

The entrepreneurial university as an engine for sustainable development

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Abstract

This study adopts a novel approach of conceptualising entrepreneurial universities through the lens of the UN Higher Education Sustainability Initiative (HESI). Transcending the narrow approach of the entrepreneurial universities as generating spin-offs, entrepreneurial universities are closely linked with the concept of sustainable development. Interpreting entrepreneurial universities as agents promoting economic, social and environmental change, the HESI can offer a useful framework for expanding the potential of entrepreneurial universities. This study reveals that whilst the majority of HESI signatories only commit to a limited number of Sustainable Development Goals (SDGs), there is sufficient evidence of 'best practices' to regard the HESI as a useful and transformative framework for HEIs that can encourage innovation and entrepreneurship. To this extent, this paper aims to

capture the interaction between entrepreneurial universities and the SDGs. However, the paper draws attention to the need for a holistic approach for HEIs that allows for more transdisciplinary thinking and collaboration. It is revealed that this can be challenging for HEIs.

Keywords:

entrepreneurial university; sustainability; higher education sustainability initiative; HESI; sustainable development goals; SDGs; entrepreneurship.

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Introduction

The Higher Education Sustainability Initiative (HESI, 2017a) sets the foundations for the embracement of the Sustainable Development Goals (SDGs) by universities and motivates them towards their sustainable transformation, enabling strategies in a wide spectrum of activities: research, teaching, campus practices and interaction with industry. To this extent, Etzkowitz's (2004) approach of the entrepreneurial university as an interactive and independent social player which generates partnerships with industry and government is aligned with the principles of the HESI. The presented conceptual framework in this paper will contribute to better defining the new notion of the entrepreneurial university through the lens of sustainable development.

The HESI was established in 2012 to assist HE providers in contributing to the SDGs; and one progress evaluation shows that 73% of 272 commitments made by HEIs indicated partial progress, either directly or indirectly; 18% hadn't demonstrated any progress and 9% could not be determined (HESI, 2014; see also ECOSOC, 2017). Moon *et al* (2018) provided an updated review of progress to find that the modal HESI signatories had only committed to achieving SDG#4. This paper further

reviews the progress in comparison with the SDGs Index (2018) and identifies both best practices and challenges.

Moving beyond the common but narrowed-down approach of the entrepreneurial universities focusing on spin-offs, this paper advocates that entrepreneurial universities as HEIs can be considered to be a key catalyst for a sustainable society (IARU, 2016). Indeed, HEIs may serve as institutional moral reinforcers (Hanson *et al.*, 2017) and be subject to legitimacy risks if significant issues in society are not effectively pursued (Snelson-Powell *et al.*, 2016).

This suggested approach of blending entrepreneurial universities with a wider social mission was highlighted recently by Ratten (2017) who points to the importance of communities, people and places towards this direction. HEIs, though, can face formidable challenges with integrating sustainability into their governance and operations (Ferrer-Balas, 2008; Fleaca, Fleace and Maiduc, 2018). Moreover, interpreting Mindt and Rieckmann's (2017) study through the concept of the entrepreneurial universities (Etzkowitz, 2004), there is a need for a sustainable orientation which leads to sustainable entrepreneurial universities. Indeed, sustainability has to be adopted in the core of the activities generated by the universities; and the aim of this paper is to offer first insights of how a transformation toward the sustainable entrepreneurial university can be achieved.

Following this introductory section, this paper develops a conceptual framework which is based on the recent literature. The methodological approach of investigating the metrics of the SDGs Index is followed by the findings of the statistical analysis. Finally, discussion and concluding remarks are presented.

Theoretical framework

The adoption of sustainability oriented strategies by universities faces constraints (Velazquez *et al.*, 2005) as the embracement of such initiatives can be prevented by governance issues (Rasche *et al.*, 2017). Indeed, the *governance implications* can impact the sustainability initiatives and the adoption of the SDGs (Moon *et al.*, 2018; Bauer, *et al.*, 2018). The obstacles to integrating a wider sustainability strategy is aligned with Etzkowitz's (2014, 2016) highlighted challenges of the entrepreneurial universities towards serving a social mission and becoming engines of growth. Snelson-Powell *et al.* (2016) conclude that failure to implement sustainability could subject [HEIs] to legitimacy risks, if the lack of operational engagement is later exposed. Thus, the recommendations offered by Mader and Rammel (2015), Rashe *et al.*, 2017, Moon *et al.*, 2018 and Baur *et al.* 2018 provide an important agenda for change in HEIs.

