Introduction

Global Initiatives and Higher Education in the Fourth Industrial Revolution

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General Introduction to the Book

The world we are living in is complex and changing faster than most of us can keep up with. It is complex because we are experiencing several simultaneous revolutionary transformations. It is changing because un-learning and re-learning are uncontested parts of our daily lives – how else will we be able to operate new cellular phones or electric cars? Most people in the HE (higher education) sector will agree that the 4IR (Fourth Industrial Revolution) and other global events are constantly transforming and disrupting our lives and work.

Unfortunately, it seems as if HE is struggling to adjust to the demands set by the complex and fast changing world. In contrast to the previous revolutions (e.g., industrial, communication revolutions), where education played an instrumental role to implement change and development, it seems as if the current revolutions are leaving HE behind. This could make HE redundant and/or superfluous. The aim of this book is to take a broad overview of how the 4IR and some international initiatives towards sustainable development are interpreted in terms of HE and to identify some weak spots as well as opportunities and chances where HE must and should take action to ensure relevance and a sustained need for HE towards positive and sustainable transformation.

Already in 2015, the UN (United Nations) assembled its Agenda for Sustainable Development (UN 2015), challenging people and countries to start working *together* to assure a sustainable world, both economically and societal (Fukuyama 2018:47). Governments and the corporate world have taken steps to meet the new era with initiatives (also called upheavals/programmes/plans) like Industry 4.0 (Germany), Advanced Manufacturing Partnership and IIoT (USA), Industrie du Futur (France), Made in China 2025, Society 5.0 (Japan), Australia 2056, and Education 5.0 (Zimbabwe), to name

but a few. However, it seems as if most of these initiatives have sidestepped HE to a certain extent, as the government of Japan, for example, has indicated that HE is *lagging behind* (GJ 2015:6 of 18). Can HE find a place and cause to exist and contribute towards the disruptive and fluid revolutionary world? How will national governments, NGOs, business in general, and society at large be made to understand that HE has a significant role to play in initiating and sustaining international development, manufacturing and industry, and the development of much needed workplace skills if it is not done by the specialists of HE themselves?

Other issues addressed in this publication include new pathways for grand strategies and statecraft, practical leadership and partnership in times of unsettling change, the ongoing and vital role of internationalisation and globalisation of HE and training, distance education, and self-directed learning amidst a pandemic, as well as the ever-pressing issue of climate change.

4IR terminology like 'disruption,' 'innovation,' 'fluidity,' and 'profound and systemic change,' already form part of our normal speech. Klaus Schwab, the founder and executive chairman of the World Economic Forum (WEF), published his ground-breaking work, *The Fourth Industrial Revolution*, in 2016. In the foreword to this book, Marc Benioff (the chairman and CEO of Salesforce) claims that the 'technologies driving the fourth industrial revolution will fundamentally transform the entire structure of the world economy, our communities and human identities' (Schwab 2016:ii). Schwab himself confirms this by stating that the 4IR is a confluence of 'multiple technologies that are leading to unprecedented paradigm shifts in the economy, business, society, and individually' (Schwab 2016:8). This means that there will be a global transformation on both macro and micro levels and the challenge will be to keep our world human-centred within a technology driven environment.

The 4IR is only one of several revolutions that are revolving our world. The communication revolution (Harnad 1991), the societal revolution (Narvaez Rojas, Alomia Peñafiel, & Loaiza Buitrago (2021:5, 6 of 16), the educational revolution (Gerstein 2014), and the revolution in human self-awareness (Floridi 2014), are all influencing our lives and the way we see the future. These revolutions are intertwined with each other, and they have far-reaching implications for human life. The following brief summary paints the broad orientation lines and wide-ranging trends (mostly linked to the Western world) that provides a general background for and link between the 4IR, HE, and some global initiatives.

The Revolution-Ridden World

The Industrial Revolutions

The First Industrial Revolution

Between the late 18th century and the early 19th century, this revolution caused one of the most disruptive transformations in human history. Narvaez Rojas *et al*. (2021:4 of 16) name three important processes that made the transition possible: The invention of machines for manufacturing and production on a large scale, the ability to generate energy for use in industrialised transport such as trains and ships and the creation of organised labour to work in factories and mines. Results from this change included population growth, urbanisation, mass employment options as well as the exploitation of workers, and the expanding and improvement of communication (during the last stage of the Third Communication Revolution) through industrialised transport.

The Second Industrial Revolution

This revolution coincided with the first period of globalisation. It started in the late 19th century and ended in the early 20th century. Through the Bessemer process, it became possible to mass produce cheap steel (Encyclopaedia Britannica 2019). Advances in processing chemicals and energy sources like electricity and oil decreased production time and cost, boosted and internationalised the economy, while opening opportunities for long distance and international transportation networks that could move ideas and people globally (Narvaez Rojas *et al*. 2021:4 of 16). This overlapped with the start of the Fourth Communication Revolution with advanced technology such as cinema, radio, and the telegraph. On the negative side, unemployment grew and life was picking up pace, regulated by the clock and money. The African continent is seemingly to a large extent trapped here, due to geohistorical and geopolitical issues as discussed in chapters 8 and 9. In chapter 6, 'noopolitik' or information age statecraft is proposed as an alternative for the realpolitik of the colonisation period.

