Relationships Between Higher Education and the Labour Market – A Review of Trends, Policies and Good Practices

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Abbreviations and Glossary

- Cedefop – European Centre for the Development of Vocational Training

- Centre/Centre - both spellings are used as per the jurisdiction of origin

- EU – European Union

- Faculty – academic staff, although occasionally both terms are used, e.g. when referring to all staff in an HEI or when quoting from other sources

- HE – Higher Education

- HEI – Higher Education Institution

- ICT – Information and Communication Technologies

- ILO – International Labour Organisation

- IR – Institutional Research

- Learners – a broader term to include students of all ages and situations

- OECD – Organisation of Economic Co-operation and Development

- PIAAC – Programme for the International Assessment of Adult Competences is undertaken by the OECD

- PISA – Programme for International Student Assessment is undertaken by the OECD

- Programme – refers to "a coherent set or sequence of educational activities designed and organized to achieve pre-determined learning objectives or accomplish a specific set of educational tasks over a sustained period. Within an education programme, educational activities may also be grouped into sub-components variously described in national contexts as 'courses', 'modules', 'units' and/or 'subjects'. A programme may have major components not normally characterised as courses, units or modules – for example, play-based activities, periods of work experience, research projects and the preparation of dissertations." (UNESCO UIS, 2011, p. 79).

- QA – Quality Assurance

- QF – Qualifications Framework

- RDI - Research, development and innovation

- Tertiary – Post-compulsory or post-secondary systems. It usually refers to academic education (university) but also includes advanced vocational or professional education (VET/TVET). See also UNESCO UIS, 2011, p. 83.

- University – refers to all HEIs undertaking research and awarding higher degrees, irrespective of their name and status in national law

- VET/TVET – Vocational education and training and Technical and vocational education and training

- WEF – World Economic Forum

Acknowledgements

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Sustainable Development Goal 4 on Education (UIS, 2018)

Target 4.3 By 2030, ensure equal access for all women and men to affordable quality technical, vocational and tertiary education, including university

4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex

4.3.2 Gross enrolment ratio for tertiary education by sex

4.3.3 Participation rate in technical-vocational programmes (15- to 24-year-olds) by sex

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

4.4.2 Percentage of youth/adults who have achieved at least a minimum level of proficiency in digital literacy skills

4.4.3 Youth/adult educational attainment rates by age group, economic activity status, levels of education and programme orientation

Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated

4.5.2 Percentage of students in primary education whose first or home language is the language of instruction

4.5.3 Extent to which explicit formula-based policies reallocate education resources to disadvantaged populations

4.5.4 Education expenditure per student by level of education and source of funding

4.5.5 Percentage of total aid to education allocated to least developed countries

Target 4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training, information and communications technology, technical, engineering and scientific programmes in developed countries and other developing countries.

4.b.1 Volume of official development assistance flows for scholarships by sector and type of study

4.b.2 Number of higher education scholarships awarded by beneficiary country

Executive Summary and Recommendations

Globalisation and the knowledge economy, changing demographics and massification, technological progress and changes in the labour market are driving social and economic change and the transformation of higher education around the world. The impacts vary according to national context but the trends are similar. This paper has reviewed the macro trends and asked how well positioned higher education is to meet and respond to these developments with particular focus on skills and jobs. It has also discussed a number of key issues and challenges arising for higher education and identified many emergent concepts. It then reviewed a wide range of policies and practices at the national and institutional level and identified "good practices". Throughout the report, actions that could be adapted by governments and institutions to help strengthen links between higher education and the labour market are mentioned with particular relevance for countries in sub-Saharan Africa.

To help meet the UN 2030 Agenda, this report identifies the characteristics required to build a sustainable knowledge-research-innovation eco-system leveraging the relationship between higher education and the labour market. This includes the following:

- Continued massification and successful participation in higher education is critical to the sustainability of knowledge intensive societies. Talent is a country's most important resource;

- Government shares responsibility for how well higher education responds to the labour market in terms of appropriate governance and accountability measures, funding and resources, faculty and leadership training and professional development, and support for learners. Government initiatives should be coordinated across all-of-government to ensure coherence and consistency;

- Clarifying the social, cultural and economic objectives of higher education in/for each country is an essential first step. This should recognise the value of having a diverse set of institutions (academic, technical and vocational) with different modes of provision and delivery, and working collaboratively;

- A skills and talent development strategy should be situated within a broader policy matrix. Sustainable social and economic development policies rely on higher education and training as well as employers and government rather than narrowly focusing on skill supply;

- Strengthening skills should be matched by understanding that learners as citizens require a wide range of competences across education and research. Technical skills alone will not be sufficient in this rapidly changing world. The concept STE**A**M recognises that all disciplines have an important contribution to make.

- Competitive knowledge-research-innovation eco-systems bring together diverse educational institutions, enterprise, local/regional authorities and civil society working together in a cooperative and mutually beneficial relationship to develop a shared set of strategies, structures and approaches, activities and framework conditions which can be implemented;

- There are many opportunities for collaboration between higher education and industry/business and civil society, including: curriculum development and delivery, research development and innovation (RDI), lifelong learning, entrepreneurship and

work-integrated learning opportunities. including apprenticeship, recruitment and professional development, etc.

- Diverse educational pathways (academic, technical and vocational) and credit systems are important mechanisms for widening participation for learners of all abilities and introducing innovations in provision and delivery. Teaching and learning should be more active and collaborative, and include work-integrated learning.

- Life-long-learning is no longer an option but is essential for economic, social and personal development;

- The quality of the education system depends upon having a pipeline of talented faculty and researchers, and capable governance, leadership and management, committed to values, vision and mission of the system and the institutions.

Recommendations

Ten high-level recommendations arising from this report are identified below. Subsidiary recommendations are also noted. Actions which follow from these recommendations should be considered as part of a comprehensive approach to ensure a co-ordinated and coherent response at national and institutional level.

1. **Implement a National Strategy For Higher Education** which recognises the different roles and responsibilities of institutions within a diversified higher education/tertiary sector system, aligned with national objectives and constituent sub-regions. The aim should be to create a seamless system embracing both advanced vocational and professional education (ISCED levels 5 to 8), overseen by a common governance framework. Developments should accord with the general shift to re-skilling and lifelong learning and the necessity for mapping learning and career pathways through the broader education continuum. Ensure an integrated, coherent set of educational programmes and access points for any learner and enable students of all ages and ability to participate actively and successfully, regardless of personal circumstance.

2. **Foster Collaborative Partnerships between Higher Education & Industry/Business & Civil Society** should become a national objective. All HEIs should be mandated to work collaboratively with industry/business and civil society to establish regional clusters with clear objectives regarding regional development and skills.

3. **Introduce a Performance Framework and Impact Assessment** to collect, monitor and measure the overall performance of the system and institutions with respect to national objectives. Collaboration with other institutions and other levels of the education and training system within a region, as well as engagement with the industry/business and cultural sectors should be monitored. Indicators which Information about student performance to highlight student progression and graduate tracking to inform programme development should be included. Institutional research capability should be developed to aid strategic decision-making.

4. **Implement a Qualifications Framework and Quality Assurance Process** to ensure the higher education system functions at the highest level possible, and that the qualifications are competitive and internationally comparable. They should recognise learning outcome descriptors which embraces "graduate-ness" in order to help guide and

direct learning and career pathways, and support employability as well as employment. External and internal QA should monitor the quality as well as the relevance of educational programmes and graduate outcomes.

5. **Embed Work-Integrated Learning/Work-Based Learning as part of Regular Curriculum Review and Reform** to ensure programmes offered at undergraduate and postgraduate level reflect the needs of the national and regional economy. Involve industry/business and civil society in the development and review of programmes. Introduce practice-based learning opportunities including work-placement, students working on actual projects in their community, projects based on industry/enterprise problem-solving, industrial doctorates, alignment with professional body requirements, etc.

6. **Introduce Innovations in Teaching and Learning** to ensure students are active learners working as partners with faculty. A Teaching and Learning Centre should be established as appropriate at national and/or institutional level to foster new pedagogical methods, digitalisation of learning, and provide certification for faculty. The involvement of practitioners and industry experts in programme development and on course approval panels should be mandated. A comprehensive career development system should be developed, beginning in year one and continue throughout student life to real life.

7. **Strengthen Research Excellence Through Impact** because the benefits extend to society beyond the university or laboratory. Research can help solve complex problems through formation bi-lateral, inter-regional and global networks not bound by borders or disciplines, such as improving our health and wellbeing, creating economic prosperity, enhancing our cultural lives and improving environmental sustainability, to name just a few. Assessing and measuring research impact is an important way to emphasis its public good value.

8. **Promote and Support a Cohort of Diverse Learners** who by their growing numbers constitute the driving force and central purpose of mass higher education. Participation rates vary in different country but efforts must be made to ensure that widening access and successful participation are available to all learners, from diverse socio-economic circumstances, age, gender and race/ethnicity. New types of educational provision and delivery widens access and provides learners with 21st century skills and competences. Engagement between universities and colleges with families and schools, aimed at strengthening relationships, is key to developing students, parent and community aspiration and achievement.

9. **Academic Recruitment, Professional and Leadership Development** should support actions to develop a sustainable pipeline of highly-qualified faculty and researchers, including education and training at doctoral and post-doctoral level and for early-career researchers, initial and continuous professional development, and leadership training. Criteria for appointment and promotion should include engagement with external stakeholders and research impact. Consider introducing a Certification of Teaching and Learning for all faculty.

10. **Tackle Gender and Equity Gaps** at national and institutional level, using a combination of actions including positive discrimination/affirmative action for recruitment and promotion including mandatory quotas, gender proofing recruitment and promotion procedures and practices, training and mentoring, scholarships and fellowships for

women, establishment of women's colleges and universities, gender management systems, targeted leadership training programmes, etc.

Using this Report

Countries and institutions can use this report as the basis for benchmarking and/or peer learning. Both are important methodologies which support strategic policymaking, and the leadership and management of systems and institutions. They encourage a structured and systematic reflection and self-assessment of an institution's own performance and path for improvement.

- Benchmarking is usually a systematic comparison of practice and performance with other peer systems or institutions. It is often undertaken as part of consortium which forms for this purpose or as part of an existing association. It involves exchange of policies, practices and data usually in a confidential setting, and often uses indicator based systems. As a practice it promotes collaborative learning.

- Peer-learning or mutual learning activities is usually an informal process. It is used to help identify good/best performance. One of the common types of peer-learning are structured visits to other jurisdictions or a peer review learning event hosted by another country or institution. The goal is to identify transferable aspects and learnings from good practice and/or to support the implementation of emerging policies or practices.

Benchmarking and peer-learning should be undertaken with appropriate peers, and not with institutions chosen randomly with reference to rankings.

1. Introduction: Higher Education and Skills in the 21st Century

1.1 Overview

The UNESCO Global Education 2030 Agenda recognises that higher education plays a major role in social, cultural and economic development.

> Education is both a goal in itself and a means for attaining all the other SDGs. It is not only an integral part of sustainable development, but also a key enabler for it (UNESCO, 2017a, p. 1).

Higher education's significance relies upon two key "connectors" which form a reinforcing *eco-system* upon which society depends:

- Human capital: Higher education produces graduates with modern skills but who are capable of independent, autonomous operation. This raises the overall productive capacity because smart, creative individuals, with knowledge and competences, have a much higher impact on society and the economy than non-graduates; and

- Knowledge production: Higher education produces a cohort of skilled knowledge workers who can lead and catalyse the long term provision of knowledge and ideas through research and discovery, carry out further research and are technologically savvy employer/employees as well as being innovators and entrepreneurs/"intrapreneurs".

The "demand for individuals who possess a broader knowledge base, more specialised skills, advanced analytical capacities, and complex communications skills continues to rise"(OECD, 2012, p. 26). Not only do graduates tend to enjoy better health, but they are likely to be more interested in politics and public affairs, participate more actively in civil society, and more trusting and supportive of other people. Moreover, higher education is itself called upon to research and offer advice on myriad issues beyond higher education.

The benefits of higher education "are not limited to people who are or have been students" but extend across society (Brennan, Durazzi, & Séné, 2013, p. 18). Skills and employment are critical outcomes of higher education but they are not the only indicators of success. Economic growth and well-being reinforce each other (Llena-Nozal, Martin, & Murtin, 2019). Good outcomes for individuals have positive impacts and benefits for family life, health, crime prevention, citizenship, civic engagement, social justice and public discourse. Democratic societies require an engaged citizenry.

This report looks at the relationship between higher education and the labour market, fully cognisant of this broader context. It includes all universities, colleges of technology and other institutions providing formal tertiary education programmes (i.e. ISCED levels 5, 6, 7, or 8), whatever their source of finance or legal status. It includes advanced academic, vocational and professional education (UNESCO UIS, 2011, p. 83).

For the purposes of this report, the working definition of "labour market relevance" for higher education borrows from the Bologna Process and European Commission notion of "employability". It refers to the role of higher education to equip students with both the discipline-specific (e.g., law, medicine, business, information technology, etc.) and transversal skills (e.g., communication skills, entrepreneurial skills, "learning to learn" skills)

to be meaningfully employed or self-employed in the labour market throughout their lives.[1] It includes i) national system level policies and ii) institutional level strategies and practices. It also includes issues of governance and leadership, professional development, the changing student cohort, social inclusion, gender, diversity of educational provision, and innovations in teaching and learning.

There are five main parts: Part 2 sets out the analytic framework which situates higher education within this wider policy eco-system. Part II discusses some of the key mega-trends impacting on and influencing higher education and the labour market in the 21st century. Part III considers the implications of these trends. Part IV discusses areas of "good practice" at the policy and institutional level from around the world, and provides some examples. Finally, Part V discusses key messages from these experiences, and suggest opportunities for bench-learning.

1.2 Terms of Reference, Information, Data Collected and Analysed

This study sought to provide an overview of international higher education policies and practices aimed at strengthening support for the labour market and graduate employment across the seven UNESCO regions. Seven dimensions were identified

- Higher education policies and strategies relating to the support for graduate employment

- Institutional arrangements on higher education (in relation to the support for graduate employment);

- Provision of/requirements for workplace learning/training in higher education study programmes (e.g. internships, research and training opportunities in industry);

- Preparation of graduates to enter the labour market (in terms of their knowledge, skills and competences) at the level of their qualification;

- Provision of career guidance, entrepreneurship and business start-up support by HEIs;

- Effective models/best practices of partnership HEIs and industry in research, education and training at HEIs; and

- Existing competency-based skills assessment approaches by HEIs.

A mixed methods approach was used drawing on a combination of:

- Desk-based global survey of strategies and policies developed by international agencies and national governments concerning labour market trends and specific world region/national issues, and higher education and skills strategies, including objectives and targets;

- Desk-based review of peer-reviewed literature on issues regarding skills strategy, skill utilisation and demand, economic and regional development strategies, role and responsibilities of higher education and VET sectors, teaching and learning, widening access, professional development, curriculum development, etc.

- Communication and email correspondence was undertaken with wide group of international policy and academic experts to help contextualise, gain in-depth insight

and interpret specific concepts or phenomena, and to provide case studies of "good practice";

An extensive bibliography was developed. Every effort was made to reasonably cover the breadth of issues and countries from the main world regions.

There are several aspects to the work undertaken. First, two analytic frameworks were designed to guide the work and place various issues in context and relationally to each other. Second, a review of the mega-trends shaping the higher education landscape and policy concerns was undertaken. Third, the implications of these trends for the labour market and education and training institutions was discussed. Fourth, arising from a review of key trends, the main issues impacting on and implications for higher education were identified. Fifth, a review of "good practice" was undertaken with respect to the seven dimensions aforementioned. Sixth, enablers and barriers at the system and institutional level were identified, and a comprehensive set of good practice examples of policy and practice was categorized. Finally, a set of recommendations drawing on the international evidence and case studies was devised, setting out policy initiatives and practices as options for Sub-Saharan Africa.

2. Analytical Framework

Higher education is recognised as a major driver of social, cultural and economic development, providing human capital through education and training, attracting and retaining high-skilled talent and investment, playing a critical role in the knowledge-research-innovation eco-system, and underpinning the global competitiveness of nations and regions (OECD, 2007b; Santiago, Tremblay, Basri, & Arnal, 2008). Globalisation and the knowledge economy, changing demographics and massification, technological progress and changes in the labour market have combined to transform the role and responsibilities of HEIs.

Today higher education sits at the centre of this complex landscape of global trends and national contexts. This helps explains why the quality and performance of higher education is no longer a matter of concern only for ministries or institutions of education but extends to constituencies way beyond higher education itself. It is integral to and touches upon almost every aspect public life and policy debate (Brennan, Durazzi, & Séné, 2013, p. 4). Furthermore, once the number of people participating in and served by higher education expands to embrace all society rather than a narrow elite, matters of governance and management, academic norms, and performance/productivity *necessarily* come under public and political scrutiny, and challenge (Calhoun, 2006; Trow, 2010).

This growing complexity has transformed higher education and reframed its relationship to the state and society in every country, and internationally. Challenges arise from and reflect the sheer logic of the interplay between these changing dynamics, societal demands and decision-making in the context of the internationalization of knowledge. How governments seek to influence and shape the system affects the extent to which the higher education system is able to meet societal objectives for: open and competitive education, offering the widest chance to the broadest number of students; coherent portfolio of horizontally differentiated high performing and actively engaged institutions – providing a breadth of educational, research and student experiences; developing knowledge and skills that citizens

need to contribute to society throughout their lives, while attracting international talent; graduates able to succeed in the labour market, fuel and sustain personal, social and economic development, and underpin civil society; and operating successfully in the global market, international in perspective and responsive to change.

This paper uses a systems approach to explain the complex relationship between higher education and the labour market. As the OECD says, complexity is a

> core feature of most policy issues today… No single public sector organisation – from a solitary city to the central government – can tackle these issues alone (OECD, 2017d).

Acknowledgement of this interconnectivity is evident in the SDGs which signals that societal challenges require collaboration and infrastructure on a global scale to resolve them.

Figure 1 illustrates this complex landscape. It identifies myriad areas of intersecting interests and interdependencies between higher education and other public and policy domains, which in different ways, can enable or inhibit the realisation of ambitions and objectives (Braun, 2008, p. 231; Jordan & Schout, 2006; Molenveld, 2016).

> Higher education does not stand alone. Being at one end of a linear scale, the cumulative baggage of educational, social and gender-based disadvantages are carried into the higher education space. Therefore, it is not possible [for example] to analyse gender inequality-related issues in higher education without referring to the burden of non-learning, discrimination induced loss of self-esteem and confidence, or facility with language (UNESCO, 2010, p.2).

Similarly, the concept of "system-ness", coined by Nancy Zimpher, former Chancellor the State University of New York, recognises the benefits which accrue when multiple components work together to create a network of activity that is more powerful than any action of individual parts on their own (Lane & Johnstone, 2013). Applying a system approach can enable governments and institutions to recognise and confront issues "in a holistic way" and transcend "administrative and territorial boundaries" (OECD, 2017b, p. 8; Haddad & Demsky, 1995).

Figure 1 Higher Education at the Centre of a Complex Knowledge-Research-Innovation Eco-System
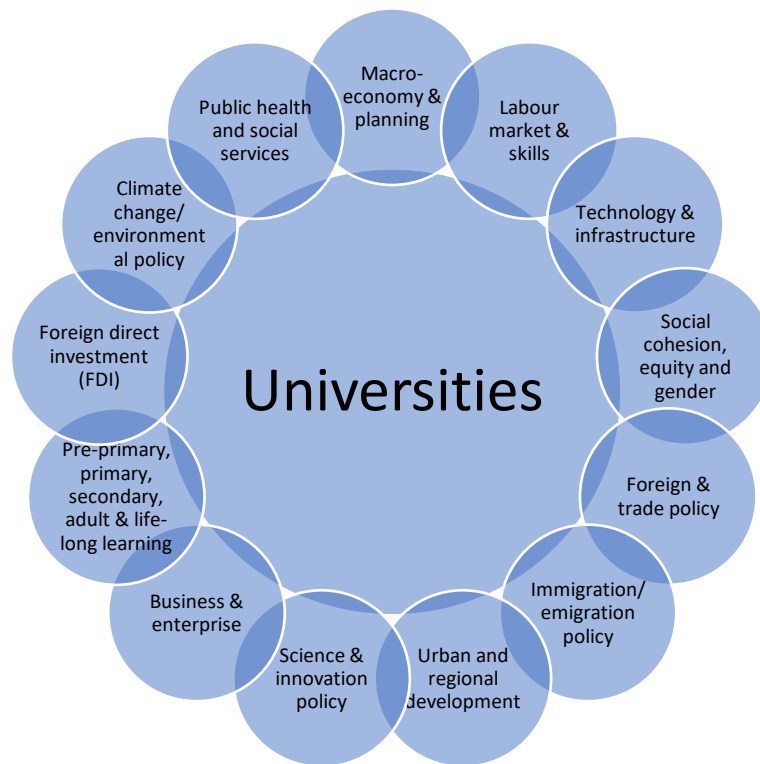
Source: Author

Building on a systems approach, Figure 2 presents a framework in which different factors come into play influencing and shaping successful higher education outcomes. It frames the complex policy and socio-economic landscape in which higher education operates and identifies some of the main enablers, inhibitors, and interdependencies which should be considered when considering policy options or practices.

