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Imperatives of Sustainable University Excellence: A Conceptual Framework

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Abstract: This study envisions the architecture of a modern era university with sustainable standards of excellence. Sustainable University Excellence is herein defined as the ability of a university to excel in the core areas of knowledge creation and dissemination via the mobilization of human, social, intellectual, and financial capital to serve on socioeconomic and environmental fronts ethically, efficiently, and effectively to secure a sustainable future. Seven core performance domains of a university are explored: Teaching quality, research culture, technological capability building, accessibility, community engagement, internationalization, and environment, which should be prioritize in order to continuously advance along a sustainable excellence continuum. This study provides a self-assessment methodology that universities can employ to compare their performance relative to the aforementioned domains, thus enabling the identification of performance gaps, the knowledge of which is crucial to the formulation of more targeted strategy. This approach allows decision makers to form a more coherent vision for sustainability within institutional and broader contexts. The approach proposed herein incorporates the three aspects of sustainability that form the so-called Triple Bottom Line (TBL).

Keywords: sustainable excellence; teaching quality; research culture; community engagement; technological capability; internationalization

1. Introduction

The notion of sustainable development has dominated organizational and environmental excellence research over the period of the last decade. This is expected to continue in future due to its relevance to global concerns [1]. It is unreasonable to expect sustainable businesses, operations, and services without a knowledgeable, skilled, and competent workforce along with other essential components. Such outcomes are "end of the pipe" in that they are results, the manifestation of which most typically flow from relevant core values that have been baked into equally relevant strategy and subsequently deployed via appropriate policies, practices, processes, and partnerships. Universities are hubs for providing a knowledgeable, skilled, and competent workforce, along with informed citizens. Therefore, university sustainability is an essential characteristic for the sustainable development of all allied stakeholders: Businesses, operations, and society. Substantial research

efforts have documented the positive impact of higher education on socioeconomic development (SD) [2–5]. Universities play critical roles in promoting awareness, creating and developing skills, and producing SD knowledge; however, sustainability of universities themselves has been heretofore inadequately addressed, especially within the domains of organizational governance and strategic perspectives [6,7].

In contrary to other business and service sectors, higher education tends to the needs of diverse stakeholder groups. Among these stakeholder groups are students, parents, employers, governments, and society [8]. The university value-addition desired by these stakeholders is multifaceted and varies from behavioural characteristics to the greater competence of graduates, to problem–solution-based research, to the expectation that the university will function as a societal change agent. The diversified nature of these needs and expectations requires intentionality by universities to devise and implement an appropriate strategic framework [9].

Sustainable development of higher education is critical to national, regional, and global development [10]. Rapid increases in information technology capability and capacity, along with communication channels have accelerate the transmission and impact of information; however, the nature and magnitude of benefits these have stimulated across the globe vary widely, primarily due to differences in existing infrastructure and availability of competent workforce [11].

Higher education is a hub for knowledge generation and dissemination and is hence ethically obliged to develop professionals with knowledge, skills, and competency necessary to address the evolving dynamics that individuals, organizations, and society face [12,13]. Universities do so with varying levels of success with the elements of focus, emphasis, approach, implementation, and execution differentiating between success and failure [14].

We propose the Sustainable University Excellence Model (SUEM) as a means to visualize a university architecture that is a responsive, responsible, and relevant part of the community. The model proposes a university structure with critical pillars that might have practical significance in the role of the university in evolving and strengthening the social, economic, and cultural fabrics of communities. The purpose of the proposed framework is to comprehend the dynamics of the contemporary university relative to generation and dissemination of usable knowledge, and the development of associations with stakeholders that support sensing, resolving and providing ethical, effective, and efficient solutions to relevant challenges.

We define a Sustainably Excellent University (SEU) as "a university that mobilizes its human, intellectual, financial and social capital to efficiently, effectively, ethically and routinely create and disseminate knowledge that advance the progress of individuals, organizations and societies toward sustainable futures." Further, we propose a SEU self-assessment mechanism comprised of springboards, compasses, and integrated SWOT tools. From the reviewed literature of organizational excellence, higher education, and sustainable enterprise excellence, we identified seven relevant university performance domains: (I) Quality teaching, (II) a research culture, (III) technological capacity building, (IV) accessibility, (V) community engagement, (VI) internationalization and (VII) the natural environment. To achieve sustainable excellence, universities have to devise strategies, policies, and the action plans for each of the aforementioned performance domains. The remainder of this paper is comprised of a literature review, methodology, core performance domains, with further provision of a SEU graphical model, and an assessment methodology that is comprised of springboards, SWOT analysis, conclusion, research limitations, and future research.

2. Literature Review

Higher education as a significant enabler of social, economic, and planetary sustainable development has been acknowledged for centuries [15,16]. The dynamics of the role(s) of universities in social and economic development have been in transition in the modern age of globalization and rapidly evolving technology [17–20]. Conventional consideration of education addresses primary, secondary, and tertiary education where higher education is regarded as a major component of tertiary

education and has largely been ignored relative to the global development agenda and research funding opportunities [21], especially in developing countries. Higher education demands more attention due to its critical role in developing analytic thought processes, critical thinking orientation, and clear vision among future workplace leaders, society icons, and effective citizens [22].

