling of the change as well as the opportunities and dangers for democracy and political participation.

These three dimensions will be examined in greater detail below.

3. Technological Change

Artificial intelligence and the „power of algorithms"

There are many sectors where they can't be ignored any more: the algorithms. Financial markets do not function any longer without them, they steer the selection of the indicated posts inside Facebook, they steer autonomous vehicles, manage the partner selection at platforms such as Parship, gather the initial choice with job applications – a practice in USA –, check the credit-worthiness of humans and much more further. Controlling, steering, accomplishing – as if algorithms would be subjects. They are not. They are made by humans. But what are algorithms actually? Simplified spoken, they are a procedural instruction, which leads to the solution of a problem. In natural life that would be for instance a baking recipe – an instruction for the 'problem' 'cake'.[10] In the words of professor of law Frank Pasquale (Maryland University) algorithms are like an agglomeration of steps, by which results are produced: „For example could these be steps in order to process water, sugar, flour and eggs into a cake. The problem: With a cake we know, which is a good and which is a bad one".[11] With an algorithm that would be much more difficult to determine.

Let us take for instance **Facebook**: A user is friends with 500 humans through her account. She receives and posts messages. But these do not, as one should expect, appear in chronological order. The user does not have influence on which he or her at what time sees and which not. The selection of the messages, which are shown in the news feed, is pre-sorted by software, which was programmed according to certain criteria. Which these criteria are in detail does Facebook not reveal. According to notes by Mark Zuckerberg, personal reports of friend and relatives, thus 'likes', comments and reactions to own postings are placed in the foreground, as well as live streams. Contents and debate contributions to current social topics are classified as subordinate. Daniel AJ Sokolov comments this bitingly as „Biedermaier instead of enlightment". „Pleasing and comfortable shall it be, not impudent and demanding. If someone feels like making a contentwise announcement nevertheless, he or she may well place an advertisement. "[12] The Postings of organizations (for instance of weltgewandt-ev or the volunteer fire-brigade) appear owing to the algorithms more rarely, unless there's paid for more presence. Similarly appears the focus on personal interaction interesting in financial

10 Steger/Sonnabend

11 Ibid.

12 Sokolov

terms: The more user participate actively, the more signals to the advertisement algorithms are sent. That pays for Facebook.

Algorithms are therefore the rules, according to which the „brain" for instance of a robot works. They are invented by humans, and they in turn affect thinking, feeling, knowledge and acting of humans. How they are programmed, which intentions, assumptions, parameters of decision play a role thereby, is all too often a trade secret. It's quite being criticized, that there's no information on how algorithms judge: „It's going to be the arbitrariness law of the 21st Century – a medieval practice, which shouldn't have a place in a modern democratic society. "[13] This is not only controversial for example with view of the estimation of the credit-worthiness of humans or the business activity at the financial markets. The example of Facebook shows the bearing of the challenge. It is profit promising data. With two billion users this will become a considerable amount. They alone however supply with their data by their click behavior – after which in turn algorithms are being programmed and optimized.

Robots

Robots – from Russian 'rabota': work – more and more carry out activities, which were once performed by humans. They are not new, but owing to technical progress they get increasingly able to carry out 'intelligent' work.

Thus robots are used in the medicine for example with operations such as kidney transplants, with the preparing of diagnoses and treatment plans, with the analysis of cell cultures on cancer, in the care by so-called care robots. In addition robots can be language assistants, which will carry out teachers' tasks, if these fail, analyze financial assets and make credit decisions.[14] They are being widely deployed in the automobile industry, but also for mowing lawn and cleaning windows. Additionally, there is a great use for them in the military sector, where self organizing drones may be quoted for an example. Owing to complex algorithms robots increasingly are able to "learn".

3D printing

3D printing allows for the production of (three-dimensional) objects. This is done by stepwise addition of layers of material, which correspond to successive cross sections of a 3D-Model during different processes. Thereby plastics will become most frequently used, increasingly, in addition, Metals.[15] The materials are usually laid on as powders and hardened thereafter. One calls these procedures also „additive manufacturing". They are in use particularly in the automobile industry, air and space technology as well as the medical applied technology. Also for science, art and design, mechanical engineering, architecture and home application increasingly articles are manufactured through 3D printing. Was initially mainly the production of prototypes concerned, for instance in the automobile industry, so is by now also produced in higher quantities through 3D printing.[16] Due to the new technology, 3D printing is quite cost-intensive, but in the outcome the production cost ease. Anke Domscheit-Berg pointed this out exemplary for the automobile industry:

13 Steger / Sonnabend

14 Domscheit-Berg, p. 10, 12

15 Autodesk

16 Wildemann

The production of cars/autoparts by 3D printing means a shortening of production time, clear lowering of the number of the different parts which need to be processed, lower prices and altered quality requirements.[17] This has also consequences for the value creation chains, because enterprises migrate to store for example data of spare parts into a Cloud and/or a database. Other enterprises as for instance an car workshop may access this data and produce the spare part locally on its own. Thereby storage costs, transport costs and duties are omitted. Particularly the demand of time for supply shortens. „Just in time delivery then becomes 3D printing on demand."[18] This could mean that mass production of car parts or other industrial goods would no longer be a common practice, but production would tend to be decentralized.

Would this be a step to a more environment compliant economy? In a study of the institute for ecological economic research the authors plead for a differentiated view: Hopes for environmental discharges by 3D printing and a more distinctively decentralized manufacturing are quite given. However no clear statements could be given to this effect due to the technological variety and the diverging production contexts.[19]
Which are factors of success for the 3D printing technology? A high domestic demand – and, implicitly, according and appropriate wages – as well as a high education grade of the population, are mentioned here.[20]

4. Social change by digitization

The increasing employment of digital technologies changes economical and social life alike. This will be discussed below preferentially with a view on the change of labour, on prognosis towards possibly rising unemployment as well as on the problem field of privacy and increasing surveillance.

The developments are ambivalent: They accompany with relief (of work), open up new liberties for networking, exchange and co-operation, for acquisition of information, own creativity and communica-

17 Domscheit-Berg, p. 5

18 Foltz, in: Wocher

19 Penschow et al., p. 49-53

20 Wildemann

tion independently of distances. In the area of work, by digitization tasks may become more challenging. Employees will be demanded within their (own) responsibility, they can participate much better and may – if the basic conditions suffice – juggle vocational and private stuff more easily.

