SOCIALLY RESPONSIBLE PRACTICES AT A PUBLIC UNIVERSITY IN A DEVELOPING COUNTRY: A SUSTAINABILITY APPROACH

Eric Dumisani Ncube [*]

* School of Management, IT and Governance, University of KwaZulu-Natal, Durban, South Africa
Contact details: School of Management, IT and Governance, University of KwaZulu-Natal, P. O. Box X54001, 4000 Durban, South Africa

Abstract

The Clean Act of 1990 of South Africa has imposed fines on producers of ozone-depleting substances and local smelting gases (Melnick, 1983). Purcell et al. (2019) suggest that Universities can deliver sustainable development goals (SDG) by working with internal and external stakeholder bodies. They further are expected to embrace issues of global and national social responsibility, governance and sustainability. Filho et al. (2019) opined that universities are central players and critical economic actors in many regions specifically related to sustainable development. The article aims to align sustainability with university operations. The extent to which postgraduate students understand sustainability operations strategy and standards that are eco-friendly are explored and informed by the triple bottom line (3BL) framework and explores the social awareness of the university community in ensuring the quality of life presently and for future generations in a developing context. This article employed a quantitative approach with a sample from the Supply Chain Management Honours students at the University of KwaZulu-Natal. The 44 questionnaires were randomly sent to students. Descriptive, and inferential, was generated to produce results, suggesting and reaffirming that all stakeholders, including the university leadership and other staff cohorts, should be committed to the United Nations (UN) SDG 4 objectives to ensure sustainability awareness and promote lifelong environmental learning.

Keywords: University Sustainable Development, Economic, Social, Environmental, Corporate Social Responsibility

Authors' individual contribution: The Author is responsible for all the contributions to the paper according to CRediT (Contributor Roles Taxonomy) standards.

Declaration of conflicting interests: The Author declares that there is no conflict of interest.

1. INTRODUCTION

Sustainability and the environment are essential concepts that drive organizations to profits Preservation of resources for future generations is through social and environmental responsibility. Sustainable development is a widely used trend in the manufacturing and the private sector. In response, institutions of higher learning are expected to ensure a reflective curriculum inclusive of practice. Higher education institutions around the globe have been integrating sustainable development into their systems, programs, and local communities for more than three decades (Filho et al., 2019). This, however, remains a constant challenge due to fast worldwide industrialization where there is extensive harm to the environment, such as depletion of ozone and Antarctic melting

(Lakshmimeera & Palanisamy, 2013). It is evident that there is a lack of awareness, ignorance, and inadequate training in the university community. The essence of supply chain sustainability is divided into three categories: namely, reducing risk and improving the performance of the supply chain, attracting customers that value sustainability, and community pressures and government incentives. These factors increase the focus on sustainable supply chains, environmental protection, and waste management operation practices to preserve for future generations on resources. Institutions of higher learning are not immune, which has implications for their practices. South African governments have a sustainable agenda to attain goals and to produce sustainably minded professionals (Ugbaja, 2018). Universities increasingly embrace sustainability, linking climate change, ecosystems, and business. Others include sustainability in their existing module, while some offer new modules, certificates, and degree programs. In particular, for example, Arizona State University and Rochester Institute of Technology offer postgraduate degrees (Stevenson, 2017). The universities are also relying on verbal communication sustainable practices in their operations. In particular, international universities, including Dartmouth, Harvard University, Stanford, Williams College, and the University of British Columbia, were termed by the environmental periodical *Grist* amongst the top 15 universities globally to reduce toxic gases in the atmosphere and be energy efficient (Stevenson, 2017). In addition, the University of KwaZulu-Natal has entered into a strategic partnership with industry, the Department of Trade and Industry (DTI) and the National Research Foundation (NRF) for the establishment of the Integrated Renewable Energy Advancement Programme (IREAP) to develop a comprehensive energy solution for South Africa using biomass and waste as an energy source. In particular, the College of Management Studies commerce students at the University of KwaZulu-Natal had metal paper banks sponsored by Mondi Paper, which excludes tins and glass trash bins. Furthermore, the college also offers a compulsory module to all undergraduate students, that is responsible, and sustainable management principles that include the impact on corporations in creating value. Hence, higher education institutions are cognizant of adhering to an ethos of sustainability and maintaining their commitment.

The paper is structured as follows. Section 2 reviews the relevant literature, and Section 3 represents the research methods employed to conduct the empirical study. Sections 4 and 5 present the results and discussions of the outcomes of the study. Finally, Section 6 provides the conclusion and includes areas of future research and some of the limitations of the paper.

2. LITERATURE REVIEW

2.1. Operations sustainability and corporate social responsibility

Millennium Development Goals (MDGs) were established as ambitious targets for improving people's lives, especially the poorest, worldwide (United Nations [UN], 2015). MDG 7 relates directly to ensuring environmental sustainability. The sustainable development goals (SDG), on the other hand, have a plan of action for the people, planet, and prosperity (UN, 2015). Goals 1 to 3 seek to end poverty, achieve food security and improved nutrition, promote sustainable agriculture, ensure healthy lives, and promote well-being of all ages. Moreover, it emphasizes that to ensure inclusive and equitable quality, quality education will promote lifelong learning opportunities for all (Goal 4). Of note are Goals 6 and 7, which seek to achieve availability and sustainable water management and sanitation. Goal 8 seeks to have access to affordable, reliable, sustainable, and modern energy for all. Goal 8 promotes sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. Goal 9 seeks to build resilient infrastructure, promote inclusive and. Goals 2 and 13 seek to ensure sustainable consumption and production patterns and take urgent action to combat climate change and its impacts. These pertinent Goals direct and guide South Africans in their engagement with sustainability.

