



Entrepreneurship education to improve the world: The role of the sustainable development goals to stimulate innovation in higher education

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Received: 1 July 2024 / Revised: 1 July 2024 / Accepted: 2 August 2024 /
Published online: 31 August 2024

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Abstract

This paper examines the role of the Sustainable Development Goals to guide university-wide entrepreneurship education programs that would help students develop skills and dispositions to innovate in addressing some of humanity's most pressing challenges. The paper discusses how universities are equipped to bring scientific and technological knowledge to bear in generating solutions to the challenges of climate change, poverty, violence, and those generated by artificial intelligence, and how growing calls for Universities to increase their relevancy in addressing these challenges create a context for a new higher education order guided by the purpose of becoming more socially embedded. The paper then reviews the role of entrepreneurship-based innovation in addressing these challenges and examines evidence suggesting greater effectiveness of university-based entrepreneurship education could contribute to the creation of the necessary entrepreneurship ecosystems to generate such innovation. It illustrates how comparative identification and analysis of diverse approaches to entrepreneurship education can stimulate the necessary innovation to augment the reach and effectiveness of university-wide entrepreneurship education programs. It reviews some of the efforts of entrepreneurship education in Asia and articulates how incorporating the SDGs and entrepreneurship education in university strategies, along with supporting curricular innovation and faculty development, can catalyze innovations that can help advance more sustainable and inclusive societies.

Keywords Entrepreneurship education · Education and Sustainable Development · Higher Education Reform · Socially embedded university · Education and Climate Change · Higher Education Innovation

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A time of extraordinary possibilities

The numerous challenges humanity faces in the first quarter of the twenty-first century, well known and much talked about, include climate change, poverty and inequality, polarization in societies, democratic decline, violence within and among nations, and the new challenges that will emerge from the development of artificial intelligence. Less talked about is the fact that we live also in times of great possibility to addressing these challenges. Technological advances create new opportunities to address some of these challenges, for example, AI and computing technologies can extend and personalize educational opportunities to learners of all ages and renewable energy can help mitigate the impact of climate change. The extraordinary connectivity that the Internet and mobile communications have allowed now enables the rapid sharing of knowledge across societies and across the world, including knowledge about these challenges and about options to address them. The higher levels of education of the population resulting from this expansion in educational opportunities and from the extensive communications networks available, have increased awareness of some of these global challenges, the interest in addressing them, and ideas about how to do so effectively. There is also growing awareness of global interdependence in facing these challenges, including economic interdependence, and on the need for planetary collaboration in addressing these challenges. Younger generations are increasingly interested in addressing environmental and societal challenges. There are a growing number of cross-national collaborations to address these challenges, from multilateral governmental organizations to private networks.

In summary, a convergence of technological opportunities, connectivity, growing awareness and will, and platforms for cooperation have created a pivotal context for progress against humanity's greatest challenges. This convergence shapes the larger context in which universities are now operating. There are, however, conundrums to be solved in advancing from recognizing the challenges to realizing the possibilities, and the solutions lay in educating greater numbers of people to understand the possibilities, to access knowledge and to develop skills and the dispositions to act on that knowledge, so they can be effective agents and leaders of the necessary change. Illustrative of the challenges resulting from superficial knowledge is the fact that while most people think they know how to reduce their environmental footprint, they are in fact unaware of the most impactful ways to do so (Skinner et al., 2021).

The role of universities in cultivating entrepreneurship to advance the UN sustainable development goals

Universities can help close this gap between recognizing the challenges and realizing the possibilities to address them by educating students so they can advance innovations that address them. At least since the creation of the modern university

of the enlightenment in 1811 by William Humboldt in Berlin, universities have been one of the institutions tasked to contributing to a world in which ordinary people can cultivate their critical reasoning skills so they can become architects of their own lives and contributing members of the communities of which they are a part. It is because of their power in advancing a world ruled by reason and a world in which such opportunities are available to all that the Universal Declaration of Human Rights adopted at the General Assembly of the nascent United Nations in December of 1948 explicitly refers to equal opportunity in access to higher education in article 26 which describes the universal right to education, in these terms:

“Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.”

