

**Aligning CCIS Programs with United Nations Sustainable Development Goals (UN-SDGs)
SDG17: Strengthen the means of implementation and revitalize the Global Partnership for
Sustainable Development (Partnerships for the Goals)**

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Summary

In 2015, several agreements were concluded regarding the establishment of numerous important global development agendas. Among these agreements, the following ones are of paramount importance: 1) Addis Ababa Action Agenda on development finance and means of implementation (United Nations 2015a); 2) the 2030 Agenda for Sustainable Development (AfSD) which defines 17 distinctive Sustainable Development Goals (SDGs) (United Nations 2015b) and the Paris Agreement (United Nations Framework Convention on Climate Change—UNFCCC 2015). Among these main development agendas, the SDGs provide a practical vehicle for higher education (HE) institutions to connect to their national SDG ambitions using the associated 169 targets and 232 indicators. Some of these targets and indicators provide a set of clear measurable objectives that will let HE institutions positively contribute to the improvement of the overall national sustainability performance. National sustainability encompasses preserving the climate and natural resources for future generations; ensuring prosperity; and prioritizing partnerships. Prince Sultan University (PSU) ambitiously aims at contributing to the achievement of the UN-SDGs at the Saudi National level. Given the diversity of the 17 UN-SDGs goals, this report is restricted to the PSU contribution towards the 17th goal: **Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.**

1. Introduction

HE institutions, including PSU, lead the national efforts of knowledge creation and dissemination. However, many outcomes of these efforts do not have a direct impact within the premises of these institutions. Thanks to the UN-SDGs, HE institutions can effectively achieve their social responsibility [1]. Socially-responsible universities can easily cope with the challenges associated with UN-SDGs achievements including knowledge deficit, insufficient support and limited human and corporate capacity. Like others, PSU focuses on a triangular achievement map including basic&applied research; teaching&learning; and community service as a socially-responsible HE

1.1 UN-SDGs and HE Connections

In order to properly localize the UN-SDGs in the HE settings, HE organizations must understand the relational intricacies between their educative mission and sustainable human development. The latter forms the core of the new trends in *education for sustainable development* [2]. However, in some instances, mapping current HE main activities to UN-SDGs can be done effortlessly. For instance, the 4th UN-SDG can be easily given a lifelong learning dimension. Such perspective is crucial in attaining many of the established goals.

1.1.1 Connections between UN-SDGs and Teaching&Learning

In [1], Tandon (2017) proposes many recommendations to inject the UN-SDGs into the teaching&learning activity. These recommendations include:

- Curriculum revisions: In some instances, it is very hard to add new courses given many other academic constraints including a capping on number of credit hours. In this case, existing courses can be revised to target specific UN-SDGs. For instance, agriculture-related academic departments may consider covering organic and traditional farming in their existing curricula to attain the 2nd goal (*UN-SDG2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture*). Medical schools may act similarly to attain the 3rd goal (*UN-SDG3: Goal 3: Ensure healthy lives and promote well-being for all at all ages*).
- introduction of new courses: Develop new service learning courses to embed some UN-SDGs goals. For example, a multi-disciplinary course on Global Engineering can be the vehicle to attain the 6th and 7th goals (*UN-SDG6: Ensure availability and sustainable management of water and sanitation for all. UN-SDG7: Ensure access to affordable, reliable, sustainable and modern energy for all*).
- Engaged pedagogy: In many situations, attaining a particular UN-SDG goal can be achieved through public lectures and awareness campaigns including visits to targeted society entities including farming communities (UN-SDG 2), remote areas (UN-SDG-3), public and private high schools to lecture about the benefits on democratized education through free massive open online courses (MOOCs) to attain the 4th goal (*UN-SDG4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*).

1.1.2 Connections between UN-SDGs and Academic Research

Leading HE institutions are setting the example of collaborative research where knowledge and talent exchange/transfer is commonly practiced. Such practices are in favor of effective attainment of the 17th goal (**UN-SDG17: Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development**). On the other hand, many HE organizations are struggling to embed these goals into their research activities and duties. In [1], Tandon suggests three distinct approaches to reduce this gap:

- Highlighting locally-usable research.
- National and international partnership to co-produce knowledge
- Learning new competencies.

