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Skills and Capacity

What does learning need to look like today to prepare the workforce of 2030?

DFID think piece

December 2015

Dr. Muriel Dunbar

Contents

Series description

This think piece is part of a series commissioned by the UK's Department for International Development (DFID). The purpose of the think piece series is to stimulate international debate on the future direction of education development in low income countries; provide direction for future DFID research priorities; and provide evidence products that can inform policy and programming decisions.

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About the author

Dr. Muriel Dunbar joined Cambridge Education, a division of Mott MacDonald, as Senior Skills Adviser in 2010, following completion of a 5-year mandate as Director of the European Training Foundation, where she was responsible, as part of the EU's external relations policy, for vocational education and labour market reform programs in 30 countries surrounding the EU. In her current role she has carried out work for DFID, the World Bank and the Asian Development Bank, in Asia and in Africa, focusing on the interaction between education and industry and their respective roles within the labour market.

Earlier in her career Dr. Dunbar worked for the British Council and the Scottish Qualifications Authority in the development of national vocational qualification systems.

1. Executive summary

The global labour market in 2015 is characterised by high unemployment, with large numbers of people either unemployed, underemployed or in vulnerable jobs. Women have been particularly badly affected, have most difficulty accessing decent work and are under-represented in the labour force. This has occurred despite an accelerating pace of growth in the 21st century during which time there has been an increase in most low and middle income countries of the number of people living below US$1.25 per day. The situation has been further exacerbated by the global financial crisis which began in 2008, and which will continue its negative impact on the job market through to 2020.

Working definition of skills

For the purposes of this paper, the term 'skills' is used to encompass the combination of technical (below university degree level), cognitive and behavioural competences, which enable a worker to acquire and retain decent work. These include entrepreneurship and business know-how.

In parallel with the steady rise in unemployment, there has been an increase in skills shortages, particularly for high-skilled, non-routine cognitive jobs. High-skilled workers are increasingly to be found in developing countries and the search for them is going global. Both jobs and workers are becoming more internationally mobile. This is essential given that the growth in labour supply is about to slow down significantly in all regions except sub-Saharan Africa. If the region can capitalise on its projected demographic dividend, could be where many of the skilled workers in tomorrow's labour market will come from. Employers will be looking for high-level skills in low-cost locations, with the developed world no longer having a monopoly on the higher-end commercial and manufacturing functions. However, in order for low income countries[1] to benefit, the proportion of their young people completing secondary school needs to increase significantly.

During the period up to 2030, there will be strong influences on the labour market which will alter the type and nature of work available to young school and college graduates. The range of applications of technology, and its level of sophistication, will continue to grow, altering the content of some jobs, eliminating others completely and creating new ones. By 2030, the majority of workers will live in urban environments, either as a result of population drift to the cities or of creeping urbanisation of existing towns and peri-urban areas. This will open up a different labour market to them but increase the risk of urban unemployment and poverty, without the safety net of subsistence farming.

Migration flows of workers, inter- and intra-regional, will continue at least at today's level, and possibly higher, both in response to income differentials but also to compensate for the imbalance created by demographic trends, in which the working population of developed and emerging countries is falling sharply, while that of some developing countries is rising. Migration patterns will change, as the economies of formerly 'sending' countries alter and they become 'receiving' countries. Rural economies will provide jobs for increased numbers of workers as agribusinesses develop and expand, resulting in a positive impact on the agriculture sector.

[1] For the 2015 fiscal year, the World Bank defines low-income economies as those with a gross national income (GNI) per capita of US$1,045 or less in 2013.
Ref: data.worldbank.org/about/country-and-lending-groups

Increasing pressure on governments to address environmental concerns will also impact on the labour market. New jobs will emerge while jobs in more traditional industries may either disappear or require radically altered skills sets and knowledge of regulatory requirements. The transition to economies which are more concerned about the impact on the environment of certain industrial processes will lead to structural changes both within sectors and in whole economies, with the resulting knock-on effect on jobs, workers and the skills they need.

On entering the labour market of 2030 some learners will have a clear advantage over others. These are the ones whose education has been completed through to the end of secondary school and who have graduated in science, technology, engineering or mathematics. However, that alone will not be enough. Employers have recognised the value of workers, of all levels, with strong interpersonal and entrepreneurial skills, the same skills which will be needed to navigate the labour market and find employment. In a multi-cultural work environment, with growth in the service sectors, employers are placing a premium on workers with strong teamworking and problem-solving skills who can initiate and develop ideas which go across disciplines and cultures.

The majority of people already in the labour market today will still be in it in 15 years time. Many of these workers, particularly those with little education, in informal work and in jobs at risk of replacement due to technological innovations or environmental regulations, will require re-skilling; as will those who have graduated from educational institutions in disciplines which are not in demand on the labour market. These vulnerable or unemployed workers would also be well advised to acquire the soft skills now prized by employers.

Having the skills in demand in the labour market will not be sufficient in 2030. Learners, workers and would-be entrepreneurs will also need to be able to interpret that labour market, to understand what it means for them, how they can acquire and then sell their skills and knowledge so that they become effective suppliers of the goods and services which the market demands. In order for that to happen, they need access to good-quality employment and business services, preferably integrated and with a global reach. They also need to have evidence of their skills and knowledge in the form of qualifications which are widely recognised as being valid proof of the holders' competence.

The scale of the challenge is massive and just as employers are turning to global, technological approaches for their human resources (HR) strategies, so must learners and workers turn to global, technological solutions to these challenges. Technology-enabled learning is already well-established and growing in tertiary education and needs to be extended into skills for a wide range of mid-level and high-level occupations. Mobile telephony and the spread of smart phones also provides an opportunity for bite-sized learning for those already in work or without time and money to invest.

Employers and education institutions can learn from each other's best practices, to create 'learning companies' which support the now continuous need for upskilling and re-training, and 'entrepreneurial colleges' which anticipate labour market demand and act on it, rather than merely responding to labour market changes, and therefore always being one step behind. This will require college managers to adopt good business practice while retaining a public service ethos, and to find technological solutions to the challenges of dramatically increasing the scale and quality of their services.

All of this is particularly pertinent for the female labour force. With higher levels of illiteracy, fewer years in schooling and an apparently greater reluctance to study science, technology, engineeering and maths (STEM) subjects and enter STEM occupations, women are at particular risk of unemployment, vulnerable employment and poverty. They will need more effective education and careers guidance, actions to counter stereotyping and access to good-quality STEM education to overcome their disadvantage.

Key policy implications

- Educate for the long-term and the 21st century by increasing the number of secondary school graduates in STEM subjects; improving access to, and training in, information technology (IT); and placing a strong focus on skills for employability and trainability.
- Develop more targeted strategies for bringing young women with STEM skills into the workforce.
- Include and assess soft skills and entrepreneurship throughout the curriculum, from primary school onwards.
- Increase cross-disciplinary teaching and break down barriers between disciplines.
- Increase investment in second chance learning, especially in STEM subjects, IT and soft skills.
- Assist medium-skill workers to move into high-skilled, non-routine cognitive jobs to counter the reduction in medium-level posts and prevent them squeezing less-educated workers out of low-skilled jobs.
- Invest in high-quality employment services for all stakeholders in the training and labour markets.
- Blur the distinctions between public and private educational institutions, and require all to conform to quality standards and to generate income.
- Focus strongly on urban labour markets, while still supporting the growth of agribusinesses for rural employment.
- Make job creation a priority.
- Achieve international recognition of qualifications.
- Engage businesses in ways which are compatible with their own self-interest.
- Develop technological solutions to address skills shortages, some of which may be beyond regional boundaries.
- Plan to capitalise on sub-Saharan Africa's demographic dividend.
- Introduce environmental awareness into all curricula.

Conceptual framework

It is assumed to be important for any country's economic and social development to have a large proportion of the working age population in employment or self-employment, in order to combat poverty and social unrest. The better the fit between the skills of the workforce and those required by employers, the greater the likelihood of full employment.

The current mis-match between the level and content of skills of workers and those required by employers will at best remain and, at worst, grow further, unless corrective action can be taken. This is a global phenomenon which, although displayed in varying degrees by different countries, is evident in all regions.