At the same time, new subjections and constraints by monitoring and surveillance, new risks by (guilelessly) passing on of data, more stress by increased work compression, the separation and alienation between humans arise or are promoted. The so-called **platform economics** (Cloud Working or Crowd Working) bear the risk of the emergence of a „new digital proletariat".[21] Moreover can the employment of digital technologies „lead to a displacement of jobs, devaluation of (human) work and de-qualification, a new kind of precarious occupation as well as higher health loads of a new kind."[22]

New Labour?

A new infrastructure of work, i.e. an alteration of professions and ways of acquisition, is predicted. Thus the employment of digital technologies corresponds with an organization of work, in which a higher degree of flexibility from the working is expected. This refers to the organization of labour time, it refers also to the kind of conditions of employment. For the years 1996-2011 it was calculated that the so-called atypical occupation has increased.[23] Part time jobs, limited contracts, temporary work, low-earning jobs and thus precarious forms of social security of work are expected to grow further also under the token of digitization. This corresponds in certain way to the changed structure of global economics, in that new „players" have established, who compellingly demand flexibility and incorporation into smart production systems. Prominent example for this is Amazon and the frequent conflicts/strikes around the arrangement of the conditions of work there. Enterprises like Uber, which are assigned to the so-called platform economics, see themselves not as employers, but as mediators.

Therefore, those working for them are not categorized as employees but as freelancers. They carry their risks alone, thus for the case of accident, illness, unemployment, in addition pension and care.[24] Enterprises like those of the GAFA (Google, Apple, Facebook, Amazon) gained substantially in size during the last decade and are now to coin the global economic structure. Certainly the financial markets are those, who give the beat. But they aren't to be imagined without employment of digital technologies any more.

Furthermore, with the large institutional lenders like Vanguard, Blackrock, JPMorganChase & CO in this economic sector concentrations took place, which have direct and indirect influence on the concrete arrangement of employer-employee relationships. A further polarization of the job market is expected: demanding, well paid and socially secured employment conditions contrast with the increase of employer-employee relationships, which are unsecure in terms of cushioning social risks and the perspectives for the employees.[25] Precarious occupation however does not neccessarily depend on qualification level. This indicate, amongst others, the debates on work contracts for the staff of German universities.

Jobs

A frequently and controversially discussed question is the one of abolition and creation of jobs. Will there happen, along with the recent rationalization and/or automation wave, an overall cutback of

21 Hoffmann, p. 5

22 Hoffmann, p. 3

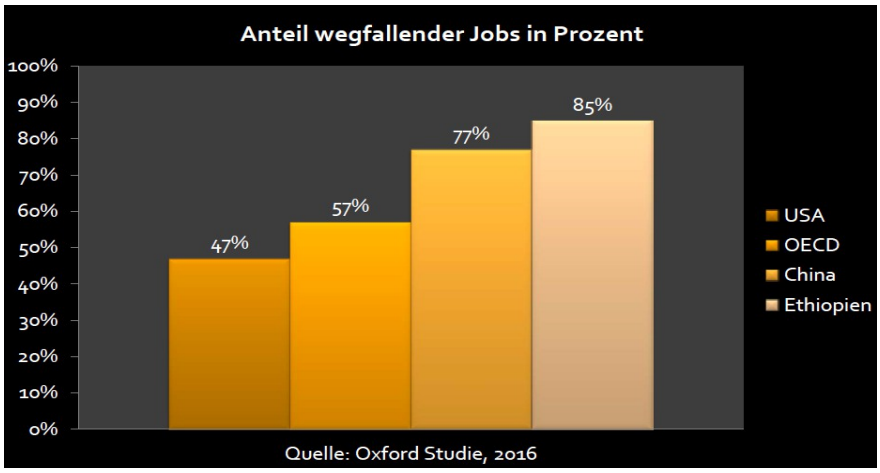
23 Eichhorst et al., p. 12

24 Eichhorst et al., p. 15

25 Eichhorst et al., p. 8

work offer? Representatives of trade associations welcome digitization and recognize first of all growth gains. The effects on occupation could hardly be prognosticated in their total effects. So characterizes Dieter Schweer, member of the managerial board of the Federal association of the German industry, statements, which predict a cutback of larger extent (47%) of jobs, as "angst debate".[26] Nonetheless, he referred to a publication of the Center for European Economic Research. It would have calculated that „job profiles with a relatively high probability of automation exhibit only 12 percent of the jobs in Germany."[27] According to a study of the Hans Böckler foundation, which is rather in favour of trade unions, fears against substantial job losses are unjustified: „Robots are so far no job killers ".[28] Other researchers refer to the fact that professions, which would be expected to be replaced by automats, would be such ones, which demand tasks of routine or of exceptional precision. Human work would be furthermore essential, where creativity, social intelligence and entrepreneurial thinking would be demanded.[29] Other prognoses are clearly more sceptic. Michael A. Osborne has, in an investigation with his colleague Carl Benedikt Frey in 2013, considered an omission of jobs by automation to the extent of 47%.[30] In a statement of April 2018 there was specified that „… from a technological capabilities point of view, 47% of jobs are automatable."[31]

As the following diagram shows, the amount of human work becoming 'redundant', compared amongst countries, might clearly vary:[32]



The loss of jobs as a result of the new wave of rationalisation may be quantified quite differently. The challenge of political control of economic and social change is present in any case. This is recognised unanimously by employers' organisations, trade unions and academia, albeit with various emphases. From an entrepreneurial point of view, education tasks are identified as a priority, especially the promotion of the so-called MINT subjects.[33] Education efforts are also called for from a trade union perspective: "In addition, there is the task of redistributing profits. Technical progress cannot only benefit

26 Schweer

27 Schweer

28 Böckler Impuls

29 Eichhorst et al., p. 9

30 Frey / Osborne

31 Frey / Osborne

32 Domscheit-Berg, p. 13

33 Schweer

employers".[34] The privately financed research on the future of work recognizes a need for action for socio-political control "... in order to best safeguard social equality as well as the increasing employment risks".[35] Anke Domscheit-Berg, member of the Bundestag and publicist, broadens the horizon of observation beyond Germany and expects population migrations, moreover, insecurity amongst populations, increased social inequality and social and political tensions.[36]

