Background materials on TVET – Volume 2

02

The effects of the digital transformation on technical and vocational education and training and the labour market

A comparison of six international studies

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PREFACE

The sector project 'Technical and Vocational Education and Training' supports the German Federal Ministry for Economic Cooperation and Development (BMZ) in upgrading strategies and approaches for technical and vocational education and training (TVET) in German and international development policy. By means of TVET, BMZ seeks to increase the supply of qualified labour in order to contribute to improving employment opportunities and economic growth. At the same time, promoting TVET as a part of lifelong learning constitutes an important contribution to the ability of individuals for social and political participation. Training geared to labour-market needs enhances people's employment prospects and enables them to earn a decent income to escape from poverty.

Currently, the issue of the future of work is very important for the future development of German development cooperation, in particular in TVET. The concern here is on the one hand with how work and employment are changing in developing countries and on the other, with the corresponding consequences for TVET in development cooperation.

- What kind of employment in which sectors calls for what skills?
- How must TVET systems be designed to cope with these altered requirements and their continuous change?
- How can vocational training measures be planned and carried out to prepare for work in the era of the digital transformation, and to harness the opportunities afforded by the digital transformation?

To answer these questions, the TVET sector project prepares background materials on TVET in development cooperation at irregular intervals. Each of these papers examines a specific aspect of the issues described above. The aim is to compile concise, relevant information, to illustrate this with good practices, and then to make practical recommendations for both development advice and implementation based on this.

The intention is to provide decision-makers and practitioners with inspiration for their own tasks so as to help TVET in development cooperation to respond to the challenges of new work and to make use of the opportunities it affords.

- The background materials are available in both German and English.

Female apprentice in industrial mechanics at Umnugobi Polytechnic College, Mongolia. Many girls plan their career in vocational training.

ABSTRACT

The effects of the digital transformation and the globalisation of work on employment are frequently called 'future of work', 'new work' or 'work 4.0'. This issue is currently very important for the future development of TVET in development cooperation. The concern here is with how changes in work and employment in developing countries will affect TVET in development cooperation.

Many publications deal with the question of what impacts technological change – especially robotics and automation, artificial intelligence, big data, social media and digital communication – and globalisation will have on the world of work. The emergence of the platform or gig economy is a major trend. These changes will affect the organisation of employment relationships, job profiles and the requisite skills. The present paper analyses six studies that have addressed these issues, while focusing on aspects with a bearing on TVET. The studies under review are:

- The OECD's Employment Outlook 2019: The Future of Work
- ILO's Work for a Brighter Future
- The World Bank's World Development Report 2019: The Changing Nature of Work
- World Economic Forum (WEF)'s The Future of Jobs Report 2018
- PriceWaterhouseCooper (PwC)'s Preparing for Tomorrow's Workforce Today
- The Bertelsmann Foundation's Berufsbildung für eine digitale Arbeitswelt (available only in German)

The documents have central factors in common: They identify future developments that are of key importance for TVET in development cooperation. The studies by ILO, the World Bank, OECD and WEF analyse international developments and their impacts on labour markets and draw the implications for skills and social policy. The PwC report centres on the business side. The study by the Bertelsmann Foundation is the only one to deal with the influence of the digital transformation on the TVET system in Germany.

In the context of the six studies these various aspects were analysed:

- Influence of the digital transformation on occupational fields and skills
- Lifelong learning
- Consequences for TVET
- Changes in employment relationships and labour markets
- Impacts on social security
- Informal economy
- Equal opportunities – inclusion – gender

One chapter is devoted to each of these aspects. The aim of comparing these studies is to assemble common key statements and to make recommendations for TVET in German development cooperation. The latter are compiled in the last chapter.

1

INTRODUCTION

In this document, the key statements from six selected studies on the issue of the future from work are analysed and compared. Subsequently, recommendations for TVET in development cooperation are derived.

The reports are as follows:

- Organization for Economic Cooperation and Development (OECD): Employment Outlook 2019: The Future of Work
  http://www.oecd.org/employment/outlook/
- International Labour Organisation (ILO): Work for a Brighter Future
  https://www.ilo.org/global/publications/books/WCMS_662410/lang--en/index.htm
- World Bank: World Development Report 2019: The Changing Nature of Work
  https://www.worldbank.org/en/publication/wdr2019
- World Economic Forum (WEF): The Future of Jobs Report 2018
  https://www.weforum.org/reports/the-future-of-jobs-report-2018
- PricewaterhouseCooper (PwC): Preparing for Tomorrow's Workforce Today
  https://www.pwc.com/gx/en/people-organisation/pdf/pwc-preparing-for-tomorrows-workforce-today.pdf
- Bertelsmann Stiftung: Berufsbildung für eine digitale Arbeitswelt (available only in German)
  https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/berufsbildung-fuer-eine-digitale-arbeitswelt/
- The Highlights of the OECD report were also analysed:
  https://www.oecd.org/employment/Employment-Outlook-2019-Highlight-EN.pdf

The reports differ considerably in length, structure, approach (analytical/normative) and their emphasis on selected aspects. This is due to the different mandates and intentions of the respective institutions.

