

## **Green Skills and Sustainable Economy in Kenya: The Influence of TVET Trainer Competencies**

*Dr. Kutto Naomi Jebungei  
University of Eldoret, Eldoret, Kenya*

### **Abstract**

*Greening Technical and Vocational Education Training (TVET) is an initiative of the United Nations Educational, Scientific and Cultural Organization (UNESCO) together with, the International Centre for the Technical and Vocational Education and Training (UNEVOC) that requires Technical and Vocational Educational Training Institutions to provide knowledge and develop skills that ease transition to green economies and societies. In an effort to attain the Sustainable Development Goals, the Kenyan government has revamped TVET institutions with both human and non-human resources. There is no doubt that green skills hold the future for sustainable economies, however, the role of trainers cannot be gainsaid. The study analyzed the influence of trainers' competencies on the relationship between green skills and sustainable economy. The study adopts the 'ex-post facto' design based on the post-positivist paradigm to sample 200 pre-existing technician graduates drawn from Uasin Gishu County. Data was collected using questionnaires and structured interview schedule which yielded both quantitative and qualitative data for analysis. Descriptive and inferential analyses revealed that the four green skills namely attitudes, values, knowledge and technical skills positively and significantly predicted sustainable economy. There is therefore need to focus on building the capacity of TVET trainers in order to inculcate the required green skills among trainees. This will largely contribute to enhancing sustainable development competences and thus implementing the Sustainable Development Goals for green economies and societies.*

**Key words:** *Green skills, sustainable economy, trainer competencies, SDGs*

### **Introduction**

The TVET systems across the world are undergoing reforms targeting sustainable development. According to the United Nations Economic Commission for Europe (UNECE) strategy for Education for sustainable development, sustainable development is underpinned by mutual respect, equality and solidarity among people, generations, and cultures and seeks to meet needs of people now and in the future by developing harmony with nature (UNECE, 2012). In Kenya, TVET considered critical to the attainment of Vision 2030 and in the push for the Big 4 agenda. According to Dr. Kevit Desai, the Principal Secretary in the State Department of Vocational and Technical Training (TVET) in the Ministry of Education, while marking the beginning of implementation of the Competency-Based Education and Training (CBET) policy framework, an effective TVET has

the propensity to play a vital role in the attainment of the Governments' 'Big 4' Agenda as well as the vision 2030 (Kenya News Agency, 2018).

## **Literature Review**

Environmental development is regarded as a key facet of sustainable development. It is acknowledged that TVET should not only concentrate on imparting specialized and technical skills, but should also encourage green development (De Haan, 2010). The increase in severe weather patterns occasioned by climate change, are compelling nations to turn to sustainable adaptation measures. It is argued that endeavors to mitigate against impacts of climate change have seen a gain in the momentum of the concept of greening (Olga, Christine, Mercedes & Shinyoung, 2011). Olga and colleagues recognize the importance of workers being skilled in practices that may lead to environmental friendliness; if at all market economies are to undergo green transformation.

Green skills are emerging as a major skill set that employees are looking for in addition to the conventional technical and generic skills (Abdullah et al., 2009). It is noted that employers are keen on employees who in addition to bearing the required generic and technical skills, also have green skills necessary for sustainable development targeting environmental, social and economic spheres. The Council of Australian Governments (COAG, 2010) defines green skills as skills for sustainability and identifies them as attitudes, values, knowledge, and technical skills required in the development and support of sustainable economic, social and environmental outcome at the workplace.

Cedefop (2012) defines green skills as attitudes, values, knowledge and skills necessary for the support and development of a resource efficient society that is sustainable, and argues that all sectors and levels in the workforce will at one stage need green skills. The United Nations in recognizing that the concepts of green skills and green jobs are often amalgamated, defines green jobs as jobs and sectors in which pollution and waste creation are minimized (UNEP, 2012). International Labour Organization (ILO) modifies this definition of green jobs by noting that green jobs relate to sectors with lower than average environmental footprints (ILO, 2013).

The United Nations Environmental Program (UNEP, 2012), advocates for green skills in reporting that transition to lower carbon economy, facilitate/d by workers armed with relevant skills, has a positive impact on a country's gross domestic product (GDP). UNEP further argues that these positive impacts are magnified by higher levels of green investment. Evidence shows that achievement of an economy that is sustainable and energy-efficient rests on responsive vocational education and training programs that nurture skills expectations for a low-carbon economy (Cedefop, 2012).

According to Price W'atershouse Coopers (2010), realization of opportunities offered under a green economy is dependent on a skilled workforce that supports

green growth. The extant literature points to increased investment in green knowledge and skills as an avenue for increasing employment opportunities, provision of decent jobs, and maintenance of the environment and with it, an increase in social capital (BIS, 2010; CEDEFOP, 2010; Charalambous, Lawrie & Beadle, 2010; European Commission, 2011; ILO 2012; 2011a; Jaeger et al., 2011; Kaffmann & Less, 2010; Mathou, 2010; OECD, 2011).

### ***Green Skills in TVET***

Recognition of the importance of green skills has given rise to the greening TVET concept. It is argued that sustainable development requires TVET institutions to be well armed with skills, knowledge and competencies aligned with green economy (Majumdar, 2010). Majumdar contends that TVET institutions ought to be green campuses loaded with green concepts for training in; they should develop green technology programmes that provide requisite skills for green jobs; should be green communities where green ideas ought to be actualized; should encourage green research through which data can be collected and new concepts developed; and should adopt a green culture consistent with a green society.

Essentially therefore TVET have the unenviable educational component of creating awareness of the green concept and developing attitudes, values, knowledge and technical skills required of a green economy. Despite the recognition that TVET institutions have the acumen to develop green skills which are central to sustainable development, it is argued that their capability to do this is hampered by skill shortage (ILO, 2012; OECD, 2011; CEDEFOP, 2013). ILO and partners point towards the lack of qualified trainers for development of skills relevant for green jobs.

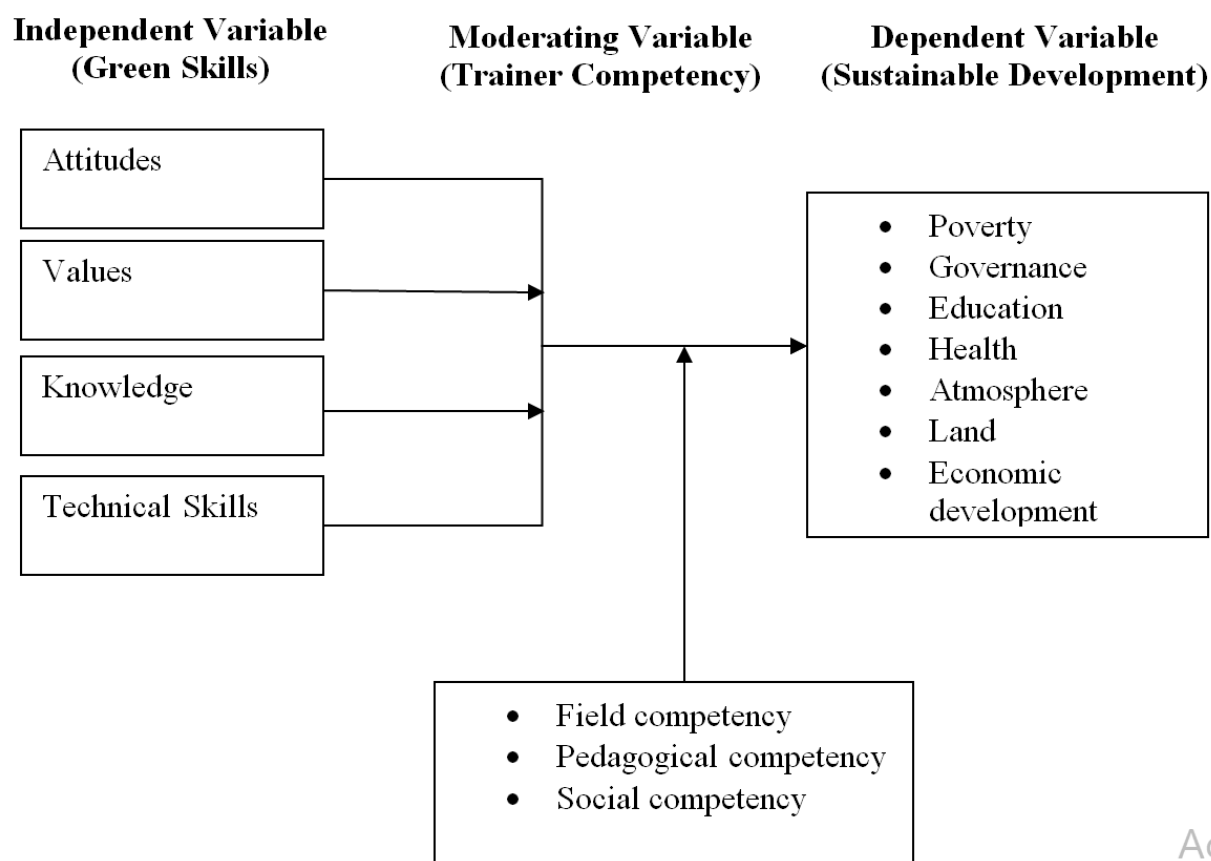
Empirical evidence has associated green skills with sustainable development. Kamis et al. (2017) for instance, examined the integration of green skills in technical and vocational education as an avenue for sustainable development. Buoyed by the understanding that TVET plays a critical role in skilled manpower contribution, Kamis and colleagues concluded that integration of green skills in the TVET courses, has potential to produce a competent workforce that takes cognizance of preservation of the environment.

Pavlova (2018) analyzed development of green skills and the fostering of inclusive and sustainable economic growth in learning cities through partnerships. Pavlova theorized that learning cities through partnerships with industrial players have the capability to harness green skills to foster sustainable economic growth. Ramli, Rasul and Affandi (2018) examined the need for green skills in ensuring sustainable development in the fourth industrial revolution. Inspired by the fact that sustainable development has emerged as a challenge to the 21<sup>st</sup> century, Ramli, Rasul & Affandi (2018) found out that technical and vocational education plays a critical role in students' awareness of the environment and, requires integration of green skills. They concluded that TVET is the agent through which facilitation and creation of a sustainable workforce capable of the fourth industrial revolution can be achieved.

Trainer competencies defined as knowledge and skills that enable trainers to be successful are necessary if trainees have to maximize training opportunities (Hattie, 2009). Evidence links trainer's competencies in terms of field competencies, pedagogical competencies, and cultural competencies to trainees' success (Babu & Mendro, 2003). Gupta (1999) views competencies as the knowledge, skills, motivations and beliefs that trainers require in order to succeed in their job. The United Nations Economic Commission for Europe strategy for Education for sustainable development recognizes that, education ought to enable a harmonious living where people contribute to sustainable development. However, the Commission decries the present education which appears to contribute to unsustainable living (UNECE, 2012). UNECE argues that learners are not exposed to opportunities for questioning their lifestyles, and systems and structures put in place to promote those lifestyles.

Despite the importance of green skills in nurturing green economy that supports green growth, evidence from Kenya shows gaps in TVET institutions' ability to develop green skills. Jahonga, Ngore and Muramba (2015) for instance, point out that lack of human resources and requisite skills are among the major challenges to green technology and that the TVET courses on offer do not integrate green technology. Were and Ferej (2018) argue that insufficient integrated sustainable content in TVET training and lack of technical skills specific for transition to green economy were impediments to greening TVET. Murgor (2017) avers that TVET training fails to inculcate green skills (soft skills) relevant for survival in self-employment.

It is therefore against this backdrop that the study sought to examine the role teacher competencies such as field, pedagogical and social play in the relationship between green skills and sustainable economy among TVET institutions. The study conceptualizes that despite having direct effects on sustainable development, green skills are more meaningful under the guidance of competent trainers (Fig. 1).



**Figure 1** Conceptual Framework

## Methodology

The study adopted the ‘ex-post facto’ research design. Choice of this design was influenced by the fact that the greening of TVET concept is already in the public domain and moreover, the study used technical graduates who pre-existed (Salkind, 2010). This approach was quasi-experimental in the sense that participants were not randomly assigned. The study used a sample of 200 technician graduates drawn from across Uasin Gishu County. The sampling units were the five constituencies namely Moiben, Kesses, Kapsaret, Turbo and Soi. The study units were individual technician graduates. Direct effects between acquisition of green skills and sustainability of the economy were analyzed using multiple regressions. The influence of trainer competencies was assessed using Hayes’ Macro Process approach for moderation. Variables were operationalized and measured as indicated in Table 1.

**Table 1***Variable Definition and Measurement*

<b>Variable</b>	<b>Nature</b>	<b>Indicator</b>	<b>Scale</b>
<b>Green skills</b>	Independent Variable	Attitudes Values Knowledge Technical skills	Ordinal
<b>Teacher Competency</b>	Moderating Variable	Field competency Pedagogical Social	Ordinal
<b>Sustainable Development</b>	Dependent Variable	Poverty Governance Education Health Atmosphere Land Economic development	Ordinal

## **Findings**

### ***Data Screening and Cleaning***

Data was screened and cleaned for missing values and univariate and multivariate outliers. According to Tabachnick and Fidell (2013), consideration and resolution of issues that crop up during data collection is fundamental to an honest analysis of data. Twenty cases were found to have missing data above 5% and were therefore deleted from further analysis. Univariate outliers were examined by computing standardized scores and deleting cases with absolute standard score in the excess of 3.0 (Tabachnick & Fidell, 2013). Eighteen cases were deleted for being Univariate outliers. An examination of the probabilities of Mahalanobis distances ( $D^2$ ) revealed that ten cases were multivariate outliers. The ten cases were once again deleted. Consequently, from the 200 questionnaires returned, a total of 152 cases were retained for further analysis.

### ***Direct effects of Green Skills on Sustainable Development***

The direct effect of green skills on sustainable development in the context of TVET institutions was analyzed by using multiple regression analysis that regressed sustainable development on the four green skills namely: - skills, attitudes, knowledge and values. The conceptualized direct effects model was

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y– sustainable development

X<sub>1</sub> – Skills

X<sub>2</sub> – Attitude

X<sub>3</sub> – Knowledge

X<sub>4</sub>- Values

B<sub>s</sub>- regression weights

The regression model summary in Table 2 revealed that variation in the four green skills accounted for 55.1% of the variation in sustainable development; an indication that, other than green skills, other factors also contribute towards sustainable development.

**Table 2**

*Regression Model Summary for Sustainable Development on Green Skills*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742 <sup>a</sup>	.551	.539	.42228
a. Predictors: (Constant), Skills, Attitude, Knowledge, Values				

Moreover, the F statistic value of 45.143 (Table 3) was significant ( $F_{4,147} = 45.143, p < 0.05$ ). The implication was that the multiple regression model regressing sustainable development on green skills was a good fit, and statistically viable.

**Table 3**

*Model Fit Test (ANOVA <sup>a</sup>)*

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	32.200	4	8.050	45.143	.000 <sup>b</sup>
Residual	26.213	147	.178		
Total	58.413	151			
<sup>a</sup> Dependent Variable: Sustainable Economy					
<sup>b</sup> Predictors: (Constant), Skills, Attitude, Knowledge, Values					

The multiple regression weights (Table 4) revealed that all the four green skills; attitude ( $\beta = 0.170$ ,  $p < 0.05$ ); values ( $\beta = 0.255$ ,  $p < 0.05$ ); knowledge ( $\beta = 0.208$ ,  $p < 0.05$ ); and technical skills ( $\beta = 0.264$ ,  $p < 0.02$ ) were positive and significant predictors of sustainable development, Technical Skills ( $t = 3.111$ ) was found to have the biggest impact on sustainable development followed with values ( $t = 2.986$ ), knowledge ( $t = 2.885$ ), and attitude ( $t = 2.202$ ) in that order.

**Table 4**

*Effect of Green Skills on Sustainable Development (Coefficients <sup>a</sup>)*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.151	.143		1.058	.292
	Attitude	.155	.071	.170	2.202	.029
	Values	.285	.096	.255	2.986	.003
	Knowledge	.209	.072	.208	2.885	.005
	Skills	.258	.083	.264	3.111	.002
<sup>a</sup> . Dependent Variable: Sustainable Economy						

Consequently, sustainable development as a function of green skills could be represented by the following equation.

$$SD = 0.151 + 0.170 \text{ attitude} + 0.255 \text{ values} + 0.208 \text{ knowledge} + 0.264 \text{ skills} + \varepsilon$$

Where SD = sustainable development

#### ***Moderating Effect of Trainer Competency***

The Hayes' Process tool in SPSS was used to test the moderating effect of trainer competency on the relationship between green skills and sustainable development. The highest order unconditional interaction test (Table 5) indicated that the interaction between green skills and trainer competency had a significant  $R^2$  change ( $R^2$  change = 0.0353,  $p < 0.05$ ). The implication of these results is that trainer competency moderated the relationship between green skills and sustainable development in the context of TVET institutions in Kenya.

**Table 5**

*Test(s) of highest order unconditional interaction(s)*

	R <sup>2</sup> -chng	F	df1	df2	p
X*W	.0354	10.9111	1.0000	148.0000	.0012



## **Discussion**

The study empirically confirms that acquisition of green skills such as environmental knowledge, green attitude, values and technical skills impacts positively and significantly on sustainable economy. The study does show that each of these skills on their individual basis influence sustainable development to varying degrees. These findings corroborate human resource management literature which affirms that individual attributes such as skills, attitudes, knowledge and self reflection influences competencies and professional awareness (Zopiatis, 2010; Horng et al., 2011).

The study further demonstrates empirically that trainer competencies moderate the direct effect of green skills on sustainable development. It also indicates that TVET trainers are critical in enabling acquired green skills to be meaningfully translated into sustainability of the economy. The finding reflects the views by Chi and Hartmann (2016). According to these authors, vocational teachers need to acquire and develop competencies that not only meet their professional requirements, but which also enable them to contribute to the building of economies that are economically sound. The finding regarding the moderating role that trainer competencies play in the relationship between green skills and sustainable economy in the context of TVET institutions corroborates views by Hattie (2009), that trainer competencies are necessary if trainers have to maximize training opportunities. It therefore emerges from the study that sustainable economy in TVET institutions depends on training that focuses on green skills with the guidance of trainers with the necessary competencies.

## **Conclusion**

This study endeavored to examine sustainable economy from a TVET institutions greening perspective by assessing the role that trainer competency plays in the relationship between green skills and sustainable economy. The study indicated that both green skills and trainer competency are critical facets to sustainable economy. Green skills such as attitude, values, knowledge and technical skills positively and significantly affect sustainable development, but this relationship is emboldened through the moderation of trainer competencies.

## **Recommendations**

This study suggests that TVET institutions that aim to excel in sustainable development need to concentrate on nurturing trainees' green skills. Courses offered in these institutions should therefore give due importance towards training for acquisition of skills like attitudes, values, knowledge and technical skills. This essentially implies that TVET institutions ought to device training packages that can suitably improve trainees' environmental knowledge, green attitudes, values and technical skills. Indeed, integration of green skills in technical and vocational education has been found to produce workforce that is not only competent in technical knowhow, but also produces workforce that is aware of the need to preserve the environment (Kamis et al., 2017; Pavlova, 2018; Ramli et al., 2018).

## References

- Abdullah, Z., Mohamed, A., Sabran, M. S., Muthusamy, P., & Amin, S.M. (2009). *Kemahiran berkesan*. UPM Press, Serdang, Selangor
- Babu, S., & Mendro, R. (2003). Teacher accountability: HLM-based teacher effectiveness indices in the investigation of teacher effects on student achievement in a state assessment program. Presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL, April.
- CEDEFOP. (2010). *Skills for Green jobs: European Synthesis Report*. Luxembourg: Publications Office of the European Union
- CEDEFOP. (2012). *Green skills and environmental awareness in vocational education and training: Synthesis Report*. Luxembourg: Publications Office of the European Union
- CEDEFOP. (2013). *Skills for a low carbon Europe: The role of VET in a sustainable energy scenario. Synthesis Report*. Luxembourg: Publications Office of the European Union
- Charalambous, S., Lawrie M., & Beadle, S. (2010). *Skills for green jobs in the UK*, CEDEFOP, Luxembourg: Publications Office of the European Union.
- Chi, D., & Hartmann, M. (2016). Green skills in vocational teacher education – A model of pedagogical competence for a world of sustainable development. *TVET@Asia*, 6:1-19
- Council of Australian Governments, (COAG). (2010). *Green skills agreement*. Australian Government, Canberra
- De Haan, G. (2010). The development of ESD-related competencies in supportive institutional frameworks. *International Review of Education*, 56. 315-328. 10.1007/s11159-010-9157-9
- European Commission. (2011). *A roadmap for moving to a low carbon economy in 2050*, 112, Brussels.
- Gupta, K. (1999). *A practical guide for need assessment*. San Francisco: John Wiley & Sons. Inc..
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses related to achievement*. New York, NY: Routledge
- Hong, J., Hsu, H., Liu, C., Lin, L., & Tsai, C. (2011), Competency analysis of top managers in the Taiwanese hotel industry, *International Journal of Hospitality Management*, 30, 1044– 1054
- ILO. (2011a). *Comparative analysis of methods of identification of skill needs on the labour market in transition to the low carbon economy*, Geneva: ILO
- ILO. (2012). *Moving towards a statistical definition of green jobs*. Available at

[www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/event/wcms\\_195698.pdf](http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/event/wcms_195698.pdf)

- ILO. (2013). *Achieving decent work, green jobs and sustainable development*. In Provisional Record, International Labour Conference, 102nd Session, Geneva, June 2013 [http://www.ilo.org/ilc/ILCSessions/102/reports/committee-reports/WCMS\\_216378/lang-en/index.htm](http://www.ilo.org/ilc/ILCSessions/102/reports/committee-reports/WCMS_216378/lang-en/index.htm)
- Jaeger, C., Paroussos L., Mangalagiu, D., Kupers, R., Mandel, A., & Tabara, J. (2011). A new growth path for Europe: Generating prosperity and jobs in a low carbon economy: *Synthesis Report*. Potsdam: German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.
- Jahonga, W. M., Ngore, P. R., & Muramba, V. W. (2015). Transforming and greening TVET for sustainable development in western Kenya. *European Journal of Research and Reflection in Management Sciences Vol. 3 No. 2*, ISSN 2056-5992.
- Kaffmann, C., & Less, C. (2010). Transition to a low carbon economy. *Public goals and corporate practice*. Paris. OECD.
- Kamis, A., Alwi, A., Limuna, B., Ismail, Hj., Zakaria, N., Yunus, F., & Yunus, N. (2017). Integration of Green Skills in Sustainable Development in Technical and Vocational Education. *International Journal of Engineering Research and Applications*, 7. 2248-962208. 10.9790/9622-0712030812.
- Kenya News Agency. (2018). *Big 4 Agenda*. Retrieved from <http://www.kenyanews.go.ke/tag/big-4-agenda/>
- Majumdar, S. (2010). *Greening TVET: Connecting the dots in TVET for sustainable development*. Paper Presented in the 16th IVETA-CPSC International Conference on “Education for Sustainable Development in TVET” Manila, Philippines
- Mathou, C. (GHK), (2010). Skills for green jobs in France. CEDEFOP, Luxembourg: Publications Office of the European Union
- Murgor, T. K. (2017). Soft skills preparation as panacea for self-employment for TVET technician graduates in Kenya. *International Journal of Vocational and Technical Education Research*. Vol.3, No.4, pp.18-34. UK. European Centre for Research Training and Development.
- OECD (2011) *Towards green growth: A summary for policy makers*, <http://www.oecd.org/greengrowth/48012345.pdf>
- Olga, S., Christine, H., Mercedes, D. H., & Shinyoung, J. (2011). *Skills for Green Jobs a Global View*. Synthesis Report Based on 21 Country Studies. Geneva. International Labour Office
- Pavlova, M. (2018). Fostering inclusive, sustainable economic growth and “green” skills development in learning cities through partnerships. *International Review of Education*, 64(3): 339–354

- PWC Global (2010). *Sustainability and climate change*. Retrieved from <https://www.pwc.com/gx/en/services/sustainability.html>
- Ramli, S., Rasul, M. S., & Affandi, H. M. (2018). Sustainable Development: Needs of Green Skills in the Fourth Industrial Revolution (4IR). *International Journal of Academic Research in Business and Social Sciences*, 8(9), 1082–1095.
- Salkind, N. (2010). *Encyclopedia of research design*. Sage. doi: <http://dx.doi.org/10.4135/9781412961288.n145>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics*. Pearson, Boston.
- UNECE. (2012). *Strategy for education for sustainable development*. Retrieved from <https://www.unece.org/ru/env/esd.html>
- UNEP. (2012). Measuring progress towards a green economy. *United Nations Environment Programme Report*.
- Were, C. M., & Ferej A. (2018). Issues affecting the greening of TVET programs for sustainable development in Kenya: A case of TVET institutions in Nairobi County. *Africa Journal of Technical and Vocational Education and Training*. ISSN: 2518-2722. <https://afritvet.org/index.php/Afritvet/issue/view/AfriTVET301>
- Zopiatis, A. (2010). Is it art or science? Chef's competencies for success. *International Journal of Hospitality Management*, 29, 459–467.