Data privacy

Aspects of data protection are rather neglected, which does not correspond to the relevance of this sensitive issue in the world of work anyhow. Big data, i.e. the evaluation of large amounts of data, makes it possible to obtain information about contacts, appointments and the files of employees. In companies which use the Microsoft Office 365 package of online service, web applications and office software, Microsoft collects the entire relationship data. This information can be used to analyse communication behaviour and to create employee profiles and will serve as a basis for decisions on the development or the end of careers. This happens anonymized, though information may be derived from data stream and reassigned to a person. Digital control is usually invisible, but omnipresent.[37]

The spying out and, based on this, diagnosis' of employees is increasingly referred to as 'People Analytics'. It is a matter of merging data traces left behind by employees. Algorithms are used amongst others to determine the mood in the company, to gain information about who has influence or who is unlikely to have it or to predict future behaviour, for instance, whether someone tends to quit. People Analytics is becoming increasingly widespread, not only in single divisions of companies. In Germany, this practice is subject to co-determination, since personal data is used. However, those who are already on the road with fitness wristbands, smart watches and the like, do practice sort of People Analytics themselves - and may not be sure that the data is only accessible to himself/herself.

Bracelets will also be used by the online mail order company Amazon. Using radio and ultrasound technology. They are designed to precisely record the hand movements of employees. For example, the wristband vibrates when a warehouse worker sorts in a parcel incorrectly. It is also possible to check whether an employee is working, taking a break or going to the toilet.[38]

The many possible uses of robots, artificial intelligence and algorithms illustrate the ambivalence associated with their use. Programmed by people, they are intended to make people's work and lives easier. At the same moment they appear both as a means of improvement and they provide the technical prerequisites for controlling and monitoring human activities down to the last detail. Therefore, political regulation and social debate on the limits, dangers and opportunities of the use of digital technologies are needed.

5 The Political Shaping of Change

When we talk about the bright and dark sides of technological and social change resulting from digitisation, we often do so on the fundamental assumption that democracy 'prevails'. It is thus assumed that questions about which technologies are used, how they are correlated with fundamental rights and to what extent they are socially acceptable, are negotiated in an open, free discourse of the various forces. A democratic framework for digitisation would include social control, transparency, the rule

34 Hoffmann, p. 3

35 Eichhorst et al., p. 5-6

36 Domscheit-Berg, p. 15

37 Holzki

38 Weißhaupt

of law and fundamental social rights - albeit imperfect, since democracy does not mark a 'solid state'. Otherwise dystopias such as George Orwell's *"1984"* could become a bitter and perhaps at first glance invisible reality, facilitated with the technical possibilities of the 21st century.

Technological progress must therefore not be viewed in isolation from the social and political framework, from which it has emerged. Like the developments described by "globalization", technical innovations are not per se, nor do they represent any practical constraint or 'higher' necessity. Therefore, the question to be asked is rather about the political pattern of its design.

In economics, different approaches with different economic policy derivations are discussed. One of these is the neoclassical view, according to which the supply side and thus often the entrepreneurial perspective is the focus of attention. The resulting economic policy recommendations are mostly about flexibility, liberalisation, deregulation and privatisation efforts. This applies in particular to labour market policy. Keynesian and post-Keynesian approaches, on the other hand, are mostly oriented towards the demand side of the economy. Their focus is on disposable incomes, especially wages, so that the goods and services offered can be purchased after all. A low wage level would lead to sales problems for companies in the long run. The necessary consequence would be either an increase in domestic wage levels or an increase in exports (which in turn would be equivalent to exported unemployment). Demand-oriented approaches also recognize a central actor in the state, who demands (creates) jobs, ensures education, makes investments, launches economic stimulus programs if necessary and also saves banks in emergencies.

The respective positions of economic policy are justified differently. Considerations of social security for work and unemployment often also refer to phenomena of globalisation and/or digitisation. However, technological progress, changes in the global economy and increased competition do not necessarily mean a change - usually a reduction - in social standards - rather the opposite, since labour productivity, as a result of technological innovation, increases and with it the assets that are generated and distributed throughout society. The question therefore is: according to what criteria and with which orientation and strategy both the current wave of automation and the associated social and economic challenges are to be politically controlled. Which topics and fields of action could be identified? Some of them are discussed below: Data protection, "good work" and taxes.

Data Privacy

People leave countless traces of data every day. They can be seen and abused by others. Information can already be obtained via so-called meta data. Employers can read emails, control the access and duration of web site usage and much more. The company Cambridge Analytica collected data from voters on a large scale and tried to actively influence their election decisions through micro targeting. Big Data is a business, and big data enables high profits. Yet also intelligence services such as NSA, GCHQ and BND are spying on motion profiles, contacts and more. Cyberattacks and other criminal activities on the Internet occur as access to data and by exploiting security gaps. How can this be controlled?

On 25 May 2018, the European Union's Data Protection Regulation will enter into force.[39] It lays down rules for transfer, storage and deletion of data by companies and their documentation obligations. Privacy and civil rights shall be guaranteed within the global flow of goods and data and the right to informational self-determination in the face of a profitable market segment shall be ensured. This Regulation harmonises standards across the EU.[40]

39 See http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016R0679&qid=1524635445057&from=EN

40 The main content is available on the website of the Federal Agency for Civic Education (in German), see Schöneberg

The regulation is controversial and has received criticism from various quarters. The DIHK (Deutscher Industrie- und Handelskammertag - German Chamber of Industry and Commerce) complains about the bureaucracy involved and the impending fines. This could lead to the development of "defensive reactions against the basic idea of data protection".[41]

On the platform LobbyPlag.eu is listed, which enterprises took influence on the text of the data security regulation. The page https://lobbyplag.eu/influence shows in detail which MEPs tabled which amendments - and that the wording was sometimes adopted 100% by companies, mostly to the detriment of the protection of privacy. These include companies such as ebay and Amazon, but also the American Chamber of Commerce and organisations such as DIGITAL EUROPE. Word-for-word adoptions from proposed changes by data protection organisations such as Bits of Freedom are also documented.

