Future work and technological change: what do future work projections tell us about the skills and competence development needed to stay in the labour market?

POLICY BRIEF
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BALTIC SEA LABOUR FORUM
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BSLF BALTIC SEA LABOUR FORUM
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SUMMARY

In our knowledge society, educational systems are challenged with keeping up with changing demands for skills and competencies in the labour market due to technological development and digitalisation. For the design of relevant educational investments, one needs to look into the future. Here we look at what research forecasts when it comes to changing employment structures, the effects of technology on different job categories and what professions, skills and competencies will be in demand in the future. For policy development, access to continuous learning and skills upgrade, focus on vulnerable groups and provision of opportunities to transition within occupations will be key.

The challenge of matching skills with changing labour market needs

The jobs we have and the way we work are changing rapidly due to technological progress. As OECD points out, in the past workers were to expect few career changes, while now we are all likely to change jobs more often, or adapt to new tasks.[1] To meet the rapidly evolving demands of the labour market, provisions of new, relevant and up-to-date skills and competence development need to be accessible to all.

For investments in future skills and competence strategies to match the needs of the labour market, one needs to look to the future. What does research say about the future of work and how it will be affected by technological change? There is no consensus between experts regarding this, but some trends are generally agreed upon: for decades, a pattern of an increasingly polarised labour structure has been developing, while many countries have also seen a significant upgrading towards higher skilled jobs.[2]

Employment structures are changing - job polarisation and upgrading

Job polarisation means that employment in low- and high-skilled jobs increases, while there is a hollowing out of jobs in medium-skilled occupations, such as manufacturing. While research points to several factors behind this development, technological change is one of them. Research shows that routine tasks – often found in medium-skilled jobs – are more easily replaced by automation technology. Furthermore, OECD estimates that 1/3 of this polarisation happens in the form of de-industrialisation, that is, jobs moving from the manufacturing to the services sector.[3]

Upgrading refers to an increase of employment in highly skilled occupations, while low-skilled jobs decline[4].

International Standard Classification of Occupations – ISCO-88 defines skills groups as follows: Low skill workers: elementary occupations. Medium skill workers: clerks, service workers and shop and market sales workers, skilled agricultural and fishery workers, raft and related trades workers, plant and machine operators and assemblers.High skill workers: legislators, senior officials and managers, professionals, technicians, and associate professionals.

Research indicates that globally, most countries show a mix of polarisation and upgrading. When it comes to the countries in the Baltic Sea Region, researchers do not agree. For the Nordic countries, some researchers claim that polarisation is dominant, while other research points towards an upgrading. Projections made by the European Centre for the Development of Vocational Training, show that the future skills demand will be concentrated on high and medium level skills in all BSR countries. (Figure 1.)

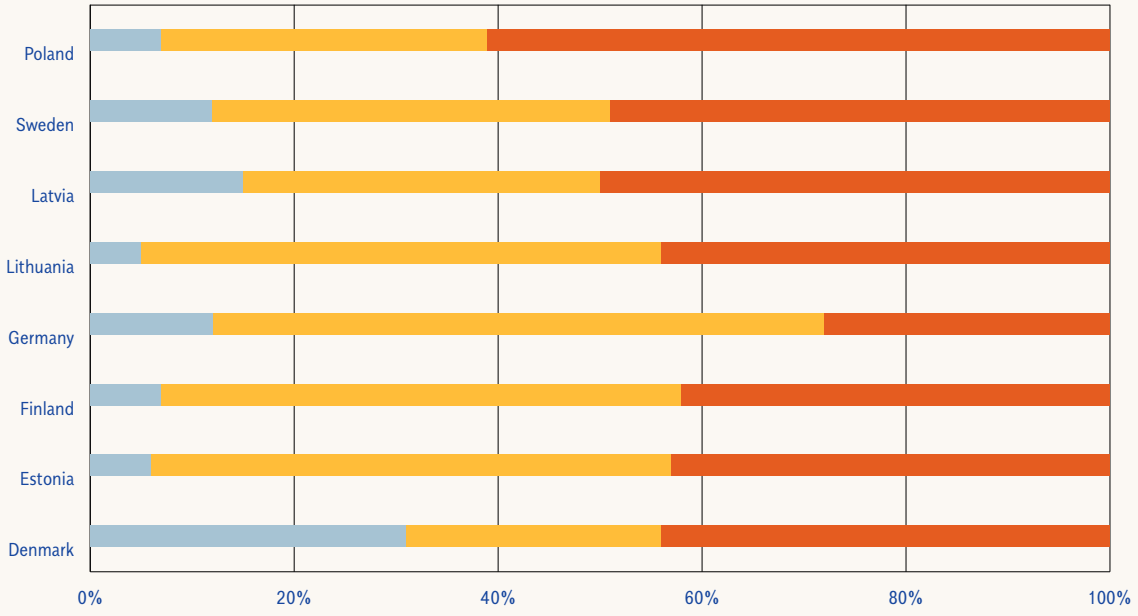
1 OECD (2017), *Preventing Ageing Unequally,* OECD Publishing, Paris.