Based on data available since the turn of the century, it can be assumed that access to technology and to the internet will continue to grow, leading to a reduction in, although not an elimination of, the digital divide.

It is also assumed that the major influencers on the labour market 15 years from now are already evident and their impact can be gauged.

2. The starting point: today's labour market

The world labour market continues to suffer from the global financial crisis and its repercussions will be felt at least until 2020. As vulnerable employment carries on rising, women will be particularly adversely affected.

Key messages

- Unemployment continues to rise alongside skills shortages.
- The growth of labour supply is about to slow, except in sub-Saharan Africa.
- Jobless growth is evident in South Asia.
- Working poverty is still prevalent.
- The decline in the proportion of medium-skilled, routine jobs will continue.
- Low female participation in decent work hinders economic growth.

In order to foresee the labour market of tomorrow, we need to understand why it is as it is today. Many of the difficulties being experienced by workers around the world can be traced to the global financial crisis which began in 2008. Even accounting for the fact that unemployment is widely under-reported and many people are under-employed, the International Labour Organization (ILO) calculated that over 201 million people were unemployed world-wide in 2014 – over 31 million more than before the crisis. It is estimated that there were 61 million fewer jobs in 2014 than would have been expected had the crisis not struck. This upward trend of unemployment is expected to continue at least until 2020, despite the fact that the growth of the labour supply globally is on the brink of a significant slowdown, largely due to falling birth rates and labour force ageing. Comparing projected average annual labour force growth until 2030 with the rates recorded over the past 25 years, sub-Saharan Africa is the only region where labour supply will continue to rise as rapidly as before (ILO, 2015, p.54).

Economic recovery does not necessarily lead to job creation. Between 2009 and 2014, South. Asia experienced an average annual economic growth of 6.1% but an employment expansion of only 1.4%, much of which was in vulnerable and informal employment. The number of workers in vulnerable employment has increased by 27 million since 2012, now standing at 1.44 billion worldwide, and is expected to remain constant at around 45% of total employment over the next two years. Progress in reducing working poverty has slowed. It is expected that in 2020, 1 out of 14 workers will be living in extreme poverty (ILO, 2015, p.12).

Developing economies need to create at least 380 million new non-farm jobs by 2022, which will require raising the rate of increase of secondary school graduates by a factor of 2.5 (McKinsey Global Institute, 2012a). In recent decades, research shows that countries with a more skilled labour force experienced faster growth in skills-intensive industries, suggesting that more skilled people contribute to a more rapid adoption of new technologies and production processes.

In recent years, there has been a decline in medium-skilled, routine jobs but a rise in demand for jobs at both the lower and upper ends of the skills ladder. Low-skilled occupations and non-routine manual jobs make up more than 45% of total employment world-wide, while medium-skills jobs account for around 37%. High-skilled, non-routine cognitive jobs account for more than 18% of total employment and are increasing. These trends are set to continue, although with significant regional variations (ILO, 2015, p.24). However, due to the exponential increase in the global supply of 'knowledge' workers, high skills are a declining source of competitive advantage for developed countries. The assumption that it would take decades for emerging

economies to compete for high-end manfacturing and services, including research and development, has proved false (Brown et al., 2008).

In 2014, information gathered from over 37,000 employers in 42 countries and territories showed that 36% of employers were having difficulty filling jobs and 54% reported that talent shortages were having a medium or high impact on their business (Manpower Group, 2014).

Women are both under-represented in the global workforce and more likely to be in vulnerable employment. Countries with the largest gaps between male and female employment figures, experience income losses of up to 30% of Gross Domestic Product (GDP) per capita in comparison to a situation where gender gaps would be lowered to the world average (ILO, 2015, p.21).

3. Forces shaping the labour market of tomorrow

The labour market of 2030 will be heavily influenced by global trends in technology, migration, urbanisation, demographics, foreign direct investment, education, agriculture and the environment. These trends will change the nature of work and access to it, and the skill sets required. Workers already in the labour market, as well as new entrants to it, will all be affected.

Key messages

- The number of workers in the labour market will increase, with the majority located in urban areas.
- Both jobs and workers will be more mobile across international borders.
- STEM disciplines and strong interpersonal skills will be in particularly high demand.
- Computerisation will replace or de-skill jobs further, even in the service sector.
- Numbers of migrant workers will remain steady or grow.
- Urban unemployment and underemployment will increase.
- Sub-Saharan Africa could experience a demographic dividend.
- Companies will seek highly-skilled workers in low-cost locations.
- Increased numbers of agribusinesses will lead to improved agriculture productivity and employment.

The labour market of 2030 will comprise 3.5 billion workers (McKinsey Global Institute, 2012a), most of whom will be in developing countries and unskilled, and 40% of the total workforce will come from China and India (OECD, 2009, p.156).

The coming decades will see higher international mobility of labour and jobs, meaning an increase in migration and in outsourcing and off-shoring. While Central Asia, the high-income countries in East Asia, China, Europe and North America will collectively lose 216 million workers by 2050, the sub-Saharan Africa labour force is projected to increase by 328 million. Migration into deficit regions is therefore likely to intensify. Labour shortages will be experienced both in mid-level occupations (nurses, intermediate business services) and low-level skills (retail sales, waiters) (World Bank, 2009, p. xix).

Worldwide research into multi-national corporations shows that the rapid expansion in the global supply of high-skilled workers in low-cost as well as high-cost economies, advances in information technologies (IT) and rapid improvements in quality standards, mean that international companies will no longer need to divide their skills strategies between high-cost 'head' nations employing high-skilled, high-waged workers, and 'body' nations that are restricted to low-skilled, low-waged employment (ESRC, 2008, p.8).

Projecting from current demographic and labour market patterns (McKinsey Global Institute, 2012a), it can be predicted that by 2020 there will be:

- a global shortage of 38-40 million high-skilled workers with the greatest demand being for graduates in STEM disciplines;
- a shortage of nearly 45 million medium-skilled workers in developing countries, brought about by low rates of high school enrolment and completion. One third of that shortfall will occur in India;

- a global surplus of 90 million low-skilled workers. This may be able to be offset in developing economies, which can create demand for less-educated workers by encouraging the expansion of labour-intensive sectors; by moving up the value chain; by scaling up the manufacturing sector; and by reducing the regulatory barriers which frustrate new business start-up and infrastructure development.

While education and training will be key to addressing shortages of skilled labour and reducing the numbers of low-skilled workers, it must be in line with the needs of the labour market. Raising expectations through education, for them only to be subsequently crushed through lack of job opportunities creates both social and economic problems (Mains, 2012).

In order to be able to envisage the labour market 15 years from not, it is helpful to know what the major influences on it will be so that we can understand why it will evolve in the way it does. The following eight factors will be particularly influential on the labour market of 2030.

3.1 Technology

Just as there exist job titles today that did not exist 15 years ago, so we should expect that technology will lead to new jobs emerging in the next 15 years. At the same time, an evolution of existing jobs is happening – new tasks, new knowledge and skills and changing work patterns (UKCES, 2014a, p.7). Further advancements in the fields of robotics, algorithms and artificial intelligence may also make it possible to automate processes and services that are currently provided by high-wage experts. This could lead to a further decoupling of productivity from employment and to the de-skilling of jobs i.e. stripping them of routine, complex technical tasks, thereby leading to a new focus on interpersonal skills in what were formerly purely technical occupations (UKCES, 2014b, p.37).

Wages and educational attainment exhibit a strong, negative relationship with an occupation's probability of computerisation (Frey and Osborne, 2013, p.1). Surprisingly, service occupations are not safe from computerisation, as the comparative advantage of human labour in tasks involving mobility and dexterity will diminish over time and although some service occupations involve interactive tasks, they do not necessarily require a high degree of social intelligence. The construction industry, which is currently a major employer of low-skilled and medium-skilled workers may be transformed by prefabrication, which allows a growing share of building work to be performed under controlled conditions in factories, which helps to eliminate quality variability. Generally, tasks involving social intelligence are unlikely to be computerised in the near future and the low susceptibility of engineering and science occupations to computerisation is largely due to the high degree of creative intelligence they require. Social technologies, when used within and across enterprises have the potential to raise the productivity of highly-skilled knowledge workers by 20-25% (McKinsey Global Institute, 2012b).