Data protectionists, for their part, complain that the EU regulation permits the storage of personal data for almost unlimited periods. Alexander Roßnagel, professor of law in Kassel, warned against a deterioration of data protection in Germany and found that the EU data protection regulation did not meet the challenges of big data, ubiquitous computing, cloud computing and data-centric business models.[42]

"Good Work 4.0"

Especially in the field of work, the lines of conflict in a society become apparent. Different interests become visible: Simply put, entrepreneurs want to achieve the highest possible profits and incomes, while employees are oriented towards receiving higher wages and reducing their working hours. Social security such as company pensions and the employer's contribution to the health insurance of employees are regularly the subject of (collective) negotiations between the two sides. In an environment of millions of unemployed people, the fear of losing one's job also faces the possibility of its actually being given up due to company closures and relocation. These 'basic conditions' also permeate the structural change associated with the use of digital technologies.

Political leaders are called upon to find adequate answers to a) the loss of jobs and b) further flexibilisation or precarisation of gainful employment. Since it is difficult to estimate the number of new jobs that will be created and jobs that will be lost, but it is to be expected that (initially?) more will be destroyed than will be added, social policy measures are needed to balance the welfare of society as a whole that go beyond the current level. These include ensuring the existence of every citizen of all ages, labour market programmes to create employment and promote employability, and efforts to requalify and retrain, to lifelong learning and digital literacy (see point 5 on education policy).

Social security in particular is a controversial issue. With reference to digitisation, demands for an unconditional basic income for all are again being made by various parties.[43] Other economists, entrepreneurs and political activists vehemently reject this. State benefits for basic insurance, such as unemployment benefit or social assistance, are again criticised by those affected, welfare organisations and above all by business associations. The latter refer to the so-called wage gap rule, so that the unemployed were disposed to take up work and do not prefer to benefit from state support. This implies the view that unemployment is the result of unrealistic wage demands. This is an argument often used by economists of the neoclassical paradigm.

41 So the chief legal adviser of the Chambers of Commerce and Industry, Stephan Wernicke, see DIHK

42 Rudl

43 See Domscheit-Berg; the pro and contra of an Unconditional Basic Income should be the subject of a separate study and can not be discussed within the framwork of this publication.

In addition to securing unemployment in times of digitisation and structural change, it is also the working conditions themselves that are under scrutiny. Trade unions in Germany had already developed the concept of good work in the 1990s. What does it include?

"'Good work' from an employees view means to receive a stable, reliable income, to be employed indefinitely, to be able to contribute and develop professional and creative skills to work, to receive recognition and to develop social relationships. Work is assessed positively if sufficient resources are available, e.g. opportunities for development, qualification and influence and a good social climate with superiors and colleagues. Another important condition is that the level of requirements is not perceived as too burdensome."[44] Good work thus above all aims at a long-term and sustainable organisation of work. A central focus is placed upon the topics of making working hours and work locations more flexible, job consolidation and control of the workforce, and social benefits.

The use of digital technologies promotes time and deadline pressure, work intensity and concentration and thus increases the psychological strain on employees.[45] In the DGB index Good Work 2016, a connection will be established with monitoring and control: "Increased monitoring and control and the feeling of being at the mercy of digital technology occur [..] increasingly along with the requirement to handle more work in the same time. Such a design of the use of digital technology is therefore accompanied by an increased intensity of work for the employees".[46] The political framework for digitisation must therefore take control and monitoring into account as a 'counterproductive' aspect of value creation and counteract it with appropriate regulations. It makes sense to strengthen the participation of employees in the use of digital technologies and to "empower" them to deal with them confidently through further training.

Flexibilisation creates new stress factors, but also opens up opportunities, for example for a better work-life balance. The increase in home-working and the so-called platform economy is nevertheless associated with the risk that locally flexible digital work is more often accompanied by unpaid work.[47] Trade unions and employers (or the collective bargaining partners) and state actors are urged to negotiate regulations that set limits to this.

In the course of flexibilisation and a growing platform economy, the challenge is to distinguish independent, seemingly self-employed and dependent employment from one another and to organise socio-political security that covers all groups of working people equally. Ideas for this include the "free employment contract" as applied in Austria and, as a counterpart to the German work contract, also includes hourly payroll and social security contributions. For the social and old-age security of self-employed, precarious work, an insurance modelled on the Künstlersozialkasse could be introduced so that old-age poverty would not (alone) have to be alleviated by state benefits of the basic insurance. Clients and intermediaries of platforms would in turn be obliged to pay social security contributions. This could be a building block for a "citizens' insurance 4.0" and thus a solidarity model for society as a whole. Forms of employee share ownership are also conceivable.[48]

From the trade union side and from the 'left' political spectrum, the minimum wage and its increase are regularly discussed. This also has a European policy dimension. For a monetary union of different economies, a common inflation target of 2% also requires a convergence of unit labour costs.[49]

44 Fuchs et al., p. 10

45 Holler, S. 4 et al.

46 Holler, S. 74

47 Holler, S. 35, 94 et al.

48 Eichhorst et al., 17-20

49 Stellvertretend Flassbeck und Herrmann

Another option to enable Good Work 4.0 and to cope with unemployment is to redistribute working time with full wage compensation - according to productivity progress. This proposal has been subject of controversial discussion and has already been rejected by some as impracticable.

Taxes

"Just taxes are what civilization costs us." Claus von Wagner

In the course of structural change, whether due to industrialization in the 19th century, the emergence of financial markets in the 20th century or digitalization in the 21st century, new players are emerging, others are losing importance. This raises the question of who is contributing to the financing of the community and to what extent.

With the advent of GAFA (Google, Apple, Facebook, Amazon) and other companies that make a profit with data, a digital sales tax of 3% payable from a worldwide turnover of 750 million euros was introduced. Nevertheless, French President Macron's proposal is met with criticism: the governments of Great Britain, Ireland, Luxembourg, Malta and other countries refuse to accept this option. From German business circles it is said that the tax endangers competition.

Another proposal aims at a so-called overall group tax: the profits of a company are taxed in the country in which it is active - according to turnover, investments and number of employees. This would prevent the turnover generated by an internationally operating company in country A from being transferred to country B, where lower tax rates apply.1

Further considerations on the financing of public tasks relate to national surveys of property and capital taxes. These are also controversially discussed.

The political design of digitisation is not limited to data protection and transparency, labour and taxes. The subject of repeated political disputes is network neutrality. Hopes are linked to the so-called sharing economy. These and other aspects cannot be deepened within the scope of this presentation.