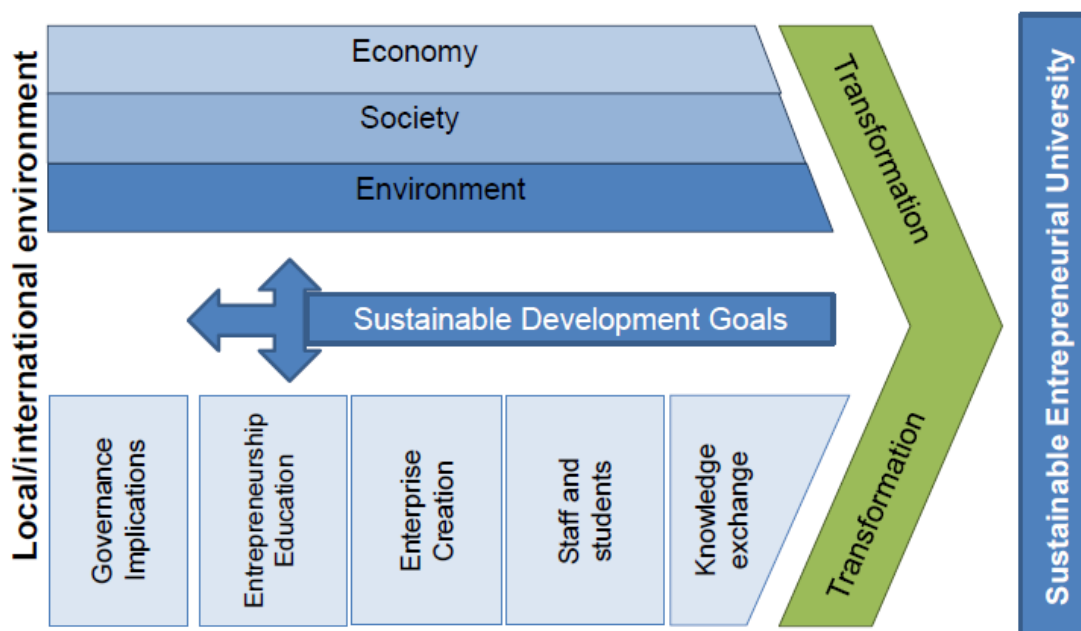
Another dimension is what Dawe *et al.* (2005) mention in a report for the Higher Education Academy (HEA) concerning sustainability 'literacy' of students in different academic disciplines over a six-month period. This supports the dimension of the *staff and students* as fundamental elements of the entrepreneurial university. The current sustainability approach is typically limited to "add-on" modules to traditional entrepreneurial teaching (Wyness *et al.*, 2015) and this raises questions on how an effective platform can be created. The element of *staff and students* is the internal driver of achieving a sustainable transformation as there is a need for an organisational culture which will be commonly accepted. Indeed, academic staffs play an important role towards the goal of an entrepreneurial university (D'este and Perkmann, 2011). Undoubtedly, there is a need for systematic change at all levels (Mader and Rammel, 2015).

This highlights the importance of taking a more holistic approach to governance, and the significance of academic-business partnerships and *knowledge exchange* (Etzkowitz, 2003; Etzkowitz and Klofsten, 2005). Thus, the interaction between the *local and international environment* through the lens of the SDGs has to be enhanced; highlighting the importance of external factors towards the entrepreneurial university. Threcher *et al.*, (2014) support this interaction through the notion of "co-

creation for sustainability” highlighting the essential parameter of more advanced interaction. Universities can act positively towards advancing and promoting sustainability based on the needs of the region that they are acting in (Stephens *et al.*, 2008). Indeed, the interaction between the HE sector and the region can lead to sustainable transformation (Whitmer *et al.*, 2010) and supports our conceptual framework developed below. In addition, the university can be an active actor in a regional social network which promotes prosperity in *economy, society* and *environment* (Apostolopoulos and Liargovas, 2018).