The notion of Higher Education for sustainable development (HESD) has received notable recent attention within the global framework of Sustainable Development (SD) [23]. Having an appreciable degree of agreement in the conceptualization of SD, an inconsistency and vagueness has been witnessed in the definition and conceptualization of Sustainability in Higher Education (SHE) and HESD [24]. In broader terms, the sustainability of a system is its ability to remain productive effectively and efficiently for a long- period of time without compromising the interests of future generations [25]. The idea of HESD first gained attention and recognition in 1972 at a conference held in Stockholm, but the agenda had a focus only on the environmental aspects of SD. The theme of SHE was extensively addressed in the higher education sector in the early 1990s [26]. The underlying philosophy of SHE is to transform universities into sustainable entities [27]. Environmental sustainability has been a dominant issue in institutions of higher education (HEI), but recently a visible shift towards social, economic, and institutional domains e.g., quality in teaching, curriculum, research and development, internal operations, and outreach to community has emerged [28,29]. The organizational changes in HEIs is deemed unavoidable as such issues as outreach, community services, governance, and internationalization have defining roles that are reshaping universities' organizational dynamics [6,30] .

A number of declarations, charters and collaborations among interested HE stakeholders is evident from rapid growth in the number of Universities and HEIs engaged in SD activities and education. A number of studies have explored declarations for SD in higher education [31], and identified salient features: Environmental issues, ethical and moral obligations, incorporating sustainability in the university curriculum, HESD research initiatives, and encouraging inter-universities collaborations for sustainable development [32]. Lozano's [31] findings suggest that HESD was exhaustively addressed in the Talloires declaration , the Halifax declaration, the Kyoto declaration , the Swansea declaration, the Global Higher Education for Sustainability Partnership, the Luneburg declaration, the declaration of Barcelona , the Graz Declaration , the Turin declaration, and the Abuja declaration. The works of Wright [32], Lozano [31] and Sylvestre [33] identified ten main themes of SD drivers of HESD in renowned declarations:

1. Curricula,
2. research,
3. operations,
4. outreach and collaboration,
5. universities collaboration,
6. assessment and reporting,
7. trans-disciplines,
8. institutional framework,
9. SD through campus experiences, and
10. educate the educators.

These declarations have near consensus on the first four of these HESD initiatives. In addition, learning and teaching was encouraged as one of the focus area to promote sustainability in universities by the Graz declaration, collaboration with society considered vital for HESD and SHE by the Kyoto declaration, and restructuring of HE, governance, and research culture was emphasized by the Turin declaration.

Teaching and learning is acknowledged as a strong driver of HESD, and there is a strong relationship between the quality of teaching and sustainable development in HEIs [34]. Teaching quality is a characteristic of educational institutions that attracts talented students, inspires future employers,

earns good market reputation, and serves their core mission of making learning visible. In the global perspective, university ranking systems are increasingly important to stakeholders: Universities, students, funding bodies, and governments. In major university ranking systems, teaching quality has not been acknowledged as a priority as, instead, these systems tend to emphasize both technology and research orientation [35].

The relationship between university culture and sustainability is an important, but relatively unexplored domain. It is evident that success of any initiative of culture change depends on the well-thought-out drivers of the proposed change [36]. Many such factors influence the dynamics of university culture. One of these factors is the changing demands of industry and society that lead academia to evaluate its priorities. Recently emerged, the term "knowledge economy or knowledge capitalism" [2] demands the reshaping and redefining of the role of universities as change agents in national and global sustainable development [37,38]. Similarly, the conduct of research is an essential responsibility of contemporary universities [37,39]. Linking these is the increasing expectation that research conducted by universities should contribute to economic and societal development that occurs in environmentally responsible ways [40,41]. The development of a research-oriented culture is an imperative for the universities [42]. Based on basic and applied research, intellectual capital is as essential as financial and human capital to the sustainable development of universities and society [43,44]. Emerged and emerging research areas span critical social, economic, and environmental issues [45,46].

The importance of technological capacity building in achieving sustainability is evident by the ever-changing needs of HEIs from stakeholders' perspectives [47]. The shift in the dynamics of work and the workplace demands the acquisition of new capabilities [48] through a less conventional workforce equipped with the requisite set of knowledge, skills, and competency [49]. Similarly, a vibrant shift in business orientation, business problems and issues demands an unconventional set of expertise of capacity building in the universities [47,50]. Dramatic and unprecedented technology advancement has exposed immense deficiencies in both the technological and intellectual capacities of individuals, organizations and society [51,52]. This implies a shift toward higher levels of knowledge, skills, and competency that enable more dynamic learning processes [34]. Universities are partially responsible for both the generation of new technologies and perfecting expertise among the learners thereof by imparting a set of effective capabilities that match or surpass market needs and expectations [53].

The modernization of universities characterised by materialistic business approaches has brought a social and economic dilemma of inaccessible and unaffordable education for many, especially in communities where the need for these is perhaps most extreme. This is perhaps most pronounced relative to the lack of accessibility and affordability of higher education in many nations—an issue that has garnered the attention of both ruling and opposition parties in the USA, UK, Europe, and Asia [54].

The university and community linkage referred to as "community engagement" has been a growing research area based on its obvious implications for sustainable futures of both universities and communities [55–58]. University contributions to community development are one of the primary justifications for the existence of the university and its crucial role in sustainable development [59–61]. Knowledge transfer, community engagement, and third stream are interchangeable terms that reflect the level of university engagement in sharing relevant knowledge, skills, and competencies [62]. Doing so requires universities to forsake isolation and embrace opportunities to contribute to economic and social development [63–65]. Universities can provide valuable solutions to community problems through knowledge exchange, sharing of expertise, and dissemination of resources, and lead societies to sustainable development [66].