The well-being of every supply chain depends on the health of the surrounding planet — the challenges of the 21st century call for sustainable designs of supply chain operations. Sustainable supply chains focus on development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Chopra, 2018).

Srivastava (2015) suggests that green supply chains are the integration of environmental thinking in managing the supply chain and should include product design, source and material selection, manufacturing processes, final product delivery to consumers, and management of the product at the end of life.

The triple bottom line (3BL) model frames this article and it is presented below in Figure 1.

Figure 1. 3BL model
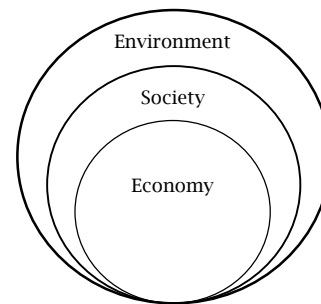
Source: Sandhu et al. (2014, p. 5).

2.2. Environmental factors — Planet

Sustainability has gained its popularity worldwide, cultivating the culture of institutions of higher learning, nations, and organisations, curbing, the depletion of natural resources, and climate change environment. Moreover, universities are pivotal in supporting and delivering national and global environmental sustainability objectives and UN MDG 7. Environmental law and corporate social responsibility (CSR) practices and ISO 14000 certifications have improved environmental practices in many companies (Lakshmimeera & Palanisamy, 2013). McCowan (2020) suggests that all universities have

some responsibilities in relation to adaptation and mitigation, both concerning themselves as institutions with their own communities and in assisting outside communities in society.

In the university environment waste management teams are expected to create awareness and impose penalties on non-compliance in order to ameliorate illegal dumping and create awareness among all its stakeholders Bosire (2014) offered that in the global corporate world, South African education institutions are expected to adhere to the commitment of the government and regulations. However, it identifies the weaknesses in their governance, especially oversight of the institution's operations.

According to the SDG report (UN, 2021), damage to ecosystems and nature may lead to the emergence of other diseases, resulting in a higher case of fatality rate. Climate change, natural disasters, heat waves, drought, typhoons, and impact on rising sea level. The introduction of the digital revolution has moved supply chains online and increased security risks such as cyberattacks. There is an increase in deforestation of 12% from 2019 to 2020 (Goldman et al., 2020). Also, there has been significant growth in plastic consumption and waste during the COVID-19 pandemic (Adyel, 2020; UN, 2021).

2.3. Social factors — People

Population growth is much higher in developing countries, while resource consumption and pollution are higher in developed countries. According to the UN (2015): "We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment" (p. 5).

Thus, social factor refers to the company's commitment to making a societal impact in communities locally and abroad such as employees, shareholders and people outside the organization like customers and other stakeholders. Correia (2019) suggests that the social dimension is the increase of CSR initiatives that have been receiving considerable strategic focus at an operation level in research. CSR has developed as a modern management concept that requires businesses to take more responsibility for their activities and to provide a meaningful influence on society. In essence, it was voluntary self-regulation, in which companies were expected to do more than simply meet policies and guidelines (Saliev & Hockerts, 2013). According to Chopra (2008), the social pillar measures the organisation's ability to address issues that are important for its surroundings, the personnel of that environment, and the society where related social factors include health and safety and training and development.

2.4. Economic factors — Profits

Every organization aims to decrease costs and increase its returns in profits in the private sector and surplus in the public sector financial statements. This factor refers to the financial return a company generates for its shareholders but should empower and sustain the well-being community as a whole SDG report (UN, 2021) suggests that low-income developing countries lack fiscal space to finance emergency response and investment-led recovery plans aligned with the SDG. The demand for incorporating sustainability practices in both government and non-governmental educational institutions has become increasingly apparent during the last decade. The university is the essential agent of change in the global economy and in the preparation of professionals who can influence the attainment of society (Ugbaja, 2018). According to Sandhu et al. (2014), many organisations recognize their power to impact the world without compromising their financial performance positively, and that adopting sustainability initiatives has driven business success.

2.5. Waste segregation and coding of dumping bins

The colour of recycling bins provides information to users about specific recyclable solid waste. The colours of waste bins are as follows: blue, green, yellow, red, orange, white, beige, and grey. The coding of bins in colours ensures that users identify the types of waste and where it belongs. Also, it saves time for recyclers to spot the type of waste they specialize in, and time to sift out waste around their specialty.

The research by Leebai et al. (2021) suggests that recycling bin separation (segregation) such as polyethylene terephthalate (PET), recyclable and compatible bins could be placed inside the building and near the stairs, in the hallways, and colour combination of all in one location.

The waste bins are in plain or transparent colour, such as dumping sites in Shibuya in Tokyo. Waste bins play a critical role in overconsumption, and prevention and promote responsible recycling and eco-friendly living standards. Huang (2007), Keramitsoglou and Tsagarakis (2018), and Wadsworth et al. (2007) disputed that transparent clear bins may increase the level of contamination which may increase incorrect waste dumping.