Figure 2 Framework for Analysing Key Drivers Influencing the Relationship between Higher Education and the Labour Market
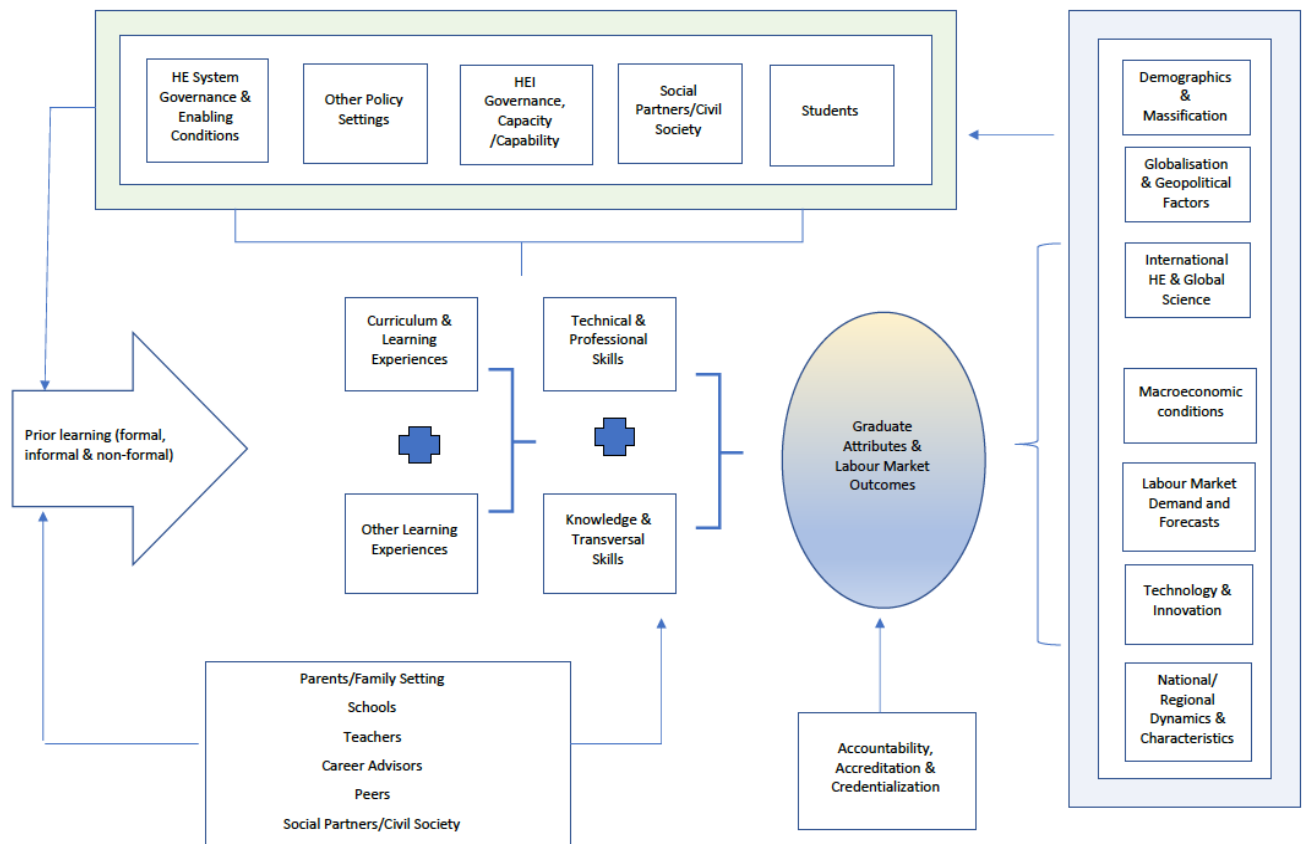
Source: Adapted from OECD, 2017, p. 18

• Higher education sits within a complex policy system, taking account of global trends and forecasts, system level conditions as well as institutional conditions. The active involvement of external and internal stakeholders are critical to this process. The ability of higher education institutions (HEI) to be (and remain) dynamic, responsive and innovative, producing well-educated actively engaged citizens capable of sustaining themselves and contributing successfully to society throughout their lives is critical.

• Over the past decades, globalization with the escalation and intensification of the movement and integration of trade, capital and people across borders has transformed the higher education landscape. These changes have, in turn, transformed the role and responsibilities of higher education.

• Colleges and universities have deep historical roots in their towns and cities. While nation states are likely to remain the largest investors, higher education is an open system. In fact, the transformation of higher education from being a local institution with strong links to its city or regional benefactors to one of geopolitical significance for individuals and nations has been one of the most noteworthy features of the last decades.

• These developments have coincided with, and been driven by, demographic growth resulting in growing demand for higher education everywhere. The world's population is now expected to reach 9.8bn by 2050, and 11.2bn by 2100. Most of this growth is anticipated

to occur in Africa, while the population of the more developed regions is expected to remain largely unchanged (UN Department of Economic and Social Affairs Population Division, 2017). By 2030, 70% of young people with tertiary education will come from non-OECD G20 countries (OECD, 2015, p. 1).

• The increase in the number of universities is in response to demographic pressures and on-going massification, continuing transition to knowledge-intensive economies and services and changes to the labour market, the expansion in lifelong learning, as well as investment by private providers.

• As globalisation advances, it accelerates rates of tertiary education participation which in turn impacts on the overall size and geographic balance of the global talent pool. There is a strong societal magnetic effect between urbanization, participation and the rise of the middle class wherein the "penalties of non-participation grow" (Marginson, 2018b, p. 4).

• The 4th industrial revolution is changing the way we live and work (World Bank, 2019). Accordingly, learners will require the knowledge and entrepreneurial attitudes, and skills and competences capable of creativity and critical thinking, initiative and independent action (Avvisati, Jacotin, & Vincent-Lancrin, 2014). As live expectancy advances, it is clear that a job for life becomes as meaningless as an education for life.

• Regional vitality is dependent upon dynamic higher education/tertiary institutions which act as anchor institutions to drive innovation and attract and retain human capital. While most new jobs will be in high-skilled industries, there will be an on-going need for middle skill jobs and employment in ancillary sectors which contribute to making regional towns and cities attractive. Ultimately, human capital is stickier than knowledge (Hazelkorn & Edwards, 2019).

• Graduate attributes are influenced by a combination of external factors inter alia family, socio-economic and personal circumstances, gender, race and ethnicity, and school settings. This influences a learner's choice of educational provider which in turn influences career and life chances. This is a feature of both developed and developing countries despite massification and widening participation.

• Regardless of whether graduates live and work close to their home or are internationally mobile, they will operate as part of the global talent pool in an inter-connected world. This necessitates credentials being quality assured, mutually recognised and internationally comparable.

• We are in the early stages of a pedagogical revolution with a greater emphasis on active engaged learning and graduate employability. There is a keen interest in internships and work-based learning, earn-and-learn models, competency-based and micro-credentials, as well as applied- and community-based research.

• Quality assurance and other accountability processes and instruments produce valuable information that can be used to enhance institutional effectiveness, and student performance and attainment. In turn, this information influences curriculum, teaching and learning and professional development to strengthen educational relevance. Linkages to schools – to teachers, career advisors and peers – and to employers and the community/region help shape decisions.

- Governance is critical to ensuring the appropriate policy levers, structures, funding and regulation to steer the higher education system. This includes support for widening access and participation – taking account of formal, informal and non-formal learning – and shaping learning pathways across and between academic, technical and vocational education.

- Higher education governance, leadership and professional capacity and capability are all critical to ensuring HEIs can navigate through this complex and changing dynamic, and participate in international higher education and global science, and ensure graduates achieve high learning outcomes. Good institutional leadership is essential for ensuring that educational providers can act strategically, identify trends and respond accordingly. Likewise, the quality of the education system is dependent on the quality of teachers/faculty and researchers. Success is dependent upon increased autonomy and greater accountability.

3. Mega Trends Affecting Higher Education

Many factors influence sustainable social, cultural and economic development including higher education. This section briefly discusses some of the macro trends underpinning systemic transformation of our societies and economies with particular relevance for education, skills and learning systems. Processes of convergence and divergence work in tandem (Popov & Sundaram, 2017, p. 7).

3.1 Impact of Globalisation on Societies and Economies

Increases in the movement and integration of trade, capital and people across borders have personified the process of globalisation over the centuries. Usually considered only in economic terms, globalisation shapes the social, cultural and political, thereby affecting the way people think and identify themselves, and perceive and pursue their interests. Whereas activity might previously have been confined (if not restricted) within national borders, trade, capital, people and knowledge are now all mobile and borders are (relatively) permeable (Crafts, 2000).

Since the late 20th century, a dramatic transformation has occurred in the balance of power across the global economy. The rise of regional alliances, such as the EU, ASEAN, Gulf Cooperation Council and MERCOSUR, are having a significant strategic and economic significance, and are active antipodes to deficits in the architecture of global governance (Robertson, Olds, Dale, & Dang, 2016).

OECD countries are experiencing a decline in their share of global GDP, from 60% in 2000 to a projected 44% by 2032 (OECD, 2018b). The US will remain the dominant power, with "global economic, military, technological and financial reach, a global currency and an unrivalled system of global alliances" (European Strategy and Policy Analysis System, 2015, p. 27) but other countries, especially China and India, are quickly catching up. China's GDP in purchasing power terms has already outstripped the US and India is expected to overtake the UK and France to become the 5th largest economy (in nominal GDP terms); Indonesia will figure in the top ten by 2032 (Buchholz, 2019; OECD, 2018b, p. 58-59)

Increased trade has enabled developing countries and regions to become active participants in the global economy "specialising in specific components, parts or tasks" which has helped to "shift participation in global markets from developed to developing countries, and between developing countries themselves" (Popper & Loikkanen, 2019). The shift to higher-valued goods and services innovated by talent is shifting trade and consumption patterns and in turn affect what and which countries can export and which sectors offer the best pathway to high-value jobs (Cunningham & Pimhidzai, 2018). Being part of the regional and global value chains is dependent upon a country's capacity and capability to develop attractive innovation systems and to create a sufficient pool of skilled labour. Considerable national differences in the share of total public expenditure point to rising inequalities (OECD, 2018a, pp. 243-333; Schwab, 2019).

As economic growth advances, countries have no option but to invest in their education and training systems to create high(er) value jobs. There is a strong magnetic effect between participation and the rise of the middle class wherein the "penalties of non-participation grow" (Marginson, 2018, p. 4). The growing middle class in Asia and Africa reflects dramatic changes in the geography of the global talent pool (OECD, 2015). By 2030, a majority of the global population will be middle class, two-thirds of whom will reside in Asia (Barton, Chen, & Jin, 2013; Kharas, 2017). By then, China and India could account for more than 60% of STEM gradates in the G20 area, with Europe and the United States providing only 8% and 4%, respectively (OECD, 2013a, p.3; Schleicher, 2016).

3.2 Demographic Change and Massification

Economic growth has coincided with, and been driven by, demographic changes bringing a growing demand for higher education everywhere. The world's population is now expected to reach 9.8bn by 2050, and 11.2bn by 2100. Most of this growth is anticipated to occur in Africa while the population of more developed regions is expected to remain largely unchanged (UN Department of Economic and Social Affairs Population Division, 2017). Worldwide participation in tertiary education has increased at a rate of approximately 4% a year since 1995 although participation rates vary considerably by world region and country.

The number of students enrolled in higher education is estimated to reach 660m by 2040 rising from 28.6m students in 1970 and approximately 220m today; this means students would represent 10% of the world's population (aged 15-79 year old) compared with 4% in 2012 (Calderon, 2018, p. 187). The number of young-people with a tertiary qualification will continue to increase across OECD and G20 countries but greatest growth is occurring in non-OECD G20 countries. The OECD estimates that if current trends continue, 70% of young people with tertiary education will come from non-OECD G20 countries by 2030 (OECD, 2015, p. 1). This growth is reflected in the growing number of universities, rising from around 12,000 in 1997 to 19,400 in 2019 (See also Roser, 2009).[2] However, participation remains "vastly unequal" with the gross enrolment ratio at tertiary level ranging from an average of 8% in sub-Saharan Africa to 75% in Europe and Northern America, thus threatening the 2030 Agenda (O'Malley, 2019; UNESCO, 2017b) (see Figure 3).

Figure 3 Tertiary Education Gross Enrolment Ratio, By Country Income Group, 1970-2014%

Enrolment in upper-middle income countries has grown by 7% per year in the past 20 years

Tertiary education gross enrolment ratio, by country income group, 1970-2014 (%)

Legend:
- High income countries
- World
- Upper middle income countries
- Lower middle income countries
- Low income countries

Y-axis: Tertiary education gross enrolment ratio (%)

X-axis: 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015

Source: UIS database.
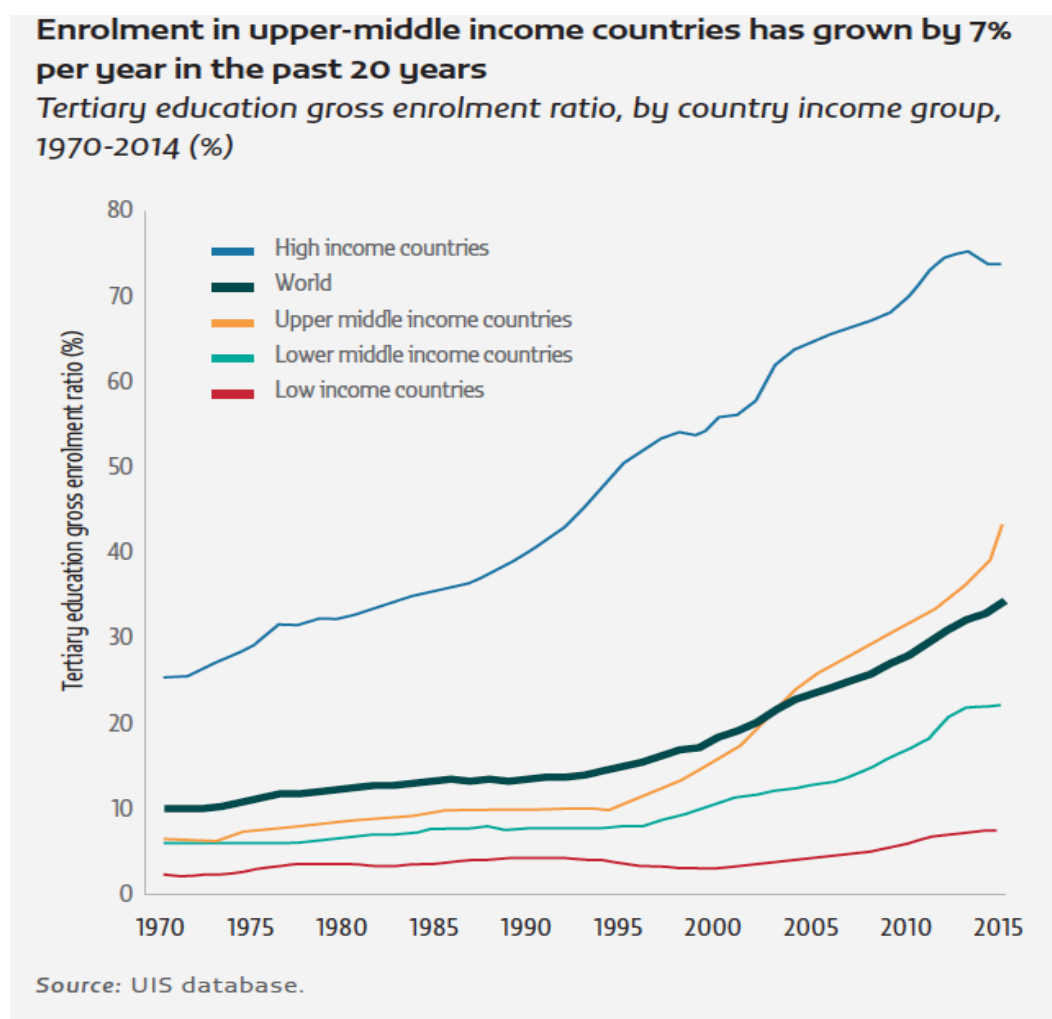
Source: UNESCO, 2017b

Significant gains in life expectancy are occurring simultaneous to a continued fall in the total fertility rate changing the ratio of older to younger people especially in developed countries. However in most of sub-Saharan Africa, as well as in Oceania and parts of Asia, Latin America and the Caribbean, the working-age population (25 to 64 years) will continue to grow faster than other age groups (United Nations, 2019, p. 14; Europa, 2014). These divergent trends are leading to changes in family structures, social systems, labour market and higher education (British Council, 2017, p. 4). It is helping to redefine the concept of "old age" in all countries as people live healthily and work longer (Europa, 2016, p. 8).

As knowledge and innovation processes become more dispersed and openly accessible, the cross-border movement of people and ideas becomes indispensable especially for growing economies with declining populations. In 2017, 258m people were estimated to be living in a country other than that of their birth; 60% of migrants are living in Asia or Europe (Popper & Loikkanen, 2019). People move in search of better jobs and opportunities, and too often because of economic and political problems at home. Climate change is an increasing factor (OECD, 2016, p. 20).

Highly educated people are most likely to be mobile leading to problems associated with brain drain to other countries as well as regions within countries. This includes internationally mobile students who are estimated to reach around 8m by 2025, compared with 0.8m in 1975. They are now the target of many countries and universities in the developed world due to demographic change including a decline in the number of domestic students especially research students. For decades the US and UK had the highest international student enrolments but other regional education hubs and markets, especially in east Asia, have been expanding provision and becoming more attractive and affordable to students, especially as their universities climb in the rankings (OECD, 2018b, p. 3).

These developments are changing the geography of the global talent pool. Expansion has propelled the rise of the middle class. However, the growing pool of graduates has not increased "the number of high-value social outcomes that graduates can reach, [because that] … is determined by relations of social power and quality/inequality beyond education" (Marginson, 2016, p. 421). The push/pull factors have the propensity to challenge national strategies for growing knowledge-intensive industries as countries struggle to have sufficient high-achieving students and talented professionals.

3.3 Fourth Industrial Revolution and Open Science

The Fourth Industrial Revolution is only beginning but there is already strong evidence that it will have a significant impact on working life, the labour market and skills requirements in developed and developing countries. Significant discoveries and innovations are projected to span categories such as: the Internet of Things; Big Data Analytics; Artificial Intelligence; Neurotechnologies; Nano/Microsatellites; Nanomaterials; Additive Manufacturing; Advanced Energy Storage Technologies; Synthetic Biology; and Blockchain (OECD 2016b, pp. 77-126). These technological advances will significantly affect the "global marketplace, the dynamics of knowledge, innovation and education" (Popper & Loikkanen, 2019, p. 12). They will be significant drivers of competitiveness and growth contributing to greater connectivity as well as having a transformative effect on how people live, work and interact with other people and things in the future (OECD, 2014). In turn companies will expand their own adoption of technologies – specifically in areas of ubiquitous high-speed mobile internet; artificial intelligence; widespread adoption of big data analytics; and cloud technology – and augment their investments accordingly (Centre for the New Economy and Society, 2018). Overtime technologies will "continue to become more powerful, and to acquire more advanced capabilities" and "digital labour will become cheaper than human labour" (Popper & Loikkanen, 2019, pp. 15, 20; Choi, Dutz, & Usman, 2019).

Technological changes will affect advanced and emerging economies in different, uneven and unknowing ways complicated further by "the high level of within-region variation between countries" (Popper & Loikkanen, 2019, p. 37). Geopolitical considerations are a significant factor. Less developed regions may be best positioned to "leapfrog" advanced economies by integrating with global markets and participating in global value chains (GVCs) and attracting FDI, supported by complementary improvements in their business environments. Elsewhere, there may be examples of "premature de-industrialisation" or "countries skipping the industrialisation phase altogether" (Popper & Loikkanen, 2019, p. 36). Task relocation coupled with job substitution by technology has been a feature of most G20 countries leading to job and political polarization. Reshoring of low and middle-skilled production jobs due to

technology spill-over effects could have a knock-on impact on emerging economies (Choi et al., 2019, p. 12; OECD & ILO, 2018; OECD, 2017a). Figure 4 shows that while the total labour force is increasing around the globe there is a geographic shift taking place, with industrial jobs falling in the West and rising in the East.

Figure 4 Changing Geography of Employment by Country Income Group
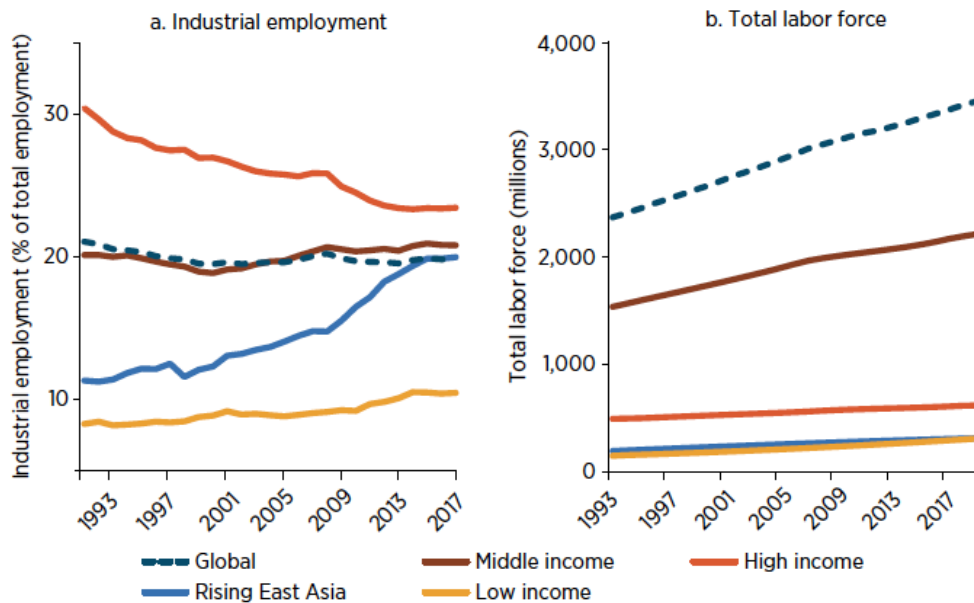
Source: WDR 2019 team, based on World Bank's World Development Indicators (database).
Note: "Rising East Asia" includes Cambodia, Indonesia, the Lao People's Democratic Republic, Mongolia, Myanmar, the Philippines, Thailand, and Vietnam.

Source: World Bank, 2019, p. 7

International collaboration is a core feature of RDI and is already transforming science into a global and co-operative enterprise today (Marginson, 2018, p. 3; Aebischer, 2016). Global networks, open science systems and digital platforms have contributed to a wide diffusion of knowledge and realignment of research whereby many emerging countries are joining the core group (Wagner et al., 2015, p.6; Marginson, 2018a; Salmi, 2015). According to Leydesdorff et al. (2013), the leading group of scientific nations now includes more than 40 nations participating in higher education and global science rather than a world monopolised by the USA, Europe and Japan. This is shifting the geopolitical "centre of gravity" eastward and southward (Levin, 2010). These developments are signposted by global rankings which should be considered lag-indicators. They show that beyond the top-200, there is a pipeline of universities, and countries (Hazelkorn, 2020). The picture emerging is of a multipolar world.