Universities must respond to the twin challenges of internationalization and globalization in ways that ensure the sustainability of their resources [67]. Globalization, borderless economies, information technology, and the ever-growing realization of knowledge-based economies have created new internationalization perspectives and opportunities in higher education [68,69]. Traditionally, provision of education opportunities and facilities were within the domain of state responsibility,

but in more recent times there is a visible global trend toward increased privatization and with it, stronger orientation toward the commoditization of education—a trend that has had both positive and negative impacts [70].

The works of Soini [71], Stough [72], Sonetti [73], and Trencher [74] suggest that HE consideration of sustainability should extend beyond environmental, energy and resources to include sustainability in learning and teaching, outreach, cultural transformation, internationalization and other core concerns. Environmental sustainability is an essential pillar of HESD, and there are many different strategic and operational approaches are being introduced in the universities to achieve it, for example: green campus, sustainable campus, UI Green Metric, and many more [75]. Being a societal entity, universities are becoming more aware of their roles and obligations towards environmental sustainability (ES), and the idea is receiving more attention from the universities in terms of actions and. Universities can contribute in dealing with ES by adopting existing models, exploring new knowledge, and disseminating knowledge across society [76]. ES implementation in universities impacts society in several ways: Inspiration of stakeholders, learning opportunities, contribution towards an eco-efficient campus, among others. Environmental sustainability should be a part of long-term university strategic planning and it should be clearly reflected in mission statements, quality policy, and quality management plans [77]. Much work remains for universities in the journey towards ES, progress toward which could be realized by institutionalizing ES commitment [78].

3. Method

This study employed a literature review to develop a conceptual framework as proposed in studies [79–81]; the approach suggests theorizing a conceptual framework based on Grounded theory. Herein, the existing literature is taken as a proxy of data for Grounded theory to clarify the concept of sustainability in HE, and eleven charters were explored to broaden the understanding of underlying concepts and to aid development of a conceptual framework. This approach helps to evaluate the opinions of different schools of thoughts on given criteria and the approach delivers a modicum of consensus [82,83]. After synthesising the SD, SHE, and HESD literature, the streamlining of the authors' interpretations, knowledge, and thought about the body of knowledge of sustainability in HE was accomplished using a hermeneutical approach [23]. In this perspective, seven core functional areas: Teaching quality, research culture, technological capability building, accessibility, community engagement, internationalization, and environment were finalized after identifying these as common ground in the existing body of knowledge. Based on these efforts, seven hypothetical propositions were then developed, one per core functional area.

4. Core Functional Areas and Propositions

4.1. Teaching Quality

In the knowledge economy, teachers and teaching are the backbone of learning systems [84,85]. An imbalance favoring research has developed in recent decades, a consequence of which is devaluation of teaching. Without knowledgeable, skilled, and competent teachers, knowledge dissemination is difficult to achieve effectively and efficiently. Although the importance of research should not be understated, synergy between the research and the teaching functions is central to the transformation process [86]. A good example of such synergy can be found in Danish HE where one's teaching is expected to be informed by one's research. Quality teaching requires special attention from both the teachers and administration perspectives with key considerations including technology adoption, curriculum relevance, and practicality of the contents, subject knowledge, ethical perspectives, and teaching competence [87,88]. Technological advancement has brought revolutionary changes in classroom settings and requirements [89]. Instructional technologies have changed the dynamics and role of class teaching [90], and the effective use of technology multiplies the learning impact [91]. Reluctance and resistance to this change is relatively natural as it demands extensive faculty effort,

but the potential reward is enormous [92]. Organizational level realization and committed focus on faculty training and development is becoming more essential to match ever-increasing professional competence requirements [93]. Teacher training programs, workshops, seminars, and discussion forums are effective means of ensuring teaching capacity-building in universities [94]. Curriculum that is relevant to employer needs is also increasingly important. Acquiring the latest and relevant knowledge about developments in a core field is essential to the knowledge dissemination process that occurs through teaching and this is core to teaching excellence [95,96]. The changed dynamics of classroom teaching due to technology innovation and advancement challenges the survival of conventional teaching strategies and methodologies [97,98]. Relatively more serious and committed efforts are required to engage students to make the learning process effective, efficient, and relevant to a generation that is advanced relative to modern communication, information access and the digital media technology [99,100].

Universities need to exercise new teaching strategies, including ones that are problem-based, are active and interactive, ones that require collaboration, ones requiring experimentation, and simulation-based ones that reinforce real world application of relevant knowledge, skills, and learner competences [101,102]. University teaching communities are morally and formally obligated to acquire advanced subject knowledge and to improve their teaching skills and the competences needed to make the learning process effective [12,103]. On other hand, the university administration is responsible for establishing a supportive culture and necessary resources [104]. Quality teaching depends strongly on teaching strategies; content quality; curriculum; a balance between theory and applications; teachers' knowledge, skills, and the subject competence; and efficient and effective use of instructional technology. Universities must recognize, acknowledge, and appreciate the significance of teaching quality in the process of developing the overall quality culture and market reputation. A flagship role of leadership, at each level of university hierarchy, is essential to re-evaluate intuitional strategies, policies and action plans that promote a quality teaching culture. A clear vision of the purpose of the university's existence, its mission, description of quality culture, and the role of quality teaching are the imperatives that leadership must address. Universities should create and implement mechanisms that inculcate, promote, and reward teaching quality initiatives.