But technology is also a tool for those in the labour market, as well as a threat for some. Sub-Saharan Africa witnessed the highest subscriber growth rate for mobile technology during 2007-12 and will continue to be the fastest-growing market until 2017. Mobile telephony, particularly mobile money, has begun to change the shape of African business. A new cohort of technology-savvy entrepreneurs has emerged (EY, 2014, p.42). New technology is adopted very readily by children and young people, in contrast to the actual use of these devices and services by educational institutions. Analysis of PISA results reveals a weak, but generally positive,

correlation between the use of technology at school and academic attainment, in four respects: access, previous experience, frequency of use, confidence level (CERI, 2008, p.15).

However, in many countries, social sciences and literary subjects are more popular than scientific and technical ones. For example, in North Africa, nearly two thirds of diplomas awarded in secondary education relate to literature and humanities (IPEMM, 2009, p.57).

The ability to gain employment in technological fields and the ability to apply technology are becoming essential tools for workers, not least as we see the rise of contingent workers able to access work opportunities around the globe from a home base.[2]

3.2 Migration

Worldwide, there are about 191 million migrants and displaced persons and about 30-40 million unauthorised migrants. These figures have been steadily growing along with the number of host countries and countries of origin. Between 1990 and 2000, a net average total of 2.5 million migrants moved from the less developed to the developed regions of the world every year. Migration flows will at the least remain constant over the next 20 years, and may rise. Migrants are most likely to come from relatively developed countries, such as Morocco, rather than from the poorest countries of sub-Saharan Africa. However, migration pressure may increase due to rising income gaps, diminishing labour forces in developed countries and increased global competition for labour, particularly highly-qualified and semi-skilled individuals (OECD, 2009, p.156). Reasons for migration can range from a lack of promotion opportunities, poor living conditions, a desire to gain experience and salary levels (Awases et al., 2004, p.46).

Asian migrants to OECD countries are notable for their relatively high education level, particularly in recent years. In 2010-11, of the 5 million tertiary-educated persons who migrated to the OECD area in the preceding 5 years, 2 million were from Asia and over 50% of them were women (ADB Institute et al., 2015, p.8).

However, migrants' jobs tend to be vulnerable as a high proportion of them are on temporary contracts and in industries that are volatile and sensitive to the economic cycle. Returning migrants can benefit developing countries, as skilled people have a positive impact on labour supply in their home country (Hays, 2014, p.10).

In addition to opening up international labour markets, migration can be intra-regional and south to south. For example, important migration flows to oil-producing Gulf states are mainly south to south migration with predominantly African and South Asian migrants (Mouhoud et al., 2011, p.4).

3.3 Urbanisation

Population drift to the cities is likely to have a major impact on labour markets in developing countries in the coming 15 years and on the workers who will be seeking jobs there. Urban drift varies regionally. For example, it has been more prevalent in Latin America than in South Asia; by the late 2030s, Africa will have more people living in urban than in rural areas; and by 2050, almost 60% of Africa's population will live in cities. For young people this will exacerbate problems of urban unemployment and underemployment and the hopelessness of bleak

[2] A contingent workforce is a provisional group of workers who work for an organisation on a non-permanent basis.

economic prospects for urban youth that is currently being experienced in other world regions (UNICEF, 2014, p.47), where only a fraction of workers in the urban labour force has access to jobs in the regulated formal sector (Slonimczyk, 2014, p.2). It will also bring them into contact with a labour market which is increasingly globalised and based on technology.

By 2050, Asia will have experienced massive urbanisation and its urban population will have nearly doubled from its present 1.6 billion to 3 billion (ADB, 2011, p.6). As in Indonesia, this may represent an, as yet untapped, opportunity to link massive infrastructural development plans to explicit youth employment targets through skills delivery institutions working with employers in the construction, and related, industries to provide training opportunities matched to the skills needed to realise these plans (Kring and Breglia, 2015, p.46).

The urban population in developing countries is projected to increase from 1.9 billion people in 2000 to about 3.9 billion by 2030, thus accounting for almost the entire increment in developing countries' population growth. Only a part of this will be caused by increased rural-urban migration – also important will be the transformation of rural settlements into urban areas (while possibly still retaining some of their rural characteristics) and natural urban population growth (FAO, 2003, p.282).

3.4 Demographics

The period up to 2050 will see massive demographic change. In 2050, there will be almost as many people in Nigeria as in the USA, and Ethiopia will have twice as many people as projected for the UK or Germany. The population of many African countries will have doubled and Pakistan will have the sixth-largest population in the world. HSBC predicts that Kenya and Uganda will be fast-growth economies, with Tanzania and Ghana having the strongest growth per capita in sub-Saharan Africa (albeit from an extremely low base) (Ward, 2012). In fact, sub-Saharan Africa is regarded as being in the early stages of a demographic transition which could prompt a 'demographic dividend' as the productive capacity of the working age population surges with the additional labour supply (ILO, 2015, p.53). Africa's youth bulge, coupled with a rising middle class, is regarded as a catalyst for further growth (Africa Development Forum, 2014, p.11), particularly in the consumer sectors and services (African Union Commission, 2013, p.6) if the potential for domestic resource mobilisation can be realised (UNECA, undated). In the Middle East and North Africa and South Asia, a decline in the youngest population (ages 0-14) will not be visible until 2040, while in the middle-income countries of Latin America, East Asia and the Pacific, and India the overall population will continue to increase until 2050 but a decline in the youngest population will become apparent as early as 2020 (World Bank, 2009, p.xvi).

This scenario will play out at the same time as the workforce in developed countries ages. It is projected that by 2030, 27% of the labour force in advanced economies will be over 55. In the most rapidly ageing economies – Germany, Japan and China – it will exceed 30% (ILO, 2015 p.58).

3.5 Foreign direct investment and off-shoring

Skills issues have taken on wider corporate significance in the context of economic globalisation and foreign direct investment (FDI) into Africa has continued to grow year-on-year as investors become more comfortable with what were, 10-20 years ago, difficult markets (EY, 2014, p.61).

Companies no longer need to divide their skills strategies between high-cost 'head' nations employing high-skilled, high-waged workers, and 'body' nations that are restricted to low-skilled, low-waged employment. Preconceived ideas, about what can be done where, are being challenged. While the home base still remains a key location for developing and coordinating corporate strategies, there is a trend towards much greater experimentation with high-end work in low-cost locations. Knowledge work is now being translated into working knowledge through the extraction, codification and digitalisation of knowledge into software prescripts and packages that can be transmitted and manipulated by others, regardless of location. The standardisation which in the past has been applied to manufacturing processes, is now being applied to the service sector. As a result, employers do not regard the availability of technical skills as a problem – workers can be trained in these. What is prized are behavioural competences including initiative, perseverance, time management and teamworking. The challenge now is to effectively integrate these local employees and local business processes into the infrastructure of global organisations in order to remain competitive (IFTF, 2011, p.5).

Contrary to a widely-held belief, Africa's growth over the past decade has not been driven by natural resources, which has contributed less than a third since 2000. The rest has come from a range of sectors, including agriculture, manufacturing, construction and, in particular, services. Those growth patterns are reflected in FDI trends. Over the past decade, as a proportion of total FDI projects, natural resources has shrunk from an average of 24% in 2003-7, to 5% in 2013 (EY, 2014, p.12).

3.6 Education

The availability of educated workers will greatly influence the supply side of the labour market in 2030, and although many countries have made enormous strides in increasing school enrolment (UNESCO, 2015), learning in primary schools is often minimal. The importance of establishing a solid foundation of education for all who enter the workforce cannot be over-emphasised (Adams et al., 2013, p.81): "Failing to do so leads to long-term adverse consequences for skills acquisition, the type of employment held, and one's subsequent earnings in employment." While primary schooling increases the likelihood of employment in the informal sector and off-farm work, and opens the door to post-basic education, secondary and higher education are generally required for entry into the formal sector. Even traditional apprenticeships, often seen as the answer to youth unemployment, have only a limited impact on earnings and few make the transition into employment in the formal sector. One of the major causes of this is "the limited education and literacy of those who pursue their skills through this means" (Adams et al., 2013, p.82).