By adopting these approaches, HE organizations can address local, national and global issues including extreme weather conditions that are usually associated with climate changes. In this way, basic&applied research can be geared towards the design and planning of climate-resilient cities and environments. By doing so, HE organizations have not only framed their research efforts to address urging issues but they have also attained some of the UN-SDGs including the 11th and 13 goals (*UN-DSG11: Make cities and human settlements inclusive, safe, resilient and sustainable. UN-SDG13: Take urgent action to combat climate change and its impacts.*). Nhamo and Mjimba identified several ways HE organizations are adopting to engage UN-SDGs into their research endeavors [3]:

Organization	UN-SDGs initiative
Academy of Science, South Africa (ASSAf)	including SDGs in academy's Annual Performance Plan, Annual Report and Strategic Plan
Science Council of Japan (SCJ)	Setting up expert committee on SDGs
Swiss Academy of Sciences (SCNAT)	incentivizing universities through SDG focused programs
The World Academy of Sciences (TWAS)	Aligning prizes and/or awards to SDGs
Global Young Academy (GYA)	Using SDG-referenced Working Groups
Academy of Sciences, Malaysia (ASM)	Running flagship studies in sustainable development research and developing a national Science, Technology and innovation plan for the SDGs
Thai Academy of Science and Technology (TAST)	Holding (bi) annual members' meetings on SDG-relevant themes
Chinese Academy of Sciences (CAS)	Commissioning national sustainability reports
Zambian Academy of Sciences (ZaAS)	Organizing live television phone-ins on SDG-relevant issues
The University of Queensland, Australia	Achieving SDG 6 discussion paper series
The University of Technology, Sydney, Australia	The UTS Development Network

Victoria University of Wellington, Australia	SDG Ideation Forum
The University of Western Australia	SDG research website
Monash University, Australia	Safe Families Research Study
institute for Sustainable Futures, University of Technology, Sydney, Australia	Mapping research to the SDGs
Curtin University Sustainability Policy institute, Australia	Western Australia's SDG Network
Sustainable Development Solutions Network Australia/Pacific, Australia	Leading SDG localization in Australia
University of South Africa	inauguration of the Cyclones, Floods and SDGs Research Group in southern Africa Proposal development, coordination and ultimate publication of books on SDGs and institutions of Higher Education in partnership with Springer

1.1.3 Connections between UN-SDGs and Academic Management

In [4], De Vall and Pubill identified practical connections between the HE management bodies and the implementation of the UN-SDGs. HE management can setup recommendations and guidelines to regulate the embedding of the UN-SDGs into the academic arena. In addition, challenges associated with HE sustainability are often ignored. According to [4], HE management can be directly involved in enforcing regulations and policies regarding the rational usage of water and energy within the campuses. In addition, waste management can be enforced and monitored.

2. Current State of Affairs

In 2019, the Times Higher Education (THE) started ranking universities according to their impact. In this ranking, THE provides global performance tables that rank HE organizations according to the attainment of the UN-SDGs. These performance tables consider the **research**, **outreach**, and **stewardship** [5]. According to [5], only **11 UN-SDGs** are considered. These include:

- UN-SDG3: Good health and well-being
- UN-SDG4: Quality education
- UN-SDG5: Gender equality
- UN-SDG8: Decent work and economic growth
- UN-SDG9: Industry, innovation, and infrastructure
- UN-SDG10: Reduced inequalities
- UN-SDG11: Sustainable cities and communities
- UN-SDG12: Responsible consumption and production
- UN-SDG13: Climate action
- UN-SDG16: Peace, justice and strong institutions
- **UN-SDG17: Partnerships for the goals**

As mentioned earlier, we restrict our study to the 17th goal in this report. THE Impact Rankings use the following criteria to assess the attainment of UN-SDG17:

a. **UN-SDG17 – Criteria 1 [Research]**¹: This criteria accounts for **27%** of the total score. It considers the following contributions:

a.1) Proportion of academic publications with co-author from other country (**14%**).

a.2) Number of publications that relate to the **11 SDGs** (**13%**).