This aspiration to expand access to higher education fueled much of the development of higher education over the last century. In effect, this goal became higher education’s major new purpose post World War II, animated by aspirations to deepen democracy along with the postcolonial emergence of newly independent nations. Whereas in 1900, access to higher education comprised about 1% of the population of university-aged students (about 500,000 students), a century later it had expanded to about 20% of the relevant cohort (about 100 million students) (Schofer & Meyer, 2005). In a study of the evolving mission of universities, Lars Engwall argues that the post World War II order of higher education, defined by the goal to expand access, has been exhausted, creating a need for a new set of goals animating universities in the third millennium (Enwall, 2021).

The search for this new higher education order has brought to the fore the role of universities in addressing societal challenges. Indicative of such heightened expectations for universities to become more relevant, the report of the first World Conference of Higher Education, convened by UNESCO in 1998, concluded:

“Relevance in higher education should be assessed in terms of the fit between what society expects of institutions and what they do. For this, institutions and systems, in particular in their reinforced relations with the world of work, should base their long-term orientations on societal aims and needs, including the respect of cultures and environment protection. Developing entrepreneurial skills and initiatives should become major concerns of higher education. Special attention should be paid to higher education’s role of service to society, especially activities aimed at eliminating poverty, intolerance, violence, illiteracy, hunger, environmental degradation and disease, and to activities aiming at the development of peace, through an interdisciplinary and transdisciplinary approach.” (UNESCO, 1998, 2).

UNESCO’s most recent report on the Futures of Education, elaborated by an international commission chaired by Ethiopia’s President Sahle-Work Zewde, gives universities a preeminent role in catalyzing a transformation of the culture

of education so that education institutions, at all levels, better prepare learners to address planetary challenges such as climate change, democratic backsliding, poverty and inequality, challenges to human rights and those created by artificial intelligence (UNESCO 2021). The report proposes greater integration of universities with the entire education ecosystem as one of the three catalytic levers of the transformations it proposes, and every chapter of the report explicitly addresses the role of universities in supporting the changes to the culture of education necessary to address the existential challenges mentioned. This contrasts with the previous two UNESCO reports on the futures of education, published in 1972 and 1996, which devoted relatively little attention to higher education (UNESCO, 1972 & 1996).

Alongside with these greater aspirations for the role of universities in addressing societal challenges, around the world universities and school systems are being questioned because they are not perceived as to be cultivating the skills needed to advance economic or social development. Entrepreneurial mindsets and skills, for example, are generally recognized as necessary to advance innovation and to create jobs. With respect to the development of entrepreneurial skills, the Global Entrepreneurship Monitor, an annual report of the state of entrepreneurship around the world which has been published over the last 25 years, identifies schools and universities as one of the least supportive conditions of entrepreneurship in Asia. Based on expert ratings of thirteen conditions necessary to support entrepreneurship, including finance, government policy, taxation, research and development, infrastructure, regulations, social and cultural norms, schools and universities receive some of the lowest ratings from experts. In China, for example, in a 10-point scale, entrepreneurship education in schools is rated as a 4, and in universities as a 5 (GEM 2023, 136), in Japan, entrepreneurship education in schools is rated as a 2 and in universities as a 4 (Ibid, 144), in South Korea, entrepreneurship education in schools is rated as 3.5 and in universities 4.5 (Ibid 172), and in Thailand, entrepreneurship education in schools is rated as a 3, and in universities as a 4 (Ibid 190). There is, however, variation across the countries included in the Global Entrepreneurship Monitor in how schools and universities are ranked in terms of their contribution to entrepreneurship, and this variation allows opportunities for learning from global experience. The countries in which universities receive the highest rankings include India, the Netherlands, Qatar, Switzerland, and the United Arab Emirates.

Even though university-based entrepreneurship education receives higher ratings than school-based entrepreneurship, universities seem to be making a relatively modest contribution to cultivating entrepreneurs in Asia. While the percentage of entrepreneurs who are university graduates is higher than the percentage of entrepreneurs who have not reached this level of education, about twice as many university graduates are entrepreneurs compared to nongraduates, this gap is arguably modest, considering the greater social advantages of those who reach university education and considering the relatively low percentages of entrepreneurs among university graduates. The level of total early-stage entrepreneurial activity for graduates in China is 9%, compared to 5% for nongraduates; in India it is 14% for graduates compared with 9% for nongraduates, and in Thailand it is 35% for graduates, compared to 15% for nongraduates (GEM, 2023, 71).