The aim of comparing these disparate studies is to assemble common key statements and to make corresponding recommendations for TVET in German development cooperation.

2

INFLUENCE OF THE DIGITAL TRANSFORMATION ON OCCUPATIONAL FIELDS AND SKILLS

Technological change and globalisation affect labour markets worldwide. There is considerable apprehension that automation will bring about substantial job reductions in future. Whereas the publications of PwC and the Bertelsmann Foundation make no specific reference to labour market figures, the other four reports stress the opportunities of the digital transformation more than the risks. Even if new technologies lead to job losses in the short term, the OECD, ILO, the World Bank and WEF agree that they will create additional jobs in the long term, raise productivity and open up new opportunities for better working conditions.

Practicing new welding methods in Pristina, Kosovo.

OECD, ILO and the World Bank identify risks primarily in the middle-skilled qualification segment, because new jobs can be expected to be located especially in the **'high-skilled jobs segment'** (OECD 2018: p. 13). While according to OECD only 1 of 7 jobs in 32 of its member countries is at risk from automation, roughly 1 of 3 jobs is **'at risk of significant change'**.

Table 1: Future of Jobs Survey 2018

Stable Roles	New Roles	Redundant Roles
› Managing Directors and Chief Executives	› Data Analysts and Scientists*	› Data Entry Clerks
› General and Operations Managers*	› AI and Machine Learning Specialists	› Accounting, Bookkeeping and Payroll Clerks
› Software and Applications Developers and Analysts*	› General and Operations Managers*	› Administrative and Executive Secretaries
› Data Analysts and Scientists*	› Big Data Specialists	› Assembly and Factory Workers
› Sales and Marketing Professionals*	› Digital Transformation Specialists	› Client Information and Customer Service Workers*
› Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	› Sales and Marketing Professionals*	› Business Services and Administration Managers
› Human Resources Specialists	› New Technology Specialists	› Accountants and Auditors
› Financial and Investment Advisers	› Organizational Development Specialists*	› Material-Recording and Stock-Keeping Clerks
› Database and Network Professionals	› Software and Applications Development and Analysts*	› General and Operations Managers*
› Supply Chain and Logistics Specialists	› Information Technology Services	› Postal Service Clerks
› Risk Management Specialists	› Innovation Professionals	› Financial Analysts
› Information Security Analysts*	› Information Security Analysts*	› Cashiers and Ticket Clerks
› Management and Organization Analysts	› E-commerce and Social Media Specialists	› Mechanics and Machinery Repairers
› Electrotechnology Engineers	› User Experience and Human-Machine Interaction Designers	› Telemarketers
› Organizational Development Specialists*	› Training and Development Specialists	› Electronic and Tele-communications Installers and Repaires
› Chemical Processing Plant Operators	› Robotics Specialists and Engineers	› Bank Tellers and Related Clerks
› University and Higher Education Teachers	› People and Culture Specialists	› Car, Van and Motorcycle Drivers
› Compliance Officers	› Client Information and Customer Service Workers*	› Sales and Purchaising Agents and Brokers
› Energy and Petroleum Engineers	› Service and Solutions Designers	› Door-To-Door Sales Workers, News and Street Vendors, and Related Workers
› Robotics Specialists and Engineers	› Digital Marketing and Strategy Specialists	› Statistical, Finance and Insurance Clerks Lawyers
› Petroleum and Natural Gas Refining Plant Operators		

Note: Roles marked with * appear across multiple columns. This reflects the fact that they might be seeing stable or declining demand across one industry but be in demand in another.

Source: Future of Jobs Survey 2018, World Economic Forum

In this context, the Bertelsmann Foundation study identifies the following trends in Germany: Since 2008, a total of 126 training occupations have been reorganised and modernised, many of them with new priorities on digital technologies. Since 2017, twelve new training occupations have also been added to meet the new qualification requirements due to the the digital transformation of the world of work (Bertelsmann Foundation 2019: p. 27). The identified trends are largely in response to automation and globalisation. The introduction of technology tends to vary greatly, depending on the different countries, which gives rise to diverse requirements for the labour force and its requisite skills. There is an urgent need to take account of this when designing projects/programmes in international TVET cooperation.

The digital transformation makes requirements in many occupations more complex. It will, however, make some training occupations simpler, as cognitive activities will be increasingly automated. The risk here consists in the **deskilling of skilled labour** (Bertelsmann Foundation 2019: p. 32). Specialists who lose their job due to the change in occupational fields are least equipped to grasp the new opportunities, because their current capabilities fail to meet the requirements of future job profiles (ILO 2019: p. 10).

The progressive digital transformation of the world of work will have enormous implications for the skills required on the labour market. The reports under review use different terms and concepts in this context:

World Bank	human capital
ILO	people's capabilities, which go beyond 'human capital' and cover rights and voices
WEF	human skills

Integration of new learning technology at the vocational training centre in Darkhan-Uul, Mongolia.

