Article

Universities as the engine of transformational sustainability in delivering against the Sustainable Development Goals: Living Labs for Sustainability

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Abstract: Universities can do more to deliver against the Sustainable Development Goals (SDGs), working with faculty, staff and students as well as their wider stakeholder community and alumni body. They play a critical role in helping shape new ways for the world, educating global citizens and delivering knowledge and innovation into society – universities can be engines of societal transformation. Here, using a case study approach, different ways of strategizing sustainability in a university setting are explored with an example from the UK, Europe and USA. The first case is a public UK university that adopted enterprise and sustainability as its academic mission to secure differentiation in a disrupted and increasingly marketized global higher education sector which then became a source of inspiration for change in regional businesses and the local community. The second case study is a business sector-led sustainability-driven transformation working with a private university in Bulgaria to catalyze economic regeneration and social innovation. Finally, the case of Harvard's Office for Sustainability engagement program is given to show how this approach connects faculty and students with institutional sustainability plans and external partners. Each case is a living lab, positioning sustainability as an intentional strategy. Leadership at all levels, and by students, was key to success in acting with purpose. Partnerships *within* and *with* universities can help accelerate delivery of the SDGs, with higher education making a fuller contribution to sustaining the economic, cultural and intellectual well-being of our global communities.

Keywords: University and Higher Education; Sustainability; Change and Transformation; Sustainable Development Goals; Living Labs.

1. Introduction

We face global environmental, social and economic challenges, approaching a tipping point that threatens to overstep our planetary boundaries. In 2015, 193 countries came together to define and adopt the Sustainable Development Goals (SDGs) – the first agreed actionable agenda by the global community for all citizens [1]. Given that higher education institutions are locally rooted and globally connected, they have significant opportunities to deliver against the SDGs, working with faculty, staff and students as well as their wider stakeholder community and alumni body [2]. As Jeff Sachs (Director, UN Sustainable Development Solutions Network) said "Advancing the SDGs is the 'moon shot' for our generation." [3]. Sustainability is a goal for today, with the SDGs a compass in a world defined by volatile, uncertain, complex and ambiguous (VUCA) conditions.

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Universities have a critical role to play as change agents, being at the forefront of scientific and technological advances in undertaking global research and educating future leaders and professionals. They deliver impactful knowledge in every sector across all nations and act as anchors in the communities they serve nationally and internationally. Higher education can help shape new ways for the world, tackling the grand challenges of our day as reflected in the SDGs [1]. However, sustainability often sits on the margins of mainstream subjects, with academic work in the field largely separate from campus operations and community service. A more transformative approach is needed to connect the university community across the institution as well as with the external communities it serves and interacts with locally, nationally and internationally. Universities can help facilitate change towards a more equitable society and a better world by adopting the SDGs at a strategic level as a means of connecting higher education with business, industry, healthcare, community partners and entrepreneurs [4]. Focusing deliberately and proactively on the SDGs, change *within* the university and *with* external partners can help deliver a more sustainable and inclusive future.

Here, the radical adaptive changes needed to deliver institutional transformation aligned with the SDGs were explored using a case study approach. Drawing on examples of different ways of strategizing this agenda in a university setting, an example is given from each of the UK, Europe and USA. The first, a UK university undergoing pan-institutional change framed by enterprise and sustainability that served to redefine its academic priorities and differentiate the institution in an increasingly marketized and disrupted global higher education sector [5]; this mission-led change went on to catalyze and accelerate change in business, civic and community settings in the wider region [6]. The second, a business-sector led change project in Bulgaria that looked to a local university to help create a transformational sustainability program for its leaders to support their sustainable development plans. The final case draws out how the professional service delivered by Harvard's Office for Sustainability is leading change, activating students and faculty around shared purpose and creating connections with external companies and civic partners relevant to the university's research-led mission.

A 'living lab' is where real-world sustainability challenges are formally addressed in stakeholder partnerships [7]; framed in this way, each of the case studies examined is in effect a living lab. While the concept has been adapted over the years, there is renewed interest in living labs as a sustainability-oriented cross-cutting approach to the SDGs in higher education and research [8]. Projects that draw upon the university's own assets, across its academic *and* operational domains, to tackle sustainable development challenges can draw upon the human capital and resource infrastructure of the institution itself. Offering real-world learning and research opportunities for students and faculty, the university itself can be a test bed for SDG solutions [9]. In this way pedagogic innovation and research opportunities emerge, focused on stakeholder priorities but aligned with the academic mission of the institution. Professional, administrative and executive staff too can engage with faculty and students, tackling campus challenges as well as strategic projects [10]. Reaching out to develop living labs with external organizations, such as local government or business, can connect a university with a wider stakeholder group to help drive innovation or create community-level projects. A living lab model can therefore function as a convening framework supporting formal intra- and inter-organizational governance [8]. The solutions emerging from living labs can deliver social, economic and/or environmental benefits to the university itself, to its wider community and potentially society at large thereby accelerating progress towards the SDGs.