2 Some examples: ILO(2016), *World Employment and Social Outlook: Trends 2016,* International Labour Office, Geneva; OECD(2019), *OECD Employment Outlook 2019 - the Future of Work,* OECD Publishing, Paris; Cedefop, Eurofound (2018), *Skills forecast: trends and challenges to 2030,* Luxembourg: Publications Office. Cedefop reference series; No 108. http://data.europa.eu/doi/10.2801/4492

3 OECD (2019), OECD Employment Outlook 2019 - the Future of Work, OECD Publishing, Paris

4 Berglund T., Doelvik J.E., Rasmussen S., Steen J.R.(2017) .Changes in the occupational structure of Nordic employment: Upgrading or polarization? Nordic future of work project 2017-20, Working paper 2, https://www.fafo.no/images/pub/2019/Nfow-wp2.pdf

Figure 1. Total Job Openings by Qualification Level, projections 2018 - 30



Source: European Centre for the Development of Vocational Training (Cedefop) Skill Forecast, 2018

What are the effects of these trends on workers?

The International Labour Organisation points out that if there are no effective transition policies, including adequate opportunities to acquire new relevant skills, the effects of job polarisation may be that many of those that risk losing their medium-skilled jobs are forced to accept low-skilled jobs.[5]

OECD describes a future where employment is being reshuffled across occupations and industries, which means that workers are confronted with the risk of job loss, followed by the need to make a difficult transition to a job in a different occupation or industry.[6] Also workers who are able to stay in the same job are often faced with changing skill demands that require retraining, OECD points out.

Routine-biased technological change (RBTC): the effects of technology depend on the characteristics of the tasks of specific jobs

The effects of technology on work vary greatly depending on skill category. The hypothesis of routine-biased technological change is generally adopted, and it is supported by empirical evidence. According to this thinking, a job that involves a high degree of routine tasks is more susceptible to be replaced by automation.[7] It is thus the main tasks characterising different jobs that determine the effect of technological progress.

High-skill workers are mostly involved in non-routine tasks and are seen to benefit from Information and Communication Technologies (ICT), as ICT complements those who perform complex cognitive tasks typically found in managerial and professional occupations. Routine tasks are easier to automate, given current technological capacities, and these kinds of tasks are typically found in medium-skill clerical and production jobs. The effects of technological progress are, however, not that evident in low-skill jobs (for example cleaning occupations, food and other personal services).[8] They usually involve quite non-routine manual tasks that are difficult to automate, as they require more manual dexterity and hand-eye co-ordination. Table 1 prepared by Cedefop illustrates well the hypothesis presented here.

5 ILO (2018a), *Skills Policies and systems for a future workforce,* Issue brief No. 8, Global Commission on the Future of Work

6 OECD (2017), *OECD Employment Outlook 2017,* OECD Publishing, Paris.

7 Ibid.

8 Ibid.

Table 1.

Top 5 occupational groups with rapidly changing skills profiles	Top 5 occupational groups with stable skills profiles
1. ICT Professionals	1. Subsistence farmers, fishers and hunters
2. ICT Associate Professionals	2. Cleaners and helpers
3. Production or specialist services managers	3. Food preparation assistants
4. Health professionals	4. Personal service workers
5. Electronic and electronic trades workers/Science and engineering professionals	5. Personal care workers