As far as their practical conclusions and recommendations are concerned, the studies are, however, closely aligned: Besides imparting specific know-how and skills for new technologies, they primarily see a need for broad cognitive and social skills and the willingness and opportunity to engage in lifelong learning. **Soft skills** will gain in relevance in the course of the digital transformation. As a consequence of the digital transformation of the world of work, the skills of learners need to be upgraded in non-technological fields of activity, and people need to be prepared in particular for those challenges that they are better able to cope with than digital technologies are. In the discussion on the future of work and education/training, digital skills therefore make up a distinct, but by no means dominant, part of so-called **transversal skills**. These encompass in particular skills that distinguish people from technology, such as critical thinking, dealing with the unpredictable, social skills, socio-emotional intelligence, creativity and the ability to make moral judgements (Bertelsmann Foundation 2019: p. 18).

Students at Industrial Training Center in Sinde/Myanmar, using modern mechatronic equipment.

Another aspect addressed by all reports is the ability to adapt. Adaptability entails a combination of various cognitive and soft skills needed to be able to respond to future labour markets. As the World Bank points out: 'The changing nature of work demands skill sets that improve the adaptability of workers, allowing them to transfer easily from one job to another' (World Bank 2019: p. 70). As workers in future will frequently shift among a variety of jobs, a certain learning ability is of particular relevance. Skills will be increasingly acquired at the workplace, as emphasised by the World Bank: 'Educated workers have greater scope for learning at work than uneducated workers' (World Bank 2019: p. 93).

The report by the Bertelsmann Foundation looks in detail at the required skills and defines four specific sets as relevant for the future:

- For current and prospective digital technologies, a broad target group will need to be able to understand technological developments, communicate about them and appraise and judge them responsibly. Beyond this, only a small group will need to be capable of upgrading their functions.

- A second skill set pertains to coping with the flood of information unleashed in part by digital technologies. The priorities here are: searching for, processing and storing information (searching and filtering; analysing and evaluating; storing and retrieving), and analysing and reflecting on it (analysing and evaluating media; understanding and reflecting on media in the digital world).

- The focus in practical application is on developing skills, solving problems in working and everyday situations in a competent, self-directed, creative and socially responsible way and also reflecting on the consequences. When it makes sense, problems are solved supported by digital technologies. This places a high value on developing cognitive skills with priority attached to key activities, such as analysis, critical reflection, judgement, decision-making and creative innovation.

- Parallel with acquiring skills in problem solving supported by digital technologies, skills need to be developed in mastering challenges in fields of activity where people have superior abilities to digital technologies (Bertelsmann Foundation 2019: p. 18).

Both PwC and WEF point to the increasing relevance of effective human resource management in the face of changing skill profiles. Companies must make a number of organisational adjustments to remain competitive in response to the rapidly changing qualification requirements for staff. Talent management and workforce analytics should increasingly make up an integral component of future corporate human resource policy (WEF 2018: p. 4).

3

LIFELONG LEARNING

Imparting specific skills and knowledge for new technologies requires a more enabling environment for lifelong learning.

While all institutions identify the growing relevance of continuing education and training as well as adult education, only the World Bank and ILO address the issue of early childhood education.

ILO demands the universal right to lifelong learning, which it defines as 'formal and informal learning from early childhood and basic education through to adult learning, combining foundational skills, social and cognitive skills and the skills needed for specific jobs, occupations or sectors' (ILO 2019: p. 30). It sees the establishment of an effective ecosystem for lifelong learning as the joint responsibility of governments, employers, employees and educational institutions and calls for their active engagement and support (ILO 2019: p. 31).

WEF cites the need for a 'universal lifelong learning fund', but also points to the relevance of adopting different approaches for different national settings, depending on the political, economic and social climate.

In the context of changing labour markets, continuing education and training as well as adult education have come to the forefront of discussions on the education sector and, as already mentioned, are dealt with in the reports. As the report by the Bertelsmann Foundation is primarily concerned with the situation in Germany, it is the only one to highlight the growing relevance of continuing education and training facilities with a bearing on dual vocational training. The scope of regulated TVET is confined to initial vocational training and only needs selective supplementation with continuing education and training.

Skills acquired through experience and continuing education and training are currently often more important than those learned during vocational training as such (Bertelsmann Foundation 2019: p. 29).

In many IT occupations, the value of approved qualifications is diminishing in favour of continually updated certificates from IT firms and evidence of current project experience. For example, for many IT specialists in system integration, the current 'Cisco career certifications' are indispensable on the labour market; the dual qualification alone is not sufficient. The same applies, for instance, to Microsoft certification for IT specialists in application development (Bertelsmann Foundation 2019: p. 28).

Software inspector in Kigali, Ruanda.

Female trainees in Gorazde, Bosnia and Herzegovina.

WEF points to a 'reskilling imperative' – 'By 2022, no less than 54 % of all employees will require significant re- and upskilling. Of these, about 35 % are expected to require additional training of up to six months, 9 % will require reskilling lasting six to 12 months, while 10 % will require additional skills training of more than a year' (WEF 2018: p. 14).

Mention has already been made in chapter 2 of the risks in the middle-skilled qualification segment emphasised by OECD, which also identifies the following challenges or obstacles to continuing education and training courses for this group: 'Disadvantaged workers face multiple barriers to training. Low-skilled workers, those in jobs at high risk of automation and workers who lose their jobs are often reluctant to train or unable to identify relevant learning activities. Even when they are well informed and motivated, some workers face other barriers, such as a lack of time or money to train. Meanwhile, employers are more likely to invest in training higher-skilled workers where the return on such investment is expected to be higher' (OECD 2018: p. 15).