Considering the fact that entrepreneurship can be a transformative driver towards the SDGs (Apostolopoulos *et al.*, 2018a) and that entrepreneurship education can lead to sustainability (Wyness *et al.*, 2015; Lans *et al.*, 2014; Lourenço *et al.*, 2013; Ekankumo and Kemebaradikumo, 2011), we propose below *enterprise creation* and *entrepreneurship education* elements of our conceptual framework towards the sustainable entrepreneurial university. The OECD (2012) sets at the core of the entrepreneurial university the need for more self-assessment tools such as the one we provide.

Fig.1: Sustainable Entrepreneurial University Framework



However, the impact of pedagogical interventions on both enterprise and sustainability outcomes is less clear due to numerous intervening variables (Wals, 2013; Rasche *et al.*, 2017; James and Schmitz, 2011; Moon *et al.*, 2018). In fact, there are tensions between the goals of traditional enterprise and entrepreneurship education and education for sustainable development. That is, economic growth and the exploitation of resources (self-interest) can be encouraged/discouraged by some faculty; and limiting growth and conserving resources (sustainability) could be encouraged/discouraged by other faculty (Moon *et al.*, 2018). Aragon-Correa *et al.* (2017) also highlight these tensions and this is why the above conceptual framework can act as an assessment tool for the universities towards the sustainable entrepreneurial university i.e. one that is actively and authentically transforming itself. Active, collaborative, problem-based, experiential and interdisciplinary approaches can all be a part of this approach; with academic-business partnerships seen through a more entrepreneurial lens, leading to more entrepreneurial and concomitantly sustainable universities.

Certainly, entrepreneurial activities should be embedded through a wide spectrum of activities to cultivate an entrepreneurial spirit (e.g. Clark, 2001; Kirby, 2005; Gibb and Hannon, 2006). The most recent review of progress with the HESI was in July 2017 (HESI, 2017b) in New York and in

conjunction with the 2017 Global Forum for Responsible Management Education. Results indicate that some HEIs are now working more actively with business on the SDG agenda. Still, many HEIs are lagging behind (Moon *et al.*, 2018). Mindt and Rieckmann (2017) conclude that ‘To date, there is no comprehensive literature review dealing with teaching-learning approaches and methods of higher education for sustainability-driven entrepreneurship’. Undoubtedly, the HEIs as they are striving to become more entrepreneurial to serve a social mission have caused a positive change to the expectations of their business partners (Rubens *et al.*, 2017). However, this paper seeks to highlight the new avenue and defines the concept of the sustainable entrepreneurial university; *the sustainable entrepreneurial university embeds the Sustainable Development Goals in all its activities and assumes the role of a key player in shaping economy, society and environment at both local and international levels.*

To summarise, this study aims to:

- 1) Contribute to the ongoing discussion surrounding HEIs’ contribution to meeting the SDGs by exploring the impact of the integration of the SDGs through HESI and analysing variables from the SDGs Index towards sustainable entrepreneurial universities.
- 2) Provide a first theoretical framework of the interaction between entrepreneurial universities and the SDGs, something currently absent in the literature.

Methodology

The following analysis relies on secondary data made available by the Sustainable Development Solutions Network in collaboration with the Bertelsmann Stiftung (<http://sdgindex.org/>). The data underpinning their 2018 SDG Index and Dashboards Report relies itself on a number of sources (e.g. WHO, UN, ILO, OECD). Our analysis is primarily concerned with seeking to understand whether correlation exist between a number of independent variables (as outlined below) and our key dependent variable ‘Global Index Score’. The index score runs from 0-100 and signifies a country’s position between the worst (0) and the best on target (100) outcomes. Thus, a country that scores 50% on the index is halfway to achieving the optimal outcome across all 17 SDGs. We tested five correlations:

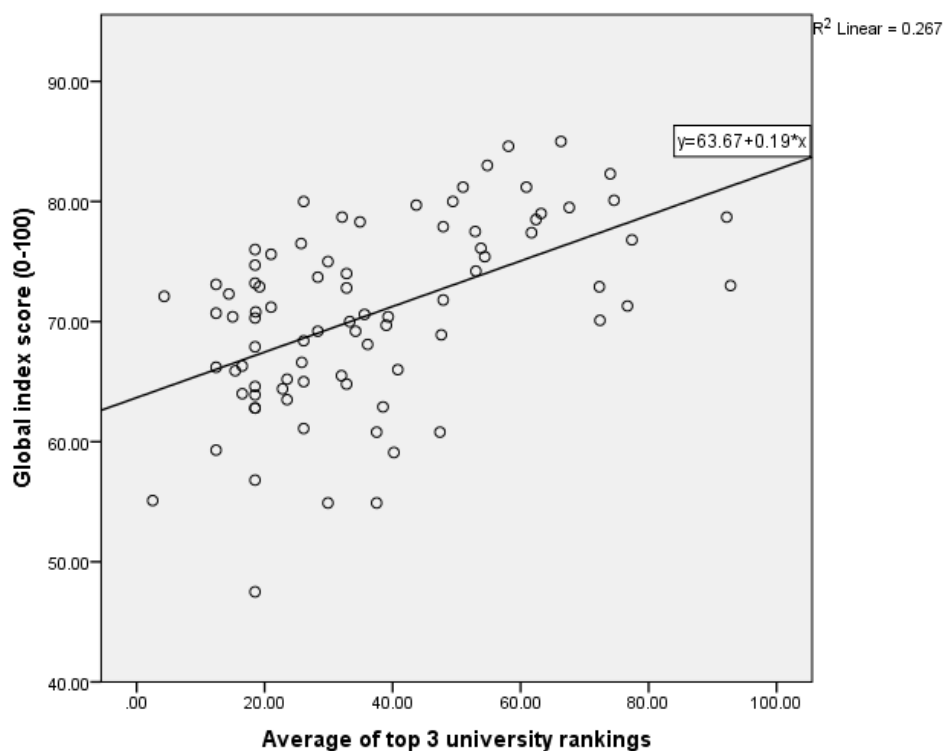
- Global Index Score (dependent variable) and Average of Top 3 University Rankings (independent variable);
- Global Index Score (dependent variable) and Scientific and technical journal articles (independent variable);
- Global Index Score (dependent variable) and Health and Education Spending (independent variable);
- Government R&D Expenditure (%GDP) (dependent variable) and Global Index Score (independent variable);
- Government R&D Expenditure (%GDP) (dependent variable) and average top 3 university rankings (independent variable).

All correlation are statistically significant at the 0.01 level. Moreover, the data are interpreted through the lens of the HESI signatories and their commitment to specific goals.

Findings

We used the data underpinning the 2018 SDG Index to help us understand the correlation between education, broadly speaking, and the existence of a strong HE sector specifically, as well as the achievement of SDG targets at a country level. Overall our analysis confirms that there is a positive correlation in the data between the existence of a strong HE sector and progress towards the SDGs. We acknowledge however that the correlation is in most cases weak ($r < 0.5$) and draw attention to only limited linearity of most of the correlations. Thus, the results are tentative but do go some way in confirming the assumed correlations. The existence of a strong HE sector is related to achievement of SDGs (Figure 2). This is important not so much in the sense that we can be sure that universities are drivers of the sustainability agenda, but more that the data did not conflict with this assumption.

Figure 2. Correlation between Global Index Score (dependent variable) and Average of Top 3 University Rankings (independent variable)



Pearson correlation coefficient = 0.517

We would assume given the results under of the correlation between Global Index Score and Average of Top 3 University Rankings that the correlation between Global Index Score and Scientific and technical journal articles (Figure 3), i.e. productivity in producing scientific and technical journal articles and achievement of SDG targets, would also hold and indeed this was found to be the case. This strengthens the case therefore for the role universities may play in driving the sustainability agenda further.

Correlation between Global Index Score and Health and Education Spending (Figure 4), that between spending on health and education, which we could take as a measure of Human Capital, and the achievement of SDG targets moves us into somewhat broader territory than a pure focus on the role of universities. Unsurprisingly perhaps, the broader focus results in a less obvious linear correlation and with it a weaker 'r' value at 0.473.

Government spending on R&D (Figure 5) as a proxy for levels of innovation and entrepreneurship should, if our assumption surrounding the role of entrepreneurship as driving the sustainability agenda is correct, be related to achievement of SDG targets. Here a review of the scatter plot is useful as it indicates fewer deviations from the regression line the higher the proportion of government spending on R&D. In other words, where this spending is less than approximately 1% then no correlation to achievement of SDG targets is discernible. However, once government spending rises above 1% the correlation is clearer.