Acquiring even basic levels of education can be challenging for young people in some countries. Amongst sixth-grade students in Mozambique, 74% are below the 'basic numeracy' level while 44% cannot read for meaning (Hungi et al., 2010, p.15 and p.21). This suggests that school-leavers have a fragile base on which to build the increasingly specialised skills which will be demanded by the labour market in 2030 (Africa Development Forum, 2014, p.14). In countries such as Ghana and South Africa, more than three quarters of students in Grades 8 and 9 do not meet the lowest level of maths proficiency. These poor educational results in countries with growing populations suggests, on the one hand, increasingly severe competition for low-skill jobs and, on the other, an extremely favourable position for those who have managed to gain a high-level of skills and who will be much sought after by employers. Such a situation can only

increase the inequality gap and lead to growing frustration amongst those in the low-skill category. As the UNESCO Education for All (EFA) Global Monitoring Report 2015 (p.25) reports, “the most important indicator of progress in opportunities to acquire foundation skills is access to secondary school”.

These foundation skills, or cognitive skills as they are sometimes referred to, lead to economically significant difference in a country’s economic growth and are strongly influenced by school policy (Hanushek and Woessmann, 2012). The acquisition of cognitive skills is also powerfully related to individual earnings and to the distribution of income (Hanushek, 2013). Research reveals much larger skill deficits in developing countries than can be attributed simply to school enrolment and attainment, thus suggesting the need for ‘major structural changes in schooling institutions’ (Hanushek, 2013).

Measurement of the Millenium Development Goals shows that many young people lack foundation skills. In 123 low and lower middle income countries, around 200 million 15-24 year-olds had not completed primary school (UNESCO, 2012 p.182). In many cases those who had, due to global inequality in learning outcomes, would have experienced a poor quality education which would not have prepared them for a successful transition into either secondary school or the workplace (UNESCO, 2012, p.185).

If the Open Working Group’s proposal for Sustainable Development Goals to ‘ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’ can be realised, then there may be a much better balance of the supply and demand sides of the labour market in 2030.

3.7 Agriculture

Agriculture and agribusiness are projected to be a US$1 trillion industry in sub-Saharan Africa by 2030, compared to US$313 billion in 2010 (World Bank, 2013, p.xiv). Together they account for nearly half of GDP in Africa. Macro-economic predictions for 2030 by the US Department of Agriculture in 2015, show India, currently in the eighth spot, rising to become the third largest producer, with Mexico, Indonesia and Nigeria also in the top twenty.

Successful agribusiness can stimulate agricultural growth through the creation of new markets and the development of a vibrant input supply sector. The challenge is to (i) develop downstream agribusiness activities (such as processing); (ii) develop commercial agriculture; and (iii) support and link smallholders and small enterprises to productive value chains. However, commercial farming and agribusiness today are managerially and technically complex and suffer from a lack of well-trained university and diploma graduates with skills in communications and teamwork, and practical skills in business management, marketing and finance. Few educational institutions have made the major changes required to produce significantly different types of graduates and the more educated youth, reluctant as they often are to enter this sector, require support in the form of skills development and capital, in order to become entrepreneurs – farmers as well as owners and managers of agribusinesses (World Bank, 2007, p.4).

In order for the agriculture and agribusiness sectors to generate the jobs which are needed in rural communities, particular attention will need to be paid to inclusive growth that integrates market-orientated smallholders and rural communities into dynamic value chains. The

alternative, fully-mechanised farms, generally create few jobs or local benefits, while increasing social and environmental risks.

3.8 Environment

The ILO warns that the transformation to economies which give greater priority to environmental issues will have profound impacts on the way we produce, consume and earn a living in all countries and sectors and will cause major structural changes in labour markets (Eberts, 2011, p.4). This will happen through: additional jobs being created; some employment being substituted; some jobs being eliminated without direct replacement; and many existing jobs being transformed and redefined as skill sets, work methods and profiles are 'greened' (Martinez-Fernandez et al., 2010, p.18-19).

Skill shortages are already hampering the transition to greener economies in terms of preparing for some new occupations and changing the skill profile for a large number of occupations (Connection Research, 2009, p.11). This is caused in part by a lack of knowledge and experience of trainers in green skills (Mclean, 2014, powerpoint presentation, slide 18). The skills required to adopt new technologies, meet new environmental regulations and shift to renewable sources of energy need to be coupled with core skills that enable workers to adapt to changing technologies and build up competence in STEM subjects (Strietska-Ilina et al., 2011, p.165).

Increased environmental awareness and regulation will have most impact on jobs and businesses in agriculture, transport, extractive industries, construction, manufacturing and services. The creation of new jobs resulting from environmental policies is likely to accelerate in the years ahead and has the potential to become an engine of development (UNEP, 2008, p.7). At the same time, some jobs will have to be substituted or redefined and one of the main challenges will be to facilitate reallocation of capital and labour across sectors while minimising the resulting adjustment costs. While the development of green technologies will require STEM skills, many of the changes will require improved generic competencies for all workers, such as environmental awareness, entrepreneurship, adaptability, and strategic, innovation and marketing skills (ADB, 2014, p.3).

4. Surviving and thriving in the 2030 labour market

The skills required of workers in 2030 require a different emphasis from those being learned today. This is as true of workers in the new urban environments of the developing world as it is of workers in the developed world. All are now trading in the same market.

The current and projected skills deficit represents an opportunity for today's learners, if they can prepare themselves to compete successfully in the labour market. At present, entrants to the labour market have an imperfect understanding of it and of the skills being sought. What do they need in order to survive and thrive in it?

Key messages

- There is consensus on the skills which workers will need in 2030.
- Soft skills, STEM disciplines, entrepreneurial skills and green awareness will be required of tomorrow's T-shaped workers and are in insufficient supply today.
- Second chance learning, as part of a life-long learning culture, will be critical for those who have already left compulsory education.
- Employment services providing well-informed advice and information will be critical.
- Qualifications must be recognised beyond country borders.

4.1 Skills for global citizenship

Throughout the literature reporting on interviews with employers, the issue of soft skills constantly occurs. A trend is emerging which suggests that as economies develop and diversify, the demand for higher-level cognitive skills increases relative to the demand for manual job-specific skills (Almeida et al., 2012, p.2). In the future, workers will do more project-based work forming and re-forming into teams, with project management and problem-solving skills being critical (Economist Intelligence Unit, 2010, p.17). Vulnerable groups, such as the unemployed and first-time job-seekers, tend to have low cognitive scores or lack the behavioural skills that predict success as a self-employed worker or entrepreneur. Purely technical and company-specific skills are not considered sufficient in a labour market which prizes employability and trainability. Individuals now have far more autonomy and flexibility in their working life and therefore managing projects and workloads is likely to become an essential skill for most workers. Technical training will need to be supplemented with life skills to promote openness, facilitate adaptation to foreign environments, including languages, and nurture the ability to recognise and seize opportunities (World Bank, 2009, p.84). There is also a clear trend towards individuals needing to take greater responsibility for acquiring and continuously updating their skills through, for example, self-directed, bite-sized learning, peer-to-peer learning and technology-enabled training opportunities (UKCES, 2014a, p.6). Generic skills required by the workforce of 2030 and beyond are listed in Annex 1 (IFTF, 2011, p.8-12).

In response to a world where data is widely available via technology, workers will require the ability to interact with data, see patterns in data, make data-based decisions, and use data to design for desired outcomes. New organisational concepts and work skills are replacing those based on traditional management and organisation theories. These in turn will drive the creation of new training paradigms and tools (IFTF, 2011, p.5). Individuals will need to be able to jump across specialist knowledge boundaries as technologies and disciplines converge, developing a blend of technical training and softer collaborative skills. These will include resilience, adaptability, resourcefulness, enterprise, cognitive skills (such as problem solving) and the core business skills for project-based employment.

It will not, however, be sufficient to merely teach these skills in educational institutions. Clear and well-defined assessment policies will be essential to ensure that these skills are taught effectively by teachers and developed by students, otherwise they risk being treated as a low priority (Ananiadou and Claro, 2009, p.14). At present they are not being recognised by learners or by their teachers as saleable attributes on the labour market and are therefore given insufficient attention in the curriculum and overlooked during assessment.