3.4 Implications for Skills and Jobs

Globalisation, massification and technological developments are changing the way in production, services and employments are organized and skills required. Labour market

estimates suggest that the bulk of new employment opportunities into the future will require higher-order cognitive, communication and interpersonal skills, complex problem solving, creativity, fluency of ideas and active learning requiring people to have broad-based skills alongside specialist knowledge. The shift to higher skilled jobs is changing the relationship between people and technology in favour of the latter over time (Centre for the New Economy and Society, 2018). According to Cedefop, by 2020, around 31.5% of all jobs will require high qualifications, and 50% medium qualifications. The demand for low qualifications will fall from a third in 1996 to around 18.5%. While there is the possibility of oversupply in some areas, there is considerable evidence of increasing needs for, and even shortages of, people with adequate levels of qualifications in many areas. The standard employment model in which people have stable jobs and work full time is likely to become less and less dominant (ILO, 2015b) with employment shifting from the career, to the job, to the task (Davis, 2015). These developments are putting pressure on countries and employments active in the global value chain.

Figure 5 Changing Occupational Structure of Employment, (EU 28+3)
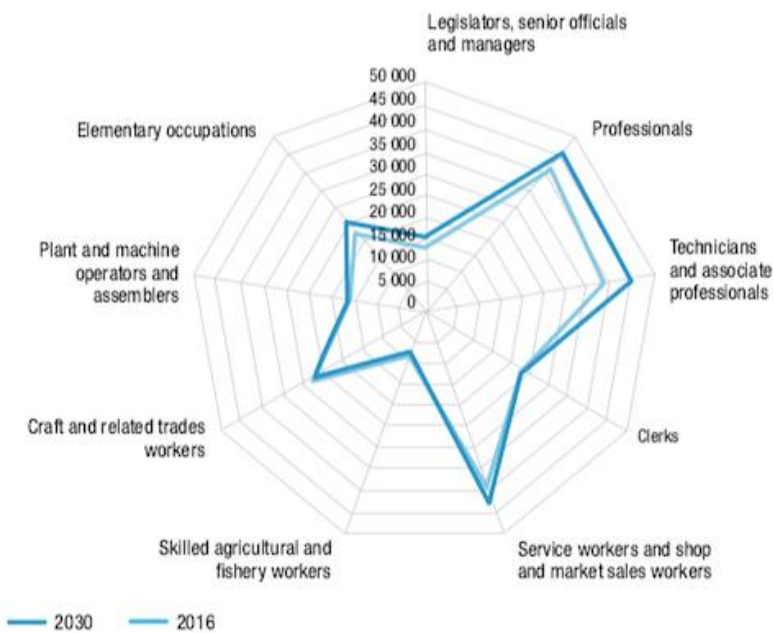
Source. Cedefop, 2018, p. 53

Climate change is already affecting the labour market by way of new policies and regulations impacting on both enterprises (the supply side) as well as consumers (the demand side). It is also affecting the natural and built environment, changing the way in which people live and work. In fact, the more attention brought to matters of climate change, the bigger impact it is having on the public's social conscience and in turn driving the abovementioned changes (Martinez-Fernandez, Hinojosa, & Miranda, 2010, p. 3). Some sectors are more likely to be affected than others while some will be leading adaptors of change, e.g. agriculture, energy, environmental protection, fisheries, forestry, insurance, infrastructure, public health, tourism and water management (Martinez-Fernandez, Hinojosa, & Miranda, 2010, p. 10; ILO, 2018, p. 28). There will be on-going requirements for education and training to improve

knowledge and support skill adaptation, and research and development to help mitigate some effects.

The biggest effects are likely to be on lower-wage services sectors which will grow in contrast to primary production, manufacturing and construction sectors which are likely to decline (Cunningham & Pimhidzai, 2018; Popper & Loikkanen, 2019). Other research suggests "better-paid, better-educated workers" will be most negatively impacted. Smaller, more rural communities and regions may be less affected because they are less exposed to technological disruption than larger urban areas (Muro & Whiton, 2019). While there are concerns of employment polarization or "hollowing out" (Sissons, 2011), technological developments will also bring many new opportunities and new types of employments that we don't yet know about (Bakhshi, Downing, Osborne, & Schneider, 2017; Choi et al., 2019; OECD & International Labour Organization, 2018). The McKinsey Global Institute estimates that less than 5% of occupations are "candidates for full automation" (Manyika et al., 2017); Carnevale et al similarly suggests that "the reported death of the middle economy is greatly exaggerated" (Carnevale, Strohl, Cheah, & Ridley, 2017, p. 1). Ultimately "social intelligence (the ability to have hunches or negotiate and respond to emotional skills), complex manipulation (the ability to deftly handle and move objects) and creativity (the ability to have novel ideas) are tasks that remain difficult for AI to master" (Cowen & Morrin, 2019, p. 29).

What this illustrates is that precise information about which jobs are likely to be affected, automated, lost or displaced remains uncertain. This also depends upon factors beyond technology, including national context and includes macroeconomic issues, environmental sustainability, urbanisation, (in)equality, political (un)certainty, and demographic change. Changes in employment and the labour market are driving new business models and management practices.

Widening access to higher education to under-served groups and to those who have been inactive is essential to meet societal and labour needs as well as stem social inequalities. As people live longer, there is a necessity to expand life-long learning opportunities to cater for re-skilling and up-skilling for those in the labour force or wishing to re-join, this includes women after child-birth or rearing. Significant investment in digital skills to enable people to take advantage of opportunities and avoid risks of worsening the digital divide are also essential. The WEF estimates that "by 2022 approximately 54% of all employees will require significant re- and upskilling (Centre for the New Economy and Society, 2018). Yet, 34% of adults without education or training beyond secondary school in Australia, China, France, Germany, India, Netherlands, Poland, Singapore, South Africa, the UK and the US, say they are not learning any new digital skills compared with 17% of graduates (PwC, 2019). There also remains a strong male dominance in ICT-related disciplines with only one in five new students being female (Jørgensen, 2019, p. 5).

As national economies shift from mass production to knowledge economy occupations, countries have strong incentives to build-up the skills of their populations through higher education. Higher education is required to add value to student's credentials (Behle, 2020). Skill strategies are often based on the assumption that if enough skills are supplied to employers then enhanced stocks of human capital can tip the scale towards greater output, quality and sustainability. When problems arise, criticism usually focuses on higher education and the appropriateness of the curriculum and whether graduates have the

appropriate balance between practical skills, learning facts and critical thinking (Machin & McNally, 2007; OECD & International Labour Organization, 2018).

Additional concerns have been raised as in response to PIAAC tests which show a sizeable proportion of adults in some countries having poor reading, numeracy and problem-solving skills and only limited experience of computers (OECD, 2016b; OECD, 2017a, p. 30-32). The concept of "labour mismatch" is used to explain divergences between qualifications and skills needs. Cedefop identifies six aspects: (i) qualification mismatch (ii) education mismatch (over-education/under-education at individual and firm levels), (iii) over-skilling/under-skilling, (iv) skill shortages (v) skill gaps and (vi) skill obsolescence (Cedefop, 2010). Thus, employability – or the lack thereof – is often envisaged as the responsibility of tertiary education.

The link between qualifications and occupations is, however, complex and multifaceted. The last decade has seen a shift towards higher qualification held by workers as well as required by employments. Within many employments the percentage of people holding higher qualifications has increased vis-à-vis those with no post-compulsory education (O'Dwyer & White, 2019). But, higher qualifications do not necessarily equate with better skills (OECD, 2011, p. 19), especially if people lack the right skills or cannot make use of them (Jaramillo & Melonio, 2011, p. 12) or there is a lack of confidence in the credential and "employers doubt the job-readiness of graduates" (Griffith, 2017, p. 10). There is a tighter fit between regulated occupations and professional bodies through influence on the curriculum, syllabus, assessment, programme structure and qualifications but this relationship does not characterise most qualifications (Wheelahan, 2008, p. 3). Difficulties can arise from strong labour market segmentation and/or the capacity of the labour market to absorb all graduates or to keep rewarding higher levels of education with higher earnings (Allais, 2018; Keep, 2016) "[S]imply improving skills supply locally in such regions will not necessarily lead to economic growth, unless simultaneous attempts are made to improve demand" (Froy, Giguère, & Meghnagi, 2019, p. 6).

Context matters. In South Africa, for example, "unemployment is uneven across race groups, with three per cent of white graduates and 8.5 per cent of black graduates unemployed in 2012" (Brtish Council, 2015, p. 2). In the MENA region misalignment between skills and the labour market is partially a function of rapid expansion of secondary and higher education vis-à-vis the stage of economic development (Angel-Urdinola, Nucifora, & Robalino, 2014; Kheyfets, Sedmik, Audah, Gregory, & Kraft, 2019).

Significantly, research from developed and developing countries highlight discordance between employers and higher education about graduate competencies required by/for the labour market. A Gallop/Lumina Foundation survey showed that 96% of provosts in the USA feel they are preparing students for work compared with only 11% of business leaders who think colleges are effectively preparing graduates for work (Pianko, 2016). While "the perception of what a relevant curriculum actually entails may differ, feedback from Cambodia suggests that employers find it "difficult to find professional staff with strong analytic and decision-making skills" while employers in Malaysia comment on the absence of "21st century skills" (UNESCO, 2014a, p. 35). This tension is reflected also in a UK report which says many "employers feel ignored by HEIs. In many cases, they have few (if any) links with an HEI; and those employers – relatively few in number – who serve on university committees say their views on course design are disregarded" (Lowden, Hall, Elliot, & Lewin, 2011). Employers feel their views are regularly rebutted by higher education (Martin, 2018a, p. 88) but the views

are too consistent to be ignored. The education and training system lacks the "information necessary to become more responsive to the needs of the economy, whereas the private sector lacks the capacity and/or interest to play its role in a demand-driven skill development system" (Angel-Urdinola et al., 2014, p. 58).

The concept of a skills eco-system has evolved overtime but essentially demonstrates that skills supply relates to a complex set of intertwined issues linking skills with other knowledge development and innovation policies. At the same time, the new economy presents significant challenges to the existing model of compulsory education which traditionally has envisaged students progressing systematically from primary to secondary to tertiary and then to employment. Moreover, employability outcomes are influenced by a combination of factors including family, socio-economic and personal circumstances, gender, race and ethnicity, and school settings (Behle, 2020). To best future-proof our citizens the requirement is for more diverse and flexible education which offers different pathways (academic, technical and vocational) and support systems to enable people to enhance their skills and knowledge throughout their lives, and sustain themselves through planned and unplanned changes in life circumstances (Cowen & Morrin, 2019, p. 20). Policy matters.

4. Issues and Challenges for Higher Education

The effect on these mega trends on higher education has been transformational. Historically universities and colleges have had an intense affiliation to the cities and towns in which they were established and hosted, and strong nation-building role. Today, universities and colleges are institutions of geopolitical significance. They act as key magnets for mobile capital and talent, their graduates are part of the global labour pool, and academics and researchers collaborate across institutional and national boundaries. Universities are themselves global actors, forming partnerships, recruiting students and actively maximising their comparative and competitive advantages. These developments have increased attention on the role, impact and value of higher education to society.

This section discusses a range of issues setting the context for discussion of "good practice" of policy and practice which are discussed in Part 5.

4.1 Promoting a Tertiary Education System and Diversity of Provision

The role, scale and mission of higher education has been transformed, from institutions which were attended by a small intellectual or social elite to a situation where attendance is more or less obligatory for the vast majority of people in order to successfully sustain most occupations and uphold democratic civil society. It has become a knowledge-producing enterprise concerned with ensuring the majority of people have the knowledge and skills to adapt to rapid social and technological change. Research is increasingly focused on solving complex problems through multi-disciplinary, bi-lateral, inter-regional and global networks rather than being bound by national, institutional or disciplinary borders.

As higher education has evolved from an elite to a mass to (near) universal status, massification has been matched by growing diversity of educational and research experiences as well as student types. In the future, a greater and more varied array of

providers, public and private, national and international, global and corporate, campus-based and virtual, comprehensive and specialist, institutions servicing 18-22 years and those serving mature learners as well as institutions which straddle these boundaries will emerge.

As employability becomes a critical objective for all graduates, boundaries between academic, technical and vocational education and training (VET) are also blurring. Significantly, the UNESCO Convention (1989), Article 1, recognises VET as a pedagogical approach rather than a particular institutional type or qualification level (Cedofop, 2015).

> All forms and levels of the education process involving, in addition to general knowledge, the study of technologies and related sciences, the acquisition of practical skills, know-how, attitudes and understanding relating to occupations in the various sectors of economic and social life (UNESCO, 1989).

Often neglected in education and training policies in many countries, VET is increasingly recognised as a vital part of a multi-faceted tertiary system.

As provision expands to meet the needs of complex economic demands with many more and new learners, there is an "unbundling" of aspects of the tertiary experience. Students are empowered to tailor their entry, exit, assessment and qualifications to their personally determined needs with the introduction of competency-base education and micro-credentials rather than being required to fit a standardised mould. The shift to learner-centred learning is aided by technology and the surge in the use of digital platforms and on-line provision. Other forms of disruptive innovation leading to new educational products and services, modes of delivery, learner and career pathways, shorter and different types of courses/programmes and credentialization. There is also growing involvement of enterprise and civil society in helping shape learning outcomes, influence career guidance, provide internship programmes, advise on faculty appointments and promotion criteria, evaluate research projects and their impact, etc. These developments facilitate a shift from traditional time-served to just-in-time education with implications for the organisation of the institutions and academic practices. This change is reducing focus on inputs and creating monitoring and accrediting systems based on outcomes and international comparability. These developments reflect the ambitions of SDG 4.3 and SDG 4.4, with the necessity for ensuring multiple flexible learning pathways through post-secondary and tertiary education to facilitate entry to the labour market (OECD, 2012, p. 30; UIS, 2018)

Figure 6 Pathways from Education to Employment
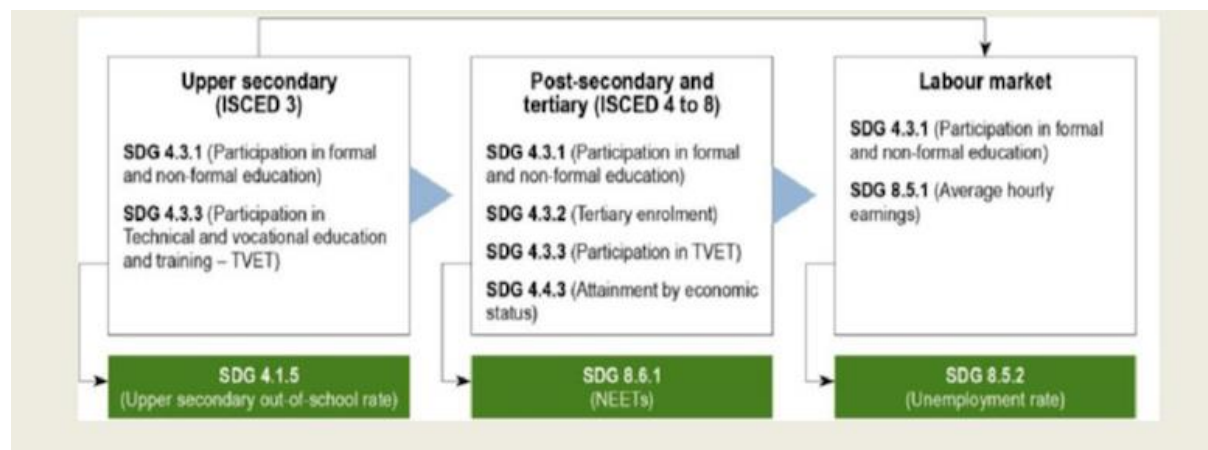
4.2 Higher Education as a Driver of Social, Cultural and Economic Development

As globalisation accelerates, higher education institutions play a key role in the knowledge-knowledge-research-innovation eco-system as an "anchor institution" (Edwards et al., 2017; Goddard, Coombes, Kempton, & Vallance, 2014). The "triple helix" model of innovation, in which higher education, government and business collaborate, has been critical to the success of competitive global cities or mega-regions. Today, it is widely recognised that a "quadruple helix" model which embraces citizens and civil society organisations working alongside HE, business and government in a highly collaborative, iterative and co-ordinated way can be even more effective (Carayannis et al., 2012; Carayannis & Campbell, 2012).

These eco-systems attract the key resources of talent and capital (Sassen, 2001). For some industries localized supply networks are especially critical to the process through which knowledge is transferred between enterprises, creating new enterprise and services, and transforming existing industries. These localized networks are frequently described as "clusters". Competitive advantage comes about through strong collaboration across institutions (Porter, 2007; 2003; OECD, 2007a). Working collaboratively they can maximise capacity beyond individual capability.

The benefits of this relationship flow in both directions – to society and the economy, and to higher education – underpinning teaching and learning, and research as described below and in Figure 4.

- Society benefits from enhanced human capital through graduate retention and professional updating, new products and services, knowledge exchange and transfer, technological innovation, improvements in societal health and lifestyle through new research and educational provision. Higher education is a major employer recruiting locally, and their students and graduates live and work locally. It is a purchaser of goods and services, contributor and provider of cultural activity and urban life, a source of advice to business and the community, and a global gateway for marketing and attracting investment and mobile talent.

- Higher education benefits from a close interaction with its region, which provides a significant and essential base of/for public support for higher education. By virtue of their location, HEIs are well-placed to contribute to social, cultural and economic life in the area and region. This close relationship ensures that educational and research programmes remain relevant to societal needs and demands in addition to providing opportunities for on-going educational and training opportunities.

Figure 7 Capacities of Higher Education to Support Social, Cultural and Economic Knowledge-Based Development

Generative
Research related (but not limited) to regional priorities
Multi- and cross- disciplinary
Connectivity – knowledge nodes
Supporting regional analysis

Absorptive
Help build capacity to ensure local firms absorb knowledge
Stimulate demand through teaching and learning activities
Knowledge exchange and transfer through mobility of staff and students

Collaborative
Acting as neutral regional brokers
Reach Out –'boundary spanners
Reach In – co-production of knowledge

Leadership
Support regional vision and partnership
Propose joint activities
Place marketing

Source: Edwards et al., 2017, p. 10

Talent development is vital for innovation. The science-driven technology transfer model depends primarily on high-skilled workers trained in the sciences to produce knowledge. But focusing *only* on innovations concerned with a small number of high-technology sectors ignores "the benefits of innovation to the … economy which come from ensuring that new technologies and work processes are adapted widely throughout all sectors of the economy" (Curtain, 2004, p. 6). This recognizes that process, product and social innovation can be equally powerful. Furthermore, SMEs and traditional industries are vital for sustainability in towns and cities outside the main metropoles. Ultimately, human capital is stickier than intellectual property.

4.3 Widening Participation, Gender and Adult Learners

As higher education expands the composition of the student cohort is becoming more diverse according to socio-economic circumstances, age, gender and race/ethnicity and drawing in students who are first-in-family. Despite SDG 4 which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all", most HEIs are primarily oriented towards traditional 18-22 year old students and retain traditional academic year and timetabling patterns (OECD, 2017e, p. 37).

The USA may be a bellwether with students aged over 25 years or older becoming the dominant component of the HE student population (Stokes, 2007). A similar picture is emerging in Australia, which also shows a growing number of students never set foot on campus and instead study on-line and through other external modes (Devlin, 2017). However across OECD countries "the share of students entering university at age 30 or older has not increased" (OECD, 2014, p. 3). More significantly the percentage of adults involved in formal education and training remains too low (Eurostat, 2019). Across countries of South Eastern Europe, the Southern and Eastern Mediterranean and Central Asia, access and participation in lifelong learning is also modest (Popper & Loikkanen, 2019, p. 52)

The concept of a "job for life" has become redundant in the face of continuing global, technological and labour market changes. Skills learned during school will not remain relevant 30-40 years later. Furthermore, as healthy aging extends active living, Life-long learning (LLL) stresses that "learning throughout life is a continuum" (Age Platform, 2007). Countries experiencing demographic change are likely to become increasingly dependent on developing the skills of older adults; thus providing education opportunities for mature learners is a sustainability issue. LLL is no longer a good-to-have opportunity but a necessity.

The gender gap in educational attainment depends upon the particular country and educational level. In almost all OECD countries, the proportion of women aged 25-64 is much higher than that of men. Figures are similar for Central Asia where women are more likely to enter tertiary education than men (Sabzalieva, 2016) whereas across Asia and the Pacific region the gender gap remains significant (UNESCO, 2010, p. 3).

Despite some impressive achievements, significant gaps persist between the rising number of women as students and those in leadership roles (European Commission, 2019) (See Figure 8 below). Organisational and cultural barriers to career opportunities continue to exist (O'Connor, Martin, et al., 2019; O'Connor, O'Hagan, et al., 2019). In Africa, only 40 female vice-chancellors lead approximately 1,500 universities and women academics constitute about 31% of positions in science, technology and innovation across Sub-Saharan Africa despite pressure for more graduates (Lirri, 2019). A 2010 UNESCO report noted dramatic levels of inequality in "the availability of women faculty, secure spaces for women students to wait between classes and the provision of separate toilets and sanitation facilities, make a big difference to women" (UNESCO, 2010, p. 5).