Given the pluralistic nature and competing goals of a university, being a professional organization largely run by faculty who are scholastic, management needs to be by persuasion with leadership effected through the articulation of a compelling change narrative [6]. Placing sustainability as a central strategic agenda, can connect the different constituencies within the university and with others outside the university to progress achievement of the SDGs with networks convened around shared purpose. Here, each case study account identifies the route taken to strategize sustainability, drawing out key

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outcomes and leadership lessons relevant to those involved in re-framing sustainability as a transformational agenda *within* a university or in partnership *with* a university.

2. Materials and Methods

A case study approach was adopted given its usefulness in obtaining an in-depth appreciation of an issue or area of interest in its natural real-life context. Three different ways of strategizing sustainability within or with a university were examined in detail, by means of an example from each of the UK (Plymouth University; PU), Europe (American University in Bulgaria; AUBG) and USA (Harvard University; HU). The authors are each closely aligned with one or more of the cases as lead investigator. In bringing the cases together, key insights into the living lab model in action were sought in pursuit of securing a better understanding of the actuality, and thus the potential, of universities to accelerate delivery of the SDGs. Key features of the transformation, from the perspective of leadership and governance, together with examples of key outcomes are given to illustrate the far-reaching benefits of placing sustainability center stage in strategy, rather than being merely a compliance or regulatory agenda. Where appropriate, observations relevant to leaders effecting change through a strategic approach to sustainability are identified to share insights with those planning, or amid, the adoption of strategic sustainability as a route to sustainable development and the SDGs.

3. Results

Each of three living lab case studies is described, highlighting key benefits realized and leadership and governance insights relevant to change and transformation in adopting strategic sustainability as a route to institutional transformation in pursuit of the collective ambition to deliver the SDGs.

3.1. Plymouth University (PU)

PU is a large (30,000 students) public university, based in the far South West region of England, UK. It achieved university status in 1992 and, as a former polytechnic institution, its focus continues to prioritize social inclusion, pedagogic innovation and vocational education (medicine, law, engineering, health etc.) together with applied research in key areas that are closely linked to business and the professions. At the time of its transformation under a new President Vice-Chancellor (2007/8-2015/16), the UK sector was undergoing significant policy-led changes with a shift in public funding from government grants to per-capita student fees. This marketized approach was a source of substantial disruption in the sector, with institutions responding by seeking to differentiate their academic offer [5]. PU adopted a mission-led transformation based on the concept of enterprise and sustainability as key to institutional health over the long term, committing to transforming lives through education and research. Sustainability was adopted at a strategic level in 2008 and was used as a lens through which the university's teaching, research, operations and community service were viewed [6].

The distinctive mission sought to draw upon the talents, aspirations and indeed dreams of the university's faculty, staff, students and wider stakeholders. As such, purposeful leadership and governance process and practices were in play to secure the engagement and innovation to effect sustained change and regeneration [11]. Outcome success indicators were multi-faceted. For example, up to 2015/16, PU remained the overall sector leader in the People & Planet Green League, based on rankings since the league table began in 2007. PU's 'green' agenda was based on a strong track record over many decades of world-leading sustainability research and the work of its Center for Sustainable Futures in education for sustainable development (ESD). This positioning was strengthened at a strategic level by the establishment in 2012 of an Institute for Sustainable Solutions Research that reflected the spectrum of sustainability across the university, from environmental and human impacts through to ESD and the humanities. PU developed the national Higher Education Academy's guide to teaching and learning for sustainability in higher education, '*The Future Fit Framework*' and *The*

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Sustainable University [12]. The university's success in adopting an integrated approach was demonstrated in 2010 when it received ISO14001 accreditation for its environmental management systems, recognizing its systematic approach to controlling environmental impacts. In 2012, PU was awarded the prestigious Queen's Anniversary Prize for its work in marine renewables research and ESD, and in 2015 it received the National Union of Students Responsible Futures Award. Other initiatives arising from the university's strategic sustainability agenda were delivered in partnership with its stakeholders. For example, working with the business-led City Centre Development Company, the environmental charity Groundwork, and the retailers Marks and Spencer plc to transform a piece of vacant land and create 'The Jigsaw Garden' as a community green space. PU also led the restoration of Drake's Place Reservoir and Gardens, a space in the heart of the city with some 0.9 hectares of green space and a 17,000 m^3 reservoir, transformed into a venue for community leisure, learning and volunteering projects; the project won an Abercrombie Sustainable Design Award in 2014, and a Green Flag Award from Keep Britain Tidy.