4.2 STEM skills

To prepare for jobs which are sought after on the labour market and which are resilient to computerisation, many more students must be given the opportunity to learn STEM skills. In the developed world, the lack of STEM skills is being referred to as a 'crisis', blaming poor careers guidance for the low numbers of STEM graduates progressing into jobs in industry while the demand for STEM graduates and the jobs which they can access at all levels continue to grow (CBI, 2012, p.40). "Many countries have focused on either promoting basic skills or producing engineers, scientists and other highly-skilled workers. In terms of growth, estimates suggest that these two efforts reinforce each other." (OECD, 2015, p.77). Achieving basic skills for all may be a pre-condition for identifying those who can achieve at the highest levels.

As with the skills for global citizenship, any significant expansion in the teaching of STEM disciplines in developing countries will require a commensurate expansion in the number of teachers and improvement in the quality of their teaching. Although STEM skills are currently taught, their value on the labour market is underestimated by learners and their advisers. STEM skills are more expensive to teach than arts and social science subjects and require greater investment when, in the past, the return on them has been less obvious.

4.3 Green skills

To complement their STEM skills and their soft skills, learners also need to have an awareness of the requirements, restrictions and opportunities in economies with strong environmental policies, how these impact on the world of work and on the jobs that they aspire to. All learners will require knowledge and skills for sustainable development and sustainable lifestyles (UNESCO, 2015, p.25) The market for skills in such economies is not so clearly-defined or tested but trends and predictions point to this becoming an increasing asset for workers to be able to offer in their skills set.

4.4 To be 'T-shaped'

Increasingly, employers are seeking T-shaped workers to recognise opportunities for and participate in cross-discipline teams and projects. These are workers who are competent in a wide range of related fields as well as expert in a particular area. The vertical stroke of the T is a depth of skill that allows a worker to contribute to the creative process, whether they be an engineer, social scientist, business specialist or other. The horizontal stroke of the T is the disposition for collaboration with co-workers and across disciplines, requiring knowledge, empathy and teamwork. At present there is a tendency for learners to focus only on the vertical stroke of the T which, in the future, will be insufficiently attractive to employers. Learners and their teachers have not yet appreciated the value of being T-shaped on the labour market.

4.5 Second-chance opportunities

Workers already in the labour market of poor countries, who have primary education or less, need assistance to learn the basics which employers demand. This includes literacy, which remains an elusive goal for many (UNESCO, 2012, p.92) but also: punctuality, communication with supervisors, teamwork, time management, etc. (McKinsey Global Institute, 2012a). Employers will not expect to teach these themselves. However, they may build on them by training in company-specific skills. Learners therefore need to become trainable, presenting future employers with a basic grounding for the world of work.

However, second chance opportunities are needed not just by the poorly educated or the young. Many countries count amongst their unemployed a majority of young graduates and school and university drop-outs. These are often a legacy of poor education policies, a preponderance of arts graduates and the expectation of government jobs for all. In India, for example, 50% of university graduates obtain a diploma in arts, which far exceeds the demand from employers for such a qualification (Almeida et al., 2012, p.2). The imbalance between arts and STEM enrolments must be corrected and young, unemployed graduates diverted to training in technical and life skills (World Bank, 2009, p.85) so that they may acquire the characteristics described in Sections 4.1-4.4.

With so many new entrants to the labour market, it has been easy to ignore the shortcomings of those already in it who need further training. The market for adult re-training has not therefore been well-developed. Spending training budgets on younger, more malleable recruits has seemed the highest priority for investment. However, some of these older workers, particularly unemployed graduates, have strong basic education and have already demonstrated their ability to learn. They are therefore excellent material for bridging courses into STEM disciplines. Unfortunately, that still leaves many adults who lack the literacy skills required to be able to benefit from skills training and governments generally lack sufficient funds to redress the problem (UNESCO, 2011, p.65-66). Research in rural communities in Uganda, Kenya and Vietnam shows that adult learners not only value the opportunity to learn to read and write but also wish to acquire numeracy and business skills. The use of community members as staff of providers of training increases its attractiveness. However, the same research revealed severe problems regarding availablity of classrooms, trained teacher and teaching materials, absenteeism, few employment prospects and distances to the learning location (Hasaba, 2013).

The market for second chance learning for low-skilled workers, particularly those in their 50s or 60s who still require to earn but need re-training in order to do so, may be unattractive as an investment. The return on their training is likely to be less, as is their ability to pay for it. For this group, the returns on training will be lower and job opportunities fewer and less secure. This makes them unattractive as borrowers, with a high likelihood of default on loans for training. The financial services market is therefore unlikely to engage without some government incentives and guarantees.

4.6 Access to employment services

As is clear from Section 3, tomorrow's labour market, with its global, technology-driven characteristics, could be a daunting place, especially for young people with little or no social capital[3] and limited networks. In an inter-connected world, up-to-date, easily-accessed information will be critical for making career decisions and finding, and responding to, job opportunities. The role of employment services, which has always been important is now even more so, and is dependent on good quality labour market information being available. To generate the information and make it available to learners requires an effective partnership between industry and government. Public employment services should be expected to: provide good information about the labour market; assist with job search and provide placement services; administer unemployment insurance benefits; and administer labour market programmes (Koeltz, 2012, p.1). In many countries, the public employment services have shown that they can respond effectively to increased, perhaps unexpected, demands (ILO, 2009, p.1).

Employment services are the oil which keeps the labour market working, bringing buyers and sellers of skills together, creating a market place in which they can meet and trade. Without it much is left to chance with the danger that neither knows what the other is offering or where to find the best fit.

4.7 Recognition of qualifications and of informal work experience

In a global marketplace an individual's competence will be judged against that of workers from other countries or regions and requires some form of validity to give it value. This usually comes in the form of formal assessment leading to qualifications. Unfortunately for many workers from developing countries, their qualifications are deemed to be of little value as the content and the quality assurance fall below accepted international norms.

This problem is exacerbated for workers in the informal sector who have acquired their skills on-the-job and have never been formally assessed. For example, in India there is a lack of skilled workers as the existing vocational training system does not target the casual or informal workforce, which constitutes over 90% of the working population. To make it more inclusive, entry requirements would have to be lowered while, at the same time, strengthening primary and secondary education systems (Hajela, 2012, p.22). Informally-trained workers therefore need the means to go back one further step, to get their skills certificated within a recognised and respected qualifications system.

Qualifications, while not the only currency on the labour market, is an extremely useful one. Without formal certification, it is much more difficult for workers to navigate their way through the labour market and convince employers of their worth. At present, the qualification systems of many developing countries are regarded as lacking integrity in both the content of training and the assessment of students, in some cases with a high instance of forged certificates. If the currency with which people are trading is not considered credible then the market cannot function effectively.

[3] The OECD defines social capital as 'networks, together with shared norms, values and understandings that facilitate co-operation within or among groups.'

4.8 Entrepreneurship, intrapreneurship[4] and start-up services

In all regions of the world, and particularly in Africa, small and medium-sized enterprises (SMEs) will be the main drivers of the job creation required to realise inclusive, sustainable growth (EY, 2014, p.25). Learners will therefore require to develop entrepreneurship skills which, if they do progress into a career in a large organisation, can still be applied to the benefit of their employing organisation. To increase the likelihood of a high success rate of new business start-ups, support services will be required to provide incubation, advice and lobbying. As with employment services (see Section 4.6), these support services oil the wheels for new entrepreneurs finding their way into, and establishing themselves, in a market. They will benefit from a study being undertaken during 2015 by the European Training Foundation (ETF) on entrepreneurial communities:[5] how they create space for cooperation, develop entrepreneurial capacity, use and develop skills, inform policies and are themselves supported by policies.

[4] Intrapreneurship is the act of behaving like an entrepreneur while working within a large organisation. It requires behaviour which displays initiative, an ability to 'think outside the box', risk-taking and leadership.
[5] Entrepreneurial communities are partnerships of businesses, vocational schools, local administrations or civil society.