Proposition 1. *Teaching quality in universities demands that leadership promote a teaching quality culture through strategizing the institutional framework of:*

1. *Acknowledging the significance of quality teaching,*
2. *Engaging the resources to materialize the teaching quality, monetary and non-monetary,*
3. *Appreciating the role of teaching quality stakeholders: Teachers, students, employers, and society, and*
4. *Rewarding stakeholders who are involved in enhancing teaching quality; teachers, administration, and support staff.*

4.2. Research Culture

Producing effective and impactful research requires a strong liaison between universities and industry in the form of collaborations, cooperation, and partnerships. Research liaisons and collaborations between academia and industry boosts research culture and makes the process more productive for engaged stakeholders [105]. The development of industry–academia collaborations programs through more formally controlled "boundary spanning" organizations in Japan secured success [106]. The majority of research produced and published by universities almost exclusively serves academic interests only, and this is especially true in developing countries. Unfortunately, most of such research is not orientated toward solutions to real social, economic, and planet problems. In universities, research conduction and production is largely a means for hierarchal promotions and financial benefits with a limited concern for providing solutions to problems faced by societies and businesses. The real impact of universities' research on society is an issue that universities must address through promoting a culture of problem-based research [107] and teaching faculty must

remain involved in advancing their knowledge through research involvement [108]. Universities facing challenges to motivate and engage faculty in the process of conducting research effectively must devise strategies to eliminate research reluctance and resistance. Provision of research-based monetary incentives, career growth, recognition, facilities, and resources can effectively raise the level of involvement of faculty in research. Postgraduate level research programs are the incubators for future researchers and significant engagement in research through well-planned programs can boost university research culture. Targeted training and engagement in real-time problems and issues can be used to align their individual research with the university research mission.

Proposition 2. *Nurturing the university research culture demands strategic action plans that motivate faculty research engagement, synchronization of research to real-time problems, exploring mutually interesting collaborations and cooperation with businesses, operations and society at national and global levels.*

4.3. Technological Capability Building

Technology has brought revolutions in all areas, including the university functions and operational aspects. From complex product prototyping, to simulation incubators, computational development, instructional aids, digital resources library management, and robotics, technology has had intensive roles in university teaching, research, and administration. Technological advancement has eliminated an enormous number of conventional jobs at the workplace, hence causing exponential decay in the demand for conventional job related skills, competencies, and technological capabilities [52]. Robotics, big data analytics, Computer Aided Design (CAD), and Computer Aided Manufacturing (CAM) brought dramatic shifts in operations, businesses, and, hence the role of human involvement in capacity building [109]. The vibrant nature of businesses and operations functions under the two different kind of problems orientation: Routine problems, and special problems. Routine problems require average levels of knowledge, skills, and competence that the workforce can easily learn by repetitive routine work activities without acquiring external involvement. Special problems may be more extraordinary and unique and may hence require higher competence levels. Universities should have to build their capacities and capabilities to become a hub of knowledge and competence acquired by stakeholders. Disciplinary competence may provide the university with a competitive edge in attracting business and operational collaborations. Rather than pursuing the conventional university tendency to produce the graduates with a specific set of competencies irrespective of the employability in real time workplace, provision of knowledge, insight, skills, and competencies of more immediate marketplace value must be an area of focus for universities [110].

Proposition 3. *Technological capability building in universities is prerequisite to achieving and sustaining the competitive edge that is indispensable to channelize core university expectations related to knowledge creation, dissemination, modernization, and society.*

4.4. Accessibility to University Education

In recent decades, the proportion of private universities in many parts of the globe has increased sharply and continues to do so. This phenomenon might be influenced by aggressive business approaches of private sector universities that have significant investments in developing state-of-art educational infrastructure. Meanwhile, expansion of public universities is noticeably slower due to lack of government support and funding, a scenario that has contributed significantly to unaffordable education in many regions, especially in developing countries. In both the USA and the UK, student access to higher education at respected universities is low due to increases in tuition fees and related expenditures—a phenomena leading to a student debt crisis in the USA that has attracted significant social and political attention in the run-up to the 2020 US presidential election. Many sincere efforts aimed at making education accessible and affordable for all are being made around the globe, with the focus mainly on more basic levels. Universities that function relatively autonomously

should address the issue not only as a matter of society wellbeing but also as a matter of self-interest. In making themselves accessible and affordable, universities can attract students characterised by different socioeconomic, multicultural, multi-linguistic backgrounds to build a global profile. University education should be accessible indiscriminately to all irrespective of gender, ethnicity, colour, nationality, and socioeconomic status [111]. Are universities equally accessible and affordable to all segments of society? Does each individual have an opportunity to excel intellectually? These are the critical questions that universities must address in devising their policies to attract talented individuals from less privileged communities.