This underlines the need for measures such as continuing education and training courses for workers in the low-skilled and middle-skilled qualification segments as well as for disadvantaged groups.

Another aspect taken up by ILO, OECD and WEF is the challenge of providing continuing education and training courses for employees in the informal sector or the so-called gig economy (see also chapter 5). Guaranteed continuing education and training often only applies to employees, and entitlement is also often contingent on the length of employment with the company, so that many atypical employees are excluded (OECD Highlights 2019: p. 8). Courses must be adapted so that workers in atypical employment relationships are also eligible.

New ways of cooperation in Africa: teamworking on the laptop.

4

CONSEQUENCES FOR TVET

The report by the Bertelsmann Foundation in particular addresses the direct impacts of the digital transformation on the design of TVET. The World Bank also looks at the issue of TVET and its relevance as compared with higher education. ILO only deals with TVET as follows: 'We recommend that governments increase opportunities for decent work for youth through employment programmes and support for young entrepreneurs. The private sector has a particular role to play in offering young people quality apprenticeships and their first opportunity to work' (ILO 2019: p. 33).

Virtual reality in the making at Technical University Al Hussein in Jordan.

The relevance of TVET in future is a key issue that arises from findings to date on the changes in labour markets. The World Bank has this to say: 'The relative returns to general and vocational education are changing in unpredictable ways, and most economies continue to demand both. Technological progress tends to lower the demand for certain occupation-specific skills, making certain vocational degrees obsolete. It also leads to a higher depreciation of narrow job-specific skills compared with general skills' (World Bank 2019: p. 7).

The digital transformation increases the demand for 'higher-order general cognitive skills'. These are commonly developed at higher education institutions. Students in the humanities at least are more adaptable than those who have undergone TVET, as the courses of study are often broader in scope. In the German model of dual vocational training, this is also the case for basic education, which is why it is still considered attractive. However, the training always has a direct connection with a specific occupation. That is the reason why graduates have greater difficultly in switching among different occupational fields.

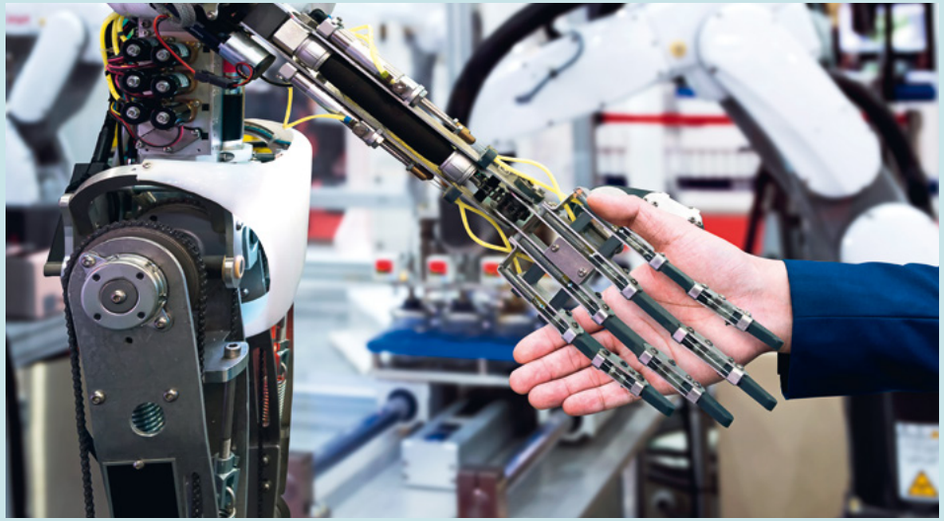
To remain competitive and to train workers to meet the requirements, TVET must in future adapt to these changed requirements.

WEF also addresses this point: 'Relevant intervention points include school curricula, teacher training, and a reinvention of vocational training for the age of the Fourth Industrial Revolution, broadening its appeal beyond traditional low- and medium skilled occupations' (WEF 2018: p. 23). The World Bank provides two practical examples:

1. 'The Democratic Republic of the Congo and Tanzania offer 'bridging' arrangements that enable vocational graduates to continue to university' (World Bank 2019: p. 79). The concern here is to ensure and improve permeability from TVET to the higher education system. Such mechanisms are already in place in Germany.

2. 'Dutch vocational colleges are providing entrepreneurial courses aimed at improving non-cognitive skills such as teamwork and self-confidence' (World Bank 2019: p. 80).

Only the Bertelsmann Foundation takes up the issue of specific technologies and their effects on the organisation of TVET. The emergence of a new technology has heralded a learning revolution, whose broad didactic implementation has, however, either been too costly or called for an unrealistic amount of material or human resources. Variants tried out in the past have proved to be without added didactic value. The experience gained with these developments should be taken into account when planning to mobilise current potential (Bertelsmann Foundation 2019: p. 8).