To further test the assumptions, we compared scores on government R&D expenditure and average of top 3 university rankings (Figure 6). The assumed correlation is positive, i.e. the more a government spends on R&D, the stronger a country's HE sector should be (with the HE sector benefiting from the R&D disbursements). Our data confirmed this correlation, and indeed this was the strongest correlation demonstrated in our analysis at $r = 0.721$.

Figure 3. Correlation between Global Index Score (dependent variable) and Scientific and technical journal articles (independent variable)

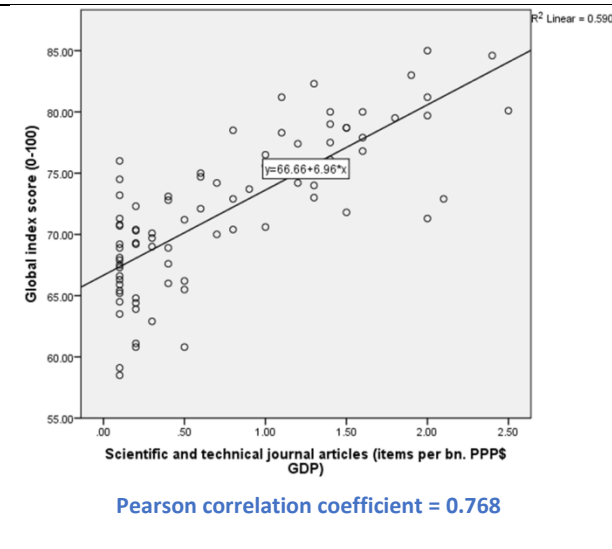


Figure 4. Correlation between Global Index Score (dependent variable) and Health and Education Spending (independent variable)

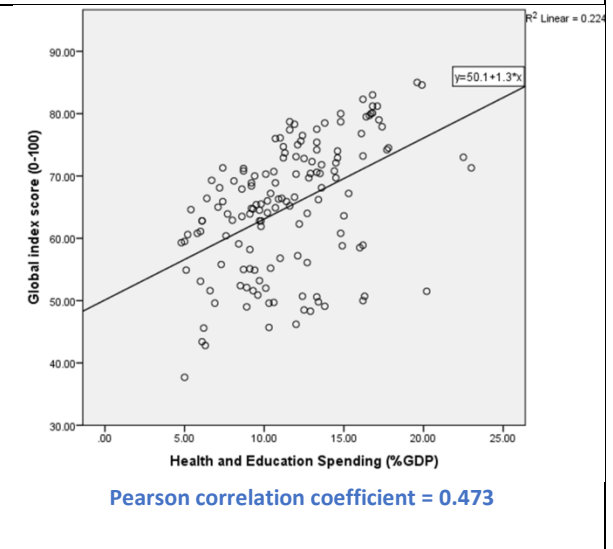


Figure 5. Correlation between Government R&D Expenditure (%GDP) (dependent variable) and Global Index Score (independent variable)