Proposition 4. *Making university education accessible indiscriminately to gender, social, economic, ethnic, colour, and geographical backgrounds is a recurring challenge for universities and demands solid initiatives from the policy makers.*

4.5. Community Engagement

The paradigm of community engagement is an extended and integrated version of a conventional university's academic domain of the core responsibilities of teaching and research [112]. This version demands a two-way flow of knowledge: Reciprocal knowledge transfer from the university to the community and from the community to the university. The ability of a university to become an effective actor of knowledge transfer heavily relies on the infrastructure it possesses, capabilities it develops, supportive culture [113], effective systems, visionary leadership [63,114], and strong connections with the community [115] and the other stakeholders [116]. In strengthening the process of the community engagement, universities have to act as both a supplier and recipient of knowledge. The dynamics of the universities' role as being both a supplier and consumer of knowledge can lead them to engage the community and the other stakeholders effectively in pursuit of economic and social development. The reciprocal nature of community engagement can effectively deliver beneficial outcomes to universities and communities, through knowledge sharing. Universities will have to play the leading role in building community partnerships, collaborations and liaisons. This is due to critical prerequisite capabilities of universities to bridge the relationship with communities based on superior knowledge, competitiveness in skills, and competencies beyond the needs and expectations of the target communities. This requires universities to have exhaustive understanding of internal structure, norms, individuals', and groups' values, collective traditions, and language of the concerned community. Globalization means the transformation of the world into a village with residents of different cultures, religions, traditions, and languages. Survival within such a dynamic and diverse village requires understanding and acceptance of differences, tolerance to live with differences and, at the same time, enjoying commonalities [117]. This behavioural shift and development requires incubators to try and assess new sets of common norms, acceptable behaviour and global citizenship [118]. Ideally, university-community engagement is a platform that can serve as incubators for such ideas, issues and solutions.

Proposition 5. *Reciprocal engagement between universities and the community demands a dynamic, proactive and leading role from universities to extend their intellectual efforts in ways that raise social, cultural and economic standards of communities.*

4.6. Internationalization

Internationalization of higher education has extended opportunities along with challenges for the institutions and countries on both sides of the demand-supply equation [119]. In the context of higher education internationalization, developed countries like United States, Canada, United Kingdom, Australia, Japan, China, South Korea, and the many European countries attributed with modern technologies, stable economies, and enriched cultures have the competitive edge. Similarly, since the beginning of the twenty-first century, countries with strong economies in the Middle East, Saudi Arabia,

and the Qatar have taken revolutionary strides in pursuit of internationalization. Developing countries are considered to be the present and future markets for internationalization in higher education [120].

Universities have explored various approaches, strategies, and action plans aimed at exploiting international opportunities [121]. Internationalization of higher education has contributed to not only student mobility, but also of educational programs and intuitions themselves with many institutions now having satellite campuses or activities around the globe along with student and/or faculty exchange programs [4,122]. The nature of internationalization in higher education is such that its development depends on critical actors, structural dimensions, strategies, and action plans [123]. Investment in internationalization might have sustainable impact on individuals, societies, regions and nations in such forms as expanded economic opportunities, improved social infrastructures, and enriched cultures.

Proposition 6. *Internationalization requires universities to make contextual strategic decisions to validate their existence globally through interaction and communication with the global knowledge community; mobilization of human resources, academic programs and institutions themselves; and materializing exchange programs, venturing international collaborations and partnerships, and offering dual or joint degree programs.*

4.7. Environment

Triple-bottom-line theory considers the social, economic, and environmental aspects of sustainability. The importance of each of these aspects is well-established, and each facet demands attention. Environmental sustainability has been a prominent theme within sustainable development over the last few decades, and numerous studies have addressed the issue in many different aspects [124]. The notion of environmental sustainability reflects the ability of an organization to utilize existing resources, both renewable and non-renewable, efficiently for its present needs with a sincere consideration of preserving those resources for future generations too [28]. Both incremental and systematic approaches to environmental sustainability are common. Incremental approaches are concerned with efficient utilization of available resources with aim to serve the stakeholders in an effective manner while including operational considerations such as water conservation, water conservation, energy consumption, material handling, waste management, building design and more with an eco-efficiency mind-set. Systematic approaches towards sustainability are concerned with the same or similar issues, but incorporate these as essential components of organizational mechanics. Systematic approaches encourage organizations to develop long term plans with comprehensive documentation, work procedures, assessment criterions, missions, policies, and incentives to engage stakeholders in their journey towards environmental sustainability [125]. To achieve environmental sustainability universities must design and deploy incremental and systematic approaches in parallel.

Universities have tripartite roles towards society in context of environmental sustainability. Firstly, being a societal entity, universities entertain the needs of a number of stakeholders directly or indirectly, for example, faculty, staff, students, and community. These relations generate many activities which may have impact on the environment through resource mobilization, resource utilization, energy consumption, transportation, waste production etc. Secondly, being a knowledge creation entity, universities should stand responsible to explore, create, and disseminate knowledge about environmental sustainability to the stakeholders [126]. Thirdly, being a learning hub, universities should develop facilities to educate future generations to become more environmentally friendly and responsible citizens. The academic contents of environmental sustainability should not be limited to environmental studies only, but these should extend across disciplines. Considering the vital part of universities in transformation of future generations, they must take a leadership role to accelerate the environmental sustainability movement not only within their premises but also across society [29].

Proposition 7. *As an essential pillar of sustainable development in universities, environmental sustainability can be achieved through efficient resource utilization (eco-efficient, incremental approach), and embedding*

environmental sustainability strategies across universities operations with the aim promoting ES learning and adoption among university stakeholders (systematic approach).