Recycling bins are covered with lids of different bright colours or else have openings with coloured borders and bear various graphics or logos drawings. In addition, waste bins of particular artistic interest exist and depict a broader picture to support recycling objectives through art. Such, include the recycling bins decorated with works of photo artists in commercial spaces and heavy traffic areas in the city of Toronto (Elder, 2008; Keramitsoglou & Tsagarakis, 2018) or the Indiana University artistic recycling bins placed around the scenic Bloomington campus. Western Massachusetts and Great Barrington, and a recycling material bank in Afula, Israel, are cities that have transparent waste bins used (Keramitsoglou & Tsagarakis, 2018).

According to the standard business practices, an assessment reveals several types of waste bins for material waste disposal. Tekin et al. (2015) indicate that green supply chain management (GSCM) can be described as a business's concern and attention to environmental problems in all other supply chain operations. GSCM also ensures that businesses do not jeopardise the ecosystem in any of their supply chain processes. Companies typically view GSCM activities as cost-increasing variables. However, studies have demonstrated that GSCM activities assist businesses in minimising overall costs, improving competitiveness, stimulating growth,

conserving money, and gaining a competitive edge (Srivastava, 2015). Aside from these concrete advantages, GSCM procedures play critical roles in employee work satisfaction and engagement, fostering brand loyalty and gratification and improving their image in the eyes of society.

The primary aim of GSCM is to ensure that sustainable standards are followed at all process stages, from raw material sourcing to customer supply, including manufacturing, processing, storage, warehousing, shipping, and assembling. The long-term aim of GSCM is to keep all operations under surveillance, minimise chemical waste, reduce carbon pollution, and eradicate all practices that may harm the environment. Thus, philanthropic efforts do not have to be ones that directly benefit society but can instead be woven into everyday operations (Tekin et al., 2015).

3. RESEARCH METHODOLOGY

The paper employed a quantitative research approach, and a probability sampling method was used. The positivist research approach was relevant to the associated address of the research questions. The data was gathered in the context of an explanatory study approach from the population of 52 randomly chosen postgraduate students enrolled for a Supply Chain Management Honours degree. The final sample included 44 participants,

which was adequately representative (Sekaran & Bougie, 2016). The sample was confined to the Supply Chain Management Honours students at the University of KwaZulu-Natal in Westville Campus. The questionnaire posed questions about D-block, which is the campus building where students meet regularly during free periods and where food outlets and banks are situated.

The timetable finder was a valuable instrument employed to locate students and distribute questionnaires which they responded to during their lectures. The dichotomous questions were divided into two environmental, two social, and seven economic factors of the triple bottom-line framework.

The data was analysed with Statistical Package for Social Sciences (SPSS), version 27. The descriptive, and inferential, results were produced.

4. RESULTS

4.1. Descriptive statistical findings

In total a sample of 41 participants responded to the questionnaire. The biographical information demonstrates that 36 were African participants, 4 were Indian, and 1 was from another race group. Twenty-five participants were between 18 and 25, and sixteen were between 26 and 33.

Figure 2. Descriptive statistics
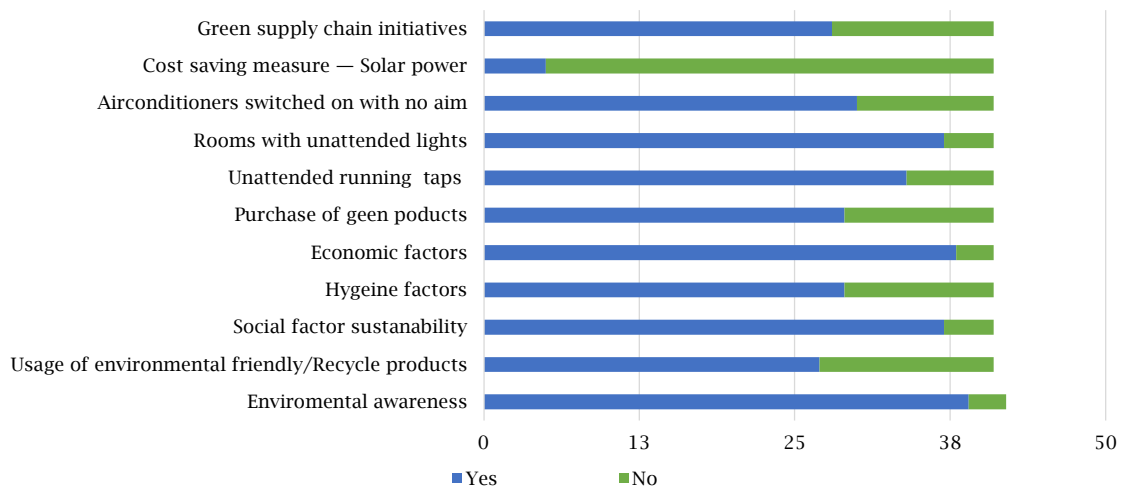
Source: Author's elaboration.

Thirty-nine participants maintained that there is environmental awareness, and three offered there is no environmental awareness campaign on campus. When questioned on the usage of environmentally friendly products or recycled products, 27 agreed, and 14 disagreed. Thirty-seven responded yes, on social sustainability factors observed on campus, and four disagreed. When questioned about the hygienic factors, 29 participants responded positively, and four disagreed. Thirty-eight participants agreed to the observation of economic factors while three did not agree. Twenty-nine participants agreed that

the campus purchased green products, and twelve did not agree. Thirty-four agreed that they have unattended running taps in campus buildings, and seven did not witness such an occurrence. Thirty-seven agreed that they had observed rooms left with light unattended, and four did not agree. Thirty participants agreed that they have observed air conditioners switched on with no purpose, and eleven have not witnessed such. Five participants agreed with using power to save energy, and thirty-six disagreed. Finally, twenty-eight acknowledged the green supply initiative on campus while thirteen had not.