Figure 8 Proportion Of Women and Men Graduates in Tertiary Education by Programme Level and Those Employed As Researchers 2014
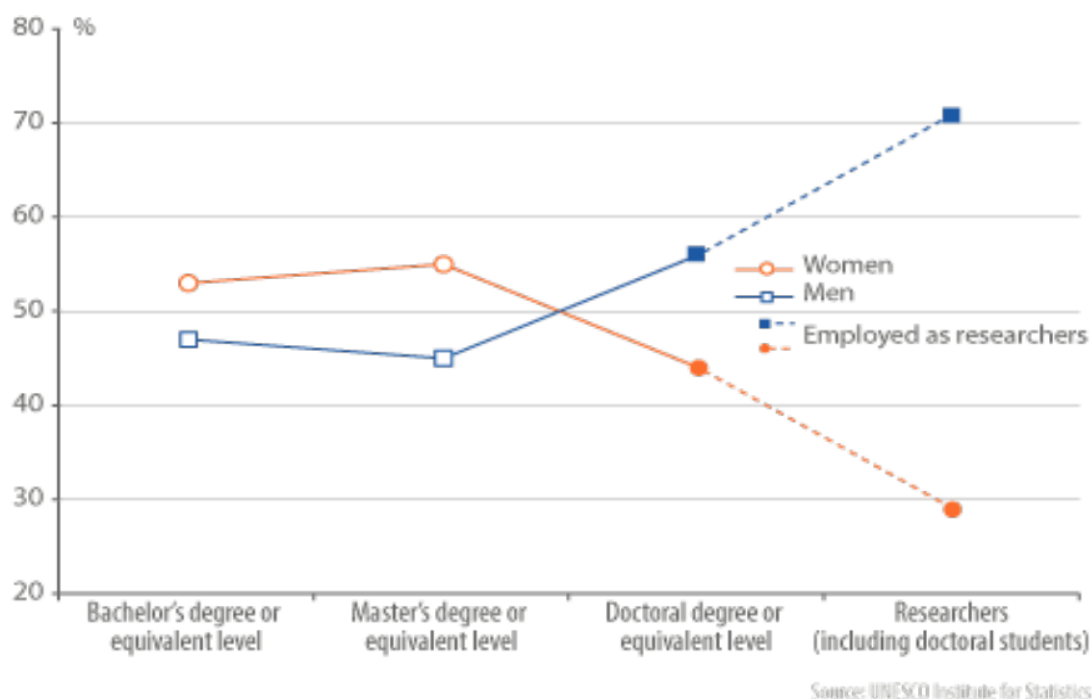
Source: UNESCO UIS, 2017

Despite on-going expansion, there is also evidence of a widening inequality gap and growing divergences in educational outcomes across many countries. Attention is drawn to students who are gradually being left behind by current systems and those who are unable to access the system in any meaningful and sustained way. Disadvantaged students remain under-represented amongst those entering the system, and if they enrol they are over-represented in less prestigious institutions and/or degree programmes (OECD, 2017e, pp. 35–36). It is also no longer certain that a higher education qualification is sufficient for personal success and social equity. Thus the issue is not simply access but active participation and successful completion. Salmi shows governments and higher education institutions are failing to address the broader equity agenda (Salmi, 2018).

4.4 Learning Outcomes and Rethinking Curriculum

Learning outcomes have shifted attention towards understanding what as well as how students learn; in other words what a student knows as a result of learning (Otter, 1992). This is not simply a question of inputs or how much time a student spends in class (e.g. class contact hours or staff/student ratio) but points to the quality of the student learning experience and the outcomes of learning Recent developments, including the Bologna Process along with PISA and PIACC, have contributed to pushing concerns around educational quality away from concentrating on material and human resource inputs towards a more intensive examination of education outputs and factors that influence them (Ross & Genevois, 2006). This in turn has raised interest in international comparability of higher education which extends beyond learning to include "employment, increased career mobility, enhanced incomes and lifestyles, the opportunity enrol for more advanced educational studies, or simply a more fulfilled and reflective life" (Ewell, 2004, p. 3).

Debate takes different forms in different countries but common concerns include: new graduates lack the skills that employers need; too many graduates study the wrong subjects for available jobs; some graduates are stuck in low-skilled jobs or under-employed; and too few students are being encouraged into vocational or professional education. HEIs are primarily seen as supply-led, focusing on credentials rather than skills. There is a view that universities in developing countries have "short-changed graduates and potential employers alike, failing to aggressively prepare workers for careers in the private sector" (Angel-Urdinola et al., 2014).

On the other hand, there is unease about narrowing the focus of higher education. Emphasis on promoting inquiry, creativity and innovation is necessitating a shift away from knowing facts to using knowledge. Research suggests that a narrow focus on vocational skills may ease initial entry into the labour market but may disadvantage people over the longer term as opportunities change later in life (Hanushek, Schwerdt, Woessmann, & Zhang, 2017).

Lundvall and Johnson (1994, p. 27-28) identified four types of economically relevant knowledge:

> Know-what refers to the knowledge about "facts"... close to what is normally called information...Know-why refers to scientific knowledge of principles and laws of motion in nature, in the human mind and in society...Know-who refers to specific and selective social relations... to know who knows what and can do what...Know-how refers to skills – i.e. the capability to do different kinds of

things on a practical level. "Know-what" and "know-why" can be marketable commodities, while "know-who" and "know-how" generally cannot be removed from their social and human context (i.e. region)(Kearns, Bowman, & Garlick, 2008, p. 6-7).

Language, artistic and scientific literacy are equally important. The concept "STE**A**M" – where the letter "A" represents all disciplines – highlights the value of interdisciplinarity in helping solve societal challenges and prepare people for changing circumstances.

In response to other concerns, universities are introducing entrepreneurial education and training programmes (Byun, Sung, Park, & Choi, 2018). Entrepreneurial education has the capacity to break down barriers of class, age, sexual orientation and race because it requires students to move away from traditional "instruction" to "utilising an action oriented, mentoring and group work approach" (Cooney, 2012). Research also shows that students who are more actively engaged in their learning develop the competences that lead to more successful life-long attributes (Avvisati et al., 2014; Kuh, 2009).

4.5 Digitalisation and the Pedagogical Revolution

These are the "early stages of a learning revolution" (Williams, Connelly, Henderikx, Weller, & Haywood, 2015). New teaching and learning pedagogies with an emphasis on student engagement (e.g. problem-based learning and students as co-creators), and the use of technology in classroom (e.g. virtual learning environments, adaptive learning, immersive environments, mobile learning, and flipped-classrooms) are redefining the way students learn and the role of the lecturer. Partnerships are being forged between public and private institutions, and with many specialist providers emerging. Higher education has a vital role to play in enhancing the digital skills of all citizens as this varies considerably across and within countries according to education level, age, gender and cultural or ethnic diversity.

Competency-based education (CBE) is currently primarily limited to the USA although the concept is well-embedded in vocational education. By assessing student learning in terms of demonstrable competencies (which can include knowledge, skills and attitudes) and not as a record of classes attended nor time taken, CBE offers a more flexible means to support adult, part-time and mobile learners drawing on their knowledge and skills (Voorhees, 2001, p. 9).

Qualifications frameworks serve a similar purpose by helping "improve understanding of qualifications (degrees, certificates) or recognition of experiential-based learning and capabilities in terms of the information they convey to an employer about prospective workers' competences" (IUCEA, 2014). In this way, they elucidate a clear pathway to achievement and enable mobility within and between institutions and internationally. Over 100 countries are involved in some way in designing and implementing qualifications frameworks. The European Qualifications Frameworks (EQF) has been a significant influence. The East African Community (EAC) Council of Ministers approved development of the East African Qualifications Framework for Higher Education (EAQFHE) in 2015.[3] Guidelines for strengthening qualifications framework in Asia and the Pacific are also underway (UNESCO, 2018).

MOOCs – massive open on-line courses – originated in Canada in 2008 as an online computing course and have expanded to wherever education structures are already well-

developed, with platforms in emerging countries providing access to US and Europe based courses. MOOCs have the potential to facilitate access to students for whom constraints of the standard university experience (time, location, cost, etc.) pose a barrier to entry. In these respects, they are potentially transformative not just for the individual learner but to higher education itself. Research suggests that students in developing countries have a much more positive experience and outcome than users in developed countries (Garrido, Koepke, & Andersen, 2016).

Digitalisation of learning and adaptation of just-in-time concepts is transforming the rhetoric of life-long learning into reality. Accessing education no longer requires months and years of planning, countless applications, using savings or taking out huge loans and/or giving up months or years of your life to match an institutional schedule. These developments have implications for the organisation and business model. At the same time, new forms of leadership and management capabilities, and as well as continuous professional development, are required (see below, section 3.6). Where established (public) HEIs fail to respond to opportunities, new (private) providers are offering an alternative "product".

4.6 Accountability, Quality Assurance and International Comparability

Quality assurance refers to planned and systematic processes that engender trust, confidence and accountability and promote continuous improvement. It includes external quality assurance of the provider and internal quality management of programme provision and support service, e.g. student services, administration, libraries, etc. (EHEA and Bologna Process, 2015). Traditionally associated with higher education, these methodologies are also a strong feature of VET/TVET systems (Bateman & Coles, 2017).

QA may be used in conjunction with accreditation, resource management and performance funding, and classification and rankings system. It facilitates mobility between countries for study and employment on the basis of mutual recognition of academic qualifications.[4] The integration of different transparency tools, such as learning outcomes, graduate tracking, social impact analysis and government "scorecards" into QA procedures is (one of) the main ways in which policy strives to enhance accountability (Nakrošis et al., 2018). Together they aim to provide information to a diverse range of users including: students and parents, businesses, academics, policy makers, and institutional leaders (Vercruysse & Proteasa, 2012, p. 11). Usually written in a discursive style, they are not usually suitable for measuring or comparing institutional and student performance at a trans-national or international level.

Recent decades have seen a growing number of international and supra-national initiatives developed in response to requirement for a deeper understanding of the quality of educational performance and outcomes, and for internationally comparative data. The OECD *Main Science and Technology Indicators* (1981) draw on the Science Citation Index and Social Sciences Citation Index. *Education at a Glance* began in 1991, and was followed in 2000 by the *Program for International Student Assessment* (PISA). In 2008, the first round of PIACC – the *Survey of Adult Skills* – was launched while the Assessment of Higher Education Learning Outcomes (AHELO) was piloted but was not progressed.[5]

Global rankings are part of this trajectory. They became popular beginning in 2003 with the launch of the *Academic Ranking of World Universities* (ARWU) and subsequently *Times Higher Education World Rankings* and *QS World University Rankings*. Since then,

approximately 20 different global rankings have emerged with different levels of value and popularity (IREG Observatory, 2018). Their success stems from relatively simplistic methodologies used to measure and compare higher education performance and "quality" on an international level. Their popularity affirms the shift away from academic self-regulation and institutional-led quality assurance to external or government-led accountability tools.

Big data has facilitated the collection and analysis of higher education outcomes and performance data. The absence of a common data set, common data definition, and lack of clarity around the governance of the data, however remains an issue. Data analytics are being used to help ensure students get the most from education and graduate on time. It can provide students with support services before they encounter problems while universities can use analytics to enable faculty to see which students may be at risk of failing. Given the emphasis on data for government and HEIs, institutional research (IR) capability is now essential. IR is at the forefront of strategic decision-making to underpin self-knowledge, planning and continuous enhancement, benchmarking and bench-learning (Saupe, 2005).

These developments signal political and public desire for greater insight into and regulation of higher education provision, nationally-based as well as trans-national/cross-border – with implications for policy and practice.

4.7 Governance, Leadership, Academic Careers and Professional Development

The ability of an HEI to respond appropriately, effectively and efficiently to changing circumstances, nationally and internationally, depends on the quality of its governance arrangements and leadership. This includes matters of how an organisation is internally structured and governed, how it develops strategy and policy and translates them into action, how it is legally embedded in its environment and how it cooperates with the external world (Shattock, 2006). In the era of increasing complexity these factors have never been more important. Higher education is a complex businesses, operating in an increasingly competitive environment domestically and internationally. It is therefore essential that the individual(s) who takes on this responsibility understand every aspect of the role, including the challenges faced by the institution they are leading (TEQSA, 2019). Studies link educational leadership to improved, performance and outcomes (Scott, Coates, & Anderson, 2008, p. vii).

Recognising that higher education has responsibilities to society requires leaders to have the capabilities and understanding to work with myriad stakeholders, within and external to the institution) and to build collaborative networks regionally, nationally and internationally. The concept "coopetition" or cooperative competition describes tensions arising from cooperation for mutual or societal benefit versus competition for students, research funding and reputation (Muijs & Rumyantseva, 2014).

Leading entrepreneurial universities involves being able to take "risks when initiating new practices whose outcomes is in doubt" to enable the organisation "to arrive at a more promising posture for the future" (Clark, 1998, p. 4; Crow & Dabars, 2015). This is because change does not just happen but must be led. They should introduce new ways of working, structures and procedures "according to their own interpretations of the pressing needs of

society, interpretations of public values, and specific local and institutional contexts" (Randles quoted in Goddard, Hazelkorn, Kempton, & Vallance, 2016, p. 301).

Yet, there is often an inadequate understanding of what governance and leadership entails and what HEIs need to do to meet today's demands. Many universities are confronted by a leadership succession crisis. In many countries, university presidents and other senior leaders have risen through the ranks over time translating their experience as "amateur academic leaders to effective professionals" (Middlehurst, 1993). But this process for recruitment and appointment of university and other academic leaders is unsuited for the dynamic realities of today. And once in position, there is usually insufficient on-going professional development opportunities (Anon, 2013; Fredua-Kwarteng, 2018).

The quality of the education system depends upon the quality of the faculty. Yet the profession in many countries is insufficiently attractive to encourage a pipeline of well-trained academics. In developed countries, there are concerns around the casualisation of the academic workforce, reductions in full-time permanent positions and less favourable career opportunities. Pressure to increase research activity are increasing stratification according to salary, opportunity, facilities, work-load and status/reputation (Kwiek, 2018).

In developing countries, many university teachers have only a bachelor's degree, and there are a considerable number of part-time academics. The lack of sufficient and adequately paid full-time positions means faculty often have to take up additional employment outside of the university (Un, Hem, & Sangha, 2017, p. 46). There are concerns about training, recruitment, security of employment, terms and conditions (e.g. salary, workload, social security benefits, health and safety), official status, promotion, discipline and dismissal (Un, Hem, & Sangha, 2017, p. 48). As a result there are worries about "uneven and often poor quality teaching, resulting from underqualified staff, large class sizes, and outdated teaching methods…" (Griffith, 2017, p. 10).

Scholarships for doctoral studies can be a double-edged sword, providing excellent study opportunities in "world-class" universities whilst also facilitating brain drain. The problem is especially acute for research positions where many countries face constraints due to inadequate infrastructure and facilities and trained faculty at the institutional and/or national level (Barasa & Omulando, 2018). Across Africa, there are fewer individuals per capita engaged in scientific activity than any other continent leading to an underrepresentation of scientists (Okeke, Babalola, Byarugaba, Djimde, & Osoniyi, 2017). There are also concerns around low levels of gender and racial and ethnic diversity amongst the academic workforce, and an overdependence on "ex-pats" (Betts, 2017; Tamrat, 2019).

5. Examples of Good Practice

Higher education is being asked to rethink its role and responsibilities. There is an increasing focus on what HEIs do rather than what they are called. The ILO has commented:

> Forward-looking approaches to skills needs should be at the heart of strategic policy mechanisms, with skills development planning integrated in the creation of investment, trade, environmental, fiscal, employment and other national strategies and industrial policies (ILO, 2015a).

This section describes a range of different policies and practices, at the system and institutional level, in response to the challenges set out in Part 4. The examples highlight the necessity for a system approach to ensure coordination across government, higher education, industry/business and civil society, thus enabling government policy and institutional strategies to be most effective.

5.1 Higher Education Policies and Strategies Relating to the Support for Graduate Employment

Improving graduate employability outcomes is a shared responsibility between government, higher education, business and enterprise, and civil society. Success is dependent upon a constellation of policies and practices which together seek to build a dynamic knowledge-knowledge-research-innovation eco-system. This requires creating a sustainable framework of collaboration and partnerships all the key stakeholders. Individual initiatives by HEIs, or business, are important but these actions are not and cannot be undertaken in isolation. It requires foundational support from government to support a combination of skill supply, skill demand and skill utilisation. Institutional autonomy and strategic capacity and capability are also vital (See for example, Dawkins, Jackson, & Noonan, 2019; DES, 2015; OECD, 2011; UNESCO, 2014).

Countries with regional/sector skills councils work well to oversee, identify and coordinate skill development initiatives. The OECD Skills for Competitiveness project designed a diagnostic tool for policy makers to assess skills gaps at local level (OECD 2012). This project found that skills strategies to boost innovation were best developed across sectors within places, rather than focusing only on individual sectors in isolation from each other. The Republic of Korea has established sector councils for human resource development in renewable energy and green finance. In Australia skills for green jobs are dealt with through several sector skills councils which also act in collaboration, and other stakeholders also participate through the Green Skills Agreement (ILO, 2015a, p. 103). Ireland has established Regional Skills Fora as a collaborative framework providing an opportunity for employers and the education and training system to work together to meet the emerging skills needs of their regions.[6]

5.1.1 National Strategies and Intermediary Agencies

Governments in many countries have developed national strategies for their education/higher education system or particular aspects of the system, such as equity and widening access, quality, internationalisation, teaching and learning, funding or skills (e.g. Estermann, Pruvot, & Claeys-Kulik, 2013; Hénard & Mitterle, 2010; Salmi, 2017, 2018) or as part of a wider strategy for economic growth (e.g. Douglass, 2010). The advantage is that they help identify the overall vision for the country and its higher education system – what it is trying to achieve –, and facilitates policymaking to implement and evaluate those objectives. It helps align all departments and agencies, and the public, to a common goal.

Having a national strategy for higher education or laws is common although it is not universal. According to as Salmi (Salmi, 2018, p. 18-19) 45.1% of the 71 countries surveyed had a combined HE law and vision, strategy or plan but only 16.9% had a higher education law, 26.8% had a vision, strategy or plan and 11.3% considered HE only as part of overall

education. Of the 13 Sub-Saharan African countries in the survey, eight had a vision, strategy or plan. Without a strategy, there is no common agenda and individual institutions adopt their own approach which may or may not align with government or national objectives (Anon, 2013).

In recent decades there has been a noticeable shift towards enhanced governance and coordination methods in recognition of the importance that HE plays. Modes of co-ordination usually involve planning and resource allocation mechanisms, overall regulatory frameworks or set of ideas (Meek, 2002). In such circumstances, the primary (lead) responsibility is usually given to the appropriate ministry or to a specific agency often referred to as a buffer body. Depending upon the jurisdiction, an intermediary body's role may be either/both advisory or regulatory (Trick, 2015). Countries with intermediary bodies include: Ireland, Wales, Scotland, Hong Kong, Israel, New Zealand, Romania, Belgium and Latvia.

The New Zealand government undertook a wide-ranging consultative process to help devise a long-term strategic direction for the tertiary education system beginning in 2000.[7] Malaysia developed its *Malaysia Education Blueprint 2015-2025* with the intention of setting out the objectives and challenges, and identify key aspirations: access, quality, equity, unity and efficiency.[8] The USA has a federal system within which individual states have strategies for their public systems. Each of the four nations within the United Kingdom (England, Wales, Scotland and Northern Ireland) have different policy formulations with England adopting a deregulated and marketized approach. The European Union and UNESCO also have strategies for higher education (High Level Group on the Modernisation of Higher Education, 2014; UNESCO, 2014b).

Box 1 National Strategy for Higher Education to 2030, Ireland

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The *National Strategy for Higher Education to 2030* was the result of a consultative process that sought to address several key challenges facing the country:

• Introduce structures to better reflect the diverse learning requirements of students;

• Develop critical mass in research, attract the best researchers and develop world-class capability in high-value nice areas;

• Fund higher education in a more sustainable and equitable manner to ensure wider participation and fairness of access, and

• Propose structural changes in the HE system to ensure greater effectiveness and efficiencies and ensure greater cooperation and collaboration to mutual benefit.

It stressed the potential for higher education to play a pivotal role in enhancing economic competitiveness, and the we now need to build a coherent system of higher education that can accommodate a range of institutions with distinct missions and diverse programmes. The report also pointed to the need for greater engagement with wider communities in order to enhance equality in access to education and social cohesion. The National Qualifications Framework was seen as critical to improving opportunities to expand progression pathways, and to deliver lifelong learning objectives. There was also a clear recognition that "higher education institutions could be more dynamic and coherent in their approach to collaboration" (Higher Education Strategy Group, 2011, p. 75) by:

Building regional clusters of educational institutions to serve local needs…Clusters allow programmes of teaching and learning to be better planned and organised; they use resource efficiently; they allow greater flexibility in student pathways and opportunities for progression; and they provide more coordinated serves to enterprise in their region (Higher Education Strategy Group, 2011, p. 100)

Source: https://hea.ie/assets/uploads/2017/06/National-Strategy-for-Higher-Education-2030.pdf; https://hea.ie/policy/he-reform/the-changing-landscape/

5.1.2 Improving Educational Pathways Tertiary Education System

Tertiary education systems are comprised of a mixture of publicly- and privately funded academic, technical and vocational colleges, higher education institutions and universities with each sector having a distinctive curriculum which prepares learners for different occupational destinations (Wheelahan, Arkoudis, Moodie, Fredman, & O'Connor, 2012, p. 10-18; Moodie, 2008, 4-10). Over the years, the benefits associated with having a higher education qualification have pushed technical and vocational education into a subsidiary role. With the notable exception of Germany, for example, colleges and apprenticeships were thus seen as low status, low demand, poorly resourced and attracting poorly prepared students.

Increased emphasis on employability and labour market relevance has changed policy and public perceptions. Enhancing employability attributes of university graduates and broadening the "soft skills" of technical and vocational students has led to a blurring between academic, technical and vocational education. As a result, many countries are introducing a single governance structure for tertiary education in order to create an integrated, coherent set of educational institutions and opportunities. The aim is to facilitate entry points for learners of all ages and ability to enable them to progress successfully through tertiary education and LLL regardless of personal circumstances.

Scotland and New Zealand have created a single intermediary agency with responsibility for formal oversight process of the whole tertiary sector. In Ireland and Finland this role is overseen by the ministry. System co-ordination is also a strong feature of some US state systems (Lane & Johnstone, 2013). The Welsh government is currently introducing legislation to establish a Tertiary Education and Research Commission[9] (Hazelkorn, 2016b).