PU was deliberate in its approach to promoting, embedding and sustaining its new mission and overall strategic direction. A Change Academy team of some 8-10 people was established by senior management; members were drawn from the different university communities, representing executive, faculty and professional staff. The initial Change Academy group was a nationally-sponsored program, by the Leadership Foundation and the Higher Education Academy over an academic year, to support teams with pan-institutional change initiatives. This was supplemented by a university-wide team of Enablers; some 50-60 people representing all constituencies and trained by the university to support change and provide peer-to peer support for innovation. A key outcome of the Change Academy and Enabler network was articulating students as partners (rather than solely customers), ensuring dynamic participation in their own learning journey, as active global citizens fully aware of the need to build and maintain a sustainable society; many projects to enhance the student experience emerged but these are not detailed here.

The transformation of PU as a public institution became a source of inspiration for the transformation of the local community and wider region in the manner of an 'anchor' institution [6]. Several initiatives at PU reveal the way in which it was focused on developing the needs of its stakeholders where they aligned with delivering the academic mission of the university, offering jobs, placements, research, consultancy and projects for students, faculty and staff. For example, the university established the Growth Acceleration and Innovation Network (GAIN) as a regional innovation ecosystem with the City Council bringing $150M of innovation assets (regional Science Park, incubation and innovation centers) under one governance entity. GAIN was used as a vehicle to secure economic development funds from the European Union and national government, bringing in some $40M and leveraging additional private monies to support sustainable economic growth in the region; around 1,500 jobs were created and $70M of private sector co-investment secured. Another example relates to promoting sustainable procurement, where PU led the consortium of civic and business actors to set up Sell-to-Plymouth (S2P) in 2009, targeting small- and medium-sized enterprises; the project won the Times Higher Education Leadership and Management Award for sustainable procurement. In community health, the university's clinical dental training was set up as a social enterprise to deliver dental services to some 16,000 patients in some of the city and region's most deprived neighborhoods. The university itself went on to champion social enterprise, leading the national University Enterprise Network for Social Enterprise and becoming the first higher education institution to be awarded the social enterprise mark.

3.2. American University in Bulgaria (AUBG)

AUBG is a small (1,000 students) private university based in the capital of Bulgaria, Sofia. Established in 1991 in the manner of a liberal arts institution, with programs accredited by US and EU

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bodies and delivered in English, its focus is on preparing democratic and ethical leaders. Approached in 2017 by the Bulgaria Soft Drinks Association (BSDA; set up in 1996 and now representing the interests of 70% of the sector including bottled water) AUBG embarked on developing a bespoke sustainability and leadership and innovation program (SLIP) for C-suite and senior staff in member companies. AUBG secured academic advice from Harvard University faculty and international academic advisers in developing the program to re-frame sustainability as a strategic agenda. The CEO's of Coca-Cola HBC and Devin Water were key stakeholders in development of the transformational leadership program, highlighting the importance and inherent tensions of competing for sustainable growth while meeting the needs of customers and society [13].

This real-world sustainability challenge of 'good growth' and the SDGs [11] is being formally addressed in a stakeholder partnership of businesses with a university, creating a living lab in which to explore creative solutions. Key was AUBGs experience with senior professionals undertaking MBAs and similar programs, together with the experience of it external academic advisers with deep knowledge and experience of whole organizational change and sustainability for business value, promoting societal impact and environmental protection and restoration. While the first cohort of senior leaders is yet to complete the program, it was piloted in 2018 with CEO members of the BSDA. Qualitative data on impact revealed the way in which sustainability was framed as a compliance/ regulatory agenda and part of being a good corporate citizen [13] but was not positioned at a systems-level in business strategy. One CEO reflected that s/he had never thought of human capital and talent as being related to sustainability, but having it reframed at a strategic level now saw the immense value to long-term business success. Similar comments related to community projects, currently under the banner of corporate social responsibility, that are now being considered as part of the innovation agenda.

Key to creating the program, was the shared governance space offered by BSDA, which as a member organization was one remove from day-to-day business challenges and was able to garner learning needs from members and collate these into a sector-led vision for the future. This deliberate process, framed by the SDGs, meant that BSDA did not seek a simple business-consultancy solution for its members rather it moved to set up an academic partnership with a university and international academic advisers to design a transformational learning journey to change people and through them the businesses concerned.