Human-machine interaction, Thailand

Human-robot collaboration, Turkey

The digital transformation takes its starting point from technologies, such as mobile devices, **social media**, **cloud computing**, **the internet of things**, **big data**, **robotics** or **artificial intelligence**. Digital technologies afford a specific potential for use, as illustrated in the table from the Bertelsmann Foundation (Bertelsmann Foundation 2019: p. 8).

As work tools, digital technologies change occupational work and business processes and are hence included as learning topics in TVET. In part at least, they therefore lay the basis for specifying the skills required for mastering related work and business proceses. As universal tools of everyday life, digital technologies also affect the prior knowledge of trainees entering occupational learning. **This poses two questions for occupational learning**:

- Does the intensive everyday use of digital technologies mean that young people have favourable cognitive capabilities and are better motivated to also plan their occupational learning more effectively with digital technologies?
- How far does the intensive use of digital technologies hamper occupational learning?

Table 2: **Scope and intensity of digital technology use**

Scope / Intensity of use	Examples
Substitution of analogue technologies	› Transparencies ➞ Presentation tools (e.g. PowerPoint) › Printed texts ➞ eBook; PDF copies › Learning videos, DVDs ➞ YouTube videos
Enhancing the training process	› Extension technologies (e.g. internet, assistance systems) › Communication technologies (e.g. webinars; forums; communities; blogs) › self-learning technologies (e.g. learning apps; simulations)
Redesigning the training process	› Blended learning arrangements › Learners' own production of digital content › Self-assesment to plan curricular and didactic paths

Source: own presentation oriented on the Bertelsmann-Stiftung

Training programme for solar technicians at ProAndres Training Centre, Santiago de Chile

As learning tools, digital technologies afford direct potential for the didactic design of occupational learning processes (Bertelsmann Foundation 2019: p. 11) and can contribute to their more effective and efficient planning. The findings also show, however, that the application of digital technologies in a training sector involve **various user types**, so that the potential is harnessed in very different ways (Bertelsmann Foundation 2019: p. 27). Besides the opportunities that technological developments provide, there are also problems that need to be taken into account.

If a TVET course prepares trainees directly for current practical requirements in rapidly changing environments, the **skills developed will only be of limited duration** and educational institutions can prepare for practice only to a limited extent. A large part of the contents of many training courses would therefore be obsolete soon after the final examination. Learning contents can therefore only serve as practical examples. It is crucial to impart the ability to practise the methodology of complex problem-solving in the digital learning and working world (Bertelsmann Foundation 2019: p. 16).

Questions referring to technological resources do not only affect schools, but also enterprises. Companies keep different pace with the rapid rate of innovation in changing work and business operations. Small and medium-sized enterprises (SMEs) in particular might have difficulties keeping up with technological developments in their investment and qualification activities.

This holds especially for SMEs in developing and newly industrialised countries which generally have very limited finances at their disposal. In TVET, this could enhance the role of vocational schools (Bertelsmann Foundation 2019: p. 20), which also usually have limited resources in less developed countries.

Moreover, the effectiveness of teaching in TVET schools does not solely depend on whether it is designed with or without technologies. Crucial for learning outcomes is not the method or medium, but the treatment, i.e. the type of method and and how it suits the capabilities of learners (Bertelsmann Foundation 2019: p. 22).

Harnessing the potential of digital technologies in TVET also depends heavily on the **attitude and skills of teaching and training staff** (Bertelsmann Foundation 2019: p. 20).

The question is how best to appeal to and convince the different types of personnel with their own attitudes towards innovation. To be able to mobilise the pedagogic potential of digital technologies, it is also important to ascertain what hampers and facilitates their use by teachers and trainers (Bertelsmann Foundation 2019: p. 21).

5

CHANGES IN EMPLOYMENT RELATIONSHIPS AND LABOUR MARKETS

Enabled by the digital transformation, in recent years, global, platform-based companies have developed whose production processes differ from those of traditional businesses. Firms operate within broader parameters. Value chains are changing, generating new forms of employment (World Bank 2019: p. 6).

The resulting platform or gig economy is taken up by the World Bank, OECD and PwC. The Bertelsmann Foundation and ILO also address these developments, but in less detail. The World Bank defines this development as follows: '**Technology is changing how people work and the terms under which they work.** Instead of the once standard long-term contracts, digital technologies are giving rise to more short-term work, often via online work platforms. These so-called gigs make certain kinds of work more accessible on a more flexible basis. More widespread access to digital infrastructure via laptops, tablets, and smartphones provides an enabling environment in which on-demand services can thrive.' (World Bank 2019: p. 26).

In many countries, there is also a discernible increase in other atypical forms of employment, such as jobs on call and various types of self-employment. These more flexible kinds of employment frequently develop in response to a genuine need on the part of both employers and employees. More adaptable types of work can afford new prospects and provide a stepping stone to permanent full-time employment (OECD Highlights 2019: p. 19).

The number of self-employed, so-called freelancers, is estimated at roughly 84 million worldwide (World Bank 2019: p. 26). According to OECD, however, regular permanent full-time employment is still the most common form in OECD countries.