Table 1. Inferential statistics

Variables	N	Minimum	Maximum	Mean	Std. dev.	Variance	Skewness		Kurtosis	
				Statistic			Statistic	Std. error	Statistic	Std. error
EnvAwareness	41	1	2	1.07	0.264	0.070	3.404	0.369	10.076	0.724
Recyclableprod	41	1	2	1.34	0.480	0.230	0.694	0.369	-1.598	0.724
Social	41	1	2	1.07	0.264	0.070	3.404	0.369	10.076	0.724
Hygiene	41	1	2	1.29	0.461	0.212	0.946	0.369	-1.164	0.724
Economic	41	1	2	1.10	0.300	0.090	2.817	0.369	6.236	0.724
GreenPur	41	1	2	1.29	0.461	0.212	0.946	0.369	-1.164	0.724
Tapsunatt	41	1	2	1.17	0.381	0.145	1.817	0.369	1.367	0.724
Lightsunatt	41	1	2	1.12	0.331	0.110	2.399	0.369	3.947	0.724
Solarpow	40	1	2	1.08	0.267	0.071	3.354	0.374	9.736	0.733
GSMintiat	41	1	2	1.32	0.471	0.222	0.816	0.369	-1.405	0.724
Valid N (listwise)	40									

Note: EnvAwareness — Environmental awareness, Recyclableprod — Recyclable products, Social — Social factors, Hygiene — Hygiene factors, Economic — Economic factors, GreenPur — Green purchases, Tapsunatt — Taps unattended, Lightsunatt — Lights unattended, Solarpow — Solar power, GSMintiat — Green supply chain initiatives.
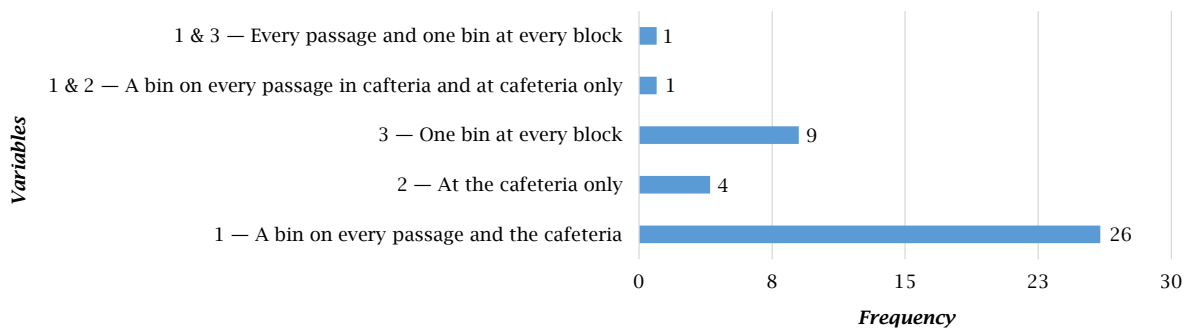*Source: Author's elaboration.*

The output presented above presents the information for each variable in the summary of their race (Africans, Indians, and other races) between the ages 18 and 36 years old with a mean of 1.32 and a standard deviation of 0.480. Table 1 also provides information about the distribution of scores on continuous variables (skewness and kurtosis, which are needed for these variables to be used in the parametric statistical techniques such as analytics of variance and t-test. The data table above indicates positive skewness, where scores are 0.694 to 3.404 respectively. Positive kurtosis values indicate that the distribution is rather peaked or clustered in the centre and kurtosis values below 0 (zero) the distribution of too many cases is extreme.

Participants were requested to choose a location where colour-coded recycling bins should be placed in on-campus buildings. Their responses are illustrated in Figure 3 below.

Figure 3. Preferred bin locations

Source: Authors' elaboration.

The majority (26) of the participants suggested placement in the cafeteria area (D-block), where most students' activities are hosted. Nine (9) recommended that one bin be at every block, 4 proposed a D-block (cafeteria area), and 1 participant offered to position it in every passage and the cafeteria was also located in every building. 1 participant preferred every passage and the passage and cafeteria area. According to Leebai et al. (2021), the location, unit colour and noticeability of trash bins can affect waste collection and separation performance, increasing human awareness through appropriate design and setting of trash bins might enable more efficient trash collection of segregated waste.

Table 2. Reliability statistics

Cronbach's alpha	No. of items
91.1	41

Source: Author's elaboration.

The Cronbach's alpha results in Table 2 demonstrated that more than 91.1% of the 41 questions indicated high levels of internal reliability. Maree (2016) suggests 0.90 high reliability, 0.80 moderate reliability, and 0.70 low reliability.

Correlation is often considered when exploring the relationship among groups of variables (see Table A.1 in Appendix). The internal relationship was investigated using Pearson sustainable practices elements correlation efficiency. The preliminary analysis was performed to ensure no violation of the assumption of normality. According to Pallant (2020), in determining the strength of the relationship; $r = 10$ to 0.29, medium, $r = 0.30$ to 0.49, and $R = 0.50$ to 1. The correlation between two variables is considered to be strong if the absolute value of r is greater than 0.75.