Box 2 Scottish Funding Council, Scotland

Scotland brought the further and higher education components of its tertiary system together under the authority of the Scottish Funding Council (SFC), a non-departmental public body of the Scottish Government, which was established with the Further and Higher Education (Scotland) Act 2005.[10] This act merged the previous separate funding councils, the Scottish Further Education Funding Council and the Scottish Higher Education Funding Council. The merger of funding councils was part of a wider goal of strategic coordination and coherence across third level education as a whole system. The merger was also intended to introduce parity of esteem between the two sectors. This also enables the SFC to take a macro and integrated approach to teaching and research,

vocational and academic studies, etc. This approach provides a more rational approach to planning and collective engagement between the institutions as well as with their myriad stakeholders.

Source: http://www.sfc.ac.uk

Box 3 Tertiary Education Commission, New Zealand

New Zealand established a Tertiary Education Advisory Commission (TEAC) in 2000 to "develop a strategic direction for tertiary education in New Zealand…[and] to produce a high-level strategic direction which has wide acceptance that will endure over the medium to longer term." In total, four reports were published, between 2000 and 2001. In its first report, the TEAC adopted a broad definition of tertiary education:

This definition includes learning at all levels within public tertiary institutions (i.e. polytechnics, universities, colleges of education and wananga), programmes provided by private and government training establishments, business-based education, industry training, and all lifelong learning beyond the compulsory school system. It thus includes both formal and non-formal education, and what is often termed "second-chance" education. Embracing these diverse forms of education and training is particularly important if the challenges of promoting lifelong learning and designing a tertiary education system that contributes to the knowledge society are to be taken seriously (TEAC, 2000, p. 9).

The Tertiary Education Commission (TEC) was established under the Education Act 1989. It has "responsibility for policy advice and funding allocation for the whole tertiary education system, including community education, second-chance education and industry training….The Commission's view is that a single coherent and comprehensive central structure would better facilitate the desired differentiation and complementarity of the tertiary education system, because its scope of coverage would mean that it would be able to steer all forms of provision" (TEAC, 2001, p. xiii-ix).

The *Learning for Life* policy agenda led to the "removal of false or outdated distinctions between 'education' and 'training', or between 'academic' and 'vocational' learning" in order to encourage a seamless post-secondary system with a commitment to life-long learning (New Zealand Producitivty Commission, 2017, p. 16.)

Source: https://www.tec.govt.nz

5.1.3   Regional Clusters and Smart Specialisation

Higher education plays a key role in helping define and develop a region's knowledge assets, capabilities and competencies – social, cultural and economic (Edwards et al., 2017; Escobari et al., 2019; Europa, 2017; Foray, Morgan, & Radosevic, 2014). This is because it has a responsible for knowledge and skill development, knowledge production and innovation diffusion – all of which have a direct impact on sustainable economic growth, especially of less developed regions (Goddard, 2011). Vocational education (VET/TVET) plays a similar role

because it builds and generates absorptive capacity by helping develop skilled graduates who are able to apply and synthesise knowledge across all technological areas and help renew competences in traditional sectors. Policies and actions which formalise collaboration between the education and training system and employers are particularly important.

Regional Clusters can become the primary policy instrument for delivering national strategic ambitions at the regional/sub-national level. The objective is to create greater co-ordination and collaboration amongst key stakeholders around a shared vision and set of goals in order to promote specialisation based on recognised strengths, improve capacity and capability for operating internationally, strengthen competitiveness, and attract and retain investment and talent. Given their breadth and scope, they have the capacity to help build sustainable competitive knowledge hubs, and engage in regional impact evaluation, with particular focus on social, cultural and economic development.

The European Union has promoted the concept of Smart Specialisation Strategy (RIS3).[11] This involves a *process* of developing a vision, identifying competitive advantage and setting strategic priorities to maximise the knowledge-based development potential of any region, strong or weak, high-tech or low-tech. Because conditions differ from region to region, innovation needs to be embedded in local business knowledge that is often concentrated in clusters of related industries. By bringing together a broad range of education/higher education institutions, businesses, researchers and other public actors the aim is to establish a coordinated approach.

Box 4 Technological Innovation Education and Training System, Basque Region, Spain

Establishing and maintaining a VET Eco-system is a top political priority for the Basque Government, Spain. Collaboration involves the Basque Government Education and Economic Development and Industry Directorate, economic and social partners, VET Centres, as well as teachers and students. Aligned with the Basque Smart Specialisation Strategy, the emphasis is on VET Excellence, with an integrated approach to training, applied innovation and active entrepreneurship. Internationalisation is a transversal component.

The strategy, which links firmly with smart specialisation, puts sustainable human development at the centre. Accordingly, VET sits at the centre of the Technological Innovation System. The objective is to help guide Basque applied innovation, bringing together 19 centres in 4 hubs organised around priorities: advanced manufacturing, digital and connected factory; energies, and biosciences and biotechnologies. There is strong co-operation between VET and SMEs in the provision of services, the aim of which is to provide high-level specialist support going beyond simply the provision of training. Working in this way creates a sustainable innovation centre of excellence.

The Basque Country region has promoted the idea of innovation hubs which carry out a continual process of entrepreneurial discovery include representatives of the VET system, notably TKNIE, the Basque agency responsible for linking VET with innovation.
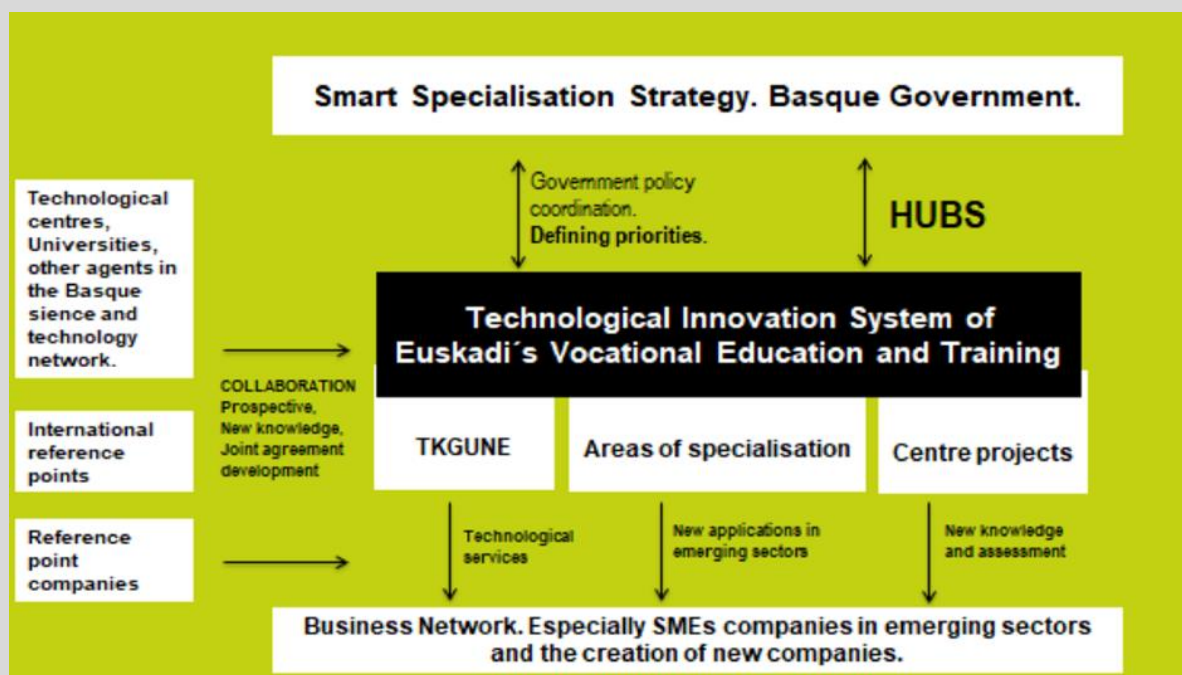
Source: Hazelkorn & Edwards, 2019, p. 23-24; Arancegui, Jose, Querejeta, & Montero, 2011. See also Navarro & Retegi, 2018.

5.1.4 National frameworks and evaluation of learning outcomes and engagement

There is growing interest in developing policy instruments to measure and assess performance with respect to learning outcomes, engagement and entrepreneurship, and the impact of research. There are two key aspects:

- i) to show qualifications are of high quality and are internationally comparable and transferable, and

- ii) to indicate whether government or students (or other stakeholders) are meeting societal needs and getting value for money (Hazelkorn, 2018; Hazelkorn, Coates, & McCormick, 2018; Martin, 2018b; Weingarten, Hicks, & Kaufman, 2018).

Quality Assurance increasingly includes review and assessment of learning outcomes and graduate performance as an indicator of educational quality (see Box 5). The UK Teaching Excellence and Student Outcomes Framework (TEF) draws on graduate employment destination data to measure the performance of higher education providers.[12]

Performance-based funding models or performance agreements are also used to encourage HEIs to focus on particular outcomes and financially reward them for them for performance in line with government priorities (Benneworth et al., 2011; De Boer et al., 2015). Countries using this approach include, inter alia: Finland, Hong Kong, Ireland, New Zealand, the Netherlands, and Norway. It has also been a strong feature of many US state systems (Dougherty & Reddy, 2011). However, as the OECD has noted, "performance monitoring and improvement must be carried out thoughtfully and patiently if they are not to result in unintended negative consequences" (Braun, 2013, p. 10). Global rankings are occasionally used for this purpose but their methodologies and indicators are not well aligned with national policy objectives or institutional goals. Accordingly, they can encourage perverse behaviour by institutions and academics (Hazelkorn, 2015, p. 26-90).

Assessing the impact and benefit of research on society and the economy is usually measured in terms of patents and start-up companies. However, impact is a much broader concept. Research impact can be defined as an effect on social behaviour, health benefits, culture and public discourse as well as new processes and ways of working. Ideally, research activity should involve end-users at the design phase and as part of the evaluation process (Expert Group on Assessment of University-Based Research, 2010; Harland & O'Connor, 2015). The UK Research Excellence Framework (REF) incorporates assessment of research impact, and can be considered an example of "good practice" (https://www.ref.ac.uk).

Institutional Research (IR) is the term given to collecting, analysing, reporting and warehousing quantitative and qualitative data about an institution's students, faculty, other staff, curriculum, course offerings, and learning outcomes. management and strategic decision making (Huisman, Hoekstra, & Yorke, 2015; Mathies & Välimaa, 2013; Saupe, 2005). This work also includes student and graduate tracking, and learning analytics to more fully understand student potential and those at risk of underperformance (Gaebel, Zhang, Bunescu, & Stoeber, 2018, p. 20-21). Information is also collected and reported to government.[13] While universities in only a small number of countries, notably the USA, United Kingdom and Australia, have IR capacity, developing this capacity would ensure universities can meet the challenges they and their students face (McCowan, 2014, p. 7).

Box 5 Quality Assurance for Employability

The following "tools" can be used to assess institutional and programme quality with a particular focus on skills and competences for employment:

- Course Evaluation involving graduates

- Employer Involvement in Study Programme Development and Revisions

- Employer Satisfaction Surveys

- Faculty Teaching Portfolio

- Graduate Tracking or Tracer Studies

- Labour Market/Job Market Analysis

- Learning Outcomes, including distinguishing between generic competences and job-specific knowledge

- Performance Target Agreements

- Programme Evaluation

- Statistical information relating to enrolment, quality and outcomes

- Student Competencies Assessment

- Student Satisfaction Surveys

Source: Martin, 2018a. See also discussion throughout this paper.

Box 6 Essential Skills of Postsecondary Students, Ontario, Canada

Ontario has developed a performance measurement tool aligned with the goals of the Ontario government. The instrument uses a limited set of indicators to assess equity of access, sustainability of institutions and academic quality, the three highest priorities for the postsecondary system.

The primary objective is to measure learning gain drawing on the experience of PIACC. ESO, the Education and Skills Online, is the commercial version of PIAAC and the results of both tests are comparable.

The EASI pilot is cross-sectional and voluntary, testing first- and final-year students from the same programmes in a single academic year. This design allows for aggregate-level comparisons of student skill levels at the start and conclusion of their postsecondary careers. During the data analysis phase, assessment results are linked to de-identified administrative variables provided by the institution to contextualize the EASI dataset. The EASI college pilot took place in the 2016/2017 academic year. First year college students were tested in the Fall 2016 semester and final year college students in the Winter 2017 semester.

The feasibility project was found to be an efficient measure of postsecondary student skills. EASI represents an important first step toward the measurement of learning gain — the degree to which students' skills change over the course of their programme of study — across multiple postsecondary institutions.

Source: Weingarten, Brumwell, Chatoor, & Hudak, 2018; see also Weingarten, 2018.

Box 7 Promoting Graduate Employability, Malaysia

The Ministry of Education is promoting a number of different initiatives, inter alia:

• *University-Industry-Community Engagement Framework* and best practices for internship and employability;

• Programmes to improve graduate employability conducted by the Ministry of Economic Affairs, Ministry of Human Resource and Ministry of Education;

• *Malaysia Future-Ready Curriculum* is currently being implemented taking into account the role of higher education with regard to labour market changes under the concept Higher Education 4.0.

• *Integrated Cumulative Grade Point Average* (iCGPA) initiative to increase employability through skill and competencies framework. This presents graduates with certificates that indicate academic and soft skill competencies based on employers feedback.

• The Ministry of Education has compiled a report identifying good practices with respect to the interface between HE and the labour market via the quadruple helix approach.

Source: https://adec.um.edu.my/pdf/Framing_malaysian_HE4.0.pdf ; http://icgpa.mohe.gov.my; S. K. Gill, 2009

5.1.5 Recruitment, Continuous Professional Development and Leadership Training

The quality of higher education is related to the quality of the academic profession. Ensuring faculty have a strong understanding of and/or professional or practical experience is vital in order to inform the curriculum in a way that enhances relevance for graduates. This has implications for faculty recruitment, for initial and on-going professional development, and for leadership training and development.

Some universities have procedures whereby relevant discipline-related practical or professional employment experience is a criteria for appointment. Others ensure that people working directly in relevant fields teach some components of the education programme, normally on a part-time or adjunct basis, to ensure a link between theory and practice. Appointment boards for new faculty or for promotion often comprise practitioners as well as academic peers. University governing boards regularly include stakeholders from the region or local business to strengthen ties to the economy and the labour market. These criteria may be mandated by legislation.

Having a credential in teaching and learning at the time of appointment or within a specific time-frame post-appointment is common in some countries, notably the United Kingdom and Ireland. Institutions may also offer incentives or award faculty on completion of an accredited teaching and learning programme, e.g. a permanent appointment, promotion and/or salary increase. National governments award special funding, teaching awards or scholarships to promote excellence in teaching and learning.

Initial and continuing professional development (CPD) plays an important part in preparing future faculty as well as providing support and development of good practice and innovation

in teaching and learning. This is especially important for tackling academic and researcher unpreparedness which are major challenges across Africa and Asia (Jacob, Xiong, & Ye, 2015).

Teaching and learning centres exist in many HEIs around the world (see Box 8). They provide on-going professional development training and support in innovative pedagogical methodologies, immersive learning experiences, curriculum development, use of technology and digitalisation, teaching non-traditional students, practice-based/community-engaged learning and research, assessment of work-based learning settings, etc. (Gaebel, Zhang, Bunescu, & Stoeber, 2018, p. 18-20; Sani, 2019). Programmes may lead to a certificate or Masters qualification. Academics from other institutions may be able to attend.

Despite rising numbers of women enrolling in higher education, large gender gaps continue to exist with respect to the number of women in teaching, research and leadership roles due to cultural practices, open and hidden biases and the fact that women often leave the workplace to raise children. In response, governments and HEIs have introduced positive discrimination and affirmative actions around recruitment and promotion, such as mandatory quotas, gender proofing procedures and practices, training and mentoring, scholarships and fellowships for women, establishment of women's colleges and universities, gender management systems, targeted leadership training programmes, etc. (Drake, Justrell, & Tammaro, 2002; Gender Action, 2019; Lirri, 2019; Report of the Gender Equality Taskforce, 2018; Rodland, Lilleslatten, & Zachariassen, n.d.)

Box 8 Teaching and Learning Centres, and Leadership Development Programmes

Advance HE, United Kingdom, https://www.advance-he.ac.uk
Centre for Higher Education, Learning and Teaching (CHELT), Australia National University, Australia, https://services.anu.edu.au/business-units/centre-for-higher-education-learning-teaching
Centre for Instructional Development and Distance Education (CIDDE), University of Pittsburgh, USA, http://www.ieee-iri.org/cidde_subdomain/index.html
Centre for Teaching and Learning (CTL), University of Pennsylvania, USA, https://www.ctl.upenn.edu
Centre for the Enhancement of Teaching and Learning (CETL), Hong Kong University, Hong Kong, https://www.cetl.hku.hk
Centre for the Study of Higher Education (CSHE), University of Melbourne, Australia, https://melbourne-cshe.unimelb.edu.au
Eberly Centre for Teaching Excellence and Educational Innovation, Carnegie Mellon University, USA, https://www.cmu.edu/teaching/
National Forum for the Enhancement of Teaching and Learning, Ireland, https://www.teachingandlearning.ie
Oxford Learning Institute (OLI), University of Oxford, United Kingdom, https://www.ctl.ox.ac.uk
Preparing Future Faculty Programme, USA, http://www.preparing-faculty.org

Eden Centre for Education Enhancement, London School of Economics, United Kingdom, http://www.lse.ac.uk/resources/calendar2019-2020/Eden%20Centre/EdenCentre.htm?from_serp=1

Higher Education Resources Services in South Africa (HERS-SA) http://www.hers-sa.org.za

Box 9 Promoting Gender Equity in Higher Education

Centre of Excellence for Gender Equality, Ireland

The *National Centre of Excellence for Gender Equality* was established following publication of the *National Gender Action Plan 2018-2020*. The objective is to ensure sustainable acceleration towards gender equality in Irish Higher Education Institutions and to advise the government on progress, new developments and measures which may be required in future for Ireland. The aim is to:

• Provide centralised support for the institutions, share good practice, and provide funding for innovative organisational and cultural change initiatives nationally;

• Enable joint initiatives and co-operation between HEIs;

• Develop a better understanding of the impact of interventions taken and determining the areas of future focus.

Source: https://hea.ie/policy/gender/

Athena Swan, Europe, Australia and North America

Athena Swan was established in 2005 to encourage and recognise commitment to advancing the careers of women in science, technology, engineering, maths and medicine (STEMM) employment in higher education and research. Universities receive bronze, silver and gold awards based upon their achievement of certain standards, policies and practices with respect to gender equality. In May 2015 the charter was expanded to recognise work undertaken in the arts, humanities, social sciences, business and law (AHSSBL), and in professional and support roles, and for trans-gender staff and students. The charter now recognises work undertaken to address gender equality more broadly, and not just barriers to progression that affect women. Athena Swan is operative in the UK, Ireland, Canada and Australia, and is currently being considered by the European Union.

Source: https://www.ecu.ac.uk/equality-charters/athena-swan/, Science in Australia Gender Equity (SAGE), 2016; Shen, 2019.

Higher Education Resource Services in South Africa (HERS-SA)

HERS-S is an NGO which supports and equips female academics with skills, helping them to build confidence to advance their careers. dedicated to the advancement and leadership development of women in the Higher Education sector. The programme has recently been replicated in East Africa, where it is called Higher Education Resources Services – East Africa (HERS-EA) and operates in Burundi, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania and

Uganda, providing leadership and management development training for women at higher education institutions.

Source: http://www.hers-sa.org.za

5.2 Institutional Arrangements on Higher Education (in relation to the support for graduate employment)

At the institutional level, universities and colleges are prioritising active engagement with their community and region as part of their mission statement and strategic objectives. Such actions recognise that individual actions by departments or faculty are not sufficient in themselves to close the gap between higher education and the labour market and that a more holistic and interventionist approach is necessary. There are corresponding moves to align research priorities to the SDGs and introduce criteria for faculty appointment and/or promotion which includes societal engagement and research impact criteria (see also section 5.1.4 above).[14]

Institutional initiatives seek to "re-brand" the university for the 21st century (see 5.2.1), and to embed engagement and employability as defining descriptors of the university's mission (see 5.2.2). These models recognise that universities of the future must understand the needs of society and diverse learners, and the necessity to embed real-world problem-solving and multidisciplinarity into the curriculum and learning experiences (Yeravdekar, Ghosh, & Ghosh, 2018). This requires HEIs to understand how work is changing in different sectors, the extent to which the changes reflect wider changes globally, how it impacts on the skills required by new forms of occupation and profession, and how it impacts on tertiary education and training institutions.

Ensuring higher education is relevant for the future requires foresight-thinking. There is also a practical dimension: by the time a new or revised curriculum is designed and approved, and the first cohort of students completes, graduates and finds employment, a considerable number of years will have passed. The economic climate may be quite different from that which existed at the start of the curriculum design process. This requires that the HEI has a robust process of programme development and quality assurance.

5.2.1 Civic Universities and Civic Mission

Many terms are being used to describe the university of the 21st century: entrepreneurial, civic, engaged, permeable or education 4.0 (Clark, 1998; Hannon, 2013; Stuart & Shutt, 2019; Yeravdekar et al., 2018). NESTA, the UK based innovation foundation, has promoted the concept of the "challenge-driven" university. This model puts students up against difficult problems and challenges for which there are no established answers, encouraging students to draw on many disciplines to solve them. Students are required to work in teams and collaborate with organisations outside higher education (Mulgan, Townsley, & Price, 2016).

The "civic university" urges universities to engage holistically and wholeheartedly with its community and region rather than participating in *ad hoc* or individual activities (Goddard, 2009). A civic university conveys a strong connection to place, adopting a place-based approach which builds on the economic, social, cultural and human assets and resources

available to regions and seeks to address the specific socio-economic challenges to identify and develop unique opportunities for development and growth with the explicit involvement of local communities (McCann, 2019, p. 11; Goddard, Hazelkorn, Upton, & Boland, 2018; UPP Foundation, 2019). Its objective is to "engage in learning beyond the campus walls, discovery which is useful beyond the academic community, and service that directly benefits the public" (Hazelkorn, 2010, p. 69; Hazelkorn, 2016). Whereas the university is often portrayed as operating from the supply side, the civic university operates from the demand side albeit not in a simplistic or transactional way. It is not only what a university is good at that counts but what it is good for (Brink, 2018).