In following sections, we suggest an integrated version of seven-performance domains, namely teaching quality, research culture, technological capability building, accessibility, community engagement, internationalization, and environment, along with the supportive domains, namely, resources, leadership, governance, and a quality assurance system.

5. Sustainable University Excellence and Its Assessment

A university's journey towards sustainable excellence is characterised by organization-wide continuous participation that is effectively integrated within and between the functional roles. Among the core functional areas of a university, we identified and discussed seven indispensable priority concerns: Teaching quality, research culture, technological capability building, accessibility, community engagement, internationalization, and the natural environment. The weight assigned to each of these is contextual and depends strongly on the concerned university's local realities, e.g., internationalization differs for universities located in developed countries than for those in developing ones, with choice of weights generally reflecting either extant realities or strategic objectives. Sustainable university excellence requires universities to have a continuous focus on strategies, policies and the action plans for the improvement of teaching quality, nurturing the research culture, advancing the technological capability, making university education accessible and affordable, ensuring an effective two-way community engagement and bringing a global perspective through flourishing internalization opportunities. Support of strategy advancing these areas requires deployment of relevant human, intellectual, and financial resources.

A *Sustainable University Excellence Model* (SUEM), that is here introduced, is characterised by the identification of approaches, mechanisms, and resources that are essential to materialising a university's impact on economic, human and societal fronts. Realisation of sustainable excellence requires university commitment to transparency, fairness, and accountability in governance at all levels, so that visionary and visible leadership is indispensable. The approach presented represents a well-defined protocol of documenting, monitoring, assessing, and controlling a university's processes and systems with the aim of assuring and advancing performance and hence progress toward sustainability—that is, a quality management system is required. Inclusion of resources in the SUEM acknowledges the usefulness of university human, intellectual, and financial capital to pursuit of sustainable excellence. Finally, universities must consider their impact on businesses, societies, and the natural environment.

Figure 1 provides one possible SUEM expression. A *compass* resides at the heart of Figure 1. The logic behind this is that each of the seven core elements included in the SUEM must be assessed, with preference for usable simple assessment over assessment that is unnecessarily complex. This latter observation is a critical motivation of so-called "*springboard*" models and assessment methods—ones that are relatively simple as a means of "springing" users of such models and methods toward relevant objectives—in this case, progress toward sustainable university excellence. In this spirit, assessment of institutional progress and performance relative to each of the seven core areas is examined through four simply expressed lens, symbolized by N, E, W and S [127]. Lenses for each core area are cited in Table 1, with those described in the table being initial "strawmen" and hence subject to refinement or substitution as this methodology evolves.

Figure 1. Sustainable University Excellence Model.

The selection of the symbols N-E-W-S is highly intentional in that these connote to the four primary directions on a compass (North, East, West and South) that when arranged is the stated order spell the word *news*. As such, *springboard assessment* associated with the SUEM is intended to provide insight into current performance—e.g., "news"—and foresight into where to move next and how to do so, that is, a compass (N-E-W-S) [128].

Left to future development is precise assessment of university progress/performance relative to each N-E-W-S element for each of the seven core areas included in the model. Further, fair assessment of this sort must occur within the context of resources available and resources dedicated to sustainable university excellence efforts, since resources or the lack thereof either enable or constrain progress. Soft assessment will use simple methods such as three-point or five-point Likert scales. Precise assessment is difficult if not impossible in the sense that what is being assessed typically combines quantitative and qualitative elements and hence are subject to opinion or perspective. Solid, even if imperfect, assessment makes use of the well-known methodology of *descriptive* maturity scales. Such scales typically use a gradation approach, with gradation ranging from, say, 0-to-10 or 0-to-5, with each level representing progress beyond the prior level and each level clearly described [1]. Similarly, a university will *describe* their performance and progress in each assessed area, so that the gap between actual progress and performance, and (descriptive) maturity levels can be identified and strategies aimed at closing or eliminating gaps can be formed and executed [127,128].

Table 1. Springboard to SUEM NEWS Compass Lenses and Their Descriptions.

Compass NEWS Lenses	Core SUEM Areas and Associated Lens (N-E-W-S) Descriptions
NEWS	**1 Teaching Quality (TQL)** Prioritising teaching quality through institutional strategy Recruiting teachers on integrated teaching and research competence Involving the stakeholders voice in curriculum and learning outcomes design Implementing quality assurance plan for teaching assessment and feedback
NEWS	**2 Research Culture (RCL)** Ensuring intellectual and economic capital availability Promoting academic interdisciplinary collaborations Build bridges between university researchers, industry, and community Assessing research for its human, societal, and economic impact
NEWS	**3 Technological Capability Building (TCB)** Acquiring, adapting, and excelling in technology usage Producing innovative technologies for the markets Embedding technology-based systems to meet stakeholder needs and facilitate success Collaborating with industry to launch marketable innovative technologies
NEWS	**4 Accessibility (ACS)** Ensuring non-discrimination in admission policies and rules for qualifying students Offering incentives to facilitate the students from lower socio-economic groups Initiating E-learning and other distance learning program for outreach students Developing strategic plans to make higher education more accessible and affordable
NEWS	**5 Community Engagement (CEG)** Developing and publicising intellectual capability to attract community Ensuring public visibility by active participation in media on national and global issues Engaging faculty and students to interact with communities purposefully on regular basis Bridging the gap between academic research and community issues
NEWS	**6 Internationalization (INT)** Building global collaborations for inbound and outbound student exchange programs Identifying joint/dual degree program opportunities with foreign universities Promoting faculty participation in external seminars, workshops and conferences Attracting international faculty for local capacity building
NEWS	**7 Environment (ENV)** Developing an effective mechanism to create and disseminate awareness of environmental sustainability issues among faculty, staff, and students Encouraging environmentally friendly culture at university by engaging stakeholders effectively in resource and energy conservation, green environment approaches, and CO_2 emission reduction Identifying and documenting the operational aspects/areas of environmental concern across the university's operations Defining a gauge and measurement mechanism to evaluate the university's performance against defined criteria on regular basis.