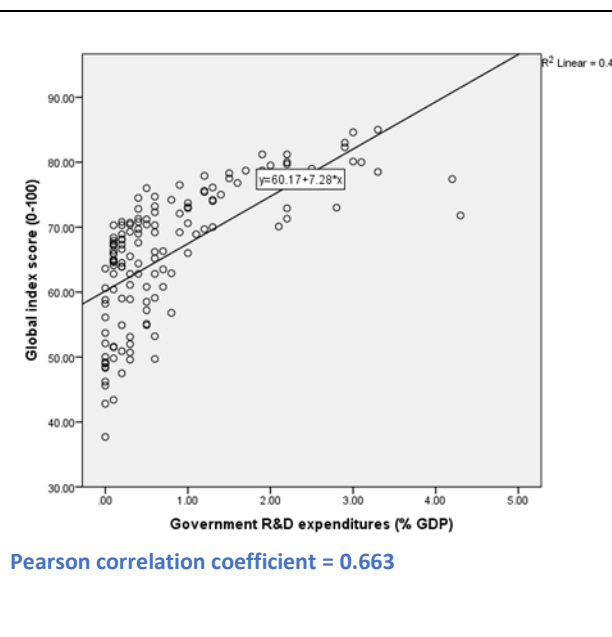
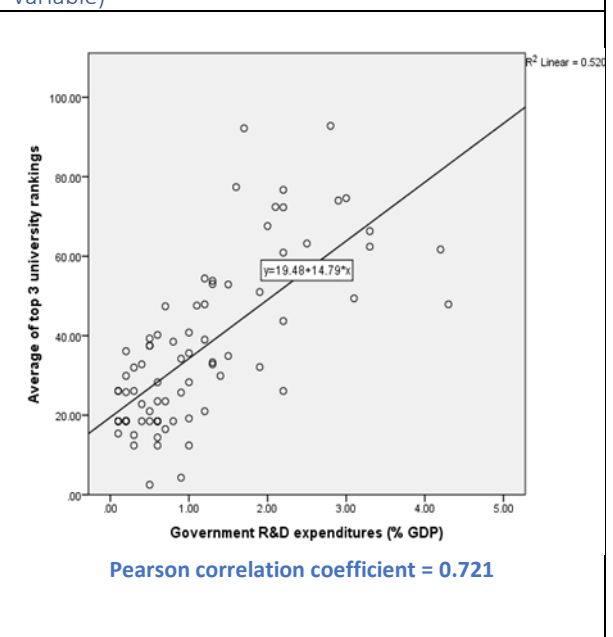


Figure 6. Correlation between Government R&D Expenditure (%GDP) (dependent variable) and average top 3 university rankings (independent variable)



Again, we recognise the tentative nature of these findings and yet none conflict with the assumptions made in terms of a strong, innovative HE sector being a driver of sustainability. SDG achievements at a country level will of course depend on numerous factors. However, the data are, we would argue, encouraging for those who advocate a greater role for entrepreneurship education and its aim to develop more enterprising and innovative graduates, who are able to identify new means to achieve the end of creating a more sustainable society. The findings reveal the complexity of the interaction between entrepreneurial universities and SDGs. It seems that the role of the entrepreneurial universities has to be advanced in order to be committed to more SDGs and move beyond the SDG#4 Education.

Discussion

Over 300 HEIs have signed the UN Higher Education Sustainability Initiative. Nevertheless, research by Moon *et al.*, (2018) found that the majority of HEIs have only committed to achieving SDG#4. Education and HEIs are facing numerous challenges and obstacles in implementing the SDGs. This paper shows that connecting the SDGs to the concept of the entrepreneurial university could be an effective driver to overcome such challenges and obstacles.

Thus, only a small proportion of HEIs are taking a holistic approach to implementing the SDGs. HEIs such as Ashridge Hult now report against all 17 SDGs; and, outside the HE sector, businesses such as BASF have operationally committed to achieving all 17 SDGs. However, these are the exceptions.

Undeniably, sustainable development has local dimensions (e.g. Apostolopoulos and Liargovas, 2016; Liargovas and Apostolopoulos, 2016; Ferry and Eckersley 2016; Liargovas and Apostolopoulos, 2014a; Liargovas and Apostolopoulos, 2014b; Salvati and Zitti, 2008); and, as a consequence, universities have to be more actively involved as key stakeholders to address complex processes towards sustainable development (Apostolopoulos and Liargovas, 2018). This will help universities to attract the necessary funds and advance knowledge exchange with society. Tackling this issue is more urgent than ever as recent studies have shown: (1) the interaction between social entrepreneurship and community resilience can be a positive one through a different culture of growth (Apostolopoulos *et al.*, 2018c); and (2) SMEs can implement more advanced green strategies in terms of intention if they have the necessary knowledge (Liargovas *et al.*, 2017b) or the institutional framework is supportive towards sustainable prosperity (Liargovas and Apostolopoulos, 2017). According to Schulte (2004), entrepreneurial learning should span across disciplines in order for the goals of the entrepreneurial university to be achieved. For example, a more advanced entrepreneurial philosophy can be cultivated towards reducing gender gap (Kakouris *et al.*, 2017, 2018). Entrepreneurial universities can be drivers of this cultivation contributing to SDG#5 in which it seems that a better performance can be achieved.

