INNOVATION, COMPETITIVENESS, OPPORTUNITY: A Policy Agenda to Build Tomorrow's Workforce

The increasing use of and demand for technology is creating new types of jobs in every sector of the economy that require an evolving set of skills. Tasks associated with jobs across many sectors are not the same today as they were just 20 years ago. Yet, as job requirements change, new technologies are generating job growth and enhancing productivity. These trends will become even more prominent with the growing use of emerging technologies, such as artificial intelligence.

Although changes are taking place, using software to create solutions to enrich every aspect of our lives presents great opportunity. Software innovation is transforming every sector of the French economy. A recent Software.org: the BSA Foundation study shows the software industry directly or indirectly contributed more than €115.2 billion to the French GDP in 2016. The study also showed that the software industry is a powerful job creator, supporting a total of 1.2 million jobs, with a significant increase of more than 3.4% in two years within the software industry itself. And there are more jobs available than there are people qualified to fill them. Jobs in software development, computer programming, cybersecurity, and related fields are growing at an incredible rate. Empirica estimates that by 2020, more than 80,000 jobs in information and communication technology will be unfulfilled.[1] Likewise, France Stratégie projects IT engineers to be in the top 20 jobs that will generate the highest demand by 2022.[2]

Enabling the French workforce to transition smoothly into the workforce demands of the new digital economy requires preparing new generations for jobs of the future, assisting current workers as they transition to the emerging opportunities of the digital economy, and expanding opportunities to reach a bigger pool of talented workers. The government and private sector must work together to:

- Improve access to STEM education;
- Create alternative pathways to evolving workforce;
- Expand workforce retraining
- Broaden access to technology.

Software is also generating new jobs across industry sectors, requiring new skills ranging from advanced manufacturing to new approaches to customer service and retail sales. Employers are encountering challenges in filling vacancies that require use of new technologies, but opportunities for qualified workers abound. Both the government and the private sector have important roles in implementing policies that will prepare the next generation for the jobs of the future and allow the current workforce to transition successfully into the new job environment.

[1] http://eskills-lead.eu/fileadmin/lead/working_paper_-_supply_demand_forecast_2015_a.pdf

[2] https://www.strategie.gouv.fr/publications/metiers-2022

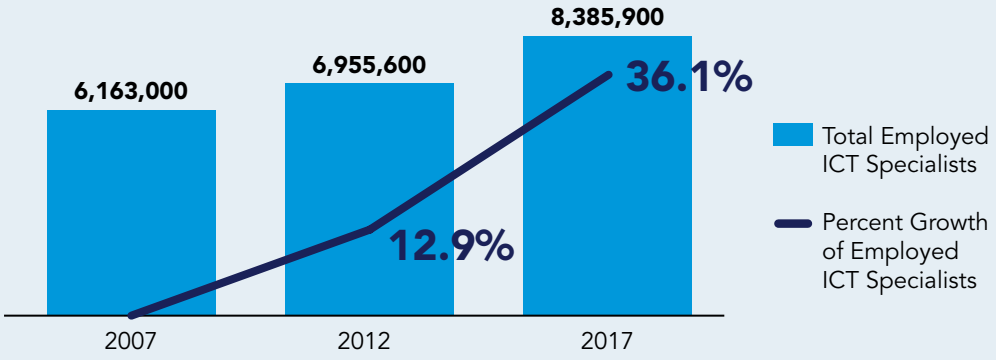
Building Tomorrow's Workforce: Why It Matters

Investing in tomorrow's workforce:

- Ensures Competitiveness in a Changing Global Economy
- Spurs Innovation Across Industry Sectors
- Expands Economic Opportunity Across all Regions of France
- Promotes Economic Security for Millions of Workers

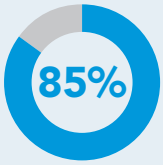
IT Job Growth Far Outpacing Other Jobs in Europe

The number of persons employed as ICT specialists grew by 36.1% during the period from 2007 to 2017, which was more than 10 times as high as the corresponding increase (3.2%) for total employment[3]