Augmenting a NEWS assessment will be a narrative evaluation of the university's strengths, weaknesses, opportunities, and threats (SWOT) relative to each core area, with this evaluation informed by NEWS assessment. In traditional analysis strengths and weaknesses are associated with elements internal to the organization—in this case a university, whereas opportunities and threats reside largely in the external environment and are hence addressable, but not controllable by the university. Figure 2 provides a simple graphic representation of a SUEM SWOT Plot.
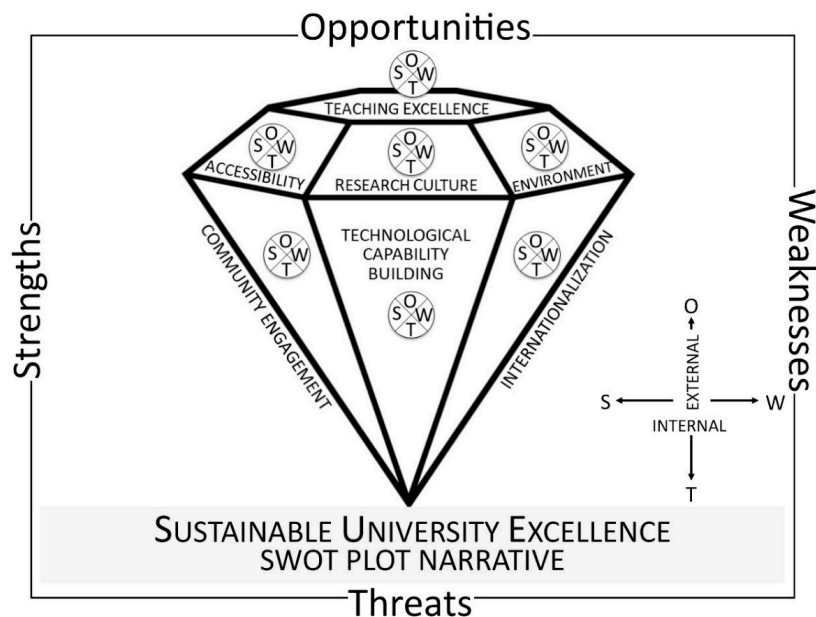
Figure 2. SUEM SWOT Plot.

6. Discussion

Sustainable development has received substantial attention over the last few decades across the world, with universities and HEIs also dedicating serious attention [36]. Hypothetically, universities have twofold role towards SD: Firstly, being a change agent, universities are expected to be more responsive in dealing with global challenges of sustainability. The creation of new knowledge through exploring the problems and issues of SD, finding and proposing viable solutions for SD, disseminating the requisite knowledge, and providing relevant learning opportunities to society [129]. Herein, it is understood that a knowledgeable, skilled, committed, responsive, and responsible citizenship would have a decisive role in the realization of HESD goals [130]. Secondly, universities cater to needs of multiple stakeholders by deploying various resources [131]. Universities consume copious amounts of both renewable and non-renewable resources, thus placing significant responsibility on universities to use these resources effectively and efficiently (eco-efficiency) to fulfil the needs of present generations, without comprising the stake of future generations. The concept of SHE and HESD was initially focused on environmental aspects of sustainability with the realization and transition towards ideas such as sustainable campus, sustainable curriculum, and sustainable operations subsequently received attention in education agendas and declarations. Such declarations are sets of guidelines, frameworks, tools and techniques that provide universities with roadmaps to embed sustainability theme within their operations [132].

In this study, we proposed SUEM, a holistic view of sustainability in universities that incorporate the social, environmental, and economic (people/planet/profit) elements of the TBL. Herein, it is argued that universities must target a synergistic and integrative approach to advance sustainable development across the TBL. Seven core functional areas were identified by reviewing the academic literature, education declarations on SHE and HESD, and sustainability frameworks introduced by HEIs around the world. Sustainable university excellence goals can be achieved within teaching through visionary leadership that establishes and promotes an appropriate culture in long-term institutional strategic plans. In practice, sustainability milestones in teaching operations could be achieved by enhancing the quality of teaching through effective involvement of stakeholders and by addressing their needs. Further, HESD goals could be materialized by efficiently utilising organizational resources, and by encouraging critical teaching operations stakeholders (teachers, students, employers, and society) to understand and engage passionately in achieving sustainably excellent teaching.

Universities are hub of knowledge creation in fields that include but are not limited to scientific, social, economic, and environmental issues. This very nature of universities' role demands the building of research-oriented cultures that engage faculty in alignment of research to real-time problems, and exploring collaborations of mutual interest and benefit to universities, organizations and society.

The incomparable technological development experienced over the last few decades has strongly impacted universities across the globe, and the responses towards this phenomenon vary greatly from university-to-university. Universities should adopt cutting edge technologies essential to fulfil their knowledge creation and dissemination obligations [133].