6. Education for Digital Maturity

In order to meet the challenges posed by digitisation appropriately, educational efforts are required above all. This concerns the so-called MINT subjects, which are to receive more support, especially in schools. This includes further training, retraining, lifelong learning and the provision of barrier-free access for all. This is because new job profiles are being created that have different requirements than before. However, educational efforts are inadequate if they are merely aimed at adapting to developments through a broad technical understanding. It is also necessary to train critical thinking, self-confident and sovereign decision-making with regard to the disclosure of personal data, the acquisition of information, the rights as a user and the pitfalls, such as those offered by social media.1 This includes, for example, insights into the functioning of Facebook, the criteria according to which the news feed functions - insofar as they are published or made accessible - how 'filter bubbles' and thus self-referential information systems come into being and yet a freedom for the appropriation of serious stocks of knowledge and the well-founded formation of opinion is possible.

Information acquisition competence and digital maturity also include the training of one's own judgement when it comes to the claim of the media (print, online, public law, private, blog posts and social media entries of citizens) to gain sovereignty of interpretation over social and political events. Education that inspires (self-) understanding about the opportunities and dangers of digitisation, that enables us to take a differentiating view not only of technical expertise but also of social conditions and their design, is always also socio-political education. If digital technology and its increasing use at

work and in everyday life are not to generate blind faith in technology along with a loss of control over the "Brave New World", an understanding of both concrete technical aspects (for example when using smartphones) and systemic contexts is inevitable.

This is also in the knowledge that technologies such as artificial intelligence, robotics, 3D printing, nanotechnology, biotechnology, genetics are mutually reinforcing and that a high rate of change is generated as a result. The developments are also embedded in global social upheavals such as climate change, instabilities in the financial sector, structural problems of the Euro monetary union, the growing gap between rich and poor and the resulting social tensions and much more.

Socio-political education means empowerment. Ideally, it encourages independent acquisition and reflection of knowledge, argumentation, participation and partaking in any way. In the face of complex developments, it encourages us to recognise diversity, tolerate complexity, ambivalence and paradoxes and to cope with insecurity. It raises awareness of the organisation of the exercise of power, conflicting interests, political strategies and their overlapping with alleged cultural conflicts. Such an education implies that trainers or educational actors understand themselves as learners and also reflect on this in the sense of learning and letting learn. Digitalisation may be a provocation for the development of attractive offers for acquiring media competence and thinking in social and political contexts, especially for the so-called disadvantaged citizens. It can thus contribute to a political culture that fosters the preservation and renewal of democracy and social progress so that the opportunities of digital change can be used creatively and made fruitful for all.

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II. Notes on the Usage of the Training Material

The tutorials M1, M3-M6 given in Chapter III were developed during the Learning Teaching and Training Activities of the project „Mind-opening to Economy. Creative Approaches to Economic Literacy" and have jointly been tested by the project partners. The two years' cooperation (2016-18) for exchange of good practices was funded by the Erasmus+ programme for adult education.

Part of the project were staff member and researchers from EDUcentrum (Czech Republic), Kairos Europe Ltd. (UK), Peipsi Center for Transboundary Cooperation (Estonia) and *weltgewandt*. Institut für interkulturelle politische Bildung e.V. (Berlin, coordinator).

The Instructions and tutorials provide information and exercises on following topics:

M1: Digital education, data protection and changes in the world of work,

M2: „The Circle": Dystopia of an overall surveillance,

M3: Values, related to work and employment,

M4: Rational and non-rational economical decision-making,

M5: Self-management in a changing world,

M6: 'Analog' relationships and the relation towards nature

The materials M6 on education for sustainability form a contrast to the topic of digitization. This takes into account that the processes of digitization and social change are embedded in a natural relationship which is both the fundament and the impact of human acting.

III. Training Material

Material M1

"Digital Maturity"

Newspaper Theatre

This kind of role-playing represents the first attempt that was made to create the Theatre of the Oppressed (Augusto Boal), by giving the audience the means of production rather than the finished artistic product. They are devised to help anyone to make a theatrical scene using a piece of news from a newspaper, or from any other written material like reports of an political meeting, texts from the Bible, from the Constitution of a country, the Lisbon Treaty, the Declaration of Human Rights, etc.

Newspaper theatre is quite simple – in its basic form – and can easily be adopted in various educational contexts.

1. There is a range of articles, texts, etc. in the room. In our example we focus on three issues: a) How to cope with Facebook without providing too much personal data, b) the Data Protection Regulation of the European Commission, c) Good Work 4.0.

2. The participants build small groups of 4-5 people.

3. They read the texts (possibly with different reading methods). They share their associations, ideas, opinions, the pro and the contra towards the article's thoughts.

4. The participants create together a scene.

5. They play it to the whole group.

6. Discussion: Participants exchange about the topic, their feelings and perceptions related to it.

TOPICS:

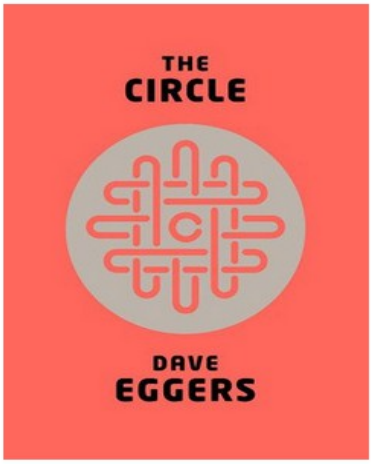
a) Facebook knows a lot about you, https://www.zdnet.com/pictures/adjust-these-facebook-privacy-settings-to-protect-your-personal-data/ ; Securing Facebook: Keep your data safe with these privacy settings, https://www.zdnet.com/article/facebook-private-data-settings/

b) Data Protection: What are my rights? https://ec.europa.eu/info/law/law-topic/data-protection/reform/rights-citizens/my-rights/what-are-my-rights_en ; Can I be subject to automated individual decision-making, including profiling? https://ec.europa.eu/info/law/law-topic/data-protection/reform/rights-citizens/my-rights/can-i-be-subject-automated-individual-decision-making-including-profiling_en

c) Good Work: Digital Work and Politics: What impact will "Work 4.0" have on the world of work and politics? https://progressivepost.eu/digital-work-politics-impact-will-work-4-0-world-work-politics/ ; Challenges of digitalisation, https://unieuropaprojects.org/challenges-digitalisation/

Material M2

THE CIRCLE



The Circle is a science fiction novel written by Dave Eggers in 2013. The main character, Mae Holland, is recruited by a powerful online company, merger of Apple, Facebook and Google. Very enthusiastic at the beginning, she will discover the terrific ambitions of her CEO. This novel was adapted in cinema in 2017, in a movie with Emma Watson and Tom Hanks.