5. Implementing at scale

The challenge of skilling massive numbers of workers to the standards required by employers in 2030 is a daunting one. Key features will be the widespread application of learning technology, the engagement of employers for company-specific training and updating, the introduction of entrepreneurial business practices to the management of educational institutions, integrated employment services to support learners, workers and entrepreneurs in a complex market and tapping the potential of the female labour force.

Key messages

- Technology and globalisation can be used to meet the challenges presented by technology and globalisation.
- Mass delivery of training may present commercial opportunities to entrepreneurs.
- There is still considerable untapped potential amongst female workers.
- Staff of educational institutions must become entrepreneurs in delivery of high-quality learning.
- Integrated support services will increase the likelihood of successful skills development leading to decent work.

From the previous chapter it can be deduced that the workers of tomorrow will ideally be predominantly STEM graduates with a range of well-developed soft skills, confident in the application of technology and with an understanding of the green economy. They will be highly skilled in a particular discipline but with a good understanding of related disciplines and cross-disciplinary opportunities, well-informed about career opportunities locally and globally, and able to bring an entrepreneurial approach to their work. They will have access to regular skills-updating opportunities, and possess qualifications and skills which are recognised beyond their immediate working location. What actions can be taken towards achieving this scenario and how might these actions contribute to achievement of the new Sustainable Development Goals for 2030 (UNESCO, 2015, p.281)?

5.1 Harness technology

To date, technology-enabled learning has been largely the preserve of higher education (HE). In many African universities it has been used to improve both distance and face-to-face learning. The lessons learned from overcoming technology-related challenges in HE can be used to inform the application of technology for skills development. For example, groups such as OER Africa and the African Virtual University are collaborating with governments, universities, development partners and the private sector to offer distance and online courses, non-academic as well as academic, which are designed to respond to the needs of local employers (Butcher et al., 2011). The challenges which would need to be overcome in order for technology to be applied successfully for skills development include:

- meeting the high demand from growing populations;
- funding;
- developing and implementing robust national policies on, and political support for, distance education;
- infrastructure constraints, not least the digital divide between urban and rural campuses;
- training sufficient professionals in the development and delivery of teaching materials.

One example of the application of technology-mediated learning has been the rapid rise of Massive Open Online Courses (MOOCs) in recent years (Waldrop, 2013), allowing undergraduate and graduate students access to the teaching of high-quality academics from around the world, including provision of online teaching materials and interactive forums. It is estimated that, by 2020, 120 million students may be enrolled worldwide, which would account for roughly 50% of overall participation in tertiary education (Uvalic-Trumbic, 2011). It has been demonstrated that a low-cost, open-source software delivery platform, combined with open educational resources (OER) can be used effectively to provide a hybrid MOOC environment to serve large numbers of learners (Porter, 2014). The same research concludes that key to achieving good results were:

- high-quality teaching and content;
- high levels of online support services;
- online mentoring and facilitation using trained instructors.

MOOCs are attracting attention for their potential to make quality education accessible (Perris, 2015) and are no longer the sole preserve of higher education. The MOOCs for Development paradigm applied by the Commonwealth of Learning (COL), is being used to provide training and skill development so that participants can apply knowledge and skills to solve pressing issues of sustainable development.

Until now, technology-enabled learning has been applied in only a limited way for intermediate skills requiring practical, hands-on experience. However, it now has the potential to be used as a tool for:

- training and updating the vast number of additional teachers who will be required to deliver the training for Sections 4.1-4.5 and to do so to international standards. This would include in-service training for existing teachers, as well as aspects of pre-service training.
- contributing the theoretical content and providing demonstrations of its application in blended learning programmes for learners of medium- and high-skilled jobs, thereby increasing the capacity of public and private education institutions in a quality-controlled manner;
- enabling access by informal workers to formal education leading to recognised qualifications.

The successful development and introduction of technology-enabled learning, depends on the engagement of businesses and educational institutions and on the availability of good internet connection, computers in homes and schools or adaptation to mobile telephony (see Sections 5.2 and 5.3). They represent a commercial opportunity for the private sector, with students and educational institutions as their customers.

Over the next 15 years, innovations in the field of open and distance learning will continue to be introduced, such as the use of Linked Data to improve access by learners and institutions to resources (d'Aquin, 2014, p.9), but developers must ensure that education technology contributes to solving the challenges facing institutions and systems in reaching out to ever-increasing numbers of learners, rather than exacerbating them (Butcher et al., 2011).

E-learning is not the only application of IT, although it now occupies a central position in national and international strategies. Its spread is accompanied by other telecommunications applications, such as telemedecine, teleworking and teleconsultation and together they can be

expected to have a joint positive impact, not just on economic performance at country level but also, through local involvement, on people's living conditions. Research shows that the decline in hardware costs and the emergence of bimodal institutional models will lead to distance education which not only benefits learners in developing countries but will also enable the learning from these countries to be disseminated to all parts of the world.

In developed countries, there has been gradual convergence between the costs of distance education and those of face-to-face education. The hope that distance education would increase provision without raising budgets is fading, although developing countries may, to some extent, avoid the rise in variable costs experienced in developed countries (Depover and Orivel, 2013, p.33).

If effectively applied, the use of technology could make a major contribution to the Sustainable Development Goals 4.3, 4.4 and 4.7 (UNESCO, 2015, p.281), by increasing access to a wide range of skills training and associated knowledge.

5.2 Enlist businesses

Table 1: The respective roles of government and industry

Role of government	Role of employers
Fund and deliver basic general education	Specify realistic recruitment requirements
Provide high-quality STEM education	Provide company-specific training
Create the environment for technology-enabled learning	Recognise and develop commercial opportunities to support technology-enabled learning
Enable learners to acquire soft skills	Provide sectoral support for small business start-ups
Provide careers guidance services and an introduction to the world of work	Submit labour market data to a central or sectoral organisation
Enable an appreciation of the green economy	Provide training in applying green awareness and skills to company-specific situations
Provide literacy and numeracy education for adults	Provide earn-and-learn opportunities, including apprenticeships
Include entrepreneurship skills in curricula throughout compulsory schooling	Provide opportunities to work in an entrepreneurial fashion within companies.
Compensate for low in-house training provision in SMEs	
Design training policies which reflect the challenges facing the private sector	
Re-skill older workers	
Negotiate recognition of national qualifications with countries receiving migrant workers	

Engaging the resouces of the private sector is often regarded as the solution to the increasing pressure on further and tertiary education establishments to enrol growing numbers of school-leavers. Undoubtedly, working with employers to make better use of and expand their in-house facilities is valid, bearing in mind that these will still only be available to recruits who can display the behavioural soft skills described earlier and, for the most part, have at least a basic education in one or more of the STEM disciplines. See Table 1 for the respective roles of givernment and employers. Employers will not see it as their role to compensate for failures in the state education system by providing basic education to raw recruits who lack an understanding of workplace mores and expectations. In addition, employer-based training has the disadvantage of being company-specific and not always imparting skills which are transferable to other employers or jobs, potentially trapping workers in low-skilled, low-pay work.

The dual system operated by some countries of northern and central Europe is generally well-regarded and, whilst the model is not easily transferable to developing countries, is based on certain principles which others can adopt. These include: close collaboration among stakeholders; common standards for apprentices; qualified training providers and instructors; recognition of, and demand for, skills by employers; and research and development to keep training programmes up-to-date (IFC, 2013, p.107). Programmes which support internships are already well-established in parts of Latin America and have begun to appear in some countries of sub-Saharan Africa. These show that training plus internship can have good results for disadvantaged youth finding productive waged employment. However their cost-effectiveness in Africa is being questioned due to the relatively small size of the modern wage sector there and the cost involved in subsidising internships for potentially quite a low impact on earnings (IFC, 2013, p.108).

While there is a need to make colleges more entrepreneurial (see below), there is also a need to make companies more educational. In a recent survey (McKinsey Global Institute, 2014a), human resources (HR) managers around the world were asked about their strategies to overcome skills shortages. Of the respondents, 47% were providing additional training to existing staff. Other strategies included: redefining qualifying criteria to include individuals who lack some required skills or formal qualifications, but have the potential to acquire them; recruiting from untapped or under-tapped talent pools (such as youth, older workers, women and military veterans); and adopting alternative work models, re-designing existing work procedures, offering flexible or virtual work arrangements, or leveraging contingent workers.