Without doubt, an entrepreneurial university and its activities can increase students' entrepreneurial intention (Palalić *et al.*, 2017), and thereby society can benefit.

This is also why the learning environment of entrepreneurship programmes has to be assessed with specific tools (Apostolopoulos *et al.*, 2018b). This is especially true for enterprise and entrepreneurship education, which is designed to enable the entrepreneurs of the future. Educational guidance has previously stated the need to develop *awareness* of social, economic and environmental factors (QAA, 2015). More recently though there is recognition that ethical and sustainable thinking is a *core competence* (QAA, 2018). And Moon *et al* (2018) have conducted a pilot of a new tool to measure 'sustainability mindset'.

There is an increasing recognition that all graduates need to be prepared to make a strong contribution to a sustainable society (TEF, 2017). What has been lacking though, within most HEIs, is the holistic approach that relates the need for changes to teaching practices across all disciplines. This is why the transition to an entrepreneurial university demands moving beyond the traditional concept of the university (Etzkowitz, 2004).

Conclusions

The SDGs Index and the data that underpin it are a valuable metric of the road towards entrepreneurial universities and by implication achievement of the UN SDGs. Additionally, UN HESI has been shown to be a valuable tool for adopting the UN SDGs in HEIs and can also serve as a useful framework towards developing more entrepreneurial universities. However, the SDGs Index can include more variables regarding the contribution of the HEIs towards the SDGs. This paper has

reviewed the developments surrounding the interaction between higher education and SDGs. The entrepreneurial university, we argue, can manifest itself in more than simply a series of commercial spin-offs. Rather, it can do so by demonstrating commitment to the SDGs, thereby becoming a driver of positive social and environmental change. Consequently, despite the fact that the literature on entrepreneurial universities focuses on commercialisation of knowledge (Mascarenhas *et al.*, 2017), this paper advocates that the transition towards the entrepreneurial university should be built upon the foundations of a wider social and environmental mission; and as a consequence evolve HEIs into sustainable entrepreneurial universities.

Whilst HEIs are clearly part of the education industry and education is critical to sustainable development, there is concern that certain HEIs have selected SDG#4 out of mere convenience or for marketing purposes. Achieving educational targets should be ‘bread and butter’ for educational institutions such as HEIs. Some HEIs have committed to a broader range of SDGs e.g. Ashridge Hult has committed to achieving all 17 SDGs. And several HEIs have identified academic-business partnerships as evidence of best practices. Nevertheless, these examples are in the minority, which raises concerns that the governance of HEIs is not fully committed to achieving the SDGs. Thus, numerous HEIs are still at the stage of simply providing courses in sustainability but not fully integrating them across disciplines, nor addressing sustainability practices in a holistic way towards a sustainable entrepreneurial university.

Perhaps it is time for other HEIs to transform or reform, in this way, in order to fully realise the transformative potential of the SDGs cited by Stevens and Kanie (2016). Towards that direction, students’ entrepreneurial intention can be influenced by the activities of the entrepreneurial university (Palalić *et al.*, 2017). Thus, the intention of future leaders is being influenced by our current failure to develop as entrepreneurial and sustainable universities. Another recommendation is the introduction of distance-based programmes; but, these programmes should satisfy students’ motives and distance-based learning journey (Liargovas *et al.*, 2017a) which can promote the international role of the sustainable university across the globe. A third recommendation is government R&D expenditures to target the transformation of the universities to sustainable entrepreneurial universities boosting academic work and higher commitment to SDGs. A fourth recommendation, which highlights future research avenues, is the need for developing more advanced assessment tools of the contribution to the SDGs by the universities. After the Research Excellence Framework (REF) and Teaching Excellence Framework (TEF), the under discussions Knowledge Excellence Framework (KEF) should be moved forward setting sustainability and entrepreneurship in its core.

In conclusion, the journey towards the sustainable entrepreneurial university can only been achieved if all activities are serving specific SDGs; and the universities commit to achieving substantially more SDGs.

Acknowledgement

This study was supported by the Enterprise Education and Research Project Fund (EERPF), 2017/2018, The UN Sustainable Development Goals and enterprise and entrepreneurship education – innovation, potential and progress.

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