Mae's friend works at The Circle, a tech company where Mae gets a job in Customer Experience. At a company meeting, The Circle's CEO introduces SeeChange, which uses small cameras placed anywhere to provide real-time video. At work, Mae rises in The Circle, embracing social networking.

Mae meets Ty at a party. He was previously part of the company and created a circle product. He showed her an area where all information on everyone was kept. She started becoming sceptical but continues her involvement in the company.

Thinking of helping her friend Mercer, Mae posted on her circle profile, a picture of his creations; light fitting made in the shape of deer antlers. Reactions of people on her network were not what she expected and Mercer was accused to kill animals for his business. Mercer became very upset since he received many insults online and Mae, disappointed, decides to go kayaking at night to calm down her frustration.

Rough waters cause her kayak to capsize, requiring rescue by the Coast Guard who were alerted thanks to a Seechange camera. This experience convinced Mae about the utility of these cameras and she decided to be the first member of The Circle to become "completely transparent", which involves wearing a small camera and exposing her life to the world 24/7. This choice of transparency damages her relationships.

Later on, The Circle's CIO announces during a meeting, support from all 50 states for voting through Circle accounts. Mae takes it a step further and suggests requiring every individual to have a Circle account, which they can then use to vote.

Mae introduces a program to find wanted felons in under 20 minutes. The program identifies an escaped prisoner within 10 minutes. Mae uses this successful test to suggest transparency can be a force for good.

As example, she chose to look for Mercer, who is located very quickly at work. Trying to avoid the people, he flees from the cameras to his truck and proceeds to lead those tracking him on a car chase. He loses control of his truck and had a terrible accident, which causes his death.

This event makes Mae having understood the importance of privacy and the risk of abuses. She goes back to her parents and takes some distance with the company.

To prove the bad intentions of The Circle's CIO, she decides to attempt a last meeting, encouraging him, in front of everybody, to go for full transparency, as she previously did. He refuses and leave the stage. Then people understand that the concept of The Circle is not right.

A further description of the book is provided on this page: https://www.newyorker.com/tech/elements/sharing-is-caring-is-sharing

Questions to debate:

Do you think such kind of company (already) does exist? Why?

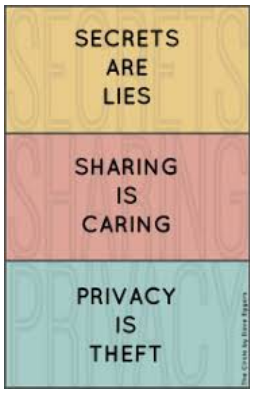
In your opinion, what are the positive and negative aspects of such a company regime? Shall we deny our privacy for conveniences? For security reasons?

What about the characteristics of a so-called surveillance society?

Does the protagonist show an erasement of subjectivity?

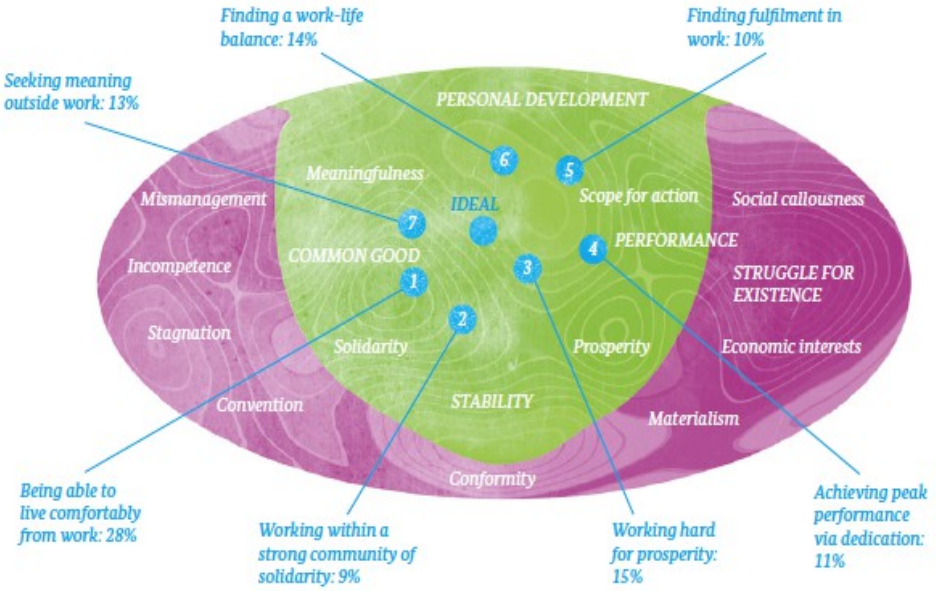
What means privacy under the circumstances of surveillance?

What about the limits of the social media's use?



Material M3

VALUES OF WORK



Source: Federal Ministry of Labour and Social Affairs (BMAS)/Nextpractice 2016

SEVEN VALUE SYSTEMS

Being able to live comfortably from work (28 per cent of respondents)
People who share this value system primarily want to be able to lead a normal life in a secure community without material worries. They see work as part of this, but in some cases they are finding that it takes up so much of their lives that little time remains for personal matters. Being able to plan ahead is a key positive value for them, while they regard a faster pace of work and growing performance pressure as negative. They expect the state to provide a safety net for all those who contribute to society.

Working within a strong community of solidarity (9 per cent)
For people with this value system, an ideal world of work is characterised by mutual loyalty, appreciation for their performance, and participation in a community of solidarity. They find developments within society worrying in some respects. They have the feeling that more and more people are falling through the cracks and are no longer finding a place in society. They long for the days when, as they see it, companies cared about the wellbeing of their staff, there was work for all, and people stood by each other even in hard times. They believe the state and companies have a duty to return to focusing more on the wellbeing of all.