¹ The data are provided by Elsevier's Scopus dataset and normalized across its range using z-scoring. It includes all indexed publications between 2013 and 2017.

b. **UN-SDG17 – Criteria 2 [Relationships to support the goals]**: This criteria accounts for **23%** of the total score. It considers the following contributions:

- b.1) Policy development with government or NGOs (**4.6%**).
- b.2) Promoting cross-sectoral dialogue with government or NGOs (**4.6%**).
- b.3) Collaborating internationally to capture data relating to SDGs (**4.6%**).
- b.4) Working internationally to promote best practice around SDGs (**4.6%**).
- b.5) Supporting the education of NGOs with respect to the SDGs (**4.6%**).

Each HE institution provides evidence based on its collected data on the progress of the UN-SDGs attainment. Then, the THE Committee evaluates and scores the collected evidence and data.

c. **UN-SDG17 – Criteria 3 [Publication of UN-SDGs reports]**: This criteria accounts for **50%** of the total score. HE organizations are requested to provide published data on their performance against each of the 10 UN-SDGs included in the first Times Higher Education University Impact Rankings (excluding UNSDG17). Additional scores can be obtained provided that the published documents are posted in an open format at public domain repositories.

2.1.1 THE Global Impact Rankings

The top-ranked HE institutions for 2019 and 2020 are shown in Figures 1-2.