The corresponding statement by the Bertelsmann Foundation is of particular interest. It places developments in the context of TVET: 'Another mainstay of the TVET system is coming under pressure through the digital transformation. TVET usually prepares for skilled work in a normal employment relationship. One reason for its attractiveness is the prospect of stable employment in an occupation for life. The digital transformation affects the organisational and legal parameters of the classical employee-employer relationship. **Solo firms, project-tied employment and the virtualisation and also globalisation of labour markets through job exchanges are eroding traditional forms of employment relationships**' (Bertelsmann Stiftung 2019: p. 28). 'This raises the question of whether the close ties between TVET and normal working relations can endure. **Is it conceivable that occupations can be regulated to meet the needs of digital day workers and freelancers?**' (Bertelsmann Foundation 2019: p. 29).

Will TVET also remain attractive in the face of new, digital training schemes for workers in the platform economy?

The platform economy is giving rise to innovative training schemes, such as: 'Andela, a U.S. company that specializes in training software developers, has built its business model on the digitization of Africa. It has trained 20,000 software programmers across Africa using free online learning tools. Once qualified, programmers work with Andela directly or join other Andela clients across the world. The company aims to train 100,000 African software developers by 2024' (World Bank 2019: p. 20).

Finally, there is the question of how to reinforce the **rights and security of workers** to whom customary labour-law and social security regulations do not traditionally apply (OECD Highlights 2019: p. 18). Compliance with current labour law is difficult to monitor on digital working platforms. The work is often badly paid, below the usual minimum wages in many cases, and there are still no official mechanisms for dealing with unfair treatment (ILO 2019: p. 47).

New ways of coworking at Okhla Industrial Estate, India

In this context, ILO demands:

- A universal labour guarantee to ensure fundamental workers' rights
- An adequate living wage
- Limits on working hours
- Protection of health and safety at work (ILO 2019: p. 40).

All workers, regardless of their contractual arrangement or employment status, should enjoy the same adequate occupational safety. Decent working conditions should be guaranteed for all.

PwC and the Bertelsmann Foundation do not deal with the issue of labour rights.

6

IMPACTS ON SOCIAL SECURITY

In response to the changes in labour markets and employment relationships outlined in ↱ Chapter 5, systems of social security must also be redesigned. Primarily ILO, the World Bank and OECD have something to say about this.

More than half the world's population currently lacks any kind of protection and a large fraction is only protected in part. The reorganisation of work has opened new gaps that need to be filled (ILO 2019: p. 37). ILO calls for universal social protection from birth to old age, which is based on the principles of solidarity and risk sharing, and meets people's needs over their lifecycle. This includes a social protection floor that affords a basic level of protection to all in need, complemented by contributory social insurance schemes that provide increased protection (ILO 2019: p. 12).

OECD also stresses the importance of social security in the context of changing employment relationships. The labour market risks which various workers face, such as job loss, workplace accidents or the obsolescence of skills, are changing. Social security provisions must therefore be reformed to better protect workers in atypical employment relationships and to cater for a reality where jobs are evolving (OECD Highlights 2019: p. 5).

The World Bank points out in this regard: 'The concept of progressive universalism could be a guiding principle in covering more people, especially in the informal economy. When social protection is established, flexible labor regulation eases work transitions' (World Bank 2019: p. 10). In addition, the ILO Commission recommends making investments in institutions and strategies to be able to assist people in managing the increasing transitions in training and working life.

Both the World Bank and the ILO Commission call for reinvigorating the social contract. In its report, the ILO Commission presents its overall approach under this heading. It accords the collective representation of workers and employers a larger role in the course of the forthcoming changes.

In ILO's opinion, employers' organisations must adapt their services to changing demands and must improve their ability to serve an increasingly diverse range of business interests (ILO 2019: p. 44). Employees can organise themselves digitally across different workplaces and countries and make use of new forms of interaction and trade in networks. Digital technologies afford employee associations opportunities to approach employees outside of traditional workplaces and to deliver new services (ILO 2019: p. 44).

7

INFORMAL ECONOMY

Only ILO and the World Bank address the informal economy. Both reports highlight the high ratio of the informal economy and informal employment in developing countries, and also cite the **danger of increasing informalisation in developed countries due to the digital transformation**. The World Bank estimates that roughly two billion people are engaged in the informal economy worldwide (World Bank 2019: p. 9), more than half of the global labour force (World Bank 2019: p. 94).

This kind of employment is ubiquitous in developing and newly industrialised nations. The ratio of informal employment amounts in Sub-Saharan Africa to 70 %, in South Asia, to 60 % and in Latin America, to over 50 % (World Bank 2019: p. 94). In spite of economic growth and the changes caused by technologisation, these figures have remained remarkably stable (World Bank 2019: p. 7). There is practically no social security for people in this part of the economy, especially in less developed countries (World Bank 2019: p. 9).

As a result of the digital transformation, industrialisation in Africa and South Asia could proceed in a way that employees will not make the transition from the informal to the formal economy. **Technological developments will blur the borders between formal and informal work.**

The World Bank assumes that changes in this sector will take place in a long-term process and makes suggestions on how to facilitate the transition of labour from the informal to the formal economy and raise productivity in agriculture. It also emphasises the need for measures in social security. Funding in this sector should be reallocated to enable workers outside of formal wage employment to receive benefits. If people are better protected in this way, labour law could be appropriately amended to assist in work transitions (World Bank 2019: p. 14).