Global skills shortages are therefore putting pressure on the private sector to become **learning companies**, which are taking the best of the underskilled and topping-up their shortcomings through in-house training. The private sector needs to be encouraged to dig more deeply into the pool of underskilled and to develop strategies to realise their potential. This is much more likely to occur in large companies (IFC, 2013, p.6). Enterprise Surveys data shows a positive correlation between company size and company training provision. Although on average, around 40% of companies provide in-house training for their staff, only about 29% of small enterprises do, 44% of medium-sized enterprises and 67% of large enterprises. Regional variations, while not so marked, do exist with Latin America being the region where in-house training is most prevalent and sub-Saharan Africa being the region where it is least common. In countries where economic development is heavily dependent on the growth of SMEs, government intervention may be required to compensate for a lack of in-house training.

However, in addition to providing in-house training, the private sector might also be alerted to the potential demand for educational technology resources for the three categories of learners listed above and to see this as a business opportunity. This would require partnerships with governments and with public and private educational institutions but, by delivering on a large scale, could provide high-quality, validated training at affordable prices. It would also require educational institutions to be equipped with sufficient computers to allow self-study supported by teachers who are practised in blended learning. Examples of initiatives already underway, include *English In Action* in Bangladesh, *Digital Study Hall* in India, and *Khan Academy*. Lessons can be learned from these initiatives and applied more widely.

It is important to be realistic and to accept that not all workers will be able, or have the motivation, to aspire to medium- or highly-skilled jobs and so creating demand for less-skilled labour will also be critically important for developing countries. This can be aided by increasing employment in labour-intensive manufacturing; removing barriers to growth and job creation; 'frugal innovation' in products and services; and lowering barriers to housing and infrastructure projects, thereby unlocking the potential of the construction sector to create jobs with forward and backward linkages to industries such as cement and steel production (McKinsey Global Institute, 2012a).

The Sustainable Development Goal to which businesses can most effectively contribute is 4.4, which is focused on expanding the numbers of young people and adults with skills in demand by the labour market.

5.3 Develop the female labour force

Economies with high female labour force participation rates experience economic growth slow-downs less often, indicating a higher resilience to adverse economic shocks. More women in the labour market results in an economy making greater use of its productive potential and acts as a powerful anti-poverty device. The African Union sees women as 'untapped potential', representing 'an enormous reservoir of energy to propel Africa's development' (African Union Comission, 2013, p.9).

However, in a labour market driven by technology there may be an additional obstacle in equipping women with the skills required. Research has repeatedly pointed out the existence of a wide gender gap when it comes to technology. Boys use computers and the internet more than girls, have wider computer experience, spend more time online, report greater interest in and perceive more positive attitudes to computer-related activities and also appear to be more motivated to learn digital skills (CERI, 2008, p.5). If these traits perceived in OECD countries are also played out in developing countries, then there is a danger of women not acquiring STEM skills and being under-represented in computer science and other technology-related jobs.

By improving women's participation rates in the labour market and overall education levels, the prospect of women from Africa filling many of the skills vacancies, which will reach a peak in Europe in the 2020s, could become a reality (World Bank, 2009, p.xxi).

Future strategies therefore need to have a particularly strong focus on women and recognise that strategies will be needed to guide them, in large numbers, towards STEM learning and related employment.

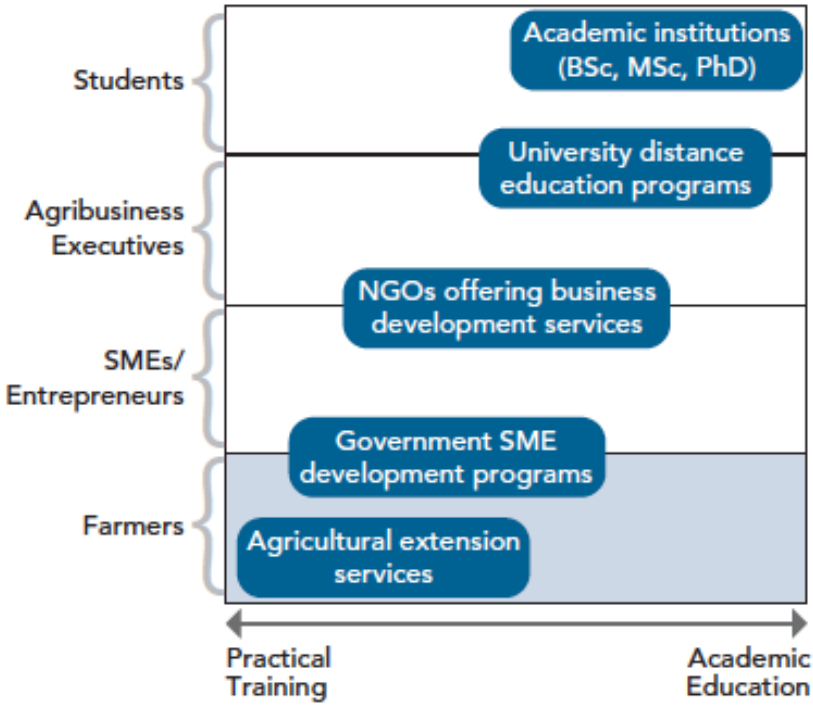
Developing the female labour force will contribute directly to Sustainable Development Goal 4.5 (UNESCO, 2015, p.284), which is concerned with eliminating gender disparities and ensuring equal access to all levels of education and vocational training for members of vulnerable groups.

5.4 Exploit the job-creation potential of the agriculture and agribusiness sectors

Governments wishing to use agriculture and agribusiness as a driver of the economy will need to include skills development as a major plank of their strategy by:

- building the range of agribusiness skills at all levels to overcome skill shortages currently hindering growth (see Figure 1);
- providing entrepreneurship training and support services for agriculture and agribusiness start-ups and for established businesses with the potential to expand;
- encouraging rural youth to enter agriculture and to perceive it as a dynamic sector through, for example, the model of Rural Youth & Agribusiness Development Centres being used in Benin, which provide practical training using private partners and facilitate access to finance and advisory services;
- providing continuing information and advisory services to farmers and small businesses to promote the commercialisation of agriculture (World Bank, 2013, p.98-100).

Figure 1: Agribusiness training is needed at many levels



Source: Reproduced from Mabaya, Christy, and Bandama (2010).
Mabaya, E., R. D. Christy, and M. Bandama. 2010. "The Current State of Agribusiness Education and Training in Africa." Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa AAEASA) Conference, September 19–23, Cape Town.

With effective strategies, of which skills development is an integral part, the agriculture and agribusiness sectors can play a major role in progress towards achieving Sustainable Development Goal 4.4 (UNESCO, 2015, p.284) through the creation of decent jobs and entrepreneurship opportunities.

5.5 Revitalise training institutions

Training institutions are key if the need for middle and highly-skilled workers is to be met. All three of the main post-school types of training programme depend on them: pre-employment technical and vocational education and technology (TVET); on-the-job training; and training-related active labour market programmes. The policies for these are often disconnected and no integrated framework exists to link them to specific government and market failures (Almeida et al., 2012, p.146).

Training institutions of the future will require to be re-profiled to:

- develop faciliities and programmes which reflect the content required for the skills in Sections 4.1–4.5, with high utilisation rates to accommodate increased numbers of learners using different modes of learning;
- incorporate recognition of prior learning into training programmes to allow skills acquired informally to be certificated, learners to be fast-tracked through training programmes and to facilitate transition of workers into the formal economy;
- promote and accommodate ‘earn-and-learn’ programmes in partnership with businesses to encourage poorer students to participate in learning and to facilitate upskilling and updating of people already in work;
- enhance the quality and increase the variety of training programmes by incorporating blended learning into the curricula for a more worthwhile student experience and better employment results;
- become ‘entrepreneurial colleges’ which are run along business lines but with a public service ethos.