3.2. Harvard University (HU)

HU is a mid-size (22,000 students) private research university, established in 1636 and global in its reach and impact. A private university, its 12 degree-granting schools are largely independent with the President and Fellows of Harvard College as one of two governing boards (The Corporation; the other, the Board of Overseers). Professional services are typically pan-university departments, such as Campus Services where the Office for Sustainability (OFS) supports building and operating a healthier and more sustainable campus community. HU's Sustainability Plan aligns the university's decentralized campus around a holistic vision and sets clear university-wide goals across a range of priorities from emissions and energy, campus operations, nature and ecosystems, health and well-being, and culture and learning. Key to delivering its role, is the way in which OFS works to encourage students, faculty and staff to experiment with sustainability solutions in the manner of a living lab, using HU's cutting-edge research and teaching to tackle real-world challenges on campus as well as in community settings at home and overseas.

OFS supports innovation to address problems threatening the health of people and planet, working on-the-ground and across disciplines, co-funding projects through its Campus Sustainability Innovation Fund and Green Revolving Fund, and acting as a convener and connector as well as adviser, trainer, mentor and coach to those involved in shared projects. Using its convening power, OFS is institutionalizing change by empowering the higher education sector at large to make informed choices.

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For example, its Healthier Building Materials Academy brings the OFS and the university's procurement teams together with faculty and students to bring about change, demanding transparency and holding vendors accountable. Together with the Harvard T.H. Chan School of Public Health's Center for Climate, Health and the Global Environment (C-CHANGE) and Google, OFS is at the center of a movement to reduce harmful chemicals in building products and materials used in construction and renovation, developing public tools and resources based on science to inform evidence-based decision-making. Working with faculty, OFS helped to create a trans-disciplinary learning course in sustainability by creating a space for students and faculty from across the university to come together to investigate solutions to real-world sustainability challenges. OFS also engages with civic organizations, for example through the Boston Green Ribbon Commission, a group of business, institutional and civic leaders working to develop shared strategies for fighting climate change, supporting the Higher Education Working Group to bring the expertise of the sector to the work of the Commission.

Key to its success, OFS acts as a trusted professional resource for the university and its wider stakeholders. But its reach and impact are amplified through the living lab model which creates a shared governance space into which faculty, students and staff can convene around shared purpose. Presenting real-world questions to those involved in creating solutions through research and innovation is mutually beneficial and reinforcing; live challenges are being addressed in real-time, and the OFS is central to evidence-based outcomes. Sustainability is strategized through the pan-university Sustainability Plan and delivered in a tricameral partnership – the OFS, the university and the communities the university serves locally and globally.

4. Discussion

Universities now operate in a global market where there is increasing pressure to be sustainable, competing in new ways to attract students, deliver world-class research and be impactful through innovation and their work in communities; they are also seeking to accommodate the rising expectations of students and other key stakeholders demanding value and lifelong return on investment [5]. Using a case study approach to examine three different strategic sustainability transformations *within* or *with* a university, key features of the change process together with illustrative outcomes were explored to secure insights relevant to leaders effecting change as a route to sustainable development and delivering the SDGs [1].

From the three case studies, there is no one-size fits all approach or blueprint to follow to bring universities and the SDGs closer together, rather there are a range of means that can be adopted to position sustainability as a strategic agenda. This may be mission-led, as in PU, business-led, as in the Bulgaria case, or a means of connecting the university internally and with external partners as illustrated by the Harvard case. Most campuses function as microcosms of society, with housing, transport, food outlets, health services and so on and therefore act as a test bed for SDG solutions. High-impact tangible outcomes emerged for partners in these examples of living labs, producing benefits for faculty and student scholarship as well as a more connected university community.

With PU, even though the university's mission-led transformation was an act of self-preservation in response to widespread disruption in the higher education sector, its tricameral approach to strategic sustainability created value across economic, social and environmental dimensions. Awareness of sustainable development and the SDGs meant that the university community became hyperaware of wider global trends, enabling it to react with agility to emerging change [6]. A strong institutional culture was a key, that is, the way people talked about, acted upon and indeed thought about sustainability and enterprise while at work and in their private lives. This relied upon a peer network of so-called Enablers working with people as they translated the institutional change mission into a personal change journey. The transformation of the university became a source of inspiration for the transformation of the local community, that itself contributed to the sustainability of the university and

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its wider community. For example, raising awareness of the university's offerings by community outreach and engagement activities drew people into the university to seek advice, commission consultancy and research as well as undertake courses and programs and become donors. PU became more entrepreneurial, able to thrive in a VUCA environment and sustain a competitive position in a dynamic policy landscape and global sector.