The ILO Commission explicitly calls for facilitating more transitions from the informal to the formal sector, including via trade union organisation and labour rights for all.

According to ILO, **greater worker protection** will afford an opportunity for many employees in the informal economy to make the transition from informal to formal employment, by assuring them workers' rights and income security (ILO 2019: p. 46). Employee associations should also pursue integrational organisational strategies, by including informal employees in their ranks. This is both a path towards formalisation and a means of integration (ILO 2019: p. 45). Freedom of association and the effective recognition of the right to collective bargaining should also be guaranteed for all workers in the informal economy (ILO 2019: p. 46).

In countries where the majority of workers perform jobs in the informal economy, ILO recommends setting up national or sectoral education and training funds. Administered by **tripartite boards**, these institutions could give workers access to education and training, with priority attached to TVET (ILO 2019: p. 32).

8

EQUAL OPPORTUNITIES – INCLUSION – GENDER

This chapter will look at how far the analysed reports address the issues of inclusion and gender as part of changing labour markets. The World Bank, ILO and OECD consider them in greater detail, as do PwC and the Bertelsmann Foundation to a more limited extent.

The ILO Commission is a firm advocate of gender equality in working life: equal responsibility of men and women in care and housekeeping, better collective representation of women, the elimination of discrimination against women, and ending violence and harassment at the workplace. ILO sees technology as playing a key role in achieving gender equality. For example, access to financial and lending facilities through mobile banking can give a boost to women's business initiatives in rural economies. Evidence suggests, however, that new business models in the digital economy appear to perpetuate the gender gap (ILO 2019: p. 36).

The World Bank makes proposals for the closer integration of women into the labour market, the elimination of legal restrictions and the improvement of qualifications. OECD advocates affordable child care, tax reforms, more flexibility at the workplace, and fathers' greater engagement at home (OECD 2018: p. 254). In the World Bank's view, the flexibility of work in the gig economy as described in chapter 5 affords women opportunities for better access to work. However, this entails risks. Although adaptability can be an advantage in part, these employment relationships pose risks for income stability and social protection.

Women power in a training centre in Bosnia and Herzegovina

On inclusion, the ILO Commission report points out the growing inequality in many countries. In the World Bank's opinion, this cannot be confirmed from the available figures for developing countries. Social media have, however, raised awareness of inequality. Only the World Bank mentions the emerging polarisation of the labour market in developed countries (increase in work with high and low qualification requirements at the expense of jobs in the middle-skilled segment), but does not go into detail. ILO argues that special importance must be attached to helping those young people who do not attend school, perform any work and are not engaged in TVET. This is crucial for them to gain access to and take part in lifelong learning to ensure their social assimilation (ILO 2019: p. 33). This is in keeping with the principle of leaving no one behind, as cited in the UN 2030 Agenda for Sustainable Development.

Training of Syrian refugees as plumbers at a vocational school in Irbid, Jordan

OECD has launched the Inclusive Growth Initiative and drawn up the related Framework for Policy Action on Inclusive Growth to give governments specific guidance on how to design and implement policies that allow all people, firms and regions the opportunity to thrive (OECD Highlights 2019: p. 4). To master the far-reaching and ongoing inequalities on the labour market, OECD sees the need for a comprehensive strategy which will promote the following agenda:

- Equal opportunities to prevent socio-economic backgrounds from deciding on success on the labour market
- Access to high-quality jobs for disadvantaged workers by promoting their participation in adult education programmes and preventing labour market segmentation
- Adequate participation in prosperity through a fair and inclusive tax and benefits policy (OECD 2019: p. 219).

The World Bank already sees better access through the digital transformation in higher education. Quality assurance is a serious challenge here (World Bank 2019: p. 79). The Bertelsmann Foundation comments on this in relation to TVET. There are, for example, possibilities for translating learning contents for youth with language deficits, adjusting user interfaces for sensory disabled persons or generally catering for a disparate learning pace in a group of trainees. This also affords general potential for training disadvantaged groups (Bertelsmann Foundation 2019: p. 25).

Furthermore, the report points out that online courses are more attractive and practicable for media-proficient young learners than seminars and textbooks. Learning with digital media is, however, usually self-directed, which calls for a degree of learning motivation and discipline that many, primarily disadvantaged, learners cannot muster without additional support. Digital learning media services have so far served TVET less than the general education and academic sector, and primarily met the needs of ambitious learners with a good standard of prior education. The Bertelsmann Foundation therefore sees the need for media-assisted TVET that reaches all its target groups (Bertelsmann Foundation 2019: p. 32).

In the view of PwC, digital technologies have a substantial potential for eliminating prejudices, e.g. in recruitment procedures. Diversity can be fostered through data-driven algorithms. Prospective sources of prejudice, such as towards gender, ethnic origin or indicators of social background, can be eliminated. If used wrongly, these technologies can of course pose large risks, particularly if the algorithms replicate human prejudices.

