



What are the skills of the future?

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The issue of what are the jobs and skills that will be needed in the future economy is a million-dollar question. Many futurologists claim to know the answer, yet an honest response to this question should be '*can anyone really know with certainty?*'

And indeed, it is hard to predict the skills of the future since we are at the cusp of the 4th Industrial Revolution, so the skills that economies will need are changing rapidly in many industries and workplaces. Technological progress ([robotics](#), [artificial intelligence](#), 3D printing, genetics and biotechnology) and changing consumer tastes are driving product innovation, rendering some skills obsolete and increasing the market value of others. At the same time demographic, socioeconomic forces and other drivers are shaping the available skill supply and demand in our economies.

A recent World Economic Forum report on the Future of jobs [1], for instance, cites one popular estimate, namely that 65% of children entering primary school today will ultimately end up working in jobs that do not yet exist as of today. **Figure 1** further highlights some broad occupational groups that are likely to have stable or unstable skills profiles, according to Cedefop's own *European skills and jobs survey*. [2] Not surprisingly, professionals and technicians in the rapidly changing ICT, health, electronics and professional and scientific services sectors are more likely to be susceptible to changing skills profiles required for their jobs, as opposed to other lower- or medium-skilled occupations typically involving less technologically-exposed tasks.

Figure 1: Degree of (recent and anticipated) change in skill profiles across jobs, 2014, EU28

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

NB: Ranking of occupations based on an index of skills stability, derived as the share of EU adult employees who experienced changes to the technologies (machinery, ICT systems) they used in the past 5 years and expect that their skills have a high likelihood of becoming outdated in the next 5 years.

Source: *Cedefop European skills and jobs survey* ([available here](#)).

But we need not make policy decisions regarding our future education and training investments in the dark – we **can** make some informed and educated guesses, relying on and learning from historical trends based on relevant data sources. This is, after all, why data analysts are frequently predicted to be a ‘hot’ occupation that will be in high demand in forthcoming decades (now you wish you had not made fun of the geeky statisticians at school or college, right?).

For many years Cedefop has carried out the European skills forecasts[3], a wide-scale exercise that projects the evolution of skill demand and supply in EU economies, assuming that past labour market trends and various assumptions regarding GDP and productivity growth are realised. The Cedefop model does not tell us what the future will be, it provides a mirror image of what our future is likely to look like if our job markets continue on the same path they have been treading in the past.

So what do we learn from the latest 2016 Cedefop projections? A majority of job growth is expected to be concentrated in business services (in particular the ICT sector, real estate and professional and scientific services), as well as in some non-marketed services (e.g. education, health and social services). By contrast, employment should continue to fall in 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). [4]

As a result of these structural trends, there should be a clear rise in the demand for individuals in managerial and professional occupations (e.g. business and financial operations) as well as occupations closely linked to science (e.g. data analysts, software and applications developers) and engineering as well as health care providers. From the supply-side EU economies are also expected to enjoy the dividends of their strong investment in more educated workforces. It is therefore clear that the future EU labour market will be one that relies heavily on individuals in possession of high qualifications and skills.

But this is not the end of the story. The intensity of the above-mentioned trends varies markedly between different EU countries and sectors. Furthermore, in the recent past employment growth has also been positive for some low- or middle-skilled occupations (such as cleaners and helpers, assemblers, sales workers) and has declined for many middle-skill jobs (e.g. clerks, agriculture or metal workers) – fostering the so-called ‘polarisation’ of the EU labour market.

Overall, the job types that are predicted to enjoy more robust employment growth in the next decade tend to be those with lower automation risk. The extent to which technological revolutions will continue replacing specific jobs (including white-collar jobs) or creating new complementary opportunities in the future will therefore depend on the nature of the tasks required to perform them. Tasks that can be easily codifiable or automated are more susceptible to technological dislocation. By contrast, tasks that comprise mostly of interactive or social services as well as problem-solving and innovative thinking are less vulnerable.

But which are the skills associated with jobs that have a low automation risk (and thus favourable

employment prospects) and which are linked to jobs susceptible to labour substitution by technological advancements? Recent data from the Cedefop European skills and jobs survey (**Figure 2**), which pictured the profiles of skill needs of occupations in EU job markets, has highlighted that the job types most threatened by automation are those reliant on physical or manual skills, numerical skills as well as customer service skills. By contrast, the job types projected to experience limited labour substitution (hence strong employment growth) are those characterised by high levels of cognitive skills, (advanced) digital skills, communication skills as well as planning skills.