There were vital variables and negative correlations between variables, $r = 35$, $n = 41$, $p < 0.001$, with the high level of sustainable practices associated with low levels of sustainable practices on campus. The only variable that had 40 responses was using solar power to save energy as South Africa faced an electricity crisis. The waste energy could be used for air conditioners, and water could be recycled for toilets and reused again.

4.2. Chi-square test

Field (2005) refers to the Pearson chi-square test of independence of two categorical variables, and it tests whether two categorical variables forming a contingency table are associated.

Table 3. Chi-square test

Variable	Chi-square test	Sig.	N
Environmental awareness	26.3	0.000	41
Solar power	2.08	0.333	41
Recyclable products	0.976	0.614	41
Social factors	2.09	0.042	41
Hygiene factors	1.28	0.352	41
Green supply chain initiatives	6.38	0.042	41
Economic factors	1.28	0.536	41
Green purchases	4.77	0.092	41

Source: Author's elaboration.

A chi-square test of independence was performed to examine the relationship between races and the campus green supply chain initiatives. The relation between these variables was significant:
- X^2 (1, $N = 41$) = 6.4, p = 0.042 (significant);
- social factors — X^2 (2, $N = 41$) = 2.0, p = 0.352 (insignificant);
- hygiene factors — (3, $N = 41$) = 1.3, p = 0.527 (insignificant);
- economic factors — (4, $N = 41$) = 1.2, p = 0.536 (insignificant);
- environmental awareness — (5, $N = 41$) = 26.3, p = 0.000;
- solar power — (6, $N = 41$) = 2.1, p = 0.366 (insignificant);
- green purchase — (7, $N = 41$) = 4.7, p = 0.092 (significant);
- tap unattended — (8, $N = 41$) = 8.8, p = 0.012;
- lights unattended — (9, $N = 41$) = 0.79, p = 0.673.

The result is significant if this value is equal to or less than the designated alpha level (normally 0.05). In this case, the p-value is smaller than the standard alpha value. More simply, the result is significant. The data suggests that the variables, i.e., environmental factors, social factors, green supply initiatives, and green purchases, are more significant than other variables.

5. DISCUSSION

Earth's resources are not infinite, and the South African government is committed to reducing the amount of plastic, cans, paper and glass going to landfills by 70% in the next decade. Sustainability, therefore, focuses on reducing risk and improving supply chain financial performance. This will attract customers who value incentives, and the government's mandate.

It was evident that the reliability statistics, Cronbach's alpha demonstrated that it is more than 91.1% (0.90), meaning that it is highly reliable. The chi-square demonstrates that race and sustainable operations are associated. All respondents indicated a strong relationship and that social, economic and environmental factors significantly impact the contribution to saving the planet especially since they occupy more space than staff during the day. Furthermore, the student community

could convey via their preferred social media sources what they have learned from the compulsory sustainable management module in the College Law and Management Studies and postgraduate is covered extensively in Honours Supply Chain Management modules. It is critical to ensure that sustainability initiatives should be included in all university programs so that students will convey the knowledge to the broader community. The chi-square depicts the significance of environmental awareness (0.00) social factors are also significant at 0.042.

For the resources required to fully implement efficient sustainable operations in the university. chi-squares depict a significant relationship of 0.042. Green supply chain initiatives on campus, such as green buildings. Green buildings are efficient resources, reduce the impact on the environment, and are healthier for people. If the same strategy could be adopted by the University of KwaZulu-Natal campus in all programs, the University would ultimately support global environmental objectives and SDG.

In locating appropriate waste disposal sites throughout the university campus. The findings indicate that the majority (26) chose to place these waste bins on every building block. To economize on operational costs, the containers should be strategically located where there are many people are situated. These spaces are the cafeteria, the quad area, and lecture venues where staff and students are often found. Therefore, these areas are a priority that correct disposable waste bins are to be located for all waste materials for easier recycling for cleaning staff and students. This change in waste disposal patterns will provide additional value to all students and staff of the university. Another option available to the university is to outsource this to the experts, who will charge collectors or hire staff to deal with waste separation for easy recycling. The monetary benefit may add value to the image of the institution, and active participation of students can allow the students to supplement their income. This can contribute to clearing their debt for tuition and accommodation fees.

South African University of Cape Town's (UCT's) environmental sustainability strategy (Braune & Morar, 2020) suggests that universities are vital in supporting and delivering national and global ecological sustainability inclusive of objectives and UN and SDG. The institution contributed immensely to research and to grow human capital on environmental sustainability (Braune & Morar, 2020). The UCT has introduced an online module/course on environmental sustainability that aims to contribute to students' overall credits at the university and create commitment (Braune & Morar, 2020). This is not different from the University of KwaZulu-Natal, where students are introduced to the nature and fundamentals of responsible and sustainable management and leadership. The module further includes the role, dynamics and impact of cooperation in the creation of sustainable social and economic value, critical issues relating to global and national social responsibility, governance, and sustainability and the honours in supply chain module covers these concepts at an advanced level of study.

