Human Resource Training and Development and Adoption of Solar Photovoltaics in Climate Smart Agriculture in Uasin Gishu County, Kenya

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Cite: Korir, D., Ouma, C.O., & Oketch, T.C. (2023). Human Resource Training and Development and Adoption of Solar Photovoltaics in Climate Smart Agriculture in Uasin Gishu County, Kenya. *The University Journal*, *5*(3), 235-246.

Abstract

The study aimed to examine the influence of Human Resource training and development on the adoption of solar energy technology in Climate Smart Agriculture in Uasin Gishu County, Kenya. The study adopted a positivist philosophy and a descriptive correlational research design targeting the County's 240 executive, policy, legislative, and decision-making level staff as of December 2022. Data was collected using a structured questionnaire that was pilot-tested and refined before final data collection. Data collected was analyzed in terms of descriptive and inferential statistics using SPSS version 28. Chi-Square test results confirmed a strong association between HR training and development and solar PV adoption {χ^2 (2546, N = 152) = 2739.667, p < .05}. Results revealed that HR training and development significantly predicted solar PV adoption, β = 1.739, t (152) = 19.548, p < .05, and stakeholder perceptions significantly moderated the relationship between HR training and development and solar PV adoption in the County. Thus, the study rejected the hypothesis that HR training and development did not significantly influence solar PV adoption. The study recommended that the county leadership allocate more financial resources and solar energy experts for training technicians and artisans.

Keywords: HR training and development, solar PV adoption, climate-smart agriculture

Introduction

Human resource training and development (HRD) is a planned practice that comprises training, organization development, and career development efforts to enhance the performance of individuals and groups in an organization. It denotes the cumulative knowledge and skill resident in an organization's total workforce and, hence, the need for leaders to recognize the organization's workforce as a critical resource to build core competencies for competitive advantage, as argued by (Trencher et al., 2018). Over time, organizational HR training and development needs have evolved in response to changing national and international economic trends caused by the changes in worker age compositions and the diversity of organizational workforces (Bhattachryya & Jha, 2018). Additionally, improved education levels, changing employee skill set requirements, evolving organizational cultural value systems, and human resource training needs have contributed to the evolution and growth of HR training and development and its sub-constructs. Analysis of

global data on education and training on renewable energy technologies by Lucas et al. (2018) shows that shortages were most prevalent in the developing world and that there existed a mismatch between the current education offered and the demands of the industry stakeholders. The study noted that the challenge was for all stakeholders to facilitate access and diversity in green energy education and training to address the shortage of professionals in this sector. The study further noted that the projected growth in renewable energy opportunities required to be matched by the growth in training capacity to provide requisite professionals in the green energy sector, including partnership with stakeholders that provide descriptive statistics on the worldwide supply of and demand for, training and course offers, coupled with expert interviews, that allow for valuable insights into the renewable energy market mechanisms.

Compared to the developed world, only a few studies exist on the specific influence of strategic leadership's HR training and development dimension on solar PV adoption in Africa. The available studies are also inconsistent with efforts required to mitigate climate change using technologies like solar PV (Pascaris et al., 2021). To stimulate adoption, leaders in organizations and governments have developed policies and strategies to improve accessibility and affordability. Zander et al. (2019) confirmed that introducing flexible payment systems in Australia helped accelerate the adoption of solar PV rooftops. In the agricultural sector, policies to support Agri voltaic adoption have emerged, as reported by (Sekiyama & Nagashima, 2019; Schindele *et al*., 2020). Minimal empirical studies are, however, available on the adoption of solar PV systems in developing countries, with most being in the developed world and especially those linking strategic leadership and the adoption of solar photovoltaic technologies and products for Climate Smart Agriculture in general and Uasin Gishu County in particular.

Mureya et al. (2020) show that challenges facing the adoption of solar PV in Uasin Gishu County were varied, with 30% indicating cost factors, about 30% intermittent and unstable nature of solar PV, while 30% attributed this to lack of skilled technical personnel to install and maintain solar PV units. However, the study did not investigate the influence of leadership; especially the HR training and development dimension of strategic leadership, with many studies concurring that there needs to be more empirical literature on the association between HR training and development dimension and solar PV adoption. This study aimed to analyze the influence of HR Training and Development in the adoption of solar PV in CSA in UG County, Kenya.

Literature Review

Solar PV adoption is influenced by several factors, including HR training and development and the constructs of solar PV adoption, namely, affordability, accessibility, and enabling environment. Iwamoto and Suzuki (2019) found that HR activities directly affected organizational financial performance and human capital corporate social responsibility. Further, increasing human capital development effectively improved employee retention and significantly impacted human capital availability for the attainment of set strategic objectives. Green human resource management initiatives were mainly found to be essential for incubating a green organizational culture and ensuring the sustainable development of an organization, as opined by Roscoe et al. (2019). Trencher et al. (2018), evaluated core competencies development in Master's degree programs in American universities and results indicated a widespread student demand for practice-oriented learning that imparted core sustainability skills. To explore the status and challenges of green human resource

management in India, Mishra (2017) conducted a case study on human resource practices of environmental training and green recruitment, and results indicated that scope existed for increased green environmental behavior in an organization and that top management support was crucial in facilitating green behavioral attitudes among employees for improved adoption of green technologies like solar PV. Chaudhary (2020) also studied the role of green human resource management and training. The results indicated that green human resource management and training engendered green employee behaviors and boosted employee green awareness, positively impacting renewable energy adoption decisions for climate mitigation. Roscoe et al. (2019) evaluated green human resource practices and green organizational culture. They found that HR practices positively impacted green organizational culture and employee empowerment with a positive influence on human capital development.

Simpson et al. (2021) researched off-grid renewable energy access by young populations in Tanzania, and results showed that awareness, backup service, and innovative financing availability influenced adoption decisions by young Tanzanians. The importance of awareness level and information availability on solar PV adoption is supported by Kumar et al. (2020), who found that customer awareness of observable factors such as water pollution, ozone depletion, deforestation, and global warming contributed to the adoption of solar systems to mitigate climate change. Elahi et al. (2022) studied the factors affecting farmers' willingness to adopt solar PV technology and concluded that awareness creation programs were necessary for increased acceptance of solar PV pump technology. Majid (2020) opined that technical skills availability was an obstacle to the deployment of affordable, dependable, and sustainable renewable energy technologies in Punjab, India. Amrutha and Geetha (2020) opine that green HRM practices support the need for organizational green training and green practices for improved performance.

Fierros-Gonzalez and Lopez-Feldman (2021) contended that climate change perception is a complex process with several psychological constructs, such as knowledge, beliefs, attitudes, and concerns about climate change. The study concluded that for agricultural producer stakeholders to adopt any mitigation measures, they needed to perceive that climate change was real and would continue to change in the future and that the change would be significant enough to warrant it. This view was supported by Fanzo et al., (2018) who opined that food systems would be negatively affected unless farmer perceptions of climate change and mitigation measures were considered at the initial stages.

Leader acceptance of climate change influenced farmer acceptance and public attitudes towards the mitigation measures to be adopted, as Ricart *et al*. (2018) opined that perception trends and awareness at the farm level influenced farmer acceptability and attribution of climate change to human activity. The research further indicated that most farmers believed and accepted that climate change was real and was occurring. Risk perception is influenced by the physical and devastating effects of natural calamities caused by climate change, which wreak havoc on world populations, causing misery and loss (Hussain *et al*., 2020). Their review of the influence of climate change on the adaptation and mitigation actions on natural calamities in Pakistan showed that GHG emissions caused climate change, which affected agricultural production, food systems, energy security, and climate change mitigation measures including solar PV adoption.

Methodology

This study adopted a positivist research philosophy targeting all the senior employees of Uasin Gishu County in executive, policy, legislative, and decision-making positions. A census was applied to the population. Data was collected using self-administered online questionnaires. The study sample comprised County's 240 executive, policy, legislative, and decision-making level staff as of December 2022. The proposal was presented to the School for approval, followed by an ethical review by the Institutional Review Board (IRB) and submission to NACOSTI for a research permit. Upon permit issuance, piloting was conducted to determine the reliability and validity of the data collection tools. Data was analyzed using descriptive and inferential statistics, including frequency distribution, mean and standard deviation, factor analysis, statistical tests, Chi-Square test, ANOVA, and regression analysis.

Results

A total of 240 questionnaires were administered: 24 for the pilot test, 216 questionnaires for the primary data collection, and 152 responses were received, representing a response rate of 70.4%. In terms of demographic information, results, as summarized in Table 1, show that the County had a higher female population than males at 51.3%; however, most were in the lower management cadres. The modal farmer income level was Kshs 20,001 to Kshs 40,000 at 40.1%, and the distribution of positions in county government indicated that category 5 accounted for 44.7% of the respondents. Most employees, 46.1% had served in the County for 6 to 10 years.

Table 1. Demographic results

Demographic Variables	Results	
Gender of Respondents	1 = Male	48.7%
	2 = Female	51.3%
Level of Education	1 = Doctoral degree	0.7%
	2 = Master's degree	21.7%
	3 = Bachelors degree	42.8%
	4 = Post-secondary certificate	28.3%
	5 = Others	6.6%
Monthly Income of Farmers	1 = Below Kshs. 20,000/=	19.1%
	2 = Kshs. 20,001 to 40,000	40.1%
	3 = Kshs. 40,001 to 60,000	33.6%
	4 = Kshs. 60,000 to 80,000	5.9%
	5 = Over Kshs. 80,001	1.3%
Position in county government	1 = CEO/Deputy CEO	1.3
	2 = CEC, Speaker, Chief officer	19.1%
	3 = Director, MCA	19.7%
	4 = Clerk to CA, D/Director	15.1%
	5 = Ward rep, CSA staff, and Others	44.7%
Years of service in county government	1 = Below 5 years	16.4%
	2 = 6 to 10 years	46.1%
	3 = 11 to 20 years	15.1%
	4 = 21 to 30 years	8.6%
	5 = Over 30 years	13.8%

Mean and Standard Deviation for HR Training and Development

Results in Table 2 show that respondents concurred that UG has a 'shortage of skilled solar technicians for solar PV adoption' (*M = 2.07, SD = 1.104*) and were neutral on 'professional staff development in solar technology for improved output' (*M = 3.05, SD = 1.339*).

Table 2. HR Capital Training and Development and Solar PV Adoption

Seminars for farmer solar energy awareness/adoption.	**N**	**Mean**	**Std Deviation**
Seminars for farmer solar energy awareness/adoption	152	2.63	1.413
Field days on Agric climate adaptation	152	2.11	1.062
Avail and support access to solar tech info.	152	2.72	1.231
Promote innovative climate mitigation tech to farmers	152	2.66	1.382
Develop special tech HR skills for solar needs	152	2.64	1.237
Employ unique HR capabilities for solar access.	152	2.92	1.355
Shortage of skilled solar technicians in UG	152	2.07	1.104
Train staff on solar tech for climate mitigation.	152	2.91	1.228
Encourage professional devt. in solar to improve output	152	3.05	1.339
Access to solar training and education.	152	2.66	1.313
Financial support for training in solar	152	2.83	1.167
Support solar training for SDG 7 goals	152	2.76	1.380

Correlation Analysis

Results in Table 3 indicate that the HR capital training and development had a strong positive and significant association with the solar PV adoption subconstructs of Affordability, Accessibility, and Enabling Environment, i.e., $r(152) = .524$, $p < .05$, $r(152) = .836$, $p < .05$ and $r(152) = .798$, $p < .05$.

Table 3. Results of Correlation Analysis

HR training and Devt. Dimension	**Solar PV Adoption Sub-constructs**			**Solar PV Total Construct**
Analysis Method	**Affordability**	**Accessibility**	**Enabling Environment**	**Solar PV Total**
Pearson Correlation	.524**	.836**	.798**	.847**
Sig. (2-tailed)	< .001	<.001	<.001	<.001
N	152	152	152	152

**Correlation is significant at the 0.05 (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed).

Regression Analysis and Hypothesis Testing
Regression Model Summary

As summarized in Table 5, the study results show that HR training and development explained a significant proportion of the variance in solar PV adoption, R^2 = .718.

Table 5. Model Summary for HR Training and Development

Model	R	R Square	Adjusted R Square	Std Error of Estimate		
1	.847[a]	.718	.716	11.82398		
			Unstandardized Coefficients		Standard. Coefficient	t	Sig.
			B	Std Error	Beta		
	(Constant)		32.939	3.000		10.981	<.001
	HR Training and Devt		1.739	.089	.847	19.548	<.001

a. Predictors: (Constant), HR Training and Development
b. Dependent Variable: Solar PV adoption

ANOVA Results

The ANOVA results in Table 6 show that HR training and development was significant in influencing solar PV adoption {F (1, 150) = 382.135, p < .05}. The results also indicated that strategic direction dimension was a good predictor of solar PV adoption in Uasin Gishu County.

Table 6. ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	53425.023	1	53425.023	382.135	<.001[b]
Residual	20970.977	150	139.807		
Total	74396.000	151			

a. Dependent Variable: Solar PV Adoption
b. Predictors: (Constant), HR Training and Development

Moderating Influence of Stakeholder Perceptions

Correlation between Stakeholder Perceptions and Solar PV Adoption

Correlation analysis results indicate that stakeholder perceptions had a strong, positive, and significant association with the overall solar PV adoption {r (152) = .568, p < .05, r (152) = .673, p < .05 and r (152) = .703, p < .05}. Further analysis of the association between stakeholder perceptions and the overall solar PV adoption variable indicated that there was a strong and positive correlation between the stakeholder perceptions and solar PV energy adoption in the County {r (152) = .767, p < .001}.

Table 8. Correlation between Stakeholder Perceptions and Solar PV Adoption

Stakeholder Perceptions	Solar PV Adoption Sub-constructs			Solar PV Total Constructs
Analysis Method	Affordability	Accessibility	Enabling Environment	Solar PV Total
Pearson Correlation	.568**	.673*	.703**	.767**
Sig. (2-tailed)	< .001	<.001	<.001	<.001
N	152	152	152	152

**Correlation is significant at the 0.05 (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed).

Regression Analysis and Hypothesis Testing incorporating Moderating influence of Stakeholder perception

The study sought to determine the moderating influence of stakeholder perceptions on the Regression Analysis to establish whether stakeholder perceptions moderated the relationship between HR training and development and solar PV adoption. As summarized in Table 9, the results show that stakeholder perceptions caused a variation of 80.9% in solar PV adoption in moderating the relationship between HR training and development and solar PV adoption.

Table 9. Regression Model Summary after Moderation

Model	R	R Square	Adjusted R Square	Std Error of Estimate
1	.899[a]	.809	.805	9.80502

a. Predictors: (Constant), Stakeholder perceptions, HR training and development, Moderating Composite.
b. Dependent Variable: Solar PV adoption

The ANOVA after moderation shows that stakeholder perceptions significantly moderated the relationship between HR Training and Development and solar PV adoption {F (3, 148) = 208.614, p < .05. Based on the significance of the F-statistic, the null hypothesis that stakeholder perceptions do not have a significant moderating influence on the relationship between HR training and development and solar PV adoption in the County was rejected.

Table 10. Regression ANOVA after Moderation

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	60167.513	3	20055.838	208.614	<.001[b]
Residual	14228.487	148	96.138		
Total	74396.000	151			

a. Dependent Variable: Solar PV adoption
b. Predictors: (Constant), Stakeholder perceptions, HR training and development, Moderating Composite.

Regression results show that HR training and development significantly predicted solar PV adoption, β = 1.686, t *(152)* = 17.360, p < .05. Further, the study shows that stakeholder perceptions had a significant negative moderating effect on the relationship between HR training and development and solar PV adoption, β = -.541, t (152) = -3.408, p < .05. This implied that an increase in stakeholder perceptions would lead to a decrease in solar PV adoption in the County.

Table 11. Regression Coefficients after Moderation

Model		Unstandardized Coefficients		Standard. Coefficient	t	Sig.
		B	Std Error	Beta		
	(Constant)