The Third Industrial Revolution

During the last quarter of the 20th century, the world started to move towards becoming an 'information society' (Narvaez Rojas *et al*. 2021:4 of 16) through the digital revolution that was founded on the development of the microchip and other electronic components that enhanced the Fourth Communication Revolution. PLCs (Programmable logic controllers) and robots further promoted automation (Desoutterttools 2022). While the internet and computers made life and work easier, the speed of change increased significantly, while the world shrank to a well-connected village.

Unfortunately not all countries and all people were equally benefitted. The American model of implementing this model is discussed in more detail in chapter 3.

The Fourth Industrial Revolution

This revolution does not denote a radical break with the past, as it builds on the Third Industrial Revolution through evolution while also impacting less diverse fields (Lee & Lee 2021:137). Characteristic is the blurring of lines and dissolving of boundaries between components and sectors into more liquid and interactive forms. The focus is on smart industry, big data, and the internet, while aiming for complete automation through cyber-physical systems (Narvaez Rojas *et al.* 2021:4 of 16). The 4IR will aid towards the creation of Society 5.0 and Education 4.0 with the focus on 'rehumanising in the age of machines' (Dervojeda 2021).

The Communication Revolutions

The First Communication Revolution

Before people developed speech, which gave rise to the first revolution in communication, they had to use actions, gestures, and voice sounds to convey ideas and information. The development of language, about 40,000 BCE, opened a different and advanced way of interaction between people.

The Second Communication Revolution

The development of writing, at about 10,000 BCE, denotes the second breakthrough in human communication skills. This allowed people to communicate over longer distances and asynchronously.

The Third Communication Revolution

The next revolution introduced the use of technology in communication in the Western world at about 1459 CE through the development of the printing press. This boosted the fast and global spread of information and news.

The Fourth Communication Revolution

Similar to what happened regarding the Third and Fourth Industrial Revolutions, the Fourth Communication Revolution built on and expanded the technology implemented during the Third Revolution. Already in the early 20th century, communication methods expanded with the added technologies of audio (radio) and video (cinema and television), which by the end of the century exploded into all the sophisticated technology-enhanced communication tools that we are currently using to communicate globally and beyond our own planet.

The Development of Society

Society 1.0

The hunting and gathering society started to craft tools and divide tasks. Men hunted and women gathered food, while fire was used for protection, light, heat, and food preparation (Narvaez Rojas *et al.* 2021:5 of 16).

Society 2.0

The moment that agriculture development progressed, people had the option to abandon the nomadic lifestyle to settle at locations where resources were readily available. The more permanent settlement options brought greater numbers of people together which led to the specialisation of trade and new career opportunities. Economy and politics became important. Transformation only set in as a result of the 1IR (First Industrial Revolution).

Society 3.0

The industrial society developed because of the automation and mass production of the 1IR. The population grew despite severe exploitation and before long the concept of human rights started to develop.

Society 4.0

Linked to the developments of the Fourth Communication Revolution, Society 4 is also called the information society. Things, people, and places got connected, using technology (Narvaes Rojas *et al.* 2021:6 of 16).

Society 5.0

Nowadays, the focus is moving towards the needs of people and the sustainability of life on our planet. Using all technological developments from the Third and Fourth Industrial Revolutions, implementing the advances from the Fourth Communication Revolution and the knowledge gained from the Human Revolutions in Self-Understanding, the aim is to develop a super smart society (cf. Medina-Borja 2017). In chapter 2, we will return to how this concept is being implemented, as well as its impact on HE and other countries. As already referred to, 'noopolitik' as discussed in chapter 6 will play an important part in the development of a super smart society. Chapter 7 adds to the development of a smart society through reference to the need for smart products, smart mobility, and smart logistics.

Revolutions in Self-Understanding

Without going into detail, we also need to take note of the significant changes that took place regarding human self-understanding. According to Floridi (2014), the first revolutionary change in human self-understanding

was instigated by Copernicus (1473-1543). Copernicus' finding that Earth is orbiting the sun 'displaced the earth from the centre of the universe' and forced people to reconsider their role and place in the solar system (Floridi 2014:87). The second major change in how we see ourselves and our relationships was brought about by the work of Darwin (1809-1882), who displaced us from the 'centre of the biological kingdom' by showing that species have evolved (and are still evolving) over time through natural selection (Floridi 2014:89). The psycho-analytic work of Freud (1856-1939) brought a 'radical displacement from our Cartesian certainties' (Floridi 2014:90). Floridi claims, '[T]oday we acknowledge that we are not immobile, at the centre of the universe (Copernican revolution), that we are not unnaturally separate and diverse from the rest of the animal kingdom (Darwinian revolution), and that we are far from being Cartesian minds entirely transparent to ourselves (Freudian or neuroscientific revolution)' (Floridi 2014:90). Floridi regards Alan Turing (1912-1954) as the father of the Fourth Revolution in Human Self-Understanding, and states that 'we are accepting the post-Turing idea that we are not Newtonian stand-alone and unique agents, we are informational organisms (inforgs), mutually connected and embedded in an informational environment (the infosphere) which we share with other informational agents, both natural and artificial' (Floridi 2014:94).