One of the UCT institution's operational targets was to reduce energy consumption, carbon emissions, water consumption, and waste to landfill to zero state by estimated 2050, and a 2.5 annual reduction from 2020 (Braune & Morar, 2020). The University of KwaZulu-Natal could commence by inviting private sector partnerships or collaborating with other universities locally or abroad to achieve this objective. In 2018, the School of Education (Edgewood campus) invited the private sector to participate in an environmental sustainability and community development conference. The aim was to foster collaboration with both the private and public sectors.

By 2030, the eThekwini municipality will enjoy the reputation of being Africa's most liveable city, where all citizens live in harmony. This vision will be achieved by growing its economy and meeting people's needs so that all citizens enjoy a high quality of life with equal opportunities in a city. The call to action is for schools, universities, businesses, community organisations, and government to engage, to meet this vision. Moreover, UCT also envisages integrating various other green campus elements that support the institution to be a leading global campus. In addition, they focus on, walkability, fossil-free mobility, digital and data connectivity, sustainable food and sustainable procurement. All new buildings are to net zero by 2030 and all existing buildings by 2050 (Baune & Morar, 2020). The University of KwaZulu-Natal's environmental report suggests that Howard and Westville campuses are situated in an abundance of flora and fauna. In 1981, the campus conservation committee was formed.

In 2018, the University of KwaZulu-Natal, School of Education in collaboration with the KwaZulu-Natal Department of Education, School of Social Sciences, Science and Technology Education Centre (STEC), local university of technologies (the Mangosuthu University of Technology [MUT] and Durban University of Technology [DUT]), Afripak, Umkhumbane Schools Project, 2020 Vision amongst others partners, convened a conference. The objectives were to appeal to the educator's syllabus with an environmentally sustainable theory and practice-based approach. Joint stakeholders' involvement and advancement of environmentally sustainable action and development and support through action plan, foster partnerships and collaborations with community drive which include all stakeholders playing a pivotal role in sustainable action to the next level. Finally, support research and civil action in community development Action and support disciplinary in addressing current and future needs.

These objectives are gradually actioned university-wide with a focus on future generations. In addition, Cavas et al. (2014) suggest that the university needs to consider supporting green purchasing and the use of alternative energy supply such as solar systems, and educate internal stakeholders on conserving water supply. In support, Stevenson (2017) opined that education, including formal education, public awareness, and training, should be recognized as the process by which human beings and societies can reach their fullest potential. Such a holistic potential is evident from the present study that promotes commitment towards a green university space. Undoubtedly University of KwaZulu-Natal recognises that as a higher education institution (HEI) they are key to promoting sustainable development and improving the capacity of people to address environmental and development issues (Cavas et al., 2014). Moreover, the university should consider supporting green purchasing and the use of alternative energy supply such as solar systems, and educate internal stakeholders on conserving water supply. Some buildings that can be identified and used as pilot studies (projects) for green building and save the institution energy operation costs.

6. CONCLUSION

This article aimed to determine the everyday sustainability awareness and understanding that postgraduate students play a vital role in shaping the university during their study and work-life after graduation. The results demonstrated that most participants are aware of their contribution towards global sustainable objectives, but these results cannot be generalized to all university campuses (Pietermaritzburg, Howard, Medical school, and Edgewood campuses). The significance of environmental awareness, social factors, and green supply chain initiatives depict that to enhance collaboration, all internal stakeholders, (students in particular) awareness campaigns can play a critical role in sustainable goals. Collaboration and outsourcing of waste management must be given to experts who could assist in cutting operating costs and contribute to ISO 14000 standards to reduce greenhouse gases. Furthermore, the university has an environmental sustainability operation strategy to ensure commitments from all internal and external stakeholders.

The universities in developing countries should increase their commitment to creating a conducive environment to achieve sustainability goals. These can be achieved by creating university comprehensive sustainability campaigns in all their teaching and learning curricula so that such lessons will be incorporated into everyday lives. In addition, campaigns could address waste reduction, recycling, nature and water conservation, environmental protection, social awareness through human development, and decreasing the cost and consumption of recyclable and environmentally friendly products. The University of KwaZulu-Natal's College of Law and Management could maximise the opportunity to formulate sustainable campaigns to deliberately save the environment and create awareness through student and community engagement. These findings suggest investing in new operational activities for disposing of waste. This approach includes purchasing solar panels, sustainable light bulbs, efficient water taps, using recyclable paper amongst the university stakeholders, and purchasing multiple waste bins for disposal to support sustainable development goals. The waste management system currently does not accommodate bottle (glass), tin (metal), and paper banks to control waste disposal. Therefore, it is highly recommended that trash bins be located where they are visible; that would help save time on recycling processes. Future research should focus on sustainability at rural secondary schools framed within a sustainability approach. It should include

exploring how to create awareness of not depleting scarce resources and preservation for future generations is feasible. This paper is limited to a small section of postgraduate students within the discipline of supply chains. Perhaps continued research should be considered to expand the sample to the faculty, and wider stakeholders inclusive of the alumni (Purcell et al., 2019). In addition, further research initiatives could also include a comparative campus study, regionally and in other BRICS countries (Brazil, Russia, India, China, and South Africa) to expand sustainable initiatives in the educational sector.