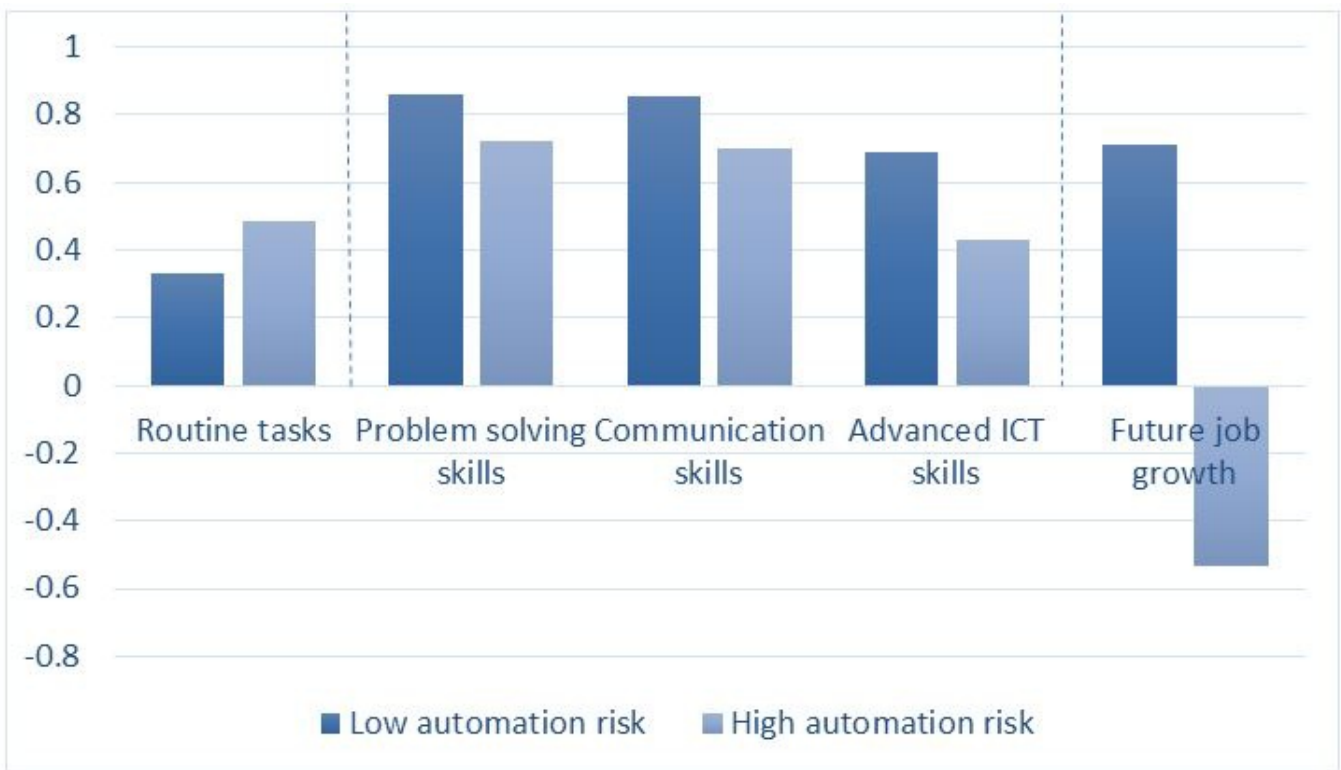
A relatively transparent picture therefore emerges as to the most important skills in the future, giving clear indications as the desirable direction of our education and training policies. Solely on the basis of anticipated structural employment shifts underlying EU job markets, future economies will increasingly require individuals in possession of strong cognitive abilities and attitudes (e.g. active learning, ICT literacy) as well as high levels of cross-functional skills (social skills, complex problem-solving, resource-management). Robust technical skills are also at the core of the arsenal of futureproof skills that individuals must possess, as nearly half of all EU jobs will have a stable need for such skills in the coming years.