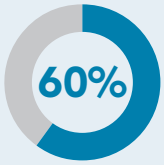


In 2017, the software industry created **more than 28,000** new jobs in France (+56% of net jobs creation)[4]

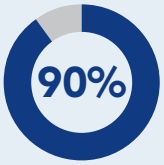
Digital Skills Gap in France and in Europe



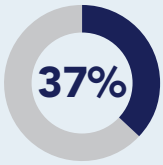
of French IT Companies Face Difficulties Hiring Research and Development Profiles[5]



of French Tech Companies face difficulties recruiting generally[6]

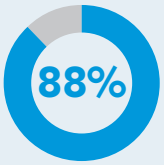


of jobs in Europe already require basic digital skills[7]



of the European workforce lack digital skills[8]

of workplaces report that the lack of digital skills has an impact on their performance[9]



of workplaces have not taken any action to tackle the lack of digital skills of their employees[10]

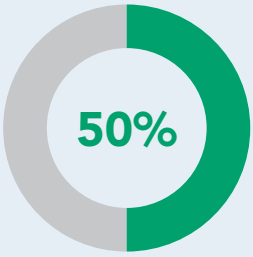
The ICT skilled workers gap in Europe is expected to reach **500,000** by 2020[11]

The ICT skilled workers gap in France is expected to reach **80,000** by 2020[12]

There are at least **350,000** open vacancies for ICT specialists in Europe right now[13]

Jobs Demand Far Outstripping Supply in Cybersecurity

New Jobs in Cybersecurity[14]



Half of All Coding Jobs Are Outside the Tech Industry[15]

65% of children now entering primary school will hold jobs that currently don't exist[16]

[3] Eurostat https://ec.europa.eu/eurostat/statistics-explained/index.php/ICT_specialists_in_employment

[4] Syntec https://syntec-numerique.fr/actu-informatique/bilan-2018-perspectives-2019

[5] Tech in France, www.techinfrance.fr/publications/categorie/indicateurs-metiers/article/tech-in-france-publie-la-4e-edition-de-son-barometre-annuel-people-in-tech

[6] Tech in France, www.techinfrance.fr/publications/categorie/indicateurs-metiers/article/tech-in-france-publie-la-4e-edition-de-son-barometre-annuel-people-in-tech

[7] European Commission, 2017

[8] European Commission, 2017

[9] European Commission, 2017

[10] European Commission, 2017

[11] Empirica, 2017 www.empirica.com/de/news/single-view/updated-forecast-of-ict-labour-market-now-expects-a-shortage-of-526000-ict-specialists-in-the-eu-in-1/

[12] Empirica, 2017 www.empirica.com/de/news/single-view/updated-forecast-of-ict-labour-market-now-expects-a-shortage-of-526000-ict-specialists-in-the-eu-in-1/

[13] European Commission, https://ec.europa.eu/digital-single-market/en/news/digital-opportunity-traineeships-journey-students

[14] Les Echos, https://solutions.lesechos.fr/tech/c/manque-competences-cybersecurite-7116/

[15] Oracle Academy / Burning Glass Technologies 2016

[16] World Economic Forum

Improve Access to STEM Education

STEM education equips students with problem solving, critical thinking, and other abilities that are important for jobs in virtually every industry. Making STEM education inclusive and widely available builds interest in developing in-demand skills and expands the available workforce for technology-related jobs. BSA therefore supports:

Reinforcing STEM Education in Primary and Secondary Schools. STEM education is essential to building a highly skilled workforce, but too few students currently have access. Enhancing government investments in early STEM interventions including initiations to programming, developing vocational and technical education, and training more STEM-qualified primary and secondary teachers are critical priorities. Professional secondary formation such as Bac Professionnel specialized in STEM fields should be better promoted to encourage more students to apply for these programs.