More intentional efforts to educate entrepreneurs, particularly with the skills and the dispositions to use business creation as an avenue to address grand societal challenges would be in line with the new demands placed in universities to stimulate innovation in addressing societal challenges and to educate students with the skills necessary to make economic and societal contributions in more demanding contexts. This would be responsive to the growing calls for institutions of higher education to reimagine their role in society and their mission to serve as catalysts ‘for a rapid, urgently needed and fair transition toward sustainability’ (UNESCO, 2022, 13).

In 1998, the concluding report of the first World Conference on Higher Education convened by UNESCO, stated that “developing entrepreneurial skills and initiative should become a major concern of higher education, in order to facilitate employability of graduates who will increasingly be required not only to be job-seekers but to become job-creators.” (UNESCO, 1998, 37).

Animating such reimagining of the role of higher education in society, the Sustainable Development Goals (SDGs), a framework toward a more inclusive and sustainable world adopted at the United Nations general assembly of 2015 offer a global compact to advance inclusive development. The seventeen goals have created a global epistemic community that shares a vision, language, and ideas to collaborate in advancing toward a more inclusive and sustainable world (Reimers, 2024a). The common language these goals provide enables communication and collaboration among governments, businesses and civil society organizations, universities, schools and school systems.

The Global Entrepreneurship Monitor now includes a section examining the extent to which entrepreneurs are aware of the SDGs and attempt to advance them as they create new businesses. The most recent report shows that a considerable percentage of early-stage entrepreneurs and established business owners around the world try to minimize the environmental impact of their business and to maximize the social impact, creating new jobs for young people and ensuring fair workplace conditions (GME, 2023, 80). The percentage of those starting or running new businesses who have identified a Sustainable Development Goal as a priority for that business is 60% in India, 73% in Thailand, and 75% in China and 30% in South Korea (GEM 2023, 61). However, even though in practice, many entrepreneurs attempt to advance one or more SDGs, the overall levels of awareness of the SDGs among entrepreneurs are low. In India, only 10% of the early-stage entrepreneurs and of the established business owners are aware of the SDGs, in China the figures are 35% for early-stage entrepreneurs and 51% for established business owners, in Thailand they are 37% for early-stage entrepreneurs and 25% for established business owners, and in South Korea they are 30% for early-staged entrepreneurs and 10% for established business owners (GEM, 2023, 83). This suggests that the integration of entrepreneurship education across the university curriculum, and the use of the SDGs as a framework to motivate entrepreneurial innovation, offer universities an opportunity to answer the growing demands for greater relevancy in addressing societal challenges.

While entrepreneurship education started in business schools, in the case of the United States in a course offered at the Harvard Business School in 1947 (Katz, 2003), at Harvard and elsewhere, entrepreneurship education has transcended the

curriculum of business schools to university-wide entrepreneurship education. A recent comparative study of entrepreneurship education concludes that university-wide entrepreneurship has grown over the last decade, in part stimulated by various agencies and initiatives, such as the Quality Assurance Agency for Higher Education in the United Kingdom, the Oslo Agenda for Entrepreneurship Education in Europe or the Association of Southeast Asian Nations (Xu & Mei, 2023a, 2023b, 236).

A university-wide approach to entrepreneurship education is well suited to the use of the SDGs as a framework to stimulate innovation through entrepreneurship because the seventeen Sustainable Development Goals are understood to be interdependent, so that addressing each of them impacts and requires action in others. This is fitting to the super complexity of the challenges they seek to address. No poverty, for instance, the first of the SDGs, is understood to be interdependent with other SDGs such as gender equity, education, climate action, or sustainable cities. A deep understanding of the root causes of these challenges, much less the generation of the innovation necessary to address them, eludes the disciplinary boundaries of traditional disciplines or professions. If entrepreneurship education remains the exclusive province of business schools, it is unlikely to generate the innovation based on deep knowledge of the root causes of super complex challenges that are the focus of the SDGs.

The SDGs are already reflected in many higher education institutions' mission and strategies. An innovative effort of the Times Higher Education (THE) provides an observatory of those global efforts of institutions of higher education, as they report the extent to which they are addressing these goals. Based on this information, THE has created a novel set of global rankings of universities, the *impact rankings*, which allow participating institutions access to the self-reported evidence describing the initiatives each institution is pursuing. There have been four rounds of impact rankings and over 1,406 institutions in 106 countries participated in the last round in 2022. Most of them also participate in the global academic rankings of THE, which involves over 1,799 institutions in 104 countries. Notably, a few of the institutions most highly ranked in the academic rankings have not participated in the impact rankings. Among the top 100 most highly ranked institutions, only 23 participated in the impact rankings, of those, only 11 had equal or better rankings in impact as they did in academics.