Developments in Education

Gerstein (2014) defines the changes in the education environment by linking Education 1.0, 2.0, and 3.0 with web services 1.0, 2.0, and 3.0. Huk (2021:42-44) expands this by adding Education 4.0 which aligns with Society 5.0 as well as the Fourth Communication Revolution and the 4IR.

Education 1.0

Education in this phase was educator-centred, done in a lecturing style with the students as passive recipients of information. The focus was on teaching students the ability to master their reading, writing, and basic mathematic skills, using non-interactive media.

Education 2.0

During this phase, the education process expanded to include interaction between the educator, other experts and students, and by means of content, using both synchronous and asynchronous communication methods (Huk 2021:38). The focus was on communication, contribution, and collaboration.

Education 3.0

During this phase, education was student-centred and unlimited in terms of time and space. Content was freely available, and the focus was on students

becoming active connectors, creators, and constructivists. Educators were acting as guides and facilitators. Chapter 9 provides guidelines on how South Africa (and other countries that find themselves far behind) can advance their education through effective learning methods.

Education 4.0

Here, education is focused on the individualised and specific needs of students. Learning takes place at the student's own pace and the process is unlimited in terms of time and space and media. Higher cognitive skills and transformative learning are prioritised (Huk 2021:40, 41). The main education responsibility is transferred to the students. Sustainability of human life and the future of the planet are the focus areas of this problem-solving educational structure. Education 4.0 is intricately linked to the idea of Industry 4.0 which is the sustainable development vision of Germany as discussed in chapter 1 and expanded in chapter 8.

Education 4.0 and Higher Education

James (2019) notes that Education 4.0 is about evolution to keep in pace with what is happening in the world outside education and training. Therefore IHEs (institutions of higher education) must understand what will be expected from their graduates and align their curricula and teaching, learning, and assessment processes to allow for personalised, independent, and appropriate learning paths that will produce 'thinkers, creators and ingenuity' (Agolla 2018:46). 'A revolutionised HE system can produce super humans' (Agolla 2018:46) that will deliver the notable contributions and innovations that will take the global village of the 4IR and Society 5.0 forward. HE curricula must include modules and programmes on the use of technology and the acquisition of hard and soft transferable skills in addition to subject-focused content.

Just when the message of the 4IR seemingly started to get people to work in creative ways to conquer some of the challenges and pin down the ever-shifting goalposts, Covid-19 struck. While the 4IR seems to gain from the pandemic, with more initiatives and inventions appearing on almost every level of living (cf. Schwab & Malleret 2020), education systems were thrown into turmoil or stopped completely in many cases. For decades now, education is extremely slow when it comes to implementing change and transformation (cf. Bates 2010; Passmore 2000). Although the Covid-19 pandemic forcefully pushed the education sector towards transformation and innovation, the shift to blended, online, and digital media platforms for teaching, learning, and assessment cannot be regarded as the paradigm shift that is required to effectively educate societies for the 4IR world. On the one hand, these changes, updates, and solutions should have been made years ago, while on the other hand, these adjustments and modifications can bring a false

sense of accomplishment through which HE can once again slump back into a comfort zone. HE must be reimagined, not restored, as the final evacuation of the ivory tower is unavoidable.

The next decade will be crucial and critical for the future of HE. The full spectrum of blended learning (time, space, media, and activity, cf. Littlejohn & Pegler 2007:75-76) needs to be explored, broadened, and made available to address the needs of individuals, to provide flexible and hybrid forms of learning through 'seamless' connectivity (Hardman 2020).

Internationalisation of Higher Education

Another aspect that can enhance and ensure development in HE is globalisation. Chapters 4 and 5 are furthering the discussion that is introduced here. Altbach and De Wit (2018) indicate that research collaboration on a global scale is increasing. At that stage, there were more than five million international students, specifically in Germany and Canada. However, these figures dissolved within a few months after Covid-19 spread through the globe in 2020. International education will therefore continue to face unpredictable short- and long-term effects.

Currently, IHEs must take the lead in transforming educational key issues (Proctor & Rumbley 2018:4). Within the current disruptive environment, these institutions are required to deliver meaningful contributions to the academic development of both local and international students. Proctor and Rumbley (2018:4) correctly argue that internationalisation has a complex and multi-dimensional nature, finding itself within the international environment of rapid change accompanied by a disruptive environment of social, political, and economic unrest and change. Internationalisation as a more recent development in HE, is presenting established IHEs that did not have any form of global interactions or engagement in their focus, with revolutionary challenges and opportunities to turn their attention to these realities (cf. Proctor & Rumbley 2018).