Working hard for prosperity (15 per cent)
A lifetime of hard work is regarded as a given by people who adhere to this value system. They believe that everyone who really works hard can succeed, although they are noticing that this is no longer as simple as it once was. And in their view, those who have made it are entitled to treat themselves to a little luxury. They expect the social partners to ensure that Germany remains strong in economic terms and that high achievers continue to have a home here. They expect the state to create conditions which ensure that everyone who works hard can achieve a certain level of prosperity. At the moment, however, they feel they are not experiencing a sufficient level of success and recognition despite working very hard.

Achieving peak performance via dedication (11 per cent)
For people with this value system, the ideal vision of work is characterised by responsibility, efficiency and striving to perform to the best of their potential. They regard the rapid pace of developments in the economy and society, including those resulting from digitalisation, as a welcome challenge rather than stressful. In their view, it is up to every individual to get to grips with the new challenges, for example through lifelong learning. They expect the state to create conditions which enable individuals to deal with the individual challenges of a changing world of work. They regard these conditions as mostly being in place, as their experience has been that particular dedication leads to personal success.

Finding fulfilment in work (10 per cent)
The ideal work situation for people with this value system is characterised by opportunities for them to constantly reinvent themselves and have many exciting experiences. They see themselves as part of a network of likeminded people, one which stretches beyond Germany. For them, there is no contradiction between personal fulfilment and performance and efficiency. They expect the state and employers to support people on their individual paths, for example through flexibility in working time and location, and comprehensive childcare.

Finding a work-life balance (14 per cent)
For people with this value system, work is ideal if it can be balanced with family commitments, personal fulfilment and involvement in shaping society. At the same time, they expect every individual to show a certain degree of personal responsibility. In their view, society's purpose is to jointly create good conditions for all. The business and working world should adapt to people's needs, not vice versa. They are not willing to sacrifice their principles for material security. They therefore expect the state to provide opportunities for effective involvement in shaping society.

Seeking meaning outside work (13 per cent)
The people with this value system do not regard paid employment as the only possible meaningful activity. They measure an activity's value by its contribution to the common good. They often regard charitable work as more meaningful than work carried out primarily for financial reasons. They expect the state to guarantee all citizens an adequate amount to live on, irrespective of what income they earn in the labour market.

Source: Federal Ministry of Labour and Social Affairs, White Paper Work 4.0, http://www.bmas.de/SharedDocs/Downloads/EN/PDF-Publikationen/a883-white-paper.pdf;jsessionid=1E53F0F002DD4B69D213521AE6C0CFE0?__blob=publicationFile&v=3 , page 19-20

Questions to debate:

What about your values in terms of work? Why? What values do you expect from others?

Material M4

ULTIMATUM GAME

Aim of the activity: show the difference between pure rational thinking and real outcomes.

Target group: 15+, otherwise not specified

Duration: 15 minutes, incl. introduction and explanation

Introduction:

- explain there is a difference between a rational and so called non-rational approach to economic problems, without examples, because that could spoil the game
- explain the game

The game

- divide the group in pairs, in case of an odd number of participants, let one group of three
- in each pair choose one person to be the bidder, this person "gets" from you one hundred Euro
    - this may be in a form of a piece of paper or simply verbally said
    - this person, the Holder, should understand the pecuniary amount as a gift or as an amount they have free at their disposal
- however the Holder has a duty to offer a share of the amount to the other person in the pair, the "Approver"
    - the Holder can offer any sum between 0 and 100 euro, according to their preferences
    - the Approver can either accept the offered sum and then both parties take the respective amount
    - if the Approver rejects, nobody gets anything
- there is no chance for a second offer
- both parties in the pair must know about the rules, and it should be explained, their target is to "take some money home"

The results

- collect all the results
    - number of rejections and successful trades
    - average amount traded and most frequent amounts traded

The explanation

- since the Approver doesn't have any money at the beginning of the game, they should be satisfied with any amount offered – anything is a financial gain for them, even one Euro
    - the Holder knows this
- since the Holder knows that the Approver must approve the trade, it is in their interest to offer a sufficient amount for the Approver to approve
    - the Approver knows this
- the ultimately rational behaviour form both sides would be an one-Euro offer and acceptance of this offer
- the usual course of the game is different – much higher amounts are accepted and even some of them are rejected
- the reason for this is the notion of fairness
    - many players don't see the one-Euro offer as fair, because the distribution of money at the end of the game would be too uneven
- usually the average is between 50 and 75 Euro for the Holder

Lessons to be learnt

This shows that the sense of fairness and expectation of it from the other side is very important in our behaviour. The question for discussion is, if the Holders don't act rationally, because of their sense of fairness, or because they expected that the Approvers wouldn't accept a strongly "unfair" offer.

Material M5

My Personal Business Model

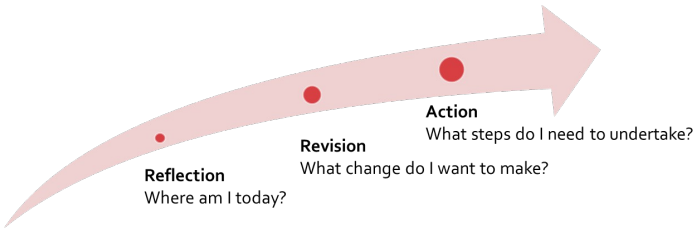
- **Aim of the activity:** to identify needs for changes in our life/career and to develop an action plan through personal business modelling
- **Target group:** adult learners
- **Duration:** min. 120 minutes
- **Materials:**
  - personal business model canvas: to be downloaded here: http://community.businessmodelyou.com/page/personal-business-model-canvas
  - book „Business Model You" (Tim Clark)
  - more information at: http://businessmodelyou.com/
  - post-its, flipchart, pens, beamer
- **Structure:**

1/ Individual creation of Personal Business Model (PBM)
2/ Group reflection
3/ Individual revision of PBM
4/ Action Planning