There are very few other contemporary examples of shared goals among so many nations, institutions and individuals, and fewer still examples of goals shaping higher education globally. The influence the SDGs are having in institutions of higher education represents an example of global adoption of a common set of goals to drive universities, comparable to the global diffusion of the tenets of the modern university of the Enlightenment, or to the idea of a liberal arts education, or to the goal of expanding access to higher education which animated the postwar order. However, in contrast to these other goals for higher education which were globally adopted, the diffusion of the SDGs is happening more rapidly, and the goals call for deeper challenges of institutional transformation. As mentioned, the interdependence of the SDGs runs across the way in which most universities organize academic units and departments, around disciplines. Furthermore, the SDGs explicitly set to animate action, whereas universities are typically organized to create and transmit

knowledge. This suggests that if universities are to embrace the SDGs as part of an emergent new order of higher education, this will have to involve new ways of thinking about the student experience, about the relationship between research and teaching, about how research is organized and about how to cultivate not just conceptual knowledge but procedural knowledge. In short, embracing the SDGs to make higher education institutions more relevant to the needs of society will require innovation. At the core of that innovation will be reimagining how we prepare students to develop skills to create and innovate in addressing these challenges. University-wide entrepreneurship education, animated by ambitious goals such as the SDGs, is an avenue to such innovation insofar as its goal is to cultivate the capacities of students to create novel solutions to problems. I am not referring here to entrepreneurship education as an activity narrowly designed to teach students the steps involved in creating a business. I am instead referring to the cultivation of an entrepreneurial mindset, a way of being able to generate solutions to unaddressed needs or challenges, which may result in the creation of a business, of other organizations, or of programs and solutions which can be sustained within an existing organization. For example, entrepreneurial approaches to innovate in addressing the SDGs will require deep study of the root causes of those challenges, and access to the best science and technology in developing such innovations.

There is much innovation taking place already in higher education with approaches to cultivate an entrepreneurial mindset which can inform further advances in this direction. The impact rankings have made globally visible some of those innovations in higher education which would have otherwise remained largely unknown. For example, Amrita University, a small private university established in 1994 in Coimbatore India, operating in seven campuses and offering 207 degrees to 18,000 students with 1,700 faculty, was recognized in the last round of the impact rankings as the most impactful university in India and the 41st most impactful university in the world, to a great extent because many of its programs focus on improving human conditions in rural communities and among the poor, and require that students spend part of their studies contributing to those efforts living in poor communities. Their teaching hospital in Kerala and allied institutions offered free medical treatment to 5.1 million patients and subsidized care to 300,000 patients in 2020. Illustrating the orthogonal relationship of academic excellence to social impact, in the world academic rankings also compiled by THE Amrita University places in the 801–1000 tranche and many other universities in India obtain higher rankings than Amrita.

The participation in this global effort helps higher education institutions make visible, in an integrated whole, their initiatives aligned with the SDGs and to articulate them with a university-wide strategy, thus supporting synergies across these efforts. The Instituto Tecnológico de Estudios Superiores de Monterrey (Tec), for example, the fifth most highly ranked university in Latin America (following the National Autonomous University of Mexico, the University of Sao Paulo in Brazil, the Universidad Andres Bello in Chile, and the Universidad de Campinas in Brazil) has integrated the SDGs in their institutional strategy, and developed periodic institutional reports of university initiatives aligned with the SDGs. Their strategic plan aims to support human flourishing, a process understood to require capabilities to

participate in multiple domains so that ‘each person can relate to the community and the environment to create a better world, with respect for human dignity.’ One of the pillars of the strategy is sustainable development, explicitly aligned with the SDGs.

There have been several efforts, led by university consortia, UN agencies and organizations of civil society, to support the alignment of higher education institutional strategies with the SDGs 2030 agenda. A recent example, the National Committee for the 2030 Agenda in Norway comprises primarily higher education institutions: the University of Oslo, the University of Bergen, the Norwegian University of Science and Technology (NTNU), the Norwegian University of Life Sciences (NMBU), the Arctic University of Norway (UiT), Universities Norway (UHR), and the National Union of Students in Norway (NSO). This committee reached out to UNESCO to propose, fund, and coordinate an independent expert group that would prepare a call for universities to align their work more intentionally with the advancement of the 2030 agenda. Their report, titled “Knowledge-driven actions: Transforming higher education for global sustainability” was presented at the UNESCO biannual conference on higher education, which took place in Barcelona in May of 2022. This conference itself, the third organized in recent years by UNESCO, is an effort to advance the SDG 2030 agenda in higher education.