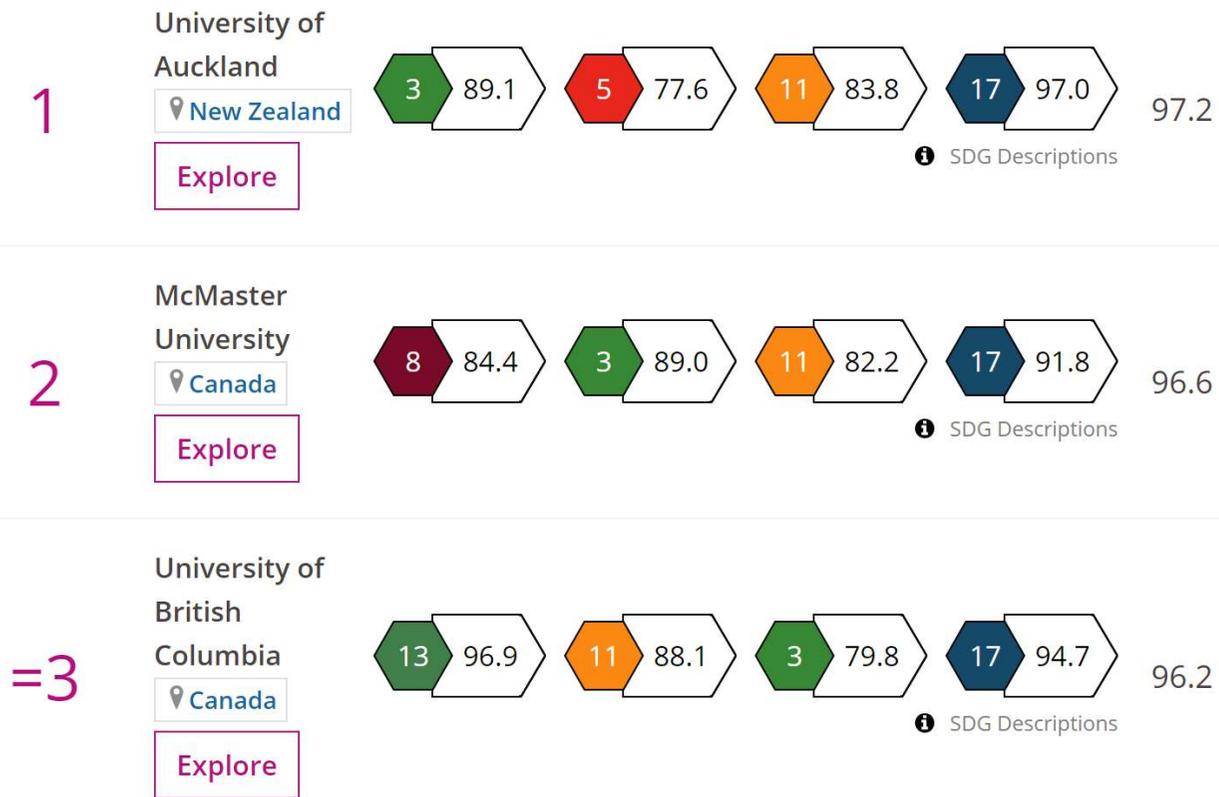


Figure 1: THE University Impact Rankings (2019) [UN-SDG17].

1	<p>James Cook University</p> <p>Australia</p> <p>Explore</p>	99.2	-
2	<p>University of Leeds</p> <p>United Kingdom</p> <p>Explore</p>	98.7	94.1
3	<p>University of Auckland</p> <p>New Zealand</p> <p>Explore</p>	97.8	98.5

Figure 2: THE University Impact Rankings (2020) [UN-SDG17].

2.1.2 Saudi Universities in THE Global Impact Rankings

The top Saudi HE institutions attaining the UN-SDGs goals are listed in Figures 3-4.

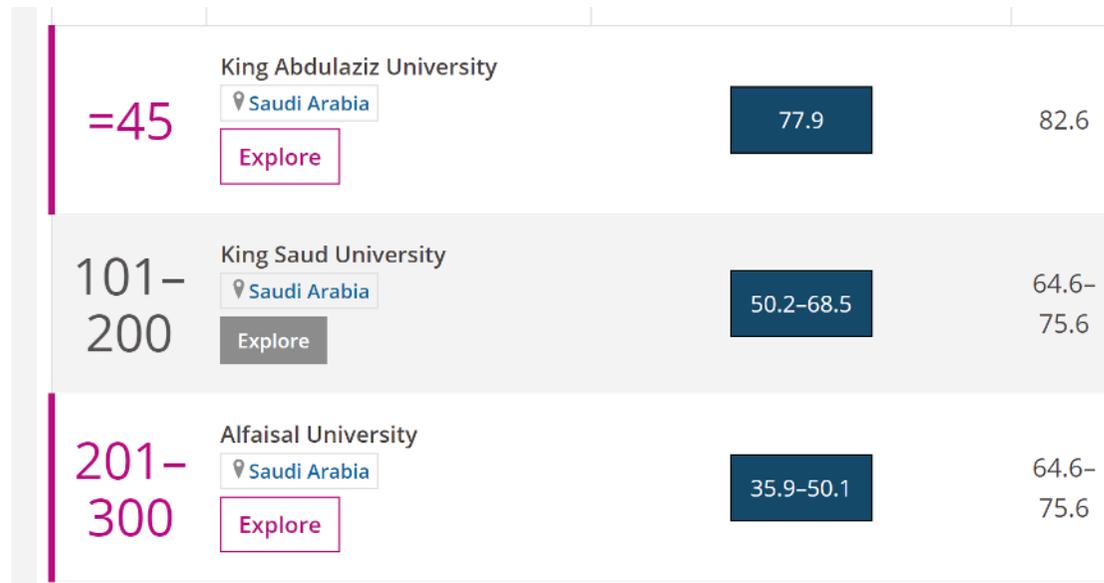


Figure 3: Top Saudi HE Universities according to THE University Impact Rankings (2019) [UN-SDG17].