REFERENCES

1. Adyel, T. M. (2020). Accumulation of plastic waste during COVID-19. *Science, 369*(6509), 1314–1315. https://doi.org/10.1126/science.abd9925
2. Bosire, M. S. (2014). *A sustainability reporting framework for South African higher education institutions* [Doctoral dissertation, Nelson Mandela Metropolitan University]. South East Academic Libraries System. http://hdl.handle.net/10948/d1016126
3. Braune, M., & Morar, R. (2020). *UCT environmental sustainability strategy* (revision 0, 2020). University of Cape Town. https://uct.ac.za/sites/default/files/media/documents/UCT_Environmental_Sustainability_Strategy_2021.pdf
4. Cahillane, J. (2007, August 1). *Beautiful bins.* Waste360. https://www.waste360.com/Recycling_And_Processing/waste_beautiful_bins
5. Cavas, B., Ertepinar, H., & Teksoz, S. (2014). Sustainable in schools of education in Turkey: In other words of lecturers. *Journal of Baltic Science Education, 13*(4), 469–482. https://doi.org/10.33225/jbse/14.13.469
6. Chopra, S. (2018). *Supply chain management: Strategy, planning, and operations* (7th ed.). Pearson.
7. Correia, M. S. (2019). Sustainability: An overview of the triple bottom line and sustainability implementation. *International Journal of Strategic Engineering, 2*(1), 29–38. https://www.researchgate.net/publication/330057873_Sustainability_An_Overview_of_the_Triple_Bottom_Line_and_Sustainability_Implementation
8. Elder, J. (2008, April 8). *Magenta foundation: "Flash forward" recycling bins.* Shape + Colour. https://shapeandcolour.wordpress.com/2008/04/15/magenta-foundatin-flash-forward-recycling-bins/
9. Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). SAGE Publications.
10. Filho, W. L., Vargas, V. R., Salvia, A. L., Brandli, L. L., Pallant, E., Klavins, M., Ray, S., Moggi, S., Maruna, M., Conticelli, E., Amogre Ayanore, M., Radovic, V., Gupta, B., Sen, S., Paço, A., Michalopoulou, E., Saikim, F. H., Koh, H. L., Frankenberger, F., … Vaccari, M. (2019). The role of higher education institutions in sustainability initiatives at the local level. *Journal of Cleaner Production, 233*, 1004–1015. https://doi.org/10.1016/j.jclepro.2019.06.059
11. Goldman, E., Weisse, M. J., Harris, N., & Schneider, M. (2020). *Estimating the role of seven commodities in agriculture-linked deforestation: Oil palm, soy, cattle, wood fiber, cocoa, coffee, and rubber* (Technical Note). World Resources Institute. https://doi.org/10.46830/writn.na.00001
12. Keramitsoglou, K. M., & Tsagarakis, K. P. (2018). Public participation in designing the recycling bins to encourage recycling. *Sustainability, 10*(4), Article 1240. https://doi.org/10.3390/su10041240
13. Lakshmimeera, B. L., & Palanisamy, C. (2013). A conceptual framework on green supply chain management practices. *Industrial Engineering Letters, 3*(10), 42–51. https://core.ac.uk/download/pdf/234685131.pdf
14. Leebai, N., Areeprasert, C., Khaobang, C., Viriyapanitchakij, N., Bussa, B., Dilinazi, D., & Takahashi, F. (2021). The effects of color preference and noticeability of trash bins on waste collection performance and waste-sorting behaviors. *Waste Management, 121*, 153–163. https://doi.org/10.1016/j.wasman.2020.12.010
15. Maree, K. (Ed.). (2016). *First steps in research* (2nd ed.). Van Schaik Publishers.
16. McCowan, T. (2020). *The impact of universities in climate change: A theoretical framework* (Working Paper No. 55). Center for Global Higher Education. https://www.researchcghe.org/perch/resources/publications/final-working-paper-55.pdf
17. Melnick, R. S. (1983). *Regulation and the courts: The case of the Clean Air Act.* Brookings Institution Press.
18. Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS.* Routledge. https://doi.org/10.4324/9781003117452
19. Purcell, W. M., Henriksen, H., & Spengler, J. D. (2019). Universities as the engine of transformational sustainability toward delivering the sustainable development goals: "Living labs" for sustainability. *International Journal of Sustainability in Higher Education, 20*(8), 1343–1357. https://doi.org/10.1108/IJSHE-02-2019-0103
20. Saliev, K., & Hockerts, K. (2013). *Karma united: How Danish sports brand hummel wants to "change the world through sport".* Copenhagen Business School (CBS). https://www.thecasecentre.org/educators/products/view?id=118713
21. Sandhu, S., McKenzie, S., & Harris, H. (Eds.). (2014). *Linking local and global sustainability.* Springer. https://doi.org/10.1007/978-94-017-9008-6
22. Sekaran, U., & Bougie, R. (2016) *Research methods for business: A skill building approach* (7th ed.). Wiley.
23. Srivastava, N. K. (2015). Does governance structure have any effect on firm performance during the financial crisis: Evidence from selected Indian companies. *Journal of Strategy and Management, 8*(4), 368–383. https://doi.org/10.1108/JSMA-02-2015-0014
24. Stevenson, W. J. (2017). *Operations management* (13th ed.). McGraw Hill.
25. Tekin, E. K., Ertürk, A., & Tozan, H. (2015). Corporate social responsibility in supply chains. In H. Tozan & A. Ertürk (Eds.), *Applications of contemporary management approaches in supply chains.* IntechOpen. https://doi.org/10.5772/59582
26. Ugbaja, S. C. (2018) Management practices towards the incorporation of sustainability in African universities. *European Journal of Business and Management, 10*(8), 92–107. https://core.ac.uk/download/pdf/234628299.pdf
27. United Nations (UN). (2015). *Transforming our world: The 2030 agenda for sustainable development.* https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf
28. United Nations (UN). (2021). *The Sustainable Development Goals Report 2021.* https://unstats.un.org/sdgs/report/2021/The-Sustainable-Development-Goals-Report-2021.pdf