The adoption of strategies to support university-wide entrepreneurial education to address ambitious goals such as the SDGs will require reimagining the student experience to develop a wider range of competencies, including deep knowledge of the disciplines and critical thinking skills, but also innovative and design skills, and the habits of mind of entrepreneurs. Elsewhere, I have explained how, with respect to helping address Climate Change, this will require more than knowledge about the science of climate change, or climate literacy, but skills to generate solutions, across a range of professions, which can help societies transition to a green economy (Reimers, 2024b). This need to rethink the instructional goals of higher education overlaps with similar demands from other quarters that universities better prepare students with skills that can help graduates contribute as economies are transformed, or to generate jobs for themselves and others. The cultivation of an entrepreneurial mindset is an avenue to respond to these varied demands.

Educating entrepreneurs to innovate in addressing complex challenges

It is now well established that entrepreneurship can be taught, even though the advancement of entrepreneurship requires a supportive ecosystem that transcends educational programs. A global review of entrepreneurship and training programs conducted by the World Bank, examining 230 program evaluations, found that these programs, which focus primarily on secondary or higher education students, tend to develop knowledge and skills to start a business. These programs focus on the development of mindsets and skills, such as self-confidence, leadership, creativity, risk propensity, motivation, resiliency, self-efficacy, awareness of entrepreneurship, and business skills (Valerio et al., 2014).

Entrepreneurship education programs encompass a variety of approaches reflecting ongoing dilemmas on the relationship between conceptual and procedural knowledge. The earliest approaches were traditional classroom lectures on concepts like business planning, marketing, finance, etc., or case-based teaching, relying on the methodology developed at the Harvard Business School, engaging students in discussions of actual cases of entrepreneurs. More recent approaches focus on procedural learning and include experiential learning, through project-based approaches such as business plan competitions, start-up incubators/accelerators, student consulting projects, or student run businesses with faculty support.

As mentioned earlier, entrepreneurship education has evolved from being housed in business schools to a more pervasive focus across the curriculum, embedding entrepreneurial perspectives and activities into disciplines such as education, engineering, arts, sciences, public health, and others.

A particular genre of entrepreneurial education are community-focused approaches in which students partner with local communities and NGOs to apply entrepreneurial solutions to social/economic issues, as in the example of Amrita University in India discussed earlier.

Even though systematic evaluations of the impact of entrepreneurship education are scarce, those that exist document positive impact (Valerio et al., 2014). In an evaluation of an entrepreneurship education program to teach high school students how to create a business in six countries in the Middle East—this was the Company program of Junior Achievement implemented by the organization Injaz, the regional branch of Junior Achievement Worldwide—my collaborators and I found reliable evidence that this program succeeded at producing significant development of a range of entrepreneurial skills and dispositions. In this study, conducted in 2010–2011, high school students in Egypt, Jordan, Lebanon, Morocco, Saudi Arabia, and the United Arab Emirates participated in groups of about 25 students over 4 to 6 months in an experiential project designed to mirror the life cycle of business creation and liquidation. Supported by a volunteer with business experience, the students developed a business idea and plan to execute it. Students then designed and produced their identified product or service and developed a marketing plan before selling their product within the community. Finally, students liquidated the assets of the company and closed the business. The study assessed the impact of participating in this entrepreneurship education program in eight dimensions of an entrepreneurial mindset and skills:

- Aspirations, views of self and of others
- Perceived self-efficacy.
- Educational aspirations
- Career motivations
- Interest in starting a business.
- Financial management knowledge
- Attitudes toward entrepreneurship and business
- Knowledge about entrepreneurship

The results of the study showed that, after participation in the program, the students' aspirations and sense of self-efficacy improved, as did their skills, knowledge, and attitudes toward entrepreneurship and their financial management skills. Their interest in starting a business increases in some, but not all countries (Reimers et al., 2018, 66).