In future, the distinction between public and private providers may become increasingly blurred if all institutions operate in the training services market, earning income from a diverse range of sources, and all become eligible, against quality criteria, for grants to deliver government initiatives. Together with schools, there needs to be clear policy direction on how much of education should be general and how much should be vocational. When there are large youth unemployment problems, as is the case in many developing countries, vocational education seems very attractive. But if this leads to students graduating with a very limited set of skills, even if appropriate for the labour market at that time, they may be less adaptable to changes in the market in the future and to advances in technology (Hanushek, 2013).

Revitalising training institutions will be essential in most developing countries in order for Sustainable Development Goal 4.3 (UNESCO, 2015, p.284) to be achieved. Without root and branch reform, most educational institutions are not capable of delivering the quality (and quantity) of skills training which is required.

5.6 Provide integrated support services

Success in the initiatives in the previous sections will be more likely if they are underpinned by high-quality support services which provide learners, employers, entrepreneurs, business start-ups and woud-be and returning migrants with the support they need: careers advice, job search services, facilities, connections, access to networks and finance, and incubation support. These services can be integrated but tailored through technology to each client, as much of the information is equally relevant to different customer groups. National systems can link into international ones to support would-be migrants and those returning from abroad, as well as workers wishing to access international opportunities while remaining home-based, through contingency working or targeting FDI opportunities and outsourcing. Attracting foreign or diaspora talent can be an important facet of a country's development strategy, as in the case of Ghana (EY, 2014, p.37).

However, in order to provide these support services, there will need to be a very considerable improvement and expansion of the labour market information systems (LMIS) of developing countries. Some do not exist, or exist in name only as they are not operating. Others collect, sometimes intermittently, a very limited range of data which is insufficient to undertake meaningful analysis and then to draw conclusions. LMIS needs to be drawn from a range of sources and across all sectors, preferably taking account of both the informal and formal job markets. LMIS is currently a critical weakness in the skills landscape of most developing countries and its lack will undermine other attempts to create the workforce which will be required by employers in 2030.

Given the expected continuing increase in migration, both intra- and inter-regional, management of labour mobility will be a critical aspect of employment services. They should include responsibility for easing the transition both for outward migrants and those returning, to help to ensure that migrants are well-advised and able to capitalise fully on the migration opportunity, avoiding dangers related to personal security, job security, exploitation or lack of recognition of skills.

The likelihood of Sustainable Development Goal 4.4 (UNESCO, 2015, p.284) being achieved will be severely undermined without strong employment services, based on accurate labour market information.

Key to all of the above six actions will be adequate financing of skills provision so that it meets the quality standards required by today's industry. While in the past, this has been largely the responsibility of governments, the expectation now is that the private sector will play a much greater role. While the objective is clear, strategies for achieving it are still having mixed results and are poorly documented, indicating a need for further research in this complex and critical area.

6. Conclusion

The markets for skills, whether global or regional, are volatile and subject to rapid change, just as the economies which they serve are a constantly-changing picture. Some of the changes which we can envisage for the coming 15 years are particularly radical and will require workers to be prepared to change job regularly and to re-skill and update on a continuous basis. Workers whose jobs are most resistant to computerisation are also those who are most likely to have technology as a fundamental feature of their work i.e. high-skilled workers in STEM disciplines. The increase in service occupations and the reliance across all sectors on collaborative working, cross-discipline working and contingency working will require a level of interpersonal skills, self-sufficiency and resilience which has not been the norm until now.

Workers in developing countries, particularly in sub-Saharan Africa, have an opportunity to step into the shoes of ageing workers in the developed world, but only if they can equip themselves with the necessary skills, based on general education which extends into secondary schooling. These skills, together with well-functioning, support services will allow them to successfully negotiate a labour market in which employers are searching globally for high-quality workers.

However, for this to happen, the market for training services needs to take a different approach. Instead of reacting to changes in the labour market after the event, it must take a more entrepreneurial approach by anticipating change and using technology to sell the services which its customers, the learners, now need. Perhaps unlike other forms of education, skills training has one very clear objective: to allow learners to acquire decent work[6] at an income higher than if they were untrained. At present, many training providers fail in that objective because their offer is trailing behind the labour market, and they are unaware that the requirements of that market have changed.

In summary, as described in Table 2, we need to recognise where opportunities exist, understand these opportunities better and then work towards realising them as a means towards achieving the SDGs by 2030.

[6] The ILO defines ‘decent work’ as: work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organise and participate in the decisions that affect their lives, and equality of opportunity for all women and men.

Table 2: Summary of conclusions

	Area of action	Opportunities	Further research required	Risks	SDGs
5.1	Harness technology	• working examples exist of technology-enabled learning in universities in the developing world • improved access to foreign expertise • improved internet access	• how to apply the lessons learned in higher education initiatives to skills development • government policies which effectively support strategies for technology-enabled learning • funding for technology-enabled learning • use of technology-enabled learning for workers in the informal sector	• lack of good-quality teachers and materials development staff • digital divide remains wide • affordability • high drop-out rate	4.3 4.4 4.7
5.2	Enlist businesses	• working examples exist of effective industry involvement in skills development • increase in educational technology creating business opportunities	• obstacles to wider application of industry/skills collaboration and development of a range of effective models • effective collaboration models in economies composed largely of SMEs and informal businesses. • creating demand for low-skilled workers • strategies for private sector funding of skills development	• company-specific skills taught which are not transferable • vulnerability of support to skills in times of recession	4.4
5.3	Develop the female labour force	• successful role models exist • economic imperatives to make women more productive in the labour force	• strategies for increasing female uptake of STEM subjects and transition into STEM occupations	• gender gap in uptake of computer technology • lower female literacy and numeracy rates hinder access to skills development	4.5

5.4	Exploit the job creation potential of the agriculture and agribusiness sectors	• huge potential in the developing world for agribusiness development and related job creation	• raising status of agriculture and agribusinesses as entrepreneurial opportunities	• agriculture sector continues to be unpopular amongst educated youth • support services not available • outdated agriculture colleges and extension services	4.4
5.5	Revitalise training institutions	• increasing priority being given by governments to TVET • increasing demand for the services of skills development institutions • potential of private training providers still under-exploited	• application of principles of 'recognition of prior learning' in developing countries with large informal education sectors serving SMEs • strategies for optimal use of private training providers as a resource for achieving national targets • integration of pre-employment, on-the-job training and active labour market programmes	• poor education management skills • indifference towards engaging with employers • under-funding • fragmentation across several Ministries	4.3
5.6	Provide integrated support services	• technology-enabled support services now possible, with a wider reach and greater access to national and international labour market information	• guidance on models of LMIS data-gathering and analysis commensurate with available resources • support services required by would-be and returning migrants	• low on list of government priorities • potential clients served by several ministries, lessening the likelihood of integration	4.4

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Annex 1: Ten skills for the future workforce[7]

1. ***Sense-making***: ability to determine the deeper meaning or significance of what is being expressed.
2. ***Social intelligence:*** ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions.
3. ***Novel and adaptive thinking:*** proficiency at thinking and coming up with solutions and responses beyond that which is rote or rule-based.
4. ***Cross-cultural competency:*** ability to operate in different cultural settings.
5. ***Computational thinking:*** ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning.
6. ***New-media literacy:*** ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication.
7. ***Transdisciplinarity:*** literacy in and ability to understand concept across multiple disciplines. The ideal worker of the next decade is 'T-shaped' – they bring deep understanding of at least one field, but have the capacity to converse in the language of a broader range of disciplines.
8. ***Design mindset***: ability to represent and develop tasks and work processes for desired outcomes.
9. ***Cognitive load management:*** ability to discriminate and filter information for importance, and to understand how to maximise cognitive functioning using a variety of tools and techniques.
10. ***Virtual collaboration:*** ability to work productively, drive engagement, and demonstrate presence as a member of a virtual team.

[7] Source: Institute For The Future (IFTF) *Future Work Skills 2020* University of Phoenix Research Institute, 2011

About

This paper is part of a series of think pieces produced by the Health & Education Advice & Resource Team (HEART), and commissioned by the UK's Department for International Development (DFID) in 2015. The purpose of the series is to stimulate debate on the future direction of education development in low income countries; provide direction for future DFID research priorities; and provide evidence products that can inform policy and programming decisions.

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