ILO also takes a critical view: The application of algorithms has been proven to perpetuate gender bias in recruitment (ILO 2019: p. 36). Specific measures therefore need to be taken to ensure equal opportunities and treatment for women in future technology-enabled jobs.

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RECOMMENDATIONS FOR TVET IN DEVELOPMENT COOPERATION

The following recommendations are the outcome of the findings drawn from comparing the reports. They refer to the statements made by the respective institutions, focussed on the specific requirements of TVET in development cooperation.

Policy-makers, the private sector and social actors must shape the future of work together to take advantage of the opportunities of the digital transformation and to cope with the attendant challenges.

On planning TVET in development cooperation:

- Designing needs-based and systemically adequate projects in development cooperation calls for more detailed, evidence-based information on the skills required and altered occupational profiles in individual countries. It is essential to involve the private sector in this.
- Besides specialist-technical training, TVET must also increasingly advance social and broad cognitive skills as well as the adaptability of workers on the labour market.
- There is a need for qualification formats, e.g. in the form of modular courses, for workers in the digital platform economy. How must training schemes for workers in the platform economy be designed and how can the target group be reached? More research is needed in this thematic cluster in order to answer these questions.
- The TVET system must be made more permeable to higher education.
- There is a need for applied research to find out how to transform dual training so that it can remain attractive as a training model in a fast-moving, dynamic world.
- More research is needed on the potential use of individual technologies in dual training: Which factors impede or enable successful use?
- Especially in partner countries, SMEs and vocational schools only have limited financial resources at their disposal, which is why they often cannot afford the costs of using digital technologies. The extent of digital infrastructure available differs by country. Situational research is required on which technologies can be sustainably and efficiently applied and financed under what circumstances.
- How can the disparate types of digital users with their respective attitudes towards innovation be best addressed? As to the pedagogic potential of digital technologies, it is also important to ascertain which factors impede their use by teaching and training staff, and how this can be facilitated (Bertelsmann Foundation 2019: p. 21). Further research is needed here, too.

- How can skills acquired in atypical employment relationships be recognised or certified? This also calls for more research.

- The quality of training courses must be better aligned with present and future labour-market needs. This includes the regular evaluation of their effectiveness. Employers can make an important contribution here. They should be supported and encouraged by government to provide vulnerable groups with further training (OECD Highlights 2019: p. 24).

On promoting lifelong learning:

- Lifelong learning is an important idea that all countries should look to for orientation.

- ILO recommends that governments set up quality assurance mechanisms for lifelong learning and monitor the effectiveness of the system in collaboration with employer and employee organisations. A joint framework should be put in place for the recognition of qualifications at national and international levels (ILO 2019: p. 32).

- An affirmative attitude to learning in general and continuing education/training in particular should be fostered among companies and individuals. This could be done by stepping up occupational guidance for all adults, running public information campaigns to raise awareness of the advantages of continuing education/training, and by guaranteeing that higher productivity resulting from participation in these measures is reflected more in wages (OECD Highlights 2019: p. 18).

- Obstacles to continuing education/training must be reduced by: alleviating time constraints through modular options, offering these courses outside of working hours or online, and granting educational/training leave for workers; lowering costs for continuing education/training by creating financial incentives for the most vulnerable groups on the labour market; dismantling restrictions on access to these courses for low-skilled workers through improved recognition of skills gained through work experience (OECD Highlights 2019: p. 18).

- In countries where the majority of workers work in the informal economy, ILO recommends setting up national or sectoral education/training funds. Through these institutions, the workers could gain access to education/training, with priority attached to TVET (ILO 2019: p. 32).

E-learning workshop in Nairobi, Kenya

- Expanding existing continuing education/training systems, enlarging the group of learners and raising the quality of training will require substantial funding. Depending on the national context, innovative, sustainable schemes will need to be developed for this.

On active labour-market policy:

- There is a need for investments in institutions, policies and strategies to assist people in labour-market transitions and upheavals.
- Especially smaller enterprises in less developed countries are often unable to define exactly which skills are needed in the respective occupational fields, so that the supply is not in alignment with demand. Does the digital transformation pose risks or possibly also afford opportunities here?

On labour rights and social protection:

- In the course of ongoing changes in the organisation of work, systems for social security must be developed further so that they continue to protect workers who shift between wage employment and self-employment or among different companies. They must ensure that rights and benefits are accessible and transferable, also for jobs on digital platforms (ILO 2019: p. 37).
- General guarantees are needed for workers, particularly on fundamental rights at work, the entitlement to a living wage, regardless of contractual agreements or employment status.

On promoting gender equality and inclusion:

- ILO recommends pursuing a policy of promoting task sharing between men and women in care and in the household. More investments are needed in public care services to ensure the balanced distribution of care work not only between men and women, but also between government and families (ILO 2019: p. 35). Companies could also promote the recruitment of women by providing child care facilities.
- Various tools of positive discrimination – from quotas to targets to equality plans – must be devised, measured for their effect and be continually updated so that they remain relevant in the fight against inequalities (ILO 2019: S. 36).
- More research is needed on the potential use of digital technologies for assisting people who are socially disadvantaged for various reasons. How can the digital transformation help these groups gain access to education and the labour market?

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