As already mentioned, a growing trend is university-wide entrepreneurship education across the curriculum. At Harvard, for example, even though entrepreneurship education began in 1947 at the Business School, over the last decades it has extended to other schools across the university. For example, the President Innovation Challenge is an annual competition, sponsored by the office of the President of the University, in which students present projects with innovative ideas to address societal challenges. The teams of students participating in these competitions come from any school and department in the university, with projects often including members from different schools. Over the course of a year these teams participate in a multitiered selection process, receiving feedback and support along the way. There are similar innovation competitions in various professional schools at Harvard. In addition, the Harvard Innovation Lab provides workspace and support to students working in developing an innovative project or organization. Typically, those are independent projects of students, taking place outside their coursework. In addition, a number of courses across various departments and professional schools, including the undergraduate program, education, engineering, government, and public health teach students innovation and entrepreneurship. For example, I teach a course on educational innovation and social entrepreneurship at the Harvard Graduate School of Education in which students develop an innovative solution to an education challenge, and craft a business plan to support the organization that will sustain that innovation. The course requires students to work on their project for a semester, supported by readings relevant to educational innovation and to the development of an organization, while students are exposed to various examples of educational innovations and to the entrepreneurs who created them. The focus of the course is in helping students think deeply about the needs of those they seek to serve, to see those needs from their point of view, to do research on the root causes of the challenges they attempt to address, and to use the best available knowledge in the education field to come up with innovative approaches that stand a better chance of being successful and of achieving impact at scale. Students leave the course with an actual plan to create an organization to support their innovation and over the years students have worked on a range of education challenges around the world, from improving the quality of education in public schools, to advancing socio-emotional learning, to expanding the curriculum to include the arts, or STEM, to advancing global citizenship education, to addressing climate change, to supporting teacher quality, to creating new education models, to supporting students in accessing college, offering lifelong learning opportunities, etc. There are, in the Harvard Graduate School of Education alone, at least ten other courses that help students develop entrepreneurial knowledge and skills, and many more throughout the rest of Harvard University.

Entrepreneurship education in Asia

Countries in Asia would benefit from greater levels of entrepreneurship not just as a way to create jobs, which are needed, but also to advance innovation and address societal challenges. This will require not just more entrepreneurship education but more effective entrepreneurship education.

In spite of the ongoing efforts to include entrepreneurship in the curriculum of schools and universities, the level of entrepreneurial activity is low in Asia. For example, in China, only 7% of the adults run early-stage business and under 5% are established business owners. In India these figures are around 13%. Entrepreneurial activity is higher in Thailand, with 24% of adults as early-stage entrepreneurs and 11% as established business owners (GEM 2023, 46). A relatively small percentage of the population plans to start a business over the next three years in China 5%, compared to 20% in India and 30% in Thailand (GEM 2023, 43).

More effective entrepreneurship education will require more than the fundamentals of understanding business creation, but also cultivating the dispositions to take risks. In many countries, a large percentage of people, even when they see good opportunities to start a business, would not pursue them because of fear they might fail. In Thailand, this is true for 45% of the population, in India, the percentage is over 60% and in China it is 65% (GEM, 2023, 42).

Entrepreneurship education has been growing significantly across Asia in recent decades as the region experiences rapid economic development and a growing middle class and as Asian economies transition from labor-intensive to more innovation-driven models, the demand for more educational opportunities that cultivate an entrepreneurial mindset and support new business creation will likely increase. Many universities in Asia now offer entrepreneurship courses, minors, and even majors to equip students with skills like opportunity recognition, business planning, financing, and managing growth (Kuratko, 2005; Othman & Othman, 2019, Thomas & Kelley 2012). The following examples illustrate the growing priority assigned to entrepreneurship education in the region:

China: Entrepreneurship education is a priority, with over 500 university-level programs now available. Government programs support entrepreneurship training at all education levels (Zhou et al., 2012).

India: Entrepreneurship development programs are offered widely by universities, NGOs, and private training providers. Government initiatives promote entrepreneurship as a career path (Kuratko, 2005).

Singapore: Programs focus on innovation and high-growth venturing. Government agencies coordinate support across education and business acceleration programs (Yu et al., 2017).

South Korea: Government-backed initiatives promote university-industry collaboration and technology commercialization. Incubators and accelerators support student and faculty start-ups (Ahn, 2023).

Malaysia: Public universities have launched entrepreneurship centers and degrees. Vocational colleges integrate entrepreneurship into technical training programs (Harun et al. 2023).

Japan: While entrepreneurship education is less developed than in other Asian nations, some leading universities now offer entrepreneurship-focused degrees (Wu et al. 2017).