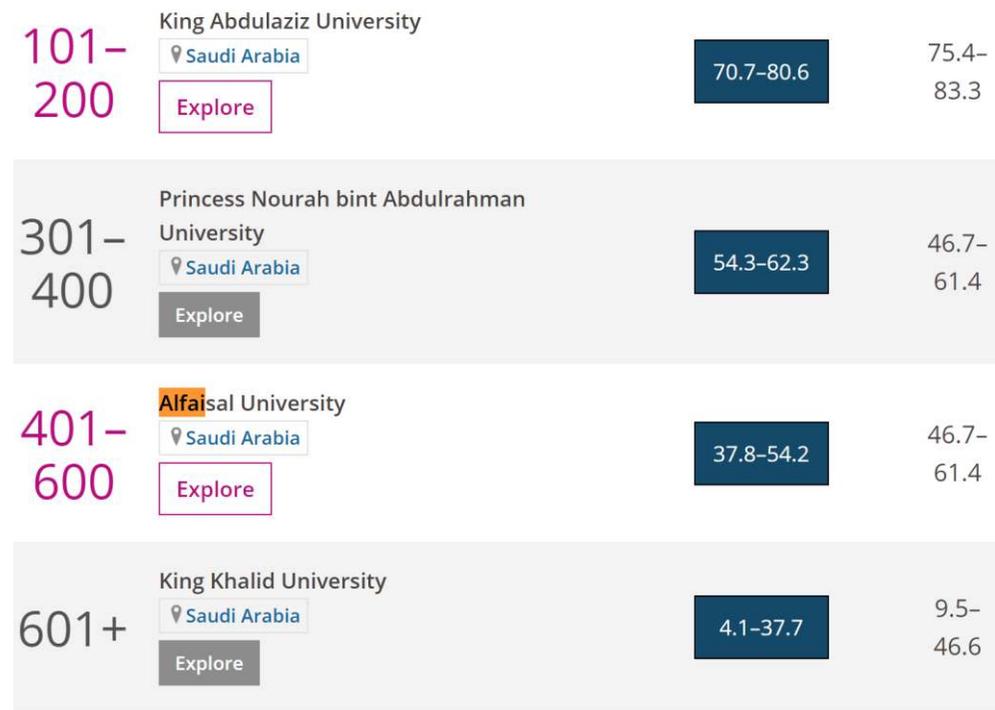


Figure 4: Top Saudi HE Universities according to THE University Impact Rankings (2020) [UN-SDG17].

3. Linkage of UN-SDGs in PSU initiatives

3.1 Embedding Sustainable Development Concepts in CCIS courses

The CCIC offers 3 different bachelor of science degrees with two distinct concentrations:

- Computer Science
- Software Engineering
- Information Sciences

The list of the courses is given below:

BSc Program	Course Number	Course Title	Targeted UN-SDG
CS	CS225	Software Engineering: Design and Development	UN-SDG8 and UN-SDG9
CS	CS489	Selected Topics in Computer Science	Sustainability in Computing Systems
CS	CS492	Co-op [Cooperative Education]	UN-SDG4, UN-SDG5, UN-SDG8 and UN-SDG9, UN-SDG12
CS	CS495	Emerging Topics in Computer Science	UN-SDG8 and UN-SDG9
CS	ETHC303	Ethical and Social Aspects of Computing	UN-SDG5 and UN-SDG8
CS	CS499	Capstone Project in Computer Science	Sustainability in Computing Systems
CS	DMS495	Emerging Topics in Digital Media	Sustainability in Computing Systems
SE	SE201	Introduction to Software Engineering	UN-SDG8 and UN-SDG9
SE	SE311	Software Requirements Engineering	UN-SDG8 and UN-SDG9
SE	SE322	Software Design and Architecture	UN-SDG8 and UN-SDG9

SE	SE401	Software Quality Assurance and Testing	Sustainability in Software Systems
SE	SE422	Software Maintenance and Evolution	Sustainability in Software Systems
SE	SE423	Software Engineering Project Management	UN-SDG8 and UN-SDG9
SE	SE489	Selected topics in Software Engineering	UN-SDG4, UN-SDG5, UN-SDG8 and UN-SDG9, UN-SDG12
SE	SE492	Co-op [Cooperative Education]	UN-SDG4, UN-SDG5, UN-SDG8 and UN-SDG9, UN-SDG12
SE	SE495	Emerging topics in Software Engineering	UN-SDG4, UN-SDG5, UN-SDG8 and UN-SDG9, UN-SDG12
SE	SE499	Software Design & Development Project	UN-SDG4, UN-SDG5, UN-SDG8 and UN-SDG9, UN-SDG12