With AUBG, the demands of the client as represented by BSDA created an opportunity to develop new academic networks and programs and brought the university into closer dialogue with major local employers gaining an insight from CEO members into future-facing challenges relevant to the university's mission to develop ethical leaders. BSDA members are being exposed through the new program not to just-in-time fixes for immediate business problems, but to a personal and professional transformational learning experience setting up C-suite and senior staff to lead in situations characterized by ambiguity and disruption. Re-framing sustainability as a solution rather than another problem is key to unleashing innovation and challenging leaders to function at a systems-level rather than in operational silos [13].

With HU, the OFS acts as a connecter drawing talented faculty, students and staff around shared purpose – the university's Sustainability Plan – but using the language that excites them of research, teaching, discovery, innovation and learning to communicate co-creation using a living lab model. Participants work across disciplinary and theory/practice gaps addressing 'real-world' projects of local/global benefit, driving up student engagement and employability as well as research funding and impact. The OFS also acts as a convener, bringing together examples of living lab projects and making these more visible and impactful at the institutional level serving to showcase its work relevant to the SDGs.

The convening power of universities can be harnessed to bring together a range of actors in a neutral space, as per the living lab model described here, reflecting the interdependence of teaching and research and the societal importance of higher education. Participants from different areas within the university and with external people and organizations can come together to collectively address real-world sustainability issues. The living lab is a dynamic network, combining an institution's intellectual and other resources with practical sustainability challenges on- or off-campus. It effectively dissolves boundaries between the traditionally segregated activities of education, research, external engagement, operational and administrative practice [8].

Common themes among the different case studies were identified. Central is that of shared purpose as represented by the SDGs [1]. A move by a university towards strategic sustainability can present a major challenge for university leaders, with tensions arising, for example, between institutional goals, cultural preferences, and individual and organizational drivers; these tensions can have a knock-on effect on resources and effort. Perhaps the greatest challenge for leadership is to foster an innovative approach *throughout* the organization, and thereby potentially be perceived as a challenge to the rightful academic independence of departments. This requires sustainability to move center stage to inform the strategic mission of the university to accelerate change and co-create the future. A transformation of this magnitude requires time for the community to do its work at the individual, group and community levels in terms of socializing the change and this is probably one of the biggest challenges to face when, along with leadership of the transformation itself, short-term results are required. Each community, like everyone, has its own amount of time required for its transformation, depending on its level of development, and so leadership of these processes requires very specific capabilities to manage the frustration, fear, uncertainty and loneliness that can arise throughout the entire transformational process.

Other common themes were collaboration and transdisciplinary approaches. Real sustainability challenges do not respect disciplinary boundaries or theoretical models, and therefore cannot be effectively addressed through these narrow lenses [9, 10]. This is highly relevant to the SDGs where pollution and poverty do not respect geography. Collaboration is central to the co-creation process

inherent in a living lab study, enabling a constant cycle of experimentation, prototyping and testing. Systems thinking by leaders also characterized the approach needed to bring sustainability center stage, understanding the interdependence and inter-connectedness within their organization as well as to global society and the natural world.

The collegiate nature of the sector with its shared governance models and different constituencies and performance drivers, means that sustainability at a strategic level must be led [6, 8], with leaders at all levels acting with purpose. Leadership is needed to harness the social forces and inspire people to take actions around a shared vision of the future. The change needs to be anchored in the culture, reminding ourselves that cultural change comes at the end of a transformation and not the beginning. The living lab can become a part of transformative institutional change that draws on both top-down and bottom-up strategies. Recognizing leadership from students and stakeholders was also important, as they bring their unique and diverse perspectives to sustainable development projects [14].

Overall, key to university engagement with the SDGs was the strategic alignment of the academic mission with sustainable development in its broadest definition [15]. An effective means of framing this was to adopt a living lab model that can bring a range of projects under one governance framework. This model also brings the on-campus professional sustainability team into closer dialogue with faculty and students to tackle real-world problems through experiential teaching and learning and/or research and development projects whether conducted within the university or with external partners [16]. The potential of higher education to deliver against the SDG 2030 agenda is profound [3] and, as the university becomes more connected to the society it serves, the journey to sustainable development can be accelerated [2]. Partnerships *within* and *with* universities can help higher education making a fuller contribution to sustaining the economic, cultural and intellectual well-being of our global communities.

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