But what the above analysis does *not* capture is changes in future skill demand taking place **within** occupational groups. Although many data sources and anecdotal evidence would lead us to expect that in the future there will be skills upgrading in most occupations, the jury is still out. Many argue that we should not underestimate that new technologies can actually foster deskilling of work. In the UK, for instance, several occupations (senior- and lower-level public administrators and leisure and travel service occupations, such as travel agents, leisure assistants and air and rail travel assistants) have seen falling levels of influence and discretion over time. [5]

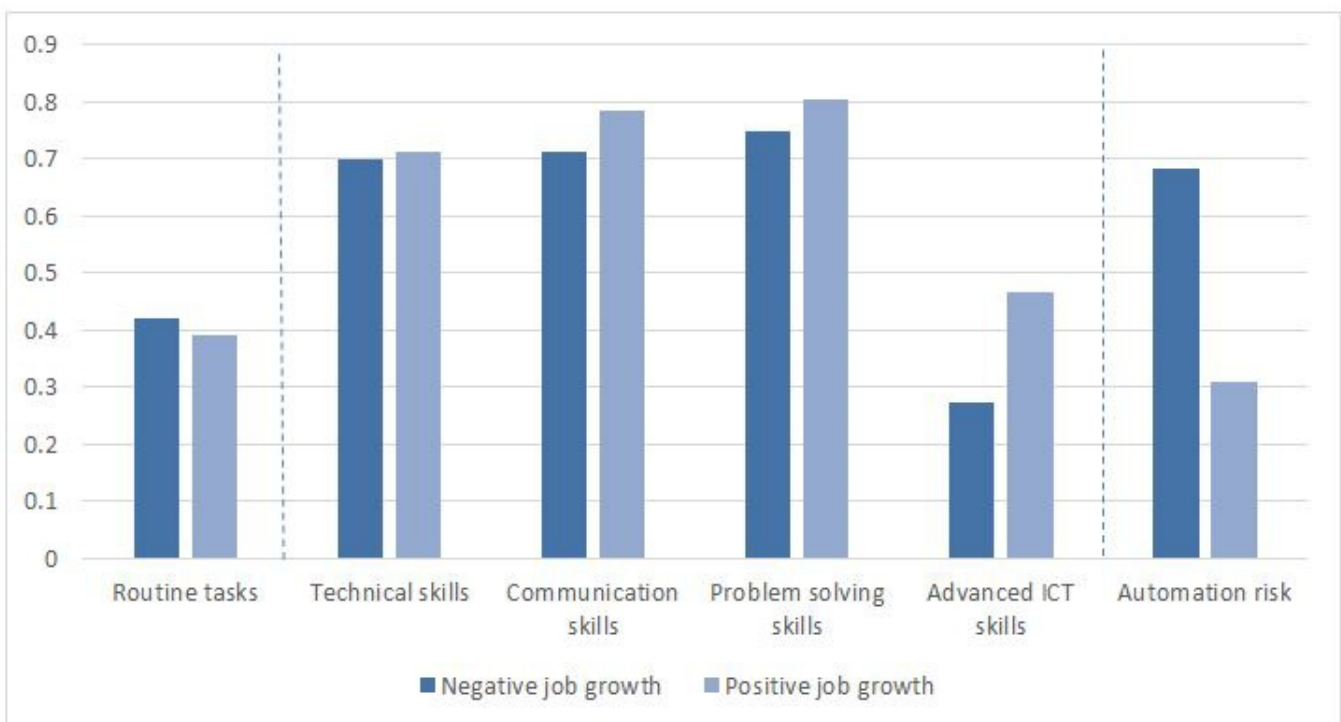
Perhaps the best forecast of all therefore seems to be that you should stop wondering what are the skills of the future and start asking yourself '*what skills should I acquire so that I decrease the chances of a robot becoming the boss of me?*'

Fig 2 Risk of automation, future job growth and importance of skills in occupations, 2014, EU28

(a) Occupations shielded from the risk of automation require higher cognitive skill levels and involve fewer routine tasks...



(b)...and jobs projected to grow in employment between 2015-2025 are mostly reliant on higher skills



NB: Average importance (0 Not important at all-1 Essential) of a set of skills in (2-digit) occupational groups as derived by the Cedefop European skills and jobs survey; the estimated risk of automation is based on Frey and Osborne (2013). Positive or negative employment growth is derived on the basis of Cedefop's skills forecasts.

References

[1] World Economic Forum, (2016), [The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution](#), Geneva

[2] Cedefop, (2016), [Skills, qualifications and jobs in the EU: the making of a perfect match? Evidence from Cedefop's European skills and jobs survey](#), Thessaloniki and Cedefop, [Analysing skill mismatch Project](#)

[3] More information about Cedefop forecasts, including the most recent data are available [here](#)

[4] Cedefop, (2016), [European sectoral trends: the next decade](#), Thessaloniki.

[5] CIPD, (2015), [Over-qualification and skills mismatch in the graduate labour market](#), Policy report

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