Being a civic university has implications for governance and organizational arrangements as well as for teaching and learning, and research. It envisages engagement as the horizontal glue linking teaching with/to research rather than a separate "third pillar". It emphasizes a synergistic and self-reinforcing circle whereby teaching uses real-life problems and issues. Research-informed teaching is balanced by teaching-informed research; the research agenda is derived from and developed in tandem with end-users; societal impact and benefit supports social, business and technological innovation; knowledge exchange is prioritised over knowledge transfer; and community/regional partnerships include the public, private and third/NGO sectors.

Tools for managing and evaluating progress towards becoming/being an "entrepreneurial" or "civic university" are being developed. These can be a helpful methodology to support university leaders (see Box 10 and Box 11). The following organizations promote greater engagement between higher education and their community, city and region. They are primarily networking organisations but they also undertake benchmarking or peer-learning activities: Talloires Network,[15] Association of Public & Land-Grant Universities[16], Coalition of Urban Serving Universities[17], Coalition of Urban and Metropolitan Universities[18], and Campus Compact[19] - all in the US – and Campus Engage[20], in Ireland. Examples of good practice can also be found in Davey et al., 2009.

Box 10 Civic University. Newcastle University, United Kingdom

Newcastle University's origins date back to the establishment of medical training in Newcastle during the 1830s followed by the development of academic work to underpin burgeoning sectors of the local economy such as mining, shipbuilding and mechanical/electrical engineering. During this time, there was a clear sense of higher education provision responding to local demands to underpin the needs of a growing urban population and industrial enterprises. As the 20th century progressed, Newcastle like similar institutions in the industrial cities of Britain loss sight of its roots.

The university's 2000-2002 mission re-affirmed its commitment to play "a leading role in the economic, social and cultural development of the North East of England". In 2008 Newcastle University decided to re-invent itself as a "civic university" but now operating in a global as well as local context. It adopted the mission of being a *world-class civic university* with the sub-heading "Excellence with a Purpose" that consciously connected the creation and dissemination of knowledge with the societal need for knowledge. To effect this, the university created three multi-disciplinary cross-cutting societal challenge research institutes: ageing, social renewal and sustainability.

In 2018 this vision was further refined to "A world leading university advancing knowledge, providing creative solutions and solving global problems". Core strategies of "Education for life" and "research for discovery and impact" are embedded in international and local engagement strategies. The university spearheaded the Helix, a landmark 240 acre city quarter which brings together international technology, science, business, the local community and residents. The site itself is a living laboratory with projects and experiments run at scale, in real time. Infrastructure, urban planning, data, and ageing are the main research themes. The aim is to close the gap between academic research and commercial innovation (https://newcastlehelix.com). It is now co-creating a Civic University Agreement with their local stakeholders following the recommendations of the UK Civic University Commission (https://upp-foundation.org/civic-university-agreements-list-of-signatories/) .

Sources: Brink & Hogan, 2016; John Goddard, 2009; John Goddard & Vallance, 2013. See "Tools for Understanding the Civic University", Goddard et al., 2016, p. 312-320.

Box 11 Entrepreneurial University

An Entrepreneurial University is one that demonstrates innovation in everything that it does. This includes how it manages resources and builds organisational capacity; how it involves external stakeholders in the leadership and governance of the institution; how it embeds digital technology into its activities; how it creates and nurtures synergies between teaching, research and societal engagement, and how it promotes entrepreneurship through education and business start-up support as well as knowledge exchange to enhance the innovation capacity of existing firms. It also involves identifying innovative approaches to teaching and learning, identifying opportunities for internationalisation or generating activities which may need to be funded in new ways. An Entrepreneurial University helps create an entrepreneurial mindset amongst its students and all its staff and encourages and supports new ways of doing and thinking.

HE Innovate, jointly developed by the European Commission and the OECD, is a self-assessment tool for all types of HEIs. The tool aims to provide HEIs with the opportunity to reflect on their perceptions of strengths and weaknesses across eight different areas thereby helping to identify institutional development needs.

- Leadership and Governance
- Organisational Capacity: Funding, People and Incentives
- Entrepreneurial Teaching and Learning
- Preparing and Supporting Entrepreneurs
- Digital Transformation and Capability
- Knowledge Exchange and Collaboration
- The Internationalised Institution
- Measuring Impact

Sources: https://heinnovate.eu/sites/default/files/heinnovate_concept_note.pdf; Hannon, 2013

5.2.2 Institutional Approaches to Embedding Graduate Employability

Graduate attributes are described with reference to a range of characteristics (see Box 12). As a group, they encompass a set of skills, attributes, attitudes and behaviours relevant to the work place but also relevant and critical to family life, social engagement and citizenship. Graduate attributes include both technical and non-technical skills although criticism of graduates often refers to their lack of non-technical skills such as confidence and capability, and the ability to learn. Effective critical and analytic thinking, the ability to understand the difference between fact and fiction, to manage information and adjust to changing environments and demands throughout their lives are all critical competencies for the 21st century.

Box 12 Graduate Attributes

> Aspiration	> Language skills (particularly second
> Autonomy	language skills)
> Career management	> Multi-tasking
> Communication skills	> Numeracy
> Creativity	> Opportunity awareness
> Critical thinking skills	> Positive attitude
> Customer awareness	> Presentation skills
> Digital literacy	> Problem solving
> Efficiency	> Professional knowledge
> Emotional intelligence	> Research skills
> Enterprise and entrepreneurship	> Resilience
> Ethics	> Self-management
> Flexibility and adaptability	> Social intelligence
> Giving and receiving feedback	> Team-working
> Independent thinking	> Time management
> Initiative and self-direction	> Willingness (and capability) to learn
> Inter-personal skills	> Work ethic
	> Writing skills

Source: Artess, Hooley, & Mellors-Bourne, 2016

There is no common view amongst employers about future skills and competences. Typically, SMEs focus on immediate skills while larger companies and/or multi-nationals emphasize competencies having the resources to fund specific skills deficits. The latter "are very strategic in their location decisions" while SMEs "lack the same capacity" yet they are critical to regional innovation (OECD, 2013b, p. 45). The task is identifying the appropriate balance across these characteristics according to institutional mission and national/regional context.

There are two main aspects:

- Curriculum and activities that encourage generic competences (e.g. team working, analytical and critical thinking, problem solving, creativity and innovation, transversal skills, etc)

- High quality work experience or work projects to facilitate transition to the labour market (e.g. practical skills and experience, active learning, etc)

A higher education qualification is not *either* about enriching the mind *or* getting a job and a future career. It is both. It requires both. This puts the onus on all disciplines, including the humanities which may not historically considered graduate employability as a key learning outcome (Dorman & Brown, 2018).

The following issues should be considered when programmes are being developed, revised or evaluated:

- External practitioners and experts are included in programme development and on course approval panels as well as partaking in reviews as a matter of common practice;

- Practice-based learning opportunities include work-placement, students working on actual projects in their community, projects based on industry/enterprise problem-solving, etc.;

- Professional body requirements (e.g. engineering, medicine, nursing, social work, child care, etc.) are being aligned with qualification frameworks to ensure that they are built into award design and undergo appropriate means of assessment;

- Programme review strategies include consideration of employment outcomes and "employability guides" as a requirement of external and internal quality assurance;

- Promoting self-employment through idea-generation, project competition, student enterprise development through competitions, paid summer intern sessions, etc.;

- Qualification frameworks include learning outcome descriptors which aim to ensure the concept of "graduate-ness" embraces abilities to guide and direct learning and career pathways, supporting employability as well as employment;

- Shorter qualifications, professional certifications and just-in-time learning (e.g. boot-camps);

- Work-based learning, internships and in-company placements at the heart of educational programmes as a requirement for (undergraduate) students. International placements would be an additional strength;

- Research qualifications to include internships and real-life problem solving, working directing in companies as part of a masters and doctorate;

- Work-based learning initiatives for research students and for academics;

- Wrap around supports for learners outside the formal curriculum which include career supports, interview preparation, industry seminars, careers fairs, mock interview, CV clinics, etc.

Box 13 Extended Campus, Cork Institute of Technology (CIT), Ireland

> Working closely with community and enterprise partners is an important part of the mission of Cork Institute of Technology (CIT). This includes: ensuring the curriculum is relevant and current for local regional and national employers, working in partnership with industry experts to develop applied research solutions and supporting new and exploring and responding to emerging workforce reskilling and upskilling needs.

The CIT Extended Campus is a novel and unique response, embedding engagement in an integrated way across the institution. The objective is to provide a platform for sharing knowledge and enhancing opportunities for engagement with private, public and not-for profit organisations. Inter-actions are grouped into three main categories:

Graduate Formation
- Work placement
- Guest lecturers
- Work-based projects
- Sites visits
- Sponsorship
- Programmatic review
- Curriculum inputs
- Shared governance
- Employability & entrepreneurship

Workforce Development
- Recruitment
- Part-time courses
- Customised & on-site learning
- Recognition of Prior learning
- Work-based learning
- Special Purpose awards

Research & Innovation
- Consultancy
- Use of equipment & facilities
- Contract & collaborative research
- Innovation vouchers & innovation partnerships
- Licensing & patents
- Commercialisation
- Incubation supports

Continuum of Academic-Enterprise engagement

This objective is to:

- Make it easier for external organizations to engage in mutually beneficial interactions with CIT academics and researchers;

- Develop a clear view of the extent and depth of existing and desirable engagement interactions to feed into institutional strategy and decision-making;

- Stimulate more interactions and measurably support regional economic development;

- Ensure that the variety of interactions with companies are collated and built on to develop broader supportive long-term mutually beneficial partnerships;

- Support enhanced practice development by exploration of processes and sharing of good practices.

Recognition of Prior Learning (RPL) and flexible learning structures meet specific industry learning needs. These include a learning pathway linked to the National Framework of Qualifications (NFQ) which recognises the prior learning and professional development enables learners to attain an ISCED Level 6 as well as a supervisory management course incorporating work-based learning to support operators in a manufacturing environment to develop management and leadership skills.

Sources: https://extendedcampus.cit.ie; Sheridan & Linehan, 2017

5.3 Provision of/Requirements for Workplace Learning/Training in Higher Education Study Programmes (e.g. internships, research and training opportunities in industry)

Despite the increase in scale over recent decades the basic model of university education has not changed significantly. It continues to be organised around three or four year courses, lectures in lecture halls, prescribed reading lists, formal examinations, dissertations and PhDs. Although universities are full of technologies, online tools for learning remain on the margins rather than at the centre of teaching and learning. Digitalisation remains an aspiration or an activity relegated to an area of the campus rather than embedded across the entire learning process. While this situation remains in many countries and institutions, elsewhere educational provision and delivery is already being transformed.

Some new initiatives include:

- The US government has launched EQUIP (Education Quality Through Innovative Partnerships) as a pilot programme to accelerate and evaluate innovation through partnerships between colleges and universities and non-traditional providers of education.[21]

- The Irish government Springboard+ Upskilling Initiative offers free courses at certificate, degree and masters level leading to qualifications in areas where there are employment opportunities in the economy. HEIs must work closely with employers, public and NGO, to ensure content is up-to-date and fit-for-purpose.[22]

- EU is promoting the idea of "open education" – an umbrella term which goes beyond MOOCs and Open Education Resources (OER) in order to widen participation to both formal and non-formal education (Santos, Punie, & Muñoz, 2016).

Apprenticeships training is a traditional form of earn/learn programme in which students are employed in firms and attend an accredited programme often on block release basis. They have traditionally been associated with the construction or traditional industries, e.g. carpentry, electricians, plumbers, mechanics, metal working, toolmaking, butcher, etc. Programmes are designed in partnership between industry and educational providers. In Ireland, apprenticeship has been undergoing a transformation to include retail, finance, accounting, cybersecurity, logistics, etc. with qualifications offered at sub-degree, bachelor and masters levels.[23] Germany has been a pioneer in this area with a well-established "Dual System" which can be traced back to medieval times.[24] The system is evolving to eliminate some structural differentiation between vocational and academic tracks and to provide wider access for non-traditional students (Wolter & Kerst, 2015).

Innovation in teaching and learning also applies to research skills – to undergraduate students undertaking research as part of their degree and to post-graduate students. Many universities provide research opportunities for students to work on projects alongside their professor either during term-time or during the summer. This may include working on real-life projects helping firms to solve technological or service provision problems, or to understand customer responses to products or other issues. The MIT Undergraduate Research Opportunities Programme (UROP) invites undergraduates to participate in a wide range of research activities across the university.[25]

Community-based research is a similar concept. It usually involves undergraduate students working on real-life projects in the community in the same way that case-study based curriculum has been used to develop critical and analytic skills. These initiatives are vital for

helping train researchers for the future. Indeed, the absence of a pipeline of doctoral talent and post-doctoral opportunities will seriously hinder a country's ambition to create a knowledge-research-innovation eco-system and to stimulate higher levels of industrial R&D.

Industrial doctorates is a term used to describe doctoral research undertaken in companies either as full-time students or as employees of the company. It is important that such research does not cross any ethical boundaries surrounding the independence of the research and researcher (Ori, 2013).

Box 14 Olin College of Engineering, Boston, USA

Franklin W. Olin College of Engineering, Boston was founded in 1997 as a private undergraduate school with a strong emphasis on project-based learning partnering with industry. The college requires students to combine science and engineering education with business and entrepreneurship, arts, humanities and social sciences. This gives students a holistic education and a broader outlook on the relationship between engineering and other disciplines.

Olin's philosophy is that learning should be taken out of the world of academic theory and practised in context. Tasks are designed to model real-life constraints such as finance and personnel, so that students learn the skills which are required to cope in a professional environment. All students complete a year-long capstone project that gives them the opportunity to implement what has been learned in the real world. The culture that has developed amongst the Olin staff promotes continual tinkering and improvement of their teaching.

The Olin SEER Programme is a summer experience for undergraduate students in research so they can improve the overall education. focuses on collaborative, faculty-mentored research and formative activities, including a short course in educational research methods. Programme participants have found that such research experiences give them new perspectives on the field of engineering and on their own educational or teaching experiences.

http://www.olin.edu; http://www.olin.edu/collaborate/collaboratory/attend/seer/

Box 15 Professional Master's Degree, Brazil

Professional master's degree programmes are popular as an alternative to undergraduate work and professional qualification in many fields. They offer a course of study that aims to bring scientific research and professional practice together so that the individual is qualified for the job market. In addition, this enhances the competitiveness and productivity of companies and public and private organizations.

Recognized by the Brazilian Federal Agency for the Support and Evaluation of Graduate Education (Capes) in 1999, the professional master's degree has become one of the fastest-growing graduate programmes in Brazil. In the early 2000s, about 60 programmes were offered mainly in private institutions of higher learning. In recent years, growth has been exponential rising from 338 programmes in 2011 to roughly 700 in 2016.

In March 2017, the Ministry of Education (MEC) established a professional doctorate programme in the National Graduate Degree System to strengthen relations between universities and the national productive sector.

The admission process for the professional master's degree programme is similar to the academic process, with a written test, an interview, and a review of the applicant's résumé. Both are two-year programmes. In many cases students do not need to submit a research project to be accepted nor do they need to prepare a dissertation. Depending on the institution, the final work may be a literature review, article, case study, report, intervention proposal, upgrade or technological innovation project, or instruments, equipment, or prototypes that are developed, among other formats

Programmes are offered in economics, public health, administration and law, aeronautical and mechanical engineering. Approximately 82 programmes are aimed at training teachers in basic education. Public health is also popular with 39 programmes helping to train people to work with health issues for different population groups.

Source: Andrade, 2017

Box 16 Earn and Learn Programmes, Singapore

The SkillsFuture Work-Study Post-Diploma, formally known as the SkillsFuture Earn and Learn Programme, is a work-learn study programme that gives recent graduates from polytechnics a head-start in careers related to their discipline of study. It provides them with more opportunities, after graduation, to build on the skills and knowledge they acquired in school, and better supports their transition into the workforce.

Participating employers can recruit local fresh talent, within three years of graduation or the Operational Ready Date for National Servicemen and prepare them to take up suitable job roles. Participants in the programme can look forward to a structured career progression pathway within the organisation.

This programme is designed in collaboration with industry to ensure relevance to employers and the growth of the sector. Since 2015, the SkillsFuture Work-Study Post-Diploma has been introduced in many sectors, including Aerospace, Biomedical Sciences, Food Services, Games Development, Healthcare, Hotel, Infocomm Technology and Retail.

The SkillsFuture Work-Study Post-Diploma Programmes lead to Advanced Diplomas, Specialist Diplomas and Singapore Workforce Skills Qualifications (WSQ) Specialist Diplomas awarded by the polytechnics and locally based institutions.

https://www.skillsfuture.sg/wspostdip

Box 17 Master's Degree in Automotive Engineering, Romania

Renault Romania collaborates with universities to offer education programmes (MAs), as follows:

- with the Politehnica University of Bucharest – the Master Programme "Engineering and Project Management" in the field of university studies "Engineering and Management";

- with the "Gheorghe Asachi" Technical University of Iasi – the master's programme "Concept and Management of Automotive Design";

- with the University of Craiova – the master's programme "Electromechanical Systems Complex";

- with the University of Pitesti – the master's programme "Concept and Management of Vehicle Design".

Programmes last for 2 years and are addressed to graduates of technical higher education: undergraduate studies (4 years, day) or long-term university studies (5 years, day). Throughout the master programmes, students develop professional skills such as working with specialists from other fields, teamwork, communication skills and the use of foreign languages in a professional context.

Programmes are characterised by a mix of theoretical courses and practical projects in the engineering field, and management of innovative product or service projects. Project pedagogy, adaptation to current employers' requirements, and partnership with the only automotive engineering centre in the region provide unique career perspectives.

For the entire duration of the Master's degree, the Renault Romania Group is involved providing scholarships, specialized presentations and internships. The last semester is devoted entirely to internship activities since these programmes aim to bring the participants closer to the practical reality of developing projects in the field of car manufacturing. The best-known outcome of this internship is the Duster Mobile Office.

Source: https://procsee.eu/good-practice/masters-degree-in-automotive-engineering/

5.3.1   Graduate Tracking

Emphasis on learning outcomes and employability has increased attention on what graduates are doing and how they are using their qualifications to the fullest extent possible. Students are themselves conscious of the employment record of fellow graduates. Graduate tracking or tracer studies along with employer surveys are common components of internal quality assurance (Martin, 2018a, p. 88-89). Different types of instruments are being developed (for an overview see: Gaebel, Hauschildt, Mühleck, & Smidt, 2012).

Many graduate assessment schemes have relied on post-graduation surveys often called first destination surveys. These systems rely on departmental or programme data to contact students after graduation often simply recording whether the graduate is employed/non-employed or pursing additional education and training. They ask graduates, often 6-9 months post-graduation, about their current status: in employment, in further

education/training, unemployed. In some instances, governments have sought to link funding/resourcing to employability outcomes (Estermann et al., 2013; J. Gill, 2008; Smith, McKnight, & Naylor, 2000; Tysome & Goddard, 1999) Global and national rankings may include some data on employability although the weightings differ (Morse, 1995, p. 93; see also QS Graduate Employability Rankings[26], Times Higher Education Global Employability Ranking[27]).

Today, sophisticated information about graduates is available at both institutional and system level. Countries are beginning to integrate student data with social security or labour market data, often including data from the school sector. Technical possibilities, data management and big data have opened up opportunities for greater use of data analytics and system integration. Initiatives include:

- The EU is currently developing a pilot version of EUROGRADUATE to capture information about the impact that student experiences have had on graduates' professional lives and their lives as European citizens.[28]

- The UK is developing LEO – Longitudinal Education Outcomes. It links tax data, social services benefits data and student loans data to better understand how graduates perform. The data will be available on a public database, and aims to provide information by institution, programme/subject and graduate characteristics (Morris, 2017; Department for Education, 2018).

- The USA has developed the College ScoreCard as an online tool to compare the cost and value of higher education; it displays data in five areas: cost, graduate rate, employment rate, average amount borrow, and loan default rate.[29]

- Australia has developed the *Graduate Outcomes Survey*,[30] the Catalan (Spain) government has developed WInddat[31] and the Russian Ministry of Education and Science government has developed an on-line tool to monitor student outcomes and employability.[32]

- The European University Association has identified some "shared approaches" where individual institutions participate in a centrally designed initiative/process (regarding method, schedule, etc.), usually initiated by a national body, occasionally as a joint initiative of a network of universities, or with a research institution. Data is collected via standardised questionnaires, which provide room for individual institutions to add specific questions. Institutions often complement tracking with other measures such as interviews, focus group meetings, student feedback sheets, etc. For graduate tracking, developing relationships with alumni can be useful (Gaebel et al., 2012).

Capturing, measuring and comparing graduate employment outcomes can be problematic for various reasons inter alia[33]:

- Graduate surveys are unable to distinguish between employment on "graduate-level jobs or under-employed" (Dill & Soo, 2005, p. 509). Many capable graduates often take a gap year before pursuing employment or further study or they may take any job initially in order to pay off debts.

- There can be "important differences by subject, class of degree, gender, background and institution attended in terms of early career trajectories" (Carnevale, Cheah, & Van Der Werf, 2015; Smith et al., 2000).

- Context is extremely important. Graduate outcomes may relate to factors beyond the direct influence of the HEI. These are, for instance, external factors such as the absorptive capacity or otherwise of the local labour market of new staff and particularly of new graduates with different skill sets (Orr & Usher, 2018). For example, labour market success is highly correlated with student pre-entry or social-capital characteristics and university attended (Britton, Dearden, Shephard, & Vignoles, 2016; Britton, Shephard, Vignoles, & Dearden, 2016; Weismann, 2012).

- Women tend to earn less then male colleagues, regardless of educational level. Thus, universities and especially countries with higher proportions of females are likely to do less well.

- Finally, there is no common understanding of student completion internationally. Different countries use different definitions for completion, time-to-degree, and retention or drop-out (Vossensteyn et al., 2015). This is not a problem for national data but it is a problem if the intention is to compare internationally.

Despite these difficulties, capturing student learning outcomes and graduate data this is a strategically important issue for policy and institutional decision-making.

Box 18 Labour Market Needs and Graduate Competence, Thailand

In Thailand there are examples of severe shortage of technical skills, mismatch between graduate skills and what the labour market needs. To gauge the extent to which higher education is "supply-driven" vs. "demand driven" an instrument was developed to help measure employer perceptions of graduates. The specific focus of this exercise was engineering education.