Knight and De Wit (2018:3) opine that the internationalisation of HE has now 'come of age,' as it is no longer on the periphery of the HE landscape. Nowadays it is imperative for students to acquire an international intercultural competence to work in multicultural societies all over the world. Internationalisation – 'coherently conceived, contextually nuanced, and thoughtfully executed' (Proctor & Rumbley 2018:4) – can supply the competency to graduates to act according to the challenges and innovations of our time.

Although the internationalisation of HE has been, until recently (prior to Covid-19) a priority in the world, there were still many obstacles. Knight and De Wit (2018:3) argue that many countries isolate themselves against it,

while racism and monoculturalism are constantly threatening the initiative. Added to this, IHEs are focusing more on 'people, programmes, providers, policies, and projects,' compared to the process of the internationalisation of HE and research (Knight & De Wit 2018:3). Many IHEs are also still practising internationalisation in fragmented ways (Knight & De Wit 2018:3). Economic and political motivations become key in the process of the internationalisation of HE, while academic and social/cultural rationales are lagging behind. A major threat to the success of the internationalisation process is that its intended purpose of 'cooperation, partnership, exchange, mutual benefits, and capacity building [has been replaced by] competition, commercialization, self-interest, and status building' (Knight & De Wit 2018:4).

International Higher Education in Action: Three Intra-Continental Initiatives in Eurasia

Altbach and De Wit (2018) regards the 25 years between 1990 and 2015 as the 'era of higher education internationalisation.' This includes the movement of students worldwide, the founding of branch campuses and franchises in other countries, as well as joint degrees and the utilising of English as the language of teaching and learning. They argue that this era has 'abruptly ended' due to the hampering policies of the USA (after Trump has been elected as president) and England (after Brexit) on student movements (Altbach & De Wit 2018). Debates on the use of English in countries with other languages (like the Netherlands, Germany, and Italy) are currently thriving.[1]

The international HE initiative by the European Union (EU), is called Erasmus+. This programme is focused on education and training, as well as sport for the youth (Erasmus+ 2020:1 of 25). It assists and motivates the youth to pursue innovative opportunities in education and to empower them with valuable life-skills, complemented by essential international experience (Erasmus+ 2020:4 of 25). It also assists educators to go abroad, sharing and learning innovative ideas, and discovering the most recent best practices (Erasmus+ 2020:6 of 25). Students may even study (and work) outside Europe – in Africa, Asia, and the USA (Erasmus+ 2020:12 of 25). This includes youth exchanges where groups of students, belonging to different countries, come together for a specific time and complete a programme filled with 'workshops, exercises, debates, role-plays, simulations, [and] outdoor activities' (Erasmus+ 2020:13 of 25), designed by their IHEs. The initial life span of this initiative was

1 Altbach and De Wit (2018) list more negative actions taken by nationalist-populist governments, like a branch campus of the Netherlands in Yantai (China) that was cancelled; widely criticised Chinese-funded Confucius Institutes that were founded in Australia and elsewhere; bad behaviour by international students; the increase of visa fees for international students, etc.

from 2014 to 2020 (Erasmus+ 2020:1 of 25). Its aim is the modernisation of education and training of the youth all over Europe, with emphasis on lifelong learning. This programme mostly finances the initiatives of companies all over Europe that meet their requirements.

KIT (Karlsruhe Institute of Technology) in Germany started to collaborate with Arts et Métiers: Le Grand Établissement de Technologie (AeM) in France – both being leaders in, and acting as reference institutes of education, research, and innovation in engineering in Europe (FGI n.d.) – creating the French-German Institute for 'Industry of the future.' For the past 20 years, the two institutes have collaborated in teaching mechanical engineers in a joint degree programme. Their current focus is on 'digitalization [and] advanced manufacturing processes,' preparing European engineers to act as protagonists in the industry of the future, as well as on research and innovation (FGI n.d.). The future challenges that they want to master are globalisation and climate change, together with digitisation, energy transition, and the processing of raw materials (FGI n.d.). Their aims are: 1) To create joint programmes in HE to educate the upcoming workforce and to train engineers to master the challenges of the future manufacturing sector; 2) to create a research and technology platform to facilitate scientific research in both institutions to support the digitisation of both countries' industries; 3) to keep humans at the centre of the industries of tomorrow; 4) to look for industrial partners to accelerate the creation of new products with their obtained knowledge; and 5) to create a cross-border incubator for researchers, academics, and innovative industrial partners in which they want to facilitate and encourage innovation and entrepreneurship (FGI n.d.).