Source: Cedefop European Skills and Jobs Survey 2015

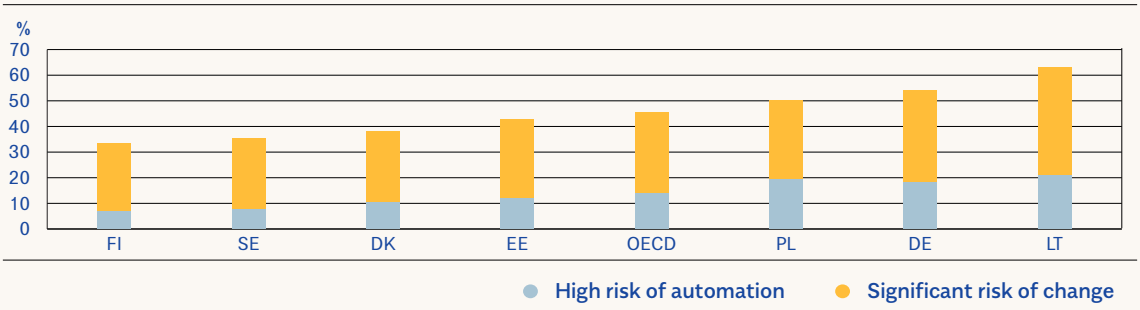
Automation leads to job loss, significant change to existing jobs, as well as new jobs

Regarding the degree to which jobs will be replaced by automation in the future, scenarios differ among researchers. While the extreme prediction is that up to 50 percent of all jobs will disappear due to automation[9], many researchers have agreed on a more modest prediction of around a midpoint of 14-16 %.[10] Digital technology and automation leads to the replacement by robots of some jobs. In other jobs, new technology can help people do their jobs better, while technology also creates new jobs. As ILO points out, automation of work processes is not an "all or nothing" scenario, but there are different options.[11] ILO underlines the importance of social dialogue in mediating the impact of new automation technologies on workers.

The degree of risk of automation of jobs is linked to past ICT investments and structural economic characteristics – great differences are seen between Baltic Sea Region countries

A study from 2018 that estimated the risk of automation of jobs in the countries that participated in the OECD's survey of adult skills (PIAAC) shows a very heterogeneous picture for the Baltic Sea Region countries.[12] When looking at the countries from this region that were part of this survey, the risk of automation of jobs ranges from a high between 18 and 21 percent of jobs in Germany, Poland and Lithuania, to around 8 percent or less in Finland and Sweden (Figure 2.). These great differences are related to the level of investment in ICT in each country, and also to specific structural economic characteristics of each country.

Figure 2. Jobs at risk of automation in BSR coutries



Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012); and Nedelkoska, L. and G. Quintini (2018), "Automation, skills use and training", OECD Social, Employment and Migration Working Papers, No. 202

Note: Jobs are at a high risk of automation if the likelihood of the job being automated is at least 70%. Jobs at risk of significant change are those with the likelihood of their job being automated estimated at between 50 and 70%.

9 Frey C.B., Osborne M.A. (2017), The Future of Employment: How Susceptible Are Jobs to Computerisation?, *Technological Forecasting and Social Change;* Volume 114, January 2017, https://www.sciencedirect.com/science/article/abs/pii/S0040162516302244?via%3Dihub

10 OECD (2019)

11 ILO (2018b), *The Impact of Technology on the Quality and Quantity of Jobs*, Issue Brief No.6, Global Commission on the Future of Work,

12 OECD calculations based on the Survey of Adult Skills (PIAAC) (2012); and Nedelkoska, L. and G. Quintini (2018), "Automation, skills use and training", *OECD Social, Employment and Migration Working Papers,* No. 202

An increasingly ageing population will also affect the future of work

Another so-called megatrend that will shape the future of work is the demographic change, in developed economies this means population ageing in combination with low fertility rates that lead to shrinking workforces. This demographic trend also includes the Baltic Sea Region. A growing proportion of older persons in the population will lead to changes in consumption patterns, which will affect both the demand for occupa-tions and skills.[13] For example, the demand for services (long-term care, health care) will grow.

The sectors that will grow or stagnate:

ICT, professional and scientific services

One of the sectors where Cedefop's European Skills Survey 2016 sees a majority of future job growth is in business services - ICT, real estate and professional and scientific services.[14] ILO confirms the trend: technical skills involving problem-solving and innovation in the field of science, technology, engineering and mathematics will be in high demand, but ILO also points out that there will be a need for people who can operate these new technologies, requiring specific vocational skills.[15] Vocational training and education will play a crucial role in providing these skills.