29. University of KwaZulu-Natal. (n.d.). *Developing innovative solutions for a changing climate: Environmental research projects at the University of KwaZulu-Natal.* https://ukzn.ac.za/wp-content/miscFiles/publications /UKZN%20Developing%20Innovative%20Solutions%20for%20a%20Changing%20Climate.pdf

30. Wadsworth, L. M., Husman, J., Duggan, M. A., & Pennington, M. N. (2007). Online mathematics achievement: Effects of learning strategies and self-efficacy. *Journal of Developmental Education, 30*(3), 6–14. https://www.fi.uu.nl/publicaties/literatuur/2007_wadsworth_self_efficacy_elwieralert.pdf

31. Wandsworth Council. (2013, March 15). *Be clear about recycling with new-look sacks.* https://www.wandsworth .gov.uk/news/article/11709

32. Zhao, Y., Song, L., Huang, R., Song, L., & Li, X. (2007). Recycling of aged refuse from a closed landfill. *Waste Management & Research, 25*(2), 130–138. https://journals.sagepub.com/doi/epdf/10.1177/0734242X07074053

APPENDIX

Table A.1. Correlations

		EnvAwareness	Recyclableprod	Social	Hygiene	GreenPur	Economic	Tapsunatt	Solarpow	GSMintiat	Lightsunatt
EnvAwareness	Pearson correlation	1000	-0.005	0.281	0.025	0.025	-0.092	0.619**	0.279	0.412**	0.182
	Sig. (2-tailed)		0.976	0.075	0.876	0.876	0.566	0.000	0.081	0.007	0.256
	N	41	41	41	41	41	41	41	40	41	41
Recyclableprod	Pearson correlation	-0.005	1	0.193	0.441**	0.328*	0.110	-0.053	0.208	-0.049	0.360*
	Sig. (2-tailed)	0.976		0.227	0.004	0.036	0.494	0.740	0.198	0.763	0.021
	N	41	41	41	41	41	41	41	40	41	41
Social	Pearson correlation	0.281	0.193	1	0.437**	0.231	-0.092	0.370*	0.279	0.010	0.754**
	Sig. (2-tailed)	0.075	0.227		0.004	0.146	0.566	0.017	0.081	0.951	0.000
	N	41	41	41	41	41	41	41	40	41	41
Hygiene	Pearson correlation	0.025	0.441**	0.437**	1	0.647**	0.150	-0.007	0.250	0.138	0.252
	Sig. (2-tailed)	0.876	0.004	0.004		0.000	0.350	0.966	0.120	0.391	0.112
	N	41	41	41	41	41	41	41	40	41	41
GreenPur	Pearson correlation	0.025	0.328*	0.231	0.647**	1	0.150	-0.149	0.250	0.022	0.088
	Sig. (2-tailed)	0.876	0.036	0.146	0.000		0.350	0.351	0.120	0.889	0.585
	N	41	41	41	41	41	41	41	40	41	41
Economic	Pearson correlation	-0.092	0.110	-0.092	0.150	0.150	1	-0.149	0.221	0.129	-0.123
	Sig. (2-tailed)	0.566	0.494	0.566	0.350	0.350		0.352	0.170	0.421	0.445
	N	41	41	41	41	41	41	41	40	41	41
Tapsunatt	Pearson correlation	0.619**	-0.053	0.370*	-0.007	-0.149	-0.149	1	0.119	0.527**	0.227
	Sig. (2-tailed)	0.000	0.740	0.017	0.966	0.351	0.352		0.466	0.000	0.153
	N	41	41	41	41	41	41	41	40	41	41
Solarpow	Pearson correlation	0.279	0.208	0.279	0.250	0.250	0.221	0.119	1	0.435**	0.179
	Sig. (2-tailed)	0.081	0.198	0.081	0.120	0.120	0.170	0.466		0.005	0.268
	N	40	40	40	40	40	40	40	40	40	40
GSMintiat	Pearson correlation	0.412**	-0.049	0.010	0.138	0.022	0.129	0.527**	0.435**	1	-0.094
	Sig. (2-tailed)	0.007	0.763	0.951	0.391	0.889	0.421	0.000	0.005		0.560
	N	41	41	41	41	41	41	41	40	41	41
Lightsunatt	Pearson correlation	0.182	0.360*	0.754**	0.252	0.088	-0.123	0.227	0.179	-0.094	1
	Sig. (2-tailed)	0.256	0.021	0.000	0.112	0.585	0.445	0.153	0.268	0.560	
	N	41	41	41	41	41	41	41	40	41	41

Note: EnvAwareness — Environmental awareness, Recyclableprod — Recyclable products, Social — Social factors, Hygiene — Hygiene factors, Economic — Economic factors, GreenPur — Green purchases, Tapsunatt — Taps unattended, Lightsunatt — Lights unattended, Solarpow — Solar power, GSMintiat — Green supply chain initiatives.
*, ** Correlation is significant at the 0.05 and 0.01 levels (2-tailed).
Source: Author's elaboration.