There is a wide variation in how entrepreneurship education is pursued in universities across the region. Many universities offer standalone entrepreneurship courses that teach topics like opportunity identification, business planning, financing, etc. This is the most common approach used across Asia. (Kuratko, 2005; Othman & Othman, 2019; Zhou & Xu, 2012). Some universities offer entrepreneurial pathways in the form of minors or concentrations in entrepreneurship that allow students to take a structured set of entrepreneurship courses. This is popular in countries like China, India, and Singapore (Kuratko, 2005; Xu & Mei, 2023a, 2023b; Yu et al., 2017; Zhou & Xu, 2012). Some of the leading universities now offer undergraduate and graduate degree programs in entrepreneurship. For example, National University of Singapore has an undergraduate entrepreneurship major (Yu et al., 2017). There are also examples of experiential approaches such as business plan competitions, start-up incubators/accelerators, and student venture funds provide practical experience. These are more prevalent in countries like China, Singapore, and South Korea (Ahn, 2023; Xu & Mei, 2023a, 2023b; Yu et al., 2017; Zhou & Xu, 2012). There are also examples of university-industry collaboration in which programs encourage collaboration between students/faculty and private sector companies through projects, internships, research commercialization. These are common in South Korea, China, and Singapore (Yu et al., 2017; Xu, 2023, Zhou & Xu, 2012).

Less prevalent in Asia are approaches to entrepreneurship education which use the SDGs as a framework to stimulate innovation, as proposed in this paper. Similar to Harvard's President's Innovation Challenge, there are competitions that challenge students to develop venture ideas that address specific SDGs like poverty, health, and education. These are popular in India, Indonesia, and the Philippines. In Malaysia and Thailand, incubators and accelerators support student start-ups focused on SDG areas like sustainable agriculture, renewable energy, and financial inclusion (Haru et al. 2023). With support from UN agencies, China and India have established SDG entrepreneurship hubs which provide training, mentorship, and funding for entrepreneurs pursuing SDG-aligned business models (Shukla et al., 2022; Xu & Mei, 2023a, 2023b).

Additional challenges of university-based entrepreneurship education in Asia germane to the discussion in this paper include, an excessive focus on business schools, rather than university-wide and lack of qualified faculty (Kuratko, 2005; Xu, 2023; Zhou & Xu, 2012), heavy reliance on pedagogical approaches emphasizing conceptual knowledge, over procedural knowledge, more emphasis on theoretical understanding than on experiential learning (Thomas & Kelley 2012, Zhou & Xu, 2012). There is also limited interaction between universities and industry (Thomas & Kelley 2012; Xu, 2023; Zhou & Xu, 2012).

Concluding thoughts

Universities are increasingly called to demonstrate the value they add to society, their relevance, and are uniquely positioned to help address some of humanity's most vexing challenges. University-wide entrepreneurship education, animated by ambitious goals such as those reflected in the United Nations Development Goals, offer a promising pathway to a new order for higher education in which universities play a crucial role in the innovation ecosystem that will help advance human flourishing and address our existential challenges.

To realize these possibilities, university strategies should more explicitly support a variety of approaches to entrepreneurship education across the curriculum, and develop faculty capacity, building on ongoing efforts but also stimulated by comparative analysis of the variety of institutional practices around the world which show institutions already leading the way. There are already tools that facilitate accessing such global experience, such as the impact rankings of the Times Higher Education or the awards for innovation as 'Outstanding Entrepreneurial Universities' in the UK and Ireland and in the Arab World which recognize university-wide entrepreneurship innovation, which the Times administers and there are examples of the contributions of institutional networks, accrediting agencies and international organizations stimulating such innovation.

It will be especially important that these efforts leverage the power of entrepreneurship to advance innovation in addressing super complex challenges, such as climate change, or poverty reduction, and to do this they should support deep and rigorous study across the disciplines, and access to systematic scientific knowledge and technology in addressing those challenges.

While more knowledge and skills that empower students to change the world will be, in and of themselves, insufficient to create a vibrant innovation ecosystem that tackles our vexing challenges, they are a critical necessary element, and one that over time will also shape more entrepreneurial cultures and societies.

Entrepreneurship Education to Improve the World. The role of the Sustainable Development Goals to stimulate innovation in Higher Education.

Declarations

Conflict of interest The author states that there is no conflict of interest.

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