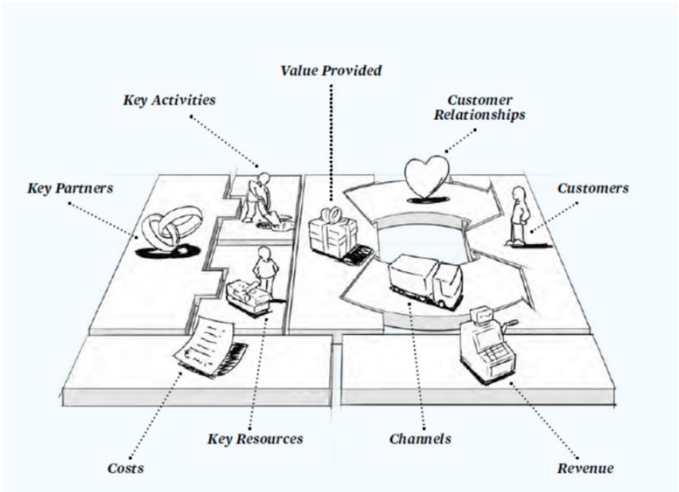
- **Instructions:**

Step 1 Introduction

- **Explain what a personal business model is and how it can help to pursue changes in our lives/careers and how it relates to economic literacy:**
  - PBM represents a life/career framework for describing, analysing and finding the way what/how to change our life/career)
  - Personal business modelling includes 3 phases:



  - PBM uses a key tool called **Personal Business Model Canvas** which consists of 9 building blocks



Source of image: "Business Model You" (Tim Clark)

- Definition of each block is accessible on the PBM canvas (http://community.businessmodelyou.com/page/personal-business-model-canvas)
- The ability to manage our own career lives is a basic management skill for life which is a part of economic literacy.

- **Step 2 Individual work**
  - Each participant gets a worksheet (PBM canvas) and post-its
  - The participants´ task is to think of their current or future career plans and to complete all nine building blocks of the canvas using post-its
  - The aim of this task is to reflect where am I today in the context of my current or future job.
  - Each participant finds concrete answers for all nine building blocks (1. Key Resources, 2. Key Activities, 3. Customers, 4. Value Provided, 5. Channels, 6. Customer Relationships, 7. Key Partners, 8. Revenue and Benefits, 9. Costs)
  - Allow each participant to work at least 30 minutes

- **Step 3 Reflection**
  - Once all participants are ready, reflect on their work and PBM canvases
  - Suggested questions:

1. *What blocks were easy to complete? X What blocks were difficult to fill in? What problems/challenges did you encounter?*
2. *What blocks are you satisfied with? Why? X What blocks are you not satisfied with? Why?*
3. *What would you like to change? Why? What would you like to start with?*
4. *What help/support/information/knowledge/skills/competences do you need to make the changes happen?*

- **Step 4 Revision**
  - Allow participants to revise their PBM canvases based on the outcomes of their reflection. They might use new post-its with another colour to make the revisions.

- **Step 5 Action**
  - Guide the participants when preparing their individual action plans. Each action plan should respond to following questions:

1. *What are the needed changes I want to make in my current/future job?*
2. *What are the concrete objectives I want to achieve?*
3. *What concrete results do I expect when meeting the objectives?*
4. *What are the particular activities/steps I have to take?*
5. *What is a time schedule to achieve the objectives? Is it realistic?*
6. *What resources do I need to achieve the objectives?*

Material M6

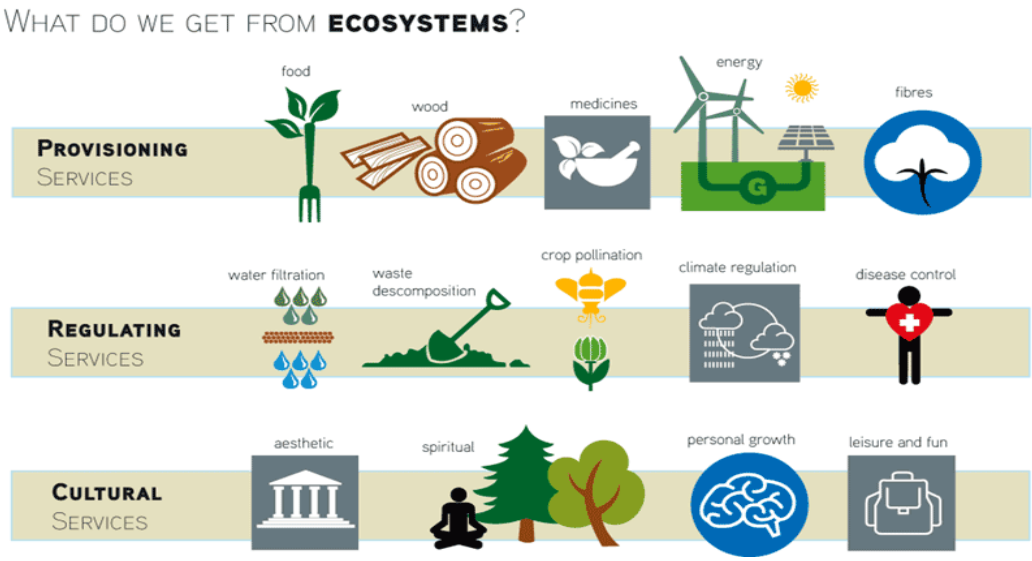
LEARNING FOR SUSTAINABLE DEVELOPMENT: ECOSYSTEM SERVICES

Outcomes of training:

- the learner is able to notice ecosystem and ecosystem services by walking in nature;
- the learner can define ecosystem services and classify them;
- the learner understands conflicts related with use of ecosystem services and knows what are conflict resolution options.

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

G.H.Brundtland (1987) Our Common Future. Report of the UN World Commission on Environment and Development



Environmental economics is a field of public sector economics dealing with the relationship between the economy and the environment. Environmental economists study the economics of the natural resources use and the waste products re-use.

Ecosystem services (ES) is defined as goods and/or services people obtain from ecosystem and which satisfies the needs of society. ES is divided into three (four) groups.

YOUR TASK 1

Imagine: you are a citizen, vacationer and learner, walking in nature. Make notes what kind of ES offers the area to human beings and society. Please classify these ES and write on the fields below.

> **Provisioning Services** are ES that describe the material or energy outputs from ecosystems.
>
> **Regulating Services** are benefits obtained from the regulation of ecosystem processes, including for example the regulation of climate, purification of waters, biodegradation, disease control, etc.
>
> **Cultural services** are non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experience.

YOUR TASK 2

Imagine: you are an entrepreneur walking through nature and looking for a new investment opportunity. Your goal is to get as much profit from your investment as possible. What kind of entrepreneurship would you develop here?

YOUR TASK 3

Imagine: you are a representative of an NGO which promotes protecting nature and sustainable development. You walk through a natural surrounding. Your goal is to prevent any destruction and pollution. What kind of activity would you suggest to reach this goal?

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