In Southeast Asia, a group of countries – Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam – established ASEAN in 1967 (ASEAN 2015:i). The purpose of ASEAN is to cooperate on a 'political, security, economic and socio-cultural' level with each other, creating a 'single market' trade between these countries (ASEAN 2015:3, 4). Attention is focused to stimulate lifelong learning (ASEAN 2015:4). Their motto is 'One Vision, One Identity, One Community' (ASEAN 2015:29).

These three initiatives are commendable on the level of internationalisation as well as heterogenisation and could set an example for others to follow.

Internationalisation cum or versus Globalisation?[2]

Globalisation can shortly be defined as the 'growing transnational flows, interactions, and connections of people, cultures, economies, and governments' (Saito 2019:198). The globalisation of education is an indication as to how educational networks are growing globally, as well as the processes and IHEs that are affecting educational practices and policies locally (Spring 2014:1). The four 'places' where global discourses are already present, are the 'knowledge economy, lifelong learning, global migration, and brain circulation' (Spring 2014:1).[3]

Globalisation already has a considerable influence on the youth of the world by conveying 'transnational processes' to them, influencing 'ancient barriers' between them like civilisation, nation pride, communities, and even gender, race, and class differences (Cicchelli & Octobre 2019:3). These 'transnational processes' include the innovative technologies presented everywhere, the escalation of the knowledge-based society, and the rise of non-Western powers.

The question is if and how the globalisation process and the internationalisation of HE can be compatible as, to some extent, globalisation has a negative effect on the internationalisation of HE (cf. Cicchelli & Octobre 2019). Saito (2019:197-198) argues that globalisation has a direct impact on students' lives, generating the emergence of both a global youth culture and a global identity, *outside the environment of IHEs* and practices (cf. also Cicchelli & Octobre 2019; Nilan & Feixa 2006). IHEs should therefore adapt to this 'phenomenon' by acting in a way that makes them indispensable in the eyes and development of the students. One way is to legitimise digital literacy as part of all the courses and degrees being presented by IHEs, as this is a crucial subject for 'surviving and thriving in the ICT (information and communications technology)-driven knowledge society' (Saito 2019:200). It should be implemented in a way that is student-friendly and -centred, where students can collaborate with each other on a global basis (Darvin 2019). In this way, IHEs can promote themselves as 'producers of knowledge' and hubs of critical thinking and innovation on an international level (Saito 2019:203-204).

2 The term 'globalisation' was coined by Theodore Levitt in 1983 (Levitt 1983).

3 According to Spring (2014:1-2), quite a few global institutions already influence worldwide educational policies, like the OECD, the World Bank, UNESCO (United Nations educational, Scientific, and Cultural Organization), the WTO (World Trade Organization), and GATS (General Agreement on Trade in Services). Together with that, English is accepted as the global language, being implemented in many schools to prepare the learners for tertiary education (worldwide).

The UN, OECD (Organisation for Economic Cooperation and Development), and the World Bank promote global educational agendas concerning multiculturalism, job preparation, and economic development. NGOs (non-governmental organisations) are already influencing basic education on a global basis, specifically in relation to human rights and environmentalism (Spring 2014:4; OECD 2017). Spring (2014:5) indicates the key terms of the components of educational globalisation: Schools and IHEs should adopt similar curricula, pedagogies, and educational practices and they should conform to the policies of national policymakers. Educational practices on both local and global level should cooperate and be influenced by ICOs (intergovernmental organisations) and NGOs, resulting in the formation of global networks and a global 'flow of ideas.' Multinational corporations should create global curricula, assessments, and other school materials, while HE and its educational services must be marketed and introduced to the entire global village. This includes IT (information technology), e-learning, and the most recent technologies. Research should be done on the effect of world migration on learners and students, becoming part of multiculturalism, including the effect of English as the preferred language of education and commerce worldwide, and the effect of religious as well as indigenous education on visiting students and scholars.

This 'global flow'[4] in education depicts a 'global flow of ideas, practices, institutions, and people interacting with local populations' (Spring 2014:5; cf. Appadurai [1990] 2010:295). The 'educational superstructure' is especially interested in the global flow of ideas and practices with specific reference as to how governments and other international institutions communicate their policies and practices about it (cf. Spring 2014:6) – these are called 'ideoscapes' (Appadurai [1990] 2010:299-300). Nowadays these global flows happen quickly with the support of IT, as educational leaders can meet via a myriad of social communication channels like Skype, Teams, Zoom, Discord, and the like, in this way constructing global networks and attracting more members as time goes by (Spring 2014:6).

Saito (2019:198) indicates a few changes that should take place: As students become more mobile, they should be able to enrol at different universities simultaneously – curricula and pedagogies should therefore adapt likewise, requiring from IHEs to collaborate more with each other on the (re) structuring of degrees (cf. Goren & Yemini 2017). Education and research should thus adapt to these 'isomorphic mechanisms,' like the assessment of international students (Saito 2019:198), evoking IHEs to evolve to institutions where global nation-building can take place (Saito 2019:198; cf. Saito 2011).