Encouraging Greater Diversity and Inclusivity in STEM Education. Making STEM education more widely available — and encouraging inclusion of underrepresented groups such as young women or inhabitants of underserved areas — through scholarships, mentorships or other initiatives will help ensure the jobs of the future are available to the entire population.

Broadening Exposure to STEM in Higher Education. Although many students in higher education choose non-STEM areas of study, ensuring a baseline exposure to STEM fields among these students can prepare graduates in all fields to embrace technology in whatever career they may choose.

Aligning STEM Curricula to Real-World Demands. Greater integration of high-demand practical disciplines, such as software engineering, data science, and cybersecurity, into computer science and other STEM curricula will ensure investments in STEM education translate into a qualified, highly skilled workforce.

Expand Workforce Retraining

Emerging technologies will create new jobs and change the skills demanded in many existing jobs. In addition to preparing the next generation workforce, we must ensure the current workforce has access to the skills needed as the job market evolves. Policies that promote access to training in 21st century skills for workers seeking to adapt to new professional demands can ensure that the evolving economy leaves no one behind. BSA therefore supports:

Investing in Mid-Career Training in High-Demand Tech Skills. Government and the private sector should aim to leverage existing mid-career retraining programs in order to provide workers with high-demand cybersecurity and IT skills, helping match qualified workers to growing occupational fields. In that regard, initiatives such as the CPF[17] (professional training account) or the Grande Ecole du Numérique[18] could be promoted more actively towards mid-career workers.

Create Alternative Pathways to the Evolving Workforce

As our economy changes, we need to consider whether our education model should change as well. In the new economy, technical schools, apprenticeships, boot camps, and other alternative pathways may be just as effective as traditional classrooms in generating the skills and interests necessary to thrive in 21st century careers. BSA therefore supports:

Strengthening Apprenticeship Programs. Apprenticeships can be an important way to gain the skills and experience needed for the evolving job market. Simplifying requirements to open programs, as announced, will make apprenticeships more feasible; building public-private partnerships, identifying incentives and actively promoting programs towards the youth will render them attractive for the future workforce.

Expanding Technical Higher Education. Technical Higher Education (BTS/DUT) should be reinforced with the ambition to make technical education more accessible to future workers, and the content and duration of their programs more relevant to future workforce needs.

Mainstreaming Boot Camps, Online Courses, and Other Alternative Education Models. Boot camps, online courses and alternative educations models like École 42[19] can each help reach new student populations, help students tailor their education to their own needs and pace, and impart high-demand skills to workers unable to participate in degree programs or other traditional pathways. The government should increase investments in these and other alternative models to expand the path to the 21st century workforce.

Broaden Access to Technology

Technology enables the creation of jobs in all industries and in all parts of the country. Ensuring equal opportunity to access technology is fundamental to job creation and economic growth. BSA therefore supports:

Achieving Universal Mobile Coverage and High-Speed Internet Access. Affordable access to high-speed Internet is increasingly a necessity for many professions; yet, close to half of the French population is still not covered with fiber and other technologies allowing very high speed Internet access , and rural areas still witness a 50% slower broadband than cities.[20] The government should pursue its plan to ensure a 100% coverage of very high speed broadband throughout the country by 2022,[21] and its efforts to put an end to the persistence of "white zones" lacking access to mobile network, with the cooperation of the private sector.

Ensuring Equitable Access to Technology in the Classroom. Exposing students to cutting-edge technologies at an early age can improve educational outcomes and prepare students for technology-related careers; yet access to technology in the classroom still varies across different localities. The government should pursue its innovative efforts to expand access to technologies, in particular in underserved classrooms.

[17] https://www.moncompteactivite.gouv.fr/cpa-public/

[18] https://www.grandeecolenumerique.fr/

[19] https://www.42.fr/

[20] https://www.quechoisir.org/action-ufc-que-choisir-observatoire-de-la-qualite-de-l-internet-fixe-premiers-resultats-d-un-dispositif-innovant-par-et-pour-les-consommateurs-n54329/

[21] https://www.gouvernement.fr/action/le-plan-france-tres-haut-debit