It is imperative to HESD that university education must be accessible indiscriminately to all segments of society irrespective of their gender, social, economic, ethnic, colour, and geographical backgrounds. Many universities face this dilemma and they must play their role in making higher education accessible to everyone. Sustainable development in higher education could be realized through fostering reciprocal relationships between universities and society, or through government policy establishment and deployment [134].

Universities must play leading roles in boosting social, cultural and economic standards of stakeholders. Globalization has transformed university dynamics around the world and many universities are extending their reach through international collaborations, joint partnerships, and other strategic initiatives. Universities should consider internationalization as an imperative relative to advancing SD [49]. Further, universities must extend their efforts toward become green campuses, and, sustainability education should be made part of every field of study. Universities should take a leading role in transforming society towards better understanding of a sustainable natural environment, promoting the idea of "responsible citizenship", and embedding environmentally friendly practices across university operations [124].

7. Conclusions

Universities have historically played critical roles in the improvement of social, cultural, and economic aspects of civilizations. Revolutionary changes in the dynamics of businesses, operations, and societies have placed visible pressure on universities to reassess their strategic, tactical, and operational roles and responsibilities. For the sustainable excellence in universities, the realization of a sustainable, excellent standing across the fundamental performance domains of the universities is obligatory. These domains include teaching quality, research culture, technological capability building, accessibility, community engagement, internationalization, and the natural environment. Further, herein we defined three essential stimulators to proposed enablers of SUE: Human, intellectual, and financial resources; a Quality Management System; and the importance of effective, visionary, transparent, fair, and accountable leadership and governance. Finally, we proposed an economic, human, and social impact assessment of universities. The Sustainable University Excellence Model (SUEM) results from integration of enablers, stimulators and impact domains.

Successful upward movement of universities relative to SUEM assessment depends on how effectively they diagnose and treat the pitfalls of the existing system within each assessed area. An appropriately planned and executed self-assessment of each enabling performance domain should be capable of sketching a detailed factual status of university—something that is essential to identifying and implementing effective improvement initiatives and this is the primary objective of the assessment approach introduced herein.

The relevance of a university is influenced by the changing dynamics of businesses, operations, and societies. Universities excelling relative to focus areas identified herein are crucial to this relevance in the sense that doing so indicates those universities are serving society in relevant and responsible ways. The roles of universities in society may remain similar to historic ones, but the strategies, policies, and action plans needed to perform successfully are radically changing. The Sustainable University Excellence Model (SUEM) provides universities with a simple springboard approach to identifying, exploring, understanding, and responding to emerging challenges within their own contextual realities.

8. Limitations and Future Research Directions

The approach taken herein is not without constraints relative to comprehensive delineation of issues that contribute to development, maintenance, and/or advancement of a sustainably excellent university. Similarly, there is nothing sacred concerning the specific N-E-W-S assessment lenses (e.g., criteria) associated with the seven core areas examined and the fact that there are four lenses used for each core area is a matter of convenient choice so that varying numbers of lenses per core area might be employed fruitfully. Equal weighting of each core area is naïve apart possibly from highly specific scenarios and instead a university could derive better value from the method introduced herein by first going through an exercise involving all relevant stakeholder segments that carefully considers their disparate challenges and priorities, for the purpose of identifying contextually-driven weights. Note however, that while these weights derive from use of a thorough process, that they will almost certainly represent values arrived at through compromise, with the weights settled upon seen as reasonable by most, but not "ideal" to any.

Not considered herein is that the seven identified core areas (or, indeed, any number of core areas) are not completely independent. Given relations among these areas, it is evident that the system represented by the SUEM is not a simple system composed of independent components, but rather a complex system composed of interacting components, so that change introduced in one area is likely to impact other areas in ways that—in some instances at least—will be unanticipated [135]. System optimization in such cases is typically more challenging.

Use of maturity scales and the descriptions used to characterise and measure performance improvement of a university relative to each lens is also a matter of choice as both "softer" and "harder" choices are available. Maturity scales that are carefully developed, with appropriate descriptive gradation from one level to the next, provide "harder" and more reliable assessment than use of "softer" approaches such as the simple Likert scale evaluation. It must be observed that in the present case, the best application of a maturity scale assessment approach would require the development of 28 such scales, with a scale for each of the four N-E-W-S lenses for each of the seven core areas assessed. Much of the language used for a given maturing level is often similar across lenses so that while the work involved in development of 28 maturity scales is significant, it is not insurmountable, due in part to applicability of partially repetitive language. Each of the 28 maturity scales will typically be on a 0-to-5 or 0-to-10 basis, with each scale point (e.g., 0, 1, 2, ... , 10) or each scale range (e.g., 0-1, 2-3, 4-6, 7-8, 9-10) in need of detailed description. Experienced assessors are generally more comfortable with ranges as they allow some flexibility—a positive given that any specific description is to a degree generic. As may be surmised, development of useful collection of maturity scales requires a combination of expertise and determination and is often accomplished by a team, rather than a single individual.

These are among the areas where future improvement in the SUEM and its associated Springboard Assessment approach can and should be explored. Given other issues cited in this section, the SUEM and Springboard Assessment, together with the use of a N-E-W-S Compass, maturity scales, and narrative summaries formed by using a traditional SWOT approach that addresses issues both internal and external to the university should be regarded as subject to periodic, if not constant change.

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