A questionnaire was devised to measure employers' expectations and perceptions of graduate competences covering four aspects:

HUMANWARE: Being skilful and intellectual to live in a knowledge-based society properly, and able to work in a society with diversities.

ORGAWARE: Being skilful and competent in regard to organizational management for the development and efficient success of work.

INFOWARE: Being able to communicate, collect information/data, search for information to enhance knowledge and to support work ability as well as other abilities.

TECNOWARE: Possessing skills relating to profession and expertise in the subjected field and duties.

Recommended actions to improve employability include the following:

- Cooperative and work-integrated education (CWIE) or Vocational Education and Training (VET) approaches are very effective;

- Comprehensive career development system should be included beginning in year one and continue throughout student life to real life;

- Promote student self-assessment and learning through self-assessment;

- Build an organizational culture based around partnership between support staff and students;

- Ensure employers and students understand that work-integrated learning standards are crucial and having a strategic value for successful careers.

Khampirat & Pop, 2017

5.4 Preparation of Graduates to Enter the Labour Market (in terms of their knowledge, skills and competences) at the level of their qualification

A QF is a formalized structure used to aid the development, classification and recognition of skills, knowledge and competencies along a continuum of agreed levels in which descriptors and qualifications illustrate the learning outcomes at each study level. This enables educators and providers to develop, assess and improve programmes and enables students, employers and others to understand how one programme and qualification corresponds with another. It supports progression from one programme to the next and between institutions. Furthermore, it aids mobility for study and/or for employment by enabling cross-border comparability of qualifications. While QF might be considered a tool of government, government agencies or institutions, the framework has noticeably become part of the common language used and understood by students and employers in many countries. Indeed, the QF image can sometimes be found displayed outside classrooms and laboratories.

The interrelationship between competences and learning outcomes was embedded within qualifications framework thinking from the beginning. UNESCO has been a forerunner in this space establishing the International Standard Classification of Education (ISCED) framework in 1976, and subsequently identifying appropriate indicators (Martin & Sauvageot, 2011). Following regional meetings (UNESCO, 2019), UNESCO Member States adopted the first United Nations convention on higher education on 25 November 2019, when the plenary of the 40th session of the General Conference endorsed the *Global Convention on Recognition of Qualifications concerning Higher Education*. In line with the Education 2030 Agenda, the new convention establishes universal principles for recognition of studies and degrees which will improve mobility for the more than 220 million students enrolled in higher education worldwide, and enhance international cooperation.[34]

QF were initially typical of Anglophone countries, and across Europe. They have now been adopted by non-English-speaking and developing countries, and internationally (Bjørnåvold et al., 2017; Burke et al., 2009). The formation of regional labour markets has created an added impetus for countries to establish mechanisms for mutual recognition of national qualifications based on comparability and compatibility (e.g. EU, CARICOM, SADC). QF Initiatives elsewhere at an earlier stage of development, e.g. the ASEAN Qualifications Reference Framework (AQRF) Task Force in Asia, the African Quality Assurance Network (AfriQAN), South America's MercoSur-Educativo, the Latin America and the Caribbean (LAC) Higher Education Common Area, and the Addis Convention (Revised Convention on the Recognition of Studies, Certificates, Diplomas, Degrees and Other Academic Qualifications in Higher Education in African States. North America and East Asia have not adopted QF (Adelman, 2009; Adelman, Ewell, Gaston, & Schneider, 2011).

Qualification frameworks primarily recognise formal learning rather than informal or non-formal learning. The increasing importance of widening participation, changes in the labour market and global mobility is inspiring change in how learning is recognised. New forms of credentialing, such as micro-credentials and badging, are usually offered by industry-providers. They provide a complementary skills profile in circumstances where their value to the individual and the workplace can be quality assured and where they are not narrowly focused on a particular industrial subsector (OECD, 2014b, p. 78). Their popularity could be viewed as an challenge to the existing educational system.

Governments are pursuing different initiatives. ASEAN countries have competency certification systems which in some circumstances have predated national qualification systems; they generally focus on lower to middle level skills but may also relate to higher skills (ASEAN, 2016, p. 16). The Singapore government has introduced the Workforce Skills Qualifications (WSQ) as a national credentialing system to facilitate transition from the traditional pre-employment (PET) sector towards the continuing education and training (CET) sector. The WSQ qualifications have six levels: (1) Certificate, (2) Higher Certificate), (3) Advanced Certificate, (4) Diploma, (5) Specialist Diploma, (6) Graduate Diploma or Graduate Certificate (Ramos & Gopinathan, 2016).

An EU project examined the benefits of including non-formal and informal learning in order to recognise a wider range of study modes and experiences. This would provide an important aid to learners who may be outside the formal education system due to access or family circumstances or adult learners who are participating in life-long learning opportunities. It would also help formalise competency-based learning (Dębowski, Sławiński, Walicka, Poczmańska, & Przybylska, 2018).

Career guidance is an important component of the process helping students identify the best programme for them and the appropriate learning pathway. While the information about study options may be available, most of it is publicity by the education provider. This can make it extremely difficult for students and parents to obtain good career advice and to understand future employment opportunities especially for students who are first-in-family to attend higher education. This is some of the rationale for government public information sites showcasing the employability outcomes of different programmes and universities.

Box 19 Strategic Focus on Employability, University of Pretoria, South Africa

Graduate employability is a strategic focus area of the University of Pretoria (UP). Specific strategic actions to improve employment rates of graduates include:

- Work-Readiness and Entrepreneurship Project to enhance students' chances of self-actualisation and success beyond graduation. The programme focuses on skills training, comprehensive student support to prepare for the world of work, internships and regular contact events with employers.

- Incorporation of work-related skills and activities across all faculties, academic disciplines and other relevant areas. As part of the academic curricula, students are exposed to the critical work skills required in the work place. Community Engagement modules also form part of the formal academic programmes to

provide opportunities for workplace learning. This happens in and out of the classroom.

- Close relationships with local and international employers through, e.g. industry networks, faculty advisory boards and alumni platforms. Employers participate in activities on campus such as specialist lectures, industry related research projects, and real world case studies through which students are exposed to world of work. Through these relationships, collaborative exchanges of knowledge and experiences between the world of work and the University are made possible.

- Development of entrepreneurship skills for students. There are various entrepreneurship initiatives on campus and a new Centre for Entrepreneurship is planned for the near future. A unique on-line entrepreneurship programme is also available to students to encourage entrepreneurial initiatives and equip them with the necessary skills to start up their own businesses.

- Career Services is a specialised unit on campus that provides support to students to enhance their employability. Typical services include career planning, skills training, workshops, one-on-one advising, specialist lectures, career fairs, job opportunities and exposing students to various potential employers.

- Develop soft skills required by employers over and above formal academic qualification utilising unique free on-line skills training programs. There are four packages:

  - Package 1: Career Planning: modules that will help plan a successful career and enhance job satisfaction: help choose a career, create a career plan, select potential employers most beneficial to overall career goals, engage in activities to enhance CV, and learn the basics of entering the workplace and/or corporate world.

  - Package 2: Job Preparation: modules that will assist looking for job opportunities and best preparing to land the job and excel at it.

  - Package 3: Workplace Skills: modules that will help navigate the workplace and ensure that graduate excels as an employee and offer the best to employer. General skills apply to anyone in any job.

  - Package 4: Personal Development: provides skills that will prove useful as a person, even when you're not at work, though they will also prove essential in the workplace as graduate deals with stress, connect with different kind of people.

Students are encouraged to start planning their careers from their first year in order to build substantial CVs in preparation for their entry into the workplace. These courses are certified and can be added to enhance their formal qualifications.

- "Work Readiness programme" engages in marketing campaigns annually to create awareness amongst students and staff about the importance of preparing for the world of work. These campaigns are very successful as the number of students that make use of the career services and online programmes gave increased notably over the last two years.

To monitor progress of work readiness initiatives, regular graduate and employer surveys are conducted. The main objective of the employer survey is to assess employers' perceptions of the work-readiness capabilities of University of Pretoria (UP) graduates entering the labour market. The primary goal of the graduate destination survey is to establish the employment status of UP's graduates The study also investigates the actual employability skills attained and desired by the graduates. The results are used to improve the current programs and to ensure that graduates meet the requirement with employer and industry needs for work skills. It also assists Faculties to align academic curricula to enhance the development of key work related capabilities that can be embedded in the curricula of the various courses.

Source: https://www.up.ac.za/career-services

Box 20 Career Development Centre, Pontificia Universidad Católica de Chile

Pontificia Universidad Católica de Chile established the Centro de Desarrollo Professional (CDP), a career service, in 2006. The focus is on preparation for job placement, career development and guidance. It is linked to other student support services to create integrated services from entry to completion of studies.

The career service promotes employability as the development of skills, abilities and attributes for transition to work. The service, offered to undergraduate and graduate students, includes mentoring, workshops, resume correction services and job interview simulation as well as specialized support to the faculties to promote the integration of career development and guidance in the overall student experience.

Interventions are evidence-based drawing on educational psychology, specifically career education and career counselling. The team comprises professionals with backgrounds in psychology. The staff has developed competencies and specialisation, and consolidated themselves as a national reference point frequently consulted by other universities in the country to learn about their practices, projects, challenges and lessons learned.

Career services are part of a highly specialized growing development in Chilean universities. Their development is associated with quality assurance and higher education policy reforms, including the introduction of graduates surveys.

Source: Orellana, N. & Cuneo, I. (s/f). Empleo y trabajo de graduados: especialización de ámbitos de la gestión universitaria, el caso de los servicios de carrera en Chile. Revista de Educación de las Américas. [In evaluation]

Box 21 Educational and Learner Pathways

There is growing recognition of the necessity to increase the percentage of students with higher education qualifications for the workforce and to support social inclusion.

Educational Pathways are designed to i) align educational outcomes with national economic priorities, ii) increase the efficiency of education systems, and help students move between different types of qualifications and different occupational sectors thus reducing the time and costs to them and to governments, and iii) support equity and

promote social inclusion. Many countries have set targets to achieve these goals, and educational pathways are intrinsic to achieving them.

There are several aspects to achieving this:

National Qualifications Frameworks help to differentiate between different learning and qualifications levels, and thus provide the basis for access and movement between education and work over the course of one's life. This facilitates mobility at the system level between different institutions.

Credit Transfer Systems enable students to accumulate credits to facilitate mobility between different study programmes, institutions and over time to fit in with change life circumstances.

Guided Learning Pathways involves mapping out highly structured, educationally coherent programme pathways for students to follow by starting with their chosen career , and then consulting with education providers and with employers to ensure that the learning outcomes of their programmes are clearly aligned with the requirements for success in further education and careers. Programme maps are developed to improve access and mobility across programmes not just courses. Student progression is closely monitoring giving frequent feedback and support to help keep them on track. These models could be adapted at the system level facilitating students to advance through VET/TVET and higher education systems.

Miami Dade Community College, USA, is a good example of how one institution has implemented guided learning pathways. The initiative was undertaken when the college realised it offered too many course and programmes choices and students were failing to complete. They did not understand programme requirements, and needed help developing academic and career goals.

Sources: Bailey, Jaggars, & Jenkins, 2015a; Bailey, Jaggars, & Jenkin, 2015b; Cedefop, n.d.

5.5 Effective Models/Best Practices of Partnerships Between HEIs and Industry in Research, Education and Training at HEIs

Traditional styles of class-room teaching whereby the students are passive recipients of learning from the teacher/lecturer who is regarded as a "sage on the stage" are rapidly being replaced by the engaged learner with the teacher as a "guide on the side". Today students actively research, discuss, create projects and use technology to make discoveries. Students work collaboratively with peers to solve problems, study abroad, engage in service learning, undertake research with a faculty member and form learning communities. Students are active participants in the learning process.

As far back as the 1930s, studies focused on defining the key characteristics which aid student learning in the realization that factors other than student entry scores or the budget have an impact on student development and outcomes. Initially, attention focused on the amount of time spent on the task and the quality of the effort. More recently attention has turned to the impact of the college experience on learning development and student engagement.

International research points to the quality of the learning environment as being the predominant factor in student achievement (Chickering & Gamson, 1987; Kuh, 2003; Pace, 1982).

The principles of practice-based learning and learning-while-doing combines the principles of active learning with practical/work experience: work-integrated learning, work-based learning, workplace learning, work placement, sandwich courses, internship and apprenticeship. Research also suggests that paid off-campus work in which students often engage to earn money could be a positive contributor to career readiness (Coates, 2015).

Variations between different initiatives depends upon institutional type, period of time involved or credits granted, whether it is voluntary or compulsory, type of assessment and whether the activity is embedded in the education programme or takes places over the summer or as a separate term or after graduation. The overall aim is similar: to provide a blended learning experience which combines academic and work-related activities which can meet different learner requirements. See list below (in alphabetical order):

- Alignment of curriculum with specific career expectations and competencies;

- Apprenticeship, traditionally for technical/technology programmes but now for a wider range of occupations and inclusive of masters degrees;

- Employers' subsidiaries to support work-based learning opportunities

- Entrepreneurship education and training;

- Graduate Job training programme (government or private);

- Internship programmes embedded in the curriculum and for which credit towards qualification is awarded;

- Practice-based learning for those who are in education;

- Project work, and clinical and fieldwork based on real-life projects from the community or industry;

- Regional Skills Partnerships which bring together educational institutions and employers to promote greater cooperation and provide more robust labour market information[35];

- Student research experience working alongside active researchers in the laboratory or in the company as part of a summer programme or embedded within the curriculum;

- Work-based initiatives do not only involve STEM programmes; for example the arts and humanities can engage with the creative and cultural industries (tourism, museums, etc.) and social science programmes can work with health or housing initiatives.

- Work-based learning for employees or self-employed to acquire, or support the acquisition of, accredited learning either as part of their initial qualification or as part of re-skilling/up-skilling;

- Work-based up-skilling/re-skilling those who may be unemployed or seeking to return to employment after illness, child-care or family responsibilities or other reasons.

- Work-placement, involving a learning activity where students spend a limited period in a business, a school, a hospital etc.

Additional examples involving professional higher education from south and eastern Europe can be found at https://procsee.eu/best-practices/

Box 22 Demola – International Innovation Challenge Platform, Finland

Demola began as a collaboration between the University of Tampere, Tampere University of Technology, Tampere University of Applied Sciences, and local and regional authorities, and firms. It is an innovative way to connect people and activities employing a user-led approach to designing services and products with private and public partners.

This open innovation model aims to provide students with an opportunity to work on a project with a multidisciplinary team to solve real-life cases together with partner companies as part of their degree programme. For companies, Demola offers the opportunity to involve talented student teams in solving real-life problems without any costs. Upon completion, participants are granted a Demola certificate.

The core idea is to generate prototypes and demonstrations drawing upon problems and challenges that private firms, but also public sector and third sector organisations, typically present, and multidisciplinary student teams work on to find solutions. The student team owns the intellectual property rights (IPR) generated in the project. They may create a start-up of their own or the partner organisation may acquire a license from students.

In Tampere, partners range from: (a) corporate giants such as Intel, ABB, YIT, Metso, Konecranes, and Nokian Tyres, (b) to local and national government, (c) to the National Broadcasting Company of Finland (YLE) and other media companies, and (d) to third sector organisations. Projects include, e.g. usage of the smart phones in crane maintenance and related services (for KoneCranes), designing a novel format for the Broadcasting Company of Finland (YLE) that would be of interest to people aged 20 to 30, and finding novel ways to use the extensive data, archived in the National Library of Finland, in basic education.

Demola is now an international innovation challenge platform operating in 17 countries and involving over 50 universities and 750,000 students: Finland, Sweden, Denmark, Norway, Spain, France, Lithuania, Latvia, Hungary, Portugal, Mexico, Namibia, South Africa, Slovenia, Japan, China and Nepal.

Source: Sotarauta, 2016, p. 127-130; https://www.demola.net

Box 23 Municipal Institute of Learning, Durban, South Africa

Durban, a developing coastal city located on the eastern seaboard of Southern Africa, is serviced by eThekwini Municipality. Durban faces combined challenges of entrenched apartheid planning infrastructure, social and economic transformation, rapid urbanisation and a range of development issues. To respond to these issues, the eThekwini Municipality has invested in developing strategic relations with local academic partners. Collaboration was based on the realisation that relevant knowledge generation to support evidence-

based policymaking is best achieved in partnership with local research-based organisations and Institutions of higher education.

The Municipal Institute of Learning (MILE) was established in 2009 as a government-driven practitioner-based Institute of Learning. There are four learning "pillars": Capacity Building; Strategic Partnerships and Networks; Collaborative Research; and Municipal Technical Support. The objective is to help enhance the capacity of professionals working in local government on the continent (and beyond), to respond more effectively to meeting the continuum of developmental local government challenges – from getting the basics right, to effectively dealing with contemporary global challenges such as climate change. It uses blended learning interventions in shared platforms to enhance their capacity and achieve the desired outcomes of municipal service delivery. The four programmes are underpinned by an integrated knowledge management system.

The partnership is yielding positive outcomes in the areas of environmental management. The Durban Research Action Partnership (D'RAP) is a collaboration between the city of Durban and the University of Kwazulu Natal formalised in 2015 to advance transdisciplinary research and manage knowledge in biodiversity conservation – within the context of global environmental change. This framework is already delivering on a range of evidence -based research outputs (drawing from the humanities, sciences, governance and finance), producing a cohort of post graduates to help the city's departments, providing much needed knowledge to assist the city make critical biodiversity and conservation decisions.

Source: Pillay, 2019; www.mile.org.za

Box 24 National Survey of Student Engagement (NSSE)

The National Survey of Student Engagement (NSSE) measures student learning. It has two key features: 1) the amount of time and effort students put into their students, and the educationally purposefulness of the activities, and 2) how the institution deploys its resources and organises its curriculum and other learning opportunities to get students to participate in activities linked to student learning. In other words, it's not simply a question of resources, time/class contact hours, or the reputation or research output of the faculty but rather the quality of the learning experience (Kuh, 2009; McCormick & Kinzie, 2014). Research shows that students who are actively engaged in their learning are more likely to be innovative and better prepared for the future.

Launched in 2000 and substantially updated in 2013, it uses eight different indicators: faculty/student contact, cooperation among students, active learning/time on task, prompt feedback, high expectations, quality of teaching, influential interactions with other students, and supportive campus environment. Information for NSSE is collected through a survey administered annually, on a voluntary basis, to two-year and four-year colleges and universities in the US. NSSE results are used privately as a developmental tool by the institution.

Variations of the survey are used in Australia, Canada, China, Ireland, New Zealand, South Africa, Japan, Korea and Mexico.

Source: http://nsse.indiana.edu; Coates & McCormick, 2014.

5.6 Provision of Entrepreneurship and Business Start-Up Support by HEIs

Entrepreneurship education is aimed at helping students to be more creative, innovative, proactive and risk-taking. It emphasizes acting responsibly and ethically (Europa, 2013). It helps prepare students for opportunities as future employers, employees or as self-employed because graduates often fluctuate between these different roles. It highlights the importance of "intrapreneurs" as well as "entrepreneurs", in other words being innovative *within* public institutions as well as in the private companies (OECD & HE Innovate, 2017). It is not just about how to run a business – with or without a commercial objective. It is embedded in programmes at undergraduate and post-graduate level (Byun et al., 2018).

Many universities are developing dedicated open-spaces where students can work together to develop new products or services. Activities may be a formal or informal part of the curriculum or facilitated projects related to university-company collaborations. Competitions are a regular feature with universities and governments providing workspaces and grants. Students are regularly encouraged to "pitch" ideas to investors with the objective of facilitating student "start-up" companies. The number of start-ups is often cited as an indicator of university performance and can be an attractive factor for students considering where to study. Sometimes this is done in a fun way, e.g. this example from the University of Oulu, Finland involves students pitching their ideas while standing in the cold Arctic waters![36]

Universities have technology transfer offices (TTO) to aid researchers identify and license their intellectual property and find suitable business or financial partners to help translate their idea in company formation. Student researchers are encouraged to do likewise.

The quality of entrepreneurship education varies across countries and institutions. It should "better respond to multiple disadvantages faced by the target groups [e.g. women and other excluded groups of people], notably by offering flexible packages of support, boosting financial literacy, increasing the provision of coaching and mentoring, and increasing the diversity among those who run programmes" (OECD & European Union, 2019, p. 29). And, because teachers and educators are critical to the process, they should have the opportunity to acquire the knowledge, skills and attitudes required to include entrepreneurship education and enable entrepreneurial learning, and for continuous professional development to ensure relevance.

Box 25 "Factories", Aalto University, Finland

Aalto University was founded in 2010 with a special national mission to contribute widely to Finnish society – to be a driver of the national innovation system and increase internationalisation and competitiveness. The university was a merger of three universities.

Degree programmes were reformed to match future needs in terms of expertise and innovativeness. Particular emphasis was given to cross-disciplinary thinking, collaborative skills and entrepreneurial mind-set. Aalto University is recognized as a highly entrepreneurial and innovative University that extensively collaborates with industry and the public sector. There are three main aspects of this collaboration:

- Factories, Hubs and Labs are physical places where multidisciplinary work occurs;

- Programmes involve systematic study, research or innovation activities that apply a particular method or process that fosters multidisciplinary work.