4 The term 'global flow' was coined by Arjun Appadurai in 2010 (Appadurai [1990] 2010:301).

Internationalisation and globalisation are not individual enterprises in competition with each other and with the world (cf. Saito 2018). These two initiatives are also not aimed at enriching a specific country or at making sure that one's own IHE becomes the biggest or dominant in the world, but to take hands in a meaningful way to the advantage of all students, businesses, and the global community.

Homogenisation versus Heterogenisation?

Already in 1990, Appadurai referred to cultural homogenisation as '[t]he central problem of today's global interactions' (Appadurai [1990] 2010:295), being a product of globalisation (cf. also Cicchelli & Octobre 2019:3). This results in countries losing their nationalism (Rixey 2019): Cultural homogenisation is all about one (global) culture taking over other countries' cultures. What is mostly referred to, is Americanisation, where this Western culture becomes part of or is enforced on other cultures like those of Africa. Appadurai ([1990] 2010:295) frankly avers: 'One man's imagined community…is another man's political prison.' Many countries are caught up in an existential choice: To retain their own identity, or to adapt to another (Western) identity, therefore slipping into homogeneity (Rixey 2019). This may also happen without countries even knowing it. For example: A specific nation or a group of nations may form an international institution which is joined by other countries in the world, thereby forming a global society. However, that society could appropriate its own ideology/ies (mostly belonging to the founding countries) which are then applied to all the member countries.

On the other hand, cultural heterogenisation refers to a multicultural society. This means that a country's culture is disseminated and accepted by other countries, without giving up their own culture. This is acceptable and within the aims of the International Bill of Human Rights (OHCHR 1948). Looking at this from an educational point of view, heterogenisation is preferable to homogenisation – with specific reference to Africa. Baker and LeTendre (2005:xi) refer to certain schools that continuously benchmark their performance in comparison to international standards, which is a good thing, keeping up with the world without giving up their own identity or culture and tradition.

Global Initiatives, Higher Education Collaboration, and the Way Forward

The book is divided into three sections. The first part is called 'Global Initiatives,' comprising of three chapters, while the second and third parts discuss HE on the level of a collaboration between universities (two chapters), and then the way forward (four chapters).

Many countries have realised that, in order to survive the challenges of the 21st century, they must upscale innovation and initiatives in line with the 4IR. In chapter 1, Willem Oliver refers to some of these important global initiatives and provides an introduction to what is further discussed in chapters 3, 5, and 7. He discusses Industry 4.0 of Germany, extended with the Indo-German industrial collaboration, the Advanced Manufacturing Partnership in the USA, the Industrie du Futur of France, and Made in China 2025. Lastly, he refers to Agenda 2063, an initiative by the African Union for uplifting Africa. Sadly, the abovementioned countries launched their initiatives in isolation, with the aim to benefit themselves, while education, specifically HE does not play an imperative role in most of these initiatives. There could be a twofold reason for this: First, industry and business have realised that HE is lagging so far behind that it will in fact hamper the potential development if involved, and second, in-service training is regarded as having precedence and preference over HE in most cases. Both reasons are devastating for HE and education systems.

Chapter 2 discusses another two initiatives, namely Society 5.0 of Japan and Education 5.0 of Zimbabwe. With Society 5.0, Japan has in mind to transform into a 'super smart society' (GJ 2015:1 of 18). Based to some extent on Industry 4.0 of Germany, the difference between the two initiatives is that Germany's initiative is more product centred, while Japan focuses more on human-centredness (Ferreira & Serpa 2018:26, 28). In this super smart society, HE should be key, together with industry, government, and the broad public (GJ 2015:1 of 18), but the response of education to the 4IR is termed 'slow and inadequate' (Gleason 2018:5), and it 'needs a dramatic realignment' (Aoun 2017:xii).

Education 5.0 of Zimbabwe does not intend to create a new, innovative form of education and was created as a survival kit for a country that is still on its knees due to corruption, 'chaotic and violent' landreform actions, and 'plundering of public resources' (Malunga 2019) after some devastating recent past events. Although reference is made to all the levels of education, the aim of this initiative is to excel this country to a 'competitive, industrialised and modernised nation by 2030' (MHTE 2019:ii), with a link to Education 3.0 and not Education 4.0. It is proposed that the name of the initiative should be changed to avoid confusion.

Chapter 3 discusses the American initiative in more detail, called AMP (the Advanced Manufacturing Partnership), forming 15 advanced manufacturing institutes, and referring to the role of universities within this initiative. William Bonvillian argues that when HE in the USA started to do research on the 4IR, the research was not applied to manufacturing technologies and production, as there was a disconnection between the two sides. As the productivity rate of the USA dropped in the early parts of the second decade of the 21st century,

the country implemented AMP, in which they assigned a leading role to the IHEs. One of the reasons why the productivity rate has dropped, is because the providers of resources, supplies, components, and R&D (research and development) outweighed the departments who had to do the distribution, sales, and repair, skewing the entire manufacturing system.