3.2 Future Plans

There are several recommendations that the CCIS can adopt to attain the 17th goal of the UN-SDGs:

3.2.1 Establishment of Sustainable Development Center:

At the university level, PSU management can lead the way in harnessing the sustainability culture by establishing a central sustainability center. The CCIS College can actively contribute to this center by focusing on the courses where sustainability concepts can be easily embedded.

3.2.2 Infusion of Sustainability Concepts in CS/SE/IS Courses:

Palacin-Silva et al. [6] proposed several approaches that can lead to the infusion of sustainability concepts in software design and senior project courses. Other courses are good candidates including SE201, SE423, SE492 and SE499.

3.2.3 Offering New Courses:

Several courses can be proposed at the CCIS targeting all majors:

- a. SE for Sustainability: A sample course can be found at: <https://www.ics.uci.edu/~djr/DebraJRichardson/SE4S.html>

3.2.4 Free Elective Courses:

The Engineering College can offer very interesting courses related to sustainability in engineering. A sample course can be found at: https://courses.kaust.edu.sa/StudentCourses/GetPdf?fileName=2019-Fall-CBE_305-00032993.pdf&isExternal=False

3.2.5 Self-learning and development in sustainability:

Provide support to PSU faculty, staff and students to enroll in MOOC courses related to sustainability. A sample course can be found at: <https://www.coursera.org/learn/sustainability>. In addition, a set of freely available courses that target all the 17 UN=SDGs is available at: <https://www.humanrightscareers.com/un-sustainable-development-goals-courses/>

These courses are offered by an international coalition of 17 universities. Such initiatives will not only align PSU community to the sustainability concepts but will allow to attain several UN-SDGs goals including UN-SDG4 and UN-SDG17.

3.2.6 Collaboration with PSU RIC for Data and Evidence Collection:

The PSU RIC can significantly contribute to the collection of data and evidence related to research output targeting the 17 UN-SDGs and the THE Global Impact Rankings.

References

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- [6] M. V. Palacin-Silva, A. Seffah, J. Porras, “infusing sustainability into SE education: Lessons learned from capstone projects,” *Journal of Cleaner Production*, vol. 120, pp. 4338-4347, January 2018 (Accessed at: <https://www.sciencedirect.com/science/article/abs/pii/S0959652617312489>).

Appendix

The proposed survey to collect data and evidence related to research output targeting the 17 UN-SDGs and the THE Global Impact Rankings.

	Sustainable Development Goal (SDG)	PSU UN-SDGs Publications 2016-2020	Saudi Arabia UN-SDGs Publications 2016-2020	PSU National Share of UN-SDGs Publications 2016-2020	PSU Internationally Co-Authored UN-SDGs Publications 2016-2020	PSU Internationally Co-Authored SDG Publication % 2016-2020
UN-SDG1	No Poverty					
UN-SDG2	Zero Hunger					
UN-SDG3	Good Health and Wellbeing					
UN-SDG4	Quality Education					
UN-SDG5	Gender Equality					
UN-SDG6	Clean Water and Sanitation					
UN-SDG7	Affordable and Clean Energy					
UN-SDG8	Decent Work and Economic Growth					
UN-SDG9	Industry, Innovation and Infrastructure					
UN-SDG10	Reduced Inequalities					
UN-SDG11	Sustainable Cities and Communities					
UN-SDG12	Responsible Consumption and Production					
UN-SDG13	Climate Action					
UN-SDG14	Life Below Water					
UN-SDG15	Life on Land					
UN-SDG16	Peace, Justice and Strong Institutions					
UN-SDG17	Partnership for the Goals					