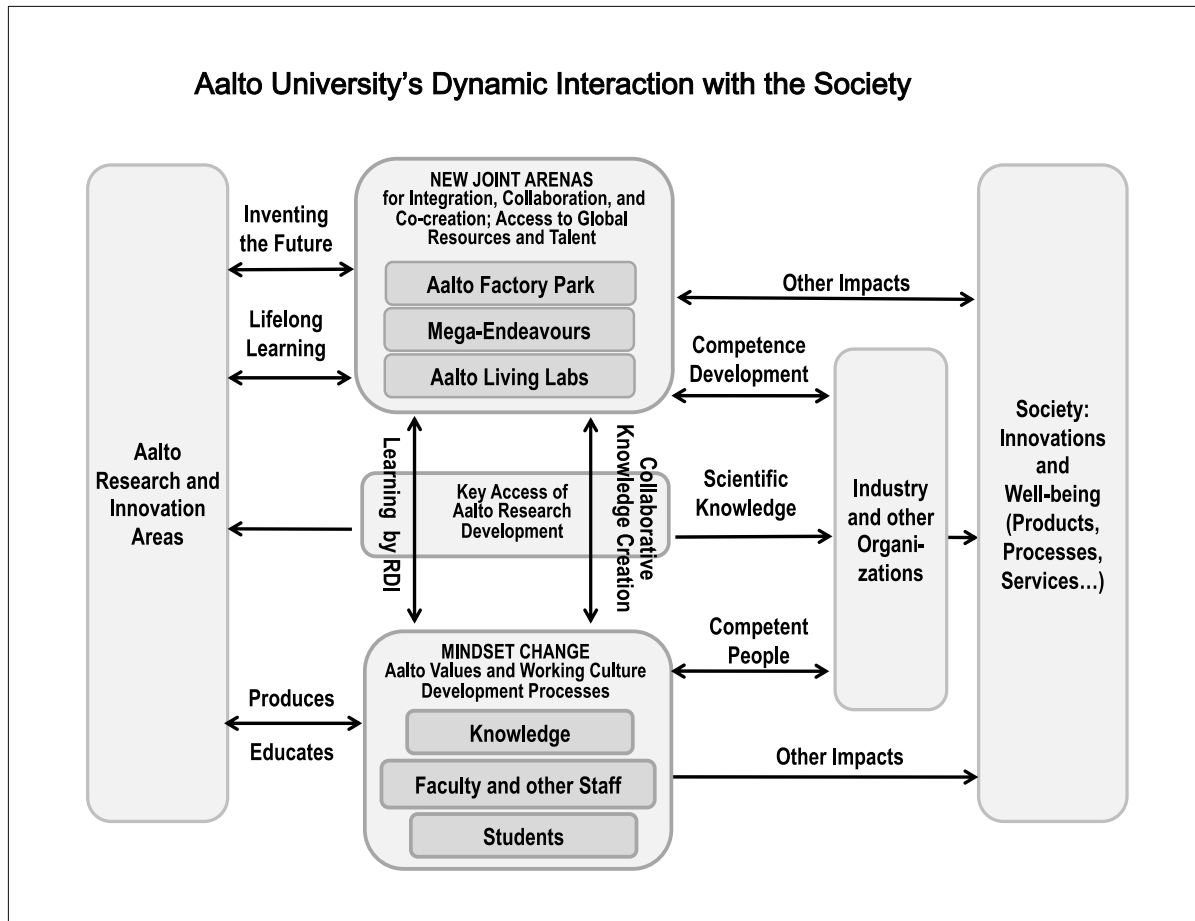- Platforms are large scale research, education and innovation activities focusing on grand challenges.

The main characteristics of Aalto Factories are as follows:

- Encourage an open and creative mind-set through multidisciplinary attitudes and innovative working processes.

- Attractive open-innovation platforms for a network-centric working culture, combining academic rigor and practical relevance. Factories are mental, physical and virtual spaces for collaborative value creation through learning by research, development and innovation RDI.

- Compose and maintain Aalto's knowledge assets related to their respective thematic areas. Factories echo and reflect the foresight-based landscape and eco-system of their thematic areas.

- Research and develop methods and practices, which are needed in the science-society dialogue as a part of the national innovation eco-system and Aalto in-house development.

The Design Factory, Service Factory and Media Factory were established in 2009; the Health Factory was launched in 2013.

The Design Factory Global Network (DFGN) operates in universities and research organisations on five continents: Europe, Asia, , North America and South America. http://dfgn.org

Source: Raevaara, Laukkanen, Markkula, & Ahonen, 2016; https://designfactory.aalto.fi

Aalto University's Dynamic Interaction with the Society

Box 26 Gengdan Institute of Beijing University of Technology, China

Gengdan Institute of Beijing University of Technology (BGD) was founded in 2005 . Degree programmes are offered in: Engineering/Architecture, Information Technology, Business, Art & Design and Humanities.

The *BGD Strategic Plan for 2016-2020* set the goal of ensuring that "students understand the methodology and basic abilities needed for employment or entrepreneurship". It also sought to strengthen the practice of teachers interacting with enterprises and implement a scheme of teachers doing projects in enterprises. The plan included a goal of recruiting 70 teachers from industry; this would enable it to achieve a target of more than 40% of teachers of professional modules who would have industry experience. It was also planned that 1 or 2 professional teachers would work in industry each semester for half a year. And teachers were encouraged to take qualification examinations of professional associations.

BGD has set itself the mission of becoming the university of choice for industry. To accomplish this goal, it has taken the following initiatives:

- All programmes have two external examiners, one an academic and one from industry, who report on standards every year;

- Students on all programmes must undertake placements/internships in industry at three different stages of their programme, usually at the end of year 2 (for four

weeks), at the end of year 3 (for four weeks) and during year 4 (for at least eight weeks);

- Each programme has a Programme Development Committee which consists of teachers and industry representatives; the committee recommends changes to programmes;

- The quality assurance system requires that each programme must be evaluated and re-approved every five years by a panel which includes two industry people;

- Final year students must complete a project/dissertation on a topic relevant to their programme; many topics are suggested by industrialists;

- Industry representative serve on each panel which evaluates the final year projects.

Several companies currently operate on the campus. PP Tech involves 7 teachers and students while an Industrial Design company is open to students. In the Academy of Design there is an Interior Design company which has offices on the campus since 2016 and two staff members who will guide students to complete projects. Tezuka, a Japanese company has an animation studio on campus which supplies two teachers for the Animation degree. The studio has been commissioned by Beijing Broadcasting Bureau to produce 30 episodes about a Chinese hero and this project will last for three years. And finally, there is a Games Studio established in 2017 which provides one teacher for programmes in that area. While the scale of these campus companies is small as yet, they indicate the intention of BGD to cooperate with industry at several levels.

In 2019, BGD joined the Shunde Innovation Research Centre in Guangdong Province, Southern China. This state-owned facility houses 268 design companies employing 8345 designers. BGD sends staff members and students to participate in industry-controlled units developing new products. Final year students can now participate in a research project at Shunde. Students of four BGD degree programmes (Product Design, Industrial Design, Electronic Engineering and The Internet of Things Engineering) will avail of the Shunde facility in 2019/20 and be involved projects that reflect current industry practice in new product development. Midea Group, a top 500 company is one of the companies in Shunde offering places to BGD students. Many top universities in China have joined Shunde, including Tsinghua and Zhejiang universities.

Source: http://www.gengdan.cn/en/

Box 27 GIS Technology Transfer Centre, Technical University of Sofia, Bulgaria

The GIS Transfer Centre is one of the pioneer organisations of technology transfer and research commercialisation that have been set up in Bulgaria. The main objective behind this successful initiative is to set up a network of transfer centres in Bulgaria. These centres are focused on transferring research output from universities, laboratories, institutes and various research teams to all interested partners. Support provided by GIS and other centres is concentrated on all aspects: financial, juridical, educational and those concerning IP and management.

The main objective of GIS activities is to build an organisational and information infrastructure that allows effective management of projects of technology transfer. The offer of support is dedicated to partners from different professional, technological and scientific fields.

GIS cooperates with national bodies including ASME (Agency for Small and Medium Enterprises) and Bulgarian Association of Agencies for Regional Development and Business Centres (BARDA). This cooperation covers activities leading to the development of national and international technological transfer services.

Other activities include the running of post-graduate studies, organisation of teaching courses, training activities focused on specialists and managers from all fields (especially hi- tech specialists) and elaboration of expertise and evaluation reports.

Success until now has been driven by proactive networking of business together with transfer centres, universities, laboratories, institutes and various research teams to all interested partners. The variety of programmes offered involving business and university personnel has contributed to its success.

Source: Davey et al., 2009, p. 76-79;   https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/organisation/gis-transfer-centre-–-bulgarian-academy-sciences

Box 28 University-Community-Engagement Toolkit, Universiti Sains Malaysia *(USM)*

University Sains Malaysia has developed a Community Engagement (CE) toolkit which provides guidelines for a CE project to achieve sustainable development goals across a broad spectrum using local innovations and creative problem-solving approaches. It employs the quadruple helix concept, CE projects involve the university, industry, community and a government agency to collaborate and share ideas in ensuring the success and significant impact of CE projects.

The toolkit shares the best practices of past CE projects which consist of comprehensive guidance and resources in designing impactful and sustainable projects. This toolkit can be customized and innovatively applied to address specific issues and/or developments in the targeted community.

The diagram below illustrates the CE Implementation Framework which is used to develop any community engagement programme.

Source: https://www.usm.my
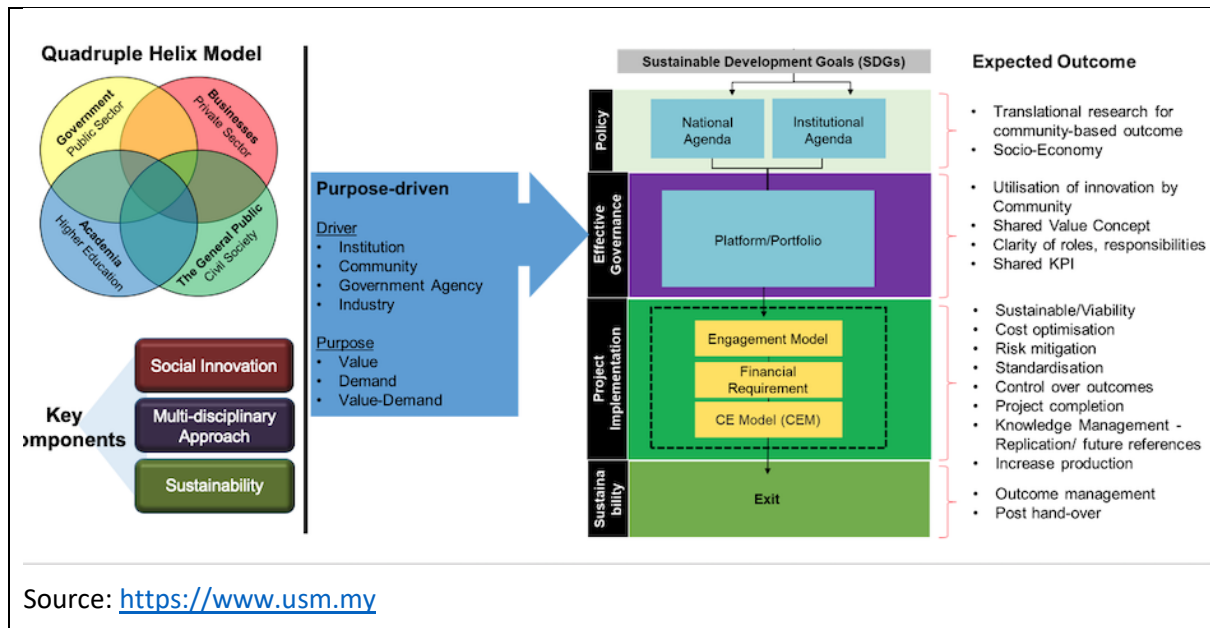
5.7 Existing competency-based skills assessment approaches by HEIs

Competence is defined as "an ability that extends beyond the possession of knowledge and skills" and includes cognitive, functional, personal and ethical competences (ASEAN, 2016, p.9). Competence based qualifications are those which are primarily comprised of credits for learning acquired outside of formal education. It facilitates widening participation, and is not about enrolling or graduating less qualified people.

Recent years has also seen growing interest in competency-based certification (Voorhees, 2001). As mentioned in Section 5.4 above, competencies learned from non-formal and informal environments are being incorporated into national qualifications frameworks. This is an important step forward in widening participation and formalising qualifications to enable career advancement and mobility. Mutual recognition agreements exist between countries with respect to professional/vocational fields, e.g. engineering and nursing, architecture, surveying, medical practitioners, dental practitioners, accountancy, and tourism. However, some countries require incoming individuals to undergo assessment on a case-by-case basis.

There are two aspects to competency-based qualifications.

1. *Competency-based education (CBE)* are programmes organised around awarding academic credits for mastering clearly defined competences and measurable learning outcomes rather than the traditional model of time-served (typically 3 or 4 years for an undergraduate degree.) Learning may be a combination of in-the-workplace, on-line or in-class. Time-to-completion is dependent upon each person's circumstances. CBE is offered by traditional public universities as well as by private providers. It is being applied to a wide range of fields including medical education (Spiel & Schober, 2018).

2. *Recognition of Prior Learning (RPL)* is the process for assessing existing competences. RPL evaluates the skills and knowledge that a person has gained through life outside of formal education and training against a given set of standards or learning outcomes (Palmer &

Nguyen, 2019). RPL processes are often used, in place of matriculation examinations, to enrol learners at a more advanced level than might otherwise be the case.

CBE may apply to, inter alia:

- Adults returning to higher education;

- Employed and unemployed people seeking recognition for skills gained through informal learning;

- People wishing to improve their existing qualifications;

- People wanting to re-train or change careers;

- People who have undertaken non-formal learning or training in the workplace or through community-based learning;

- People who have gained skills and knowledge through volunteering or through activities and projects in the community.

Ultimately, CBE is about "supporting learners with the potential to benefit both themselves and society through participating in higher education. This means reaching out to an increasingly broad range of learners with different motivations and interests" (Sheridan & Linehan, 2009).

Box 29 Southern New Hampshire University, USA

> Southern New Hampshire University (SNHU) is a private non-profit institution with more than 3,000 on-campus students and over 60,000 online students. Unlike traditional universities, SNHU College for America offers competency-based education programmes. This provides a different path to a university degree. Students can apply their existing job skills and knowledge to move faster or use the optional learning resources included in the programme to spend more time learning new skills. Students work independently on projects to learn career-relevant skills. Progression is based on the learning/mastering specific competences and completing real-life projects rather than taking tests. Time-to-degree depends on how fast students can successfully complete the required projects.
>
> Source: https://www.snhu.edu/program-finder/cbe-2

Box 30 Tax Credits and Vouchers for LLL

> Learning accounts have the potential to provide a good, equitable model for how citizens can be supported to pursue education and training. Some versions use a central fund while others may provide a personal entitlement for each individual, known as personal or individual learning accounts. Vouchers is a form of learning accounts.
>
> In the last few years, individual learning accounts have become a policy option in recognition of the need to continually up-skill/re-skill people throughout their lives.
>
> *Canada Training Benefit* proposes to provide a flexible option for finding the time and the money needed to pursue training, improve skills, and build strong and lasting careers. It proposes to give workers a refundable tax credit on their income tax and benefit return to help offset tuition costs for training, provide income support during training, and offer job

protection so that workers can take the time they need to keep their skills relevant and in-demand.

Source: https://www.canada.ca/en/employment-social-development/news/2019/05/backgrounder-canada-training-benefit.html

Singapore SkillsFuture Credit is a universal benefit that provides every citizen aged 25 years or over who has completed full-time education with a financial contribution to lifelong learning. The credits do not expire and can be topped up to pay for work related course fees. They can be used in addition to existing government- provided course fee subsidies.

Source: https://www.skillsfuture.sg/Credit

See also: Cedefop, 2009; Cowen & Morrin, 2019,p. 37-38 McGinity, 2016.

6 Summary of Findings

This report has provided an extensive review of the trends, policies and practices with respect to the relationship between higher education and the labour market with suggestions as to how to strengthen this relationship.

Table 1 below provides a summary of the main findings of this report. It identifies many "good practice" examples at policy and institutional level across seven dimensions, and aligned with the role and responsibilities of specific stakeholder groups. As a summary it does not cover all the issues discussed in this report, and therefore it is advisable that individual chapters should be consulted for more complete discussion. Individual sections of this report also contain additional examples of "good practice".

The actions identified are relevant for all world regions of UNESCO, and are specifically identified for reference to sub-Saharan Africa. Any of the "good practices" listed can be adapted for different national and institutional circumstances as context matters considerably with respect to national and institutional capacity and capability including human, physical and financial resources.

As the report notes, there is significantly more work to be undertaken to strengthen links between higher education and the labour market at the policy and institutional levels. Table 2 identifies notable barriers as well as enablers for success that should be taken into account when purposing policy and practices for implementation. Ultimately because there are important interdependences across different policy agendas and context, a system approach is strongly recommended for best outcomes.

Table 1 Summary of "Good Practices" at the Government and Institutional Level by Stakeholder Group, Across 7 dimensions

Role & Responsibility of Key Stakeholders	1. Policies & Strategies for Graduate Employment	2. Institutional Arrangements in Support of Graduate Employment	3. Provision of & requirements for Workplace Learning and Training	4. Preparation of Graduates to Enter the Labour Market	5. Provision of career guidance, entrepreneurship & industry/business start-up support	6. Effective models/best practices of partnership HEIs & industry in research, education & training	7. Existing competency-based skills assessment approaches
Government	• Enabling Legislation & Resources • Assessment of Skill Gaps & Skills Strategy • National Strategy for HE • Tertiary Education System (VET/TVET & HE) Governance • Regional Clusters • Performance Frameworks • University-Industry-Community Engagement Framework	• Quality Assurance Policies with involvement of industry/business /community people • Research Impact Assessment • Learning Outcomes • Certification of university teaching practice • Gender & Equity Policies • Qualifications Framework to recognise new forms of credentials	• Labour Activation Programmes; • Apprenticeship Programmes; • Work-Learn Programmes • Graduate Tracking/First-Destination Surveys	• Qualifications Framework; • New forms of employment credentials; • Recognition of non-formal & informal learning; • Mutual recognition of qualifications	• National Training Fund; • Graduate Job Training Programmes; • National Survey of Student Engagement	• National Knowledge & Technology Transfer Programmes; • Collection of Data on commercialisation, patents, licensing, start-ups, etc.	• Recognition of Competency-based Education (CBE); • National Training Fund/Vouchers to support LLL

HEIs	• Institutional Research Capability • International Quality Assurance • Graduate Tracking • Learning Outcomes • Future Ready Curriculum • Certification of university teaching practice • Teaching & Learning Centre	• Embed employability & engagement in mission & activities; • Adopt principles of civic university • Develop tools to manage & assess progress • Emphasize graduate attributes in learning outcomes; • Recognition of Prior Learning	• Labour Activation Programmes; • Apprenticeship Programmes • Research; • Industrial Doctorates; • Undergraduate/ Community Research Opportunities; • Project-based learning; • Professional Masters	• Career services, guidance & planning; • Work-readiness programmes; • Incorporation of work-related skills and activities; • University-Business-Community Partnerships	• Engaged/Active Learning Pedagogies; • Work-Integrated Learning, Work-Based Learning, Workplace Learning, Work Placement, Sandwich Courses, Internship & Apprenticeship; • Project work, and clinical and fieldwork; • Entrepreneurship Education & Training • Tools for monitoring & assessing.	• Entrepreneurship & Business Start-Up Programmes; • Technology Transfer Offices (TTO); • Innovation Labs for Collaborative Working	• Competency-based Education (CBE); • Recognition of Prior-Learning; • Widening Access & Participation; • Re-design of the academic year and delivery to facilitate diverse students
Business & Enterprise	• Identification of Future Skill Needs • Regional Clusters; • Maximising Skills Utilisation	• Work with HEI to define graduate attributes for future work; • Provide work-based learning opportunities; • Partner with HEIs to support	• Apprenticeship Programmes; • Support for Industrial Doctorates and Work-Learn Programmes	• Micro-credentials & badges; • University-Business-Community Partnerships	• Regional Skills Partnerships; • Graduate Job Training Programmes; • Entrepreneurship Education & Training;	• Entrepreneurship & Business Start-Up Programmes; • Innovation Labs for Collaborative Working	• Recognition of Competency-based Education (CBE);

		programme development; • Participate on governing boards, interview panels, programme development & review			• Collaborative Research & Problem-Solving Initiatives with HEIs		
Civil Society	• Regional Clusters; • Maximising Skills Utilisation	• Work with HEI to define graduate attributes for future work; • Partner with HEIs to support programme development; • Participate on governing boards, interview panels, programme development & review	• Support for Work-Learn Programmes	• University-Business-Community Partnerships	• Regional Skills Partnerships; • Graduate Job Training Programmes; • Collaborative Research & Problem-Solving Initiatives with HEIs	• Innovation Labs for Collaborative Working	• Recognition of Competency-based Education (CBE)

Table 2 Strengthening Links between HE and the Labour Market: Enablers and Barriers

Enablers	Barriers
• Coherent all-of-government approach to talent and knowledge development;	• Lack of coherence across government with respect to coherent knowledge development and skills policies;
• Governance arrangements which emphasize regional cohesion and collaboration between HE, industry/business , government and civil society;	• Failure to align skill supply, skill utilisation and skill demand policy development and implementation;
• Flexible higher education system providing diverse learning/career pathways (academic, technical and vocational) for people throughout their lives;	• Insufficient attention given to ensuring qualifications and programmes adequately anticipate future skills needs;
• Providing incentives for learners to continually update and re-qualify as people live and work longer and actively;	• Weak governance and leadership at the higher system and institutional levels;
• Emphasis on transversal competences like inquiry, creativity and entrepreneurship to help people develop their full potential for innovation;	• Poorly trained and supported faculty, without sufficient resources and facilities to support educational and research;
• Governance arrangements which emphasize regional cohesion and collaboration;	• Widening inequality gap, regional disparities and growing divergences in educational outcomes leaves too many people unable to participate fully in employment and society;
• Linking educational relevance and skills development to the quality assurance and/or other accountability systems;	• Weak articulation between different parts of the education system, and especially the higher system to facilitate flexible learning pathways and recognition of prior learning (APL);
• Closing the gender gap, incentivising more women into STEM disciplines and careers, and HE leadership roles;	• Absence of shared vision for regional growth and sustainability;
• Well-designed work-based learning curriculum and assessment;	• Weak applied research capacity and capability and poor evaluation of research impact monitoring and assessment;
• Differentiated indicators to incentivise, support, monitor and reward higher provision and performance aligned with national objectives;	• Insufficient understanding and value of vocational, professional and technological education by the public, students and parents, and policy.
• Recognition of prior learning and competency education to widen access and recognise learning that occurs in informal and non-formal settings;	

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