Care and service sectors

Non-marketed services, e.g. education, health and social services is the second growing sector, research from Cedefop indicates. This is related to the changing needs due to the demographic change. Hotels and catering, health and social work are sectors where significant employment growth is expected.

Green economy

ILO predicts that the the "green economy" will bring in many job opportunities in the areas of renewable energy, energy efficiency, recycling, repair and remanufacturing.[16] Occupations such as plumbers, electricians and architects will need an upgrade in skills and competences related to environmental awareness and green technical solutions, while there will be need for specialists in areas such as waste and water management.

Manufacturing and the primary sector will see a decrease in jobs

By contrast, employment should continue to fall in basic manufacturing and the primary sector, especially mining, textile and clothing or metal products, although some other activities, like motor vehicle production, may see employment grow.

Tasks and skills that will be in demand:

European Working Conditions Survey indicates that there will be a decline in tasks that require physical strength and dexterity linked to occupations in agriculture and industry, while intellectual and social tasks will increase in importance.[17] The EU projects business literacy and selling/persuading to be the two most rapidly increasing tasks in terms of what work is done.[18] Business literacy is the processing of verbal business information, including tasks such as reading and writing letters and financial statements. Selling/persuading refers to commercial activity.

All studies (OECD, ILO, EU) underline the increasing importance of strong cognitive abilities and attitudes (e.g. active learning, ICT literacy). There is also need for individuals with well-developed cross-functional skills - social skills, complex problem-solving and resource-management. Cedefop furthermore predicts a continuous need for robust technical skills.

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13 OECD (2019)

14 Cedefop (2018), *Insights into skill shortages and skill mismatch: learning from Cedefop's European skills and jobs survey,* Luxembourg: Publications Office. Cedefop reference series; No 106. http://data.europa.eu/doi/10.2801/645011

15 ILO (2018a)

16 ILO (2018a)

17 Eurofound (2017), *Sixth European Working Conditions Survey – Overview report (2017 update)*, Publications Office of the European Union, Luxembourg.

18 Eurofound, 2017

Table 2. Predictions of occupations most in demand, 2018-2030, Cedefop skills forecast 2018

Country	Occupations, ranked
Denmark	Business and admin. associate professionals Teaching professionals Personal care workers
Estonia	Teaching professionals Drivers and mobile plant operators Business and admin. associate professionals
Finland	Business and admin. associate professionals Business and admin. professionals Legal, social, cultural related associated professionals
Germany	Business and admin. associate professionals Personal service workers Sales workers
Lithuania	Business and admin. professionals Legal, social, cultural related associated professionals Market oriented skilled agricultural workers
Latvia	Labourers in mining, construction, manufacturing and transport Business and admin. professionals Teaching professionals
Sweden	Business and admin. associate professionals Personal service workers Drivers and mobile plan operators
Poland	Building and related trades workers Business and admin. associate professionals Market oriented skilled agricultural workers

Source: Cedefop European Skills and Jobs Survey 2015

POLICY IMPLICATIONS

- As routine-based jobs will be at the highest risk of disappearing due to technological change, policies that support workers' transition to non-routine jobs will have to be developed. High-quality lifelong learning and vocational education with focus on non-routine tasks will be required.

- Adult policies will need to have a life cycle orientation, ensuring skills and competence development for workers throughout their careers, preparing people for career changes and adapting to rapid technological change. Examples of measures: provision of leaves for employees to undertake training and skills-upgrade, include rights to lifelong learning in collective bargaining and employment contracts.

- Labour policies need to include strategies for transition between jobs for those that risk losing their jobs due to technological change. There is need to focus on inclusion of the vulnerable workers: low-skilled, low-educated workers.

- Social partners will have an important role in mediating working conditions for employees in new types of employment contracts, often short- and fixed-term.

This policy brief is part of a series of policy briefs written for the project **BSLF for Sustainable Working Life** (BSLF-SWL) which is funded by the European Social Fund and Swedish Institute. The project addresses the demographic challenge in the BSR - i.e. an ageing population, low fertility rates and a shrinking labour force - by focussing on the working population in the age group 55+ and efforts to prolong working life through Active Ageing and Lifelong Learning. The overarching aim of the project is to support the improvement of working conditions and lifelong learning provisions, systems and policies for the older labour force in order to promote active ageing and employability.

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