The big challenge in this regard is still for the IHEs to deliver. That is why the universities have started to work more closely with companies – using manufacturing institute-funded R&D. A college degree has been implemented for economic wellbeing (cf. Golden & Katz 2008), but nowadays it needs to be updated. Currently, the degrees which are presented, do not reflect the career needs and related skills for the 4IR world, and the capabilities taught are not well-tied to competencies needed in the workplace. Once again, it seems as if education is still *lagging*, even in the Global North.

In the second part of the book, we are looking at partnerships between universities, first local and international, and then intra-continental. Exchanging the classroom for a myriad of virtual spaces has prompted educators to rethink the curricula that they were presenting. New curriculum development includes moving content closer to the focus of the 4IR, implementing more scaffolding, making content and learning experiences more student-centred (Ehlers & Kellermann 2019), and assisting students to become self-directed, lifelong learners (Dennis 2020). Having IHEs done this on an individual basis in isolation would take a proverbial lifetime, and therefore Geesje van den Berg focuses on partnerships between IHEs in chapter 4. Participating in two successful partnerships between the University of South Africa (UNISA) and two international universities – the University of Maryland Global College (formerly known as the University of Maryland University College) and the Carl von Ossietzky University of Oldenburg in Germany – she narrates that there is actually 'strength in unity,' more intelligence encapsuled in partnerships, more enhancement in capacity, and more academic development in collaboration (cf. also Van den Berg, Joffe, & Porto 2016). As HE in South Africa was unprepared for the 4IR (Oke & Fernandes 2020), these collaborations assisted UNISA in creating a better educational strategy. A Certificate of Advanced Studies in Online Teaching and Learning at Master's level was offered to UNISA educators. Doing this course, staff members learned how to purposefully integrate technology into their curriculum. An international cohort of scholars were involved as presenters in this programme. All these contributed to getting the staff at UNISA more ready for handling and coping with 4IR demands, thus more ready to partake in this global initiative to get HE on par with the workplace.

Jackline Nyerere from Kenya gives examples in chapter 5 of how specific African academic institutions are working together to meet the needs of internationalisation, globalisation, and the 4IR. Apart from gaining new

knowledge, the students attain intercultural competencies, and bring back much needed scientific knowledge. The mobility of students is therefore encouraged. These issues have been discussed and applied to Africa during a meeting of the AU (African Union) in 2015 where they have decided to launch an initiative called *Agenda 2063: The Africa we want* (African Union Commission 2015). In this meeting the AU emphasised cutting-edge research and innovation, as well as sharing and learning from each other.

A big challenge that Africa faces, is that when its post-graduate students study overseas, they do not return home. This is specifically why East Africa started to encourage students to partake in the intra-regional African mobility, thus studying at another university *inside Africa*. Five countries constitute the EAC (East African Community), namely Burundi, Kenya, Rwanda, Tanzania, and Uganda. Nyerere discusses two IHEs in Kenya, namely the Kenyatta University and the USIU-A (United States International University – Africa). While the mentioned countries' universities focus on sending their students to universities of the EAC, they are also welcoming international students. The USIU-A, for instance, boasts with 15.3% students from various countries abroad, being above the target of 10% set for universities worldwide.

The last part of the book discusses disruptive ways forward for HE. David Ronfeldt and John Arquilla introduce this part, with chapter 6, calling for a rethinking of strategy and statecraft within the 4IR era. They elaborate on the way in which the threats and challenges to societies, institutions, and cultures should be dealt with – on a cognitive level, using an innovative kind of information-age statecraft, called 'noopolitik' – as a successor to 'realpolitik.' Realpolitik is used in 'hard' forms of power by getting an advantage over others, with a good example of Europe's colonisation of Africa. Noopolitik (from the Greek term 'nous' – *mind, thought, reason*), however, has an ideational approach to statecraft with a higher success rate.

This initiative does not leave room for one country to gain power over the other, but rather to create and establish a new way of thinking, an alternative approach to being real citizens of the earth within the 4IR. This way of thinking is slowly but surely 'invading' HE, as there are already quite a few universities and schools presenting programmes in grand strategy. It is rather imperative for curricula to be changed away from realpolitik to noopolitik – moving away from the military, economic, technological, and other geopolitical forces with a view on the past, and start grappling with ideational, cultural, social, and other noopolitical forces of the present and the future.

Joseph Evans Agolla refers to the 4IR as I4R (Industry 4.0 Revolution) in chapter 7, with Industry 4.0 of Germany at the back of his mind. Where Society 5.0 refers to a smart society, he refers to smart products (production), the

smart factory/manufacturing, as well as smart mobility and smart logistics, also in line with Germany's Industry 4.0. He discusses this disruptive trend within an African context. Agolla focuses on the preparedness of Africa and its responses to the I4R and ends his chapter referring to the ways in which Africa can effectively become part of internationalisation and globalisation.

Globalisation has caused education to stop focusing on local curricula and teaching-and-learning methods, and to focus on international knowledge and skills that would make the potential worker fit into any global work environment. Students are therefore motivated and invited to attend international interactive platforms of education – 'virtual classes' – to broaden their knowledge. As today's students are already part of the 'gig economy' (mostly entrepreneurs and freelancers doing short-term jobs, not working for a boss), it is imperative for them to equip themselves maximally with as much knowledge and skills as possible. Education therefore is the main determinant for a nation's competitiveness, adhering to the World Summit on Sustainable Development held in Johannesburg in 2002 (SDG 2002), implying that ESD (education for sustainable development) is imperative for Africa. ESD is meant to shape students socially, economically, morally, and politically, and to prepare them for a job anywhere in the world, being capable to adapt to the fluidity of the I4R.

The way forward for HE within the 4IR is further discussed by Hiro Saito in Chapter 8, reaching the same conclusion as mentioned above, that HE is lagging behind. However, the author points here to a vital situation/danger in which the 4IR is finding itself: Its impact on Earth. From the 1IR onward, technology has contributed to a drastic increase in CO_2 emissions on Earth and in the atmosphere. The result would be that Earth becomes uninhabitable. The WEF has, however, stated that the 4IR will be the first industrial revolution with 'an effective enabling environment' (WEF 2017:4). Will that be possible? Saito argues that HE should first address climate change before it responds to the needed changes for the 4IR (cf. Schwab 2021:145). Curricula should be developed to inform students and the broader public about the consequences of the 4IR on habitable Earth. This is where researchers will play such a vital role in providing the necessary knowledge to the people, indicating that they should not be gullible by postulating that the 4IR only has positive characteristics, over against the modernist positivistic faith in science and technology.

HE and the 4IR are important contributors towards the future of Earth. The theme of climate change, with the issue of geohistorical justice, should therefore be a crucial point on the agenda of HE, as most colonial powers refuse to compensate 'surviving victims of terrible and obvious wrongdoing' (Butt 2015:183). Geopolitical injustice opened the door for political-economic

inequalities and racism, still being rife. The continent that has suffered most from this is most probably Africa.

In the last chapter (9), Ignatius Gous focuses on enhancing learning methods for students. He argues that change in education as well as personal change need to happen more rapidly. However, especially in South Africa, HE is reluctant to become part of a changed environment. It seems as if HE got stuck in the 2IR (Second Industrial Revolution), making the classroom and guiding pedagogies of 2022 look very much the same as the classroom of 1922… or even 1822. This begs the question whether HE was in service of the 3IR (Third Industrial Revolution) at all.

Gous also has the conviction that Covid-19 caused a disruption in education (cf. also Harari 2020). With the commencement of the first wave of lockdowns, learners initially received 'emergency distance education,' but the educators soon realised that it was unsustainable. One reason was that it affected the learning behaviour of the learners. Gous then focuses on effective learning behaviour and narrows it down to *curiosity* – 'information seeking behaviour' – arguing that this kind of behaviour is needed within the world of the 4IR. Whereas curiosity is a common attribute of every person, educators must exploit it maximally to keep their students interested and engaged. In line with the core of the 4IR, education is about the acquisition of relevant knowledge. Because the appropriation of new knowledge happens almost daily, students must be motivated and trained to become self-directed lifelong learners.

According to the WEF (2018), the 4IR is an amalgamation of different technologies that blurs the boundaries between the physical, digital, and biological spheres on Earth. During the first three IRs, education played a vital and pivotal role (cf. Penprase 2018), therefore forming the foundation of transformations taking place in and during these revolutions. However, with the rise of the 4IR, education did not rise to the occasion. Education, and specifically HE, is still stuck within a semi-3IR space. In a sense, Covid-19 came to the rescue, forcing education to use available technologies and innovative resources to survive the lockdowns. Africa proved to itself and the world that this continent can rise to the task. However, the achievements and innovations must be expanded and new pathways explored, preferably by working together as a continent and with the assistance and support from the rest of the world.

Conclusion

The content of this book gives us a glimpse into a few initiatives from around the world and how it interacts with the 4IR. It also shows that HE has not yet come to the party in most cases and that IHEs will have to be creative and

willing to adapt to a *rapid change* mode if it wants HE to be fully part of the 4IR, revolutionary world racing towards a super smart society. With all the in-service training already taking place in big businesses (cf. Schroeder 2016:5) and with the 'gig economy' gaining more ground, HE must take care not to be declared redundant in society. The way forward is for HE to take hands with the 4IR and for IHEs to work together as an example of what can be done when an agenda of sustainable development is put into practice.

Can we successfully combine the 4IR, HE, and global initiatives? Well, the 4IR is described as a blurring of boundaries and a fusion of advances between numerous technologies, creating the perfect storm to pave the way for transformation (McGinnis 2020). This transformation is directly impacting on HE worldwide. Therefore, we as authors hope that the discussions and ideas put forward here, will stimulate, provoke, and create new and exciting ideas and actions that will enhance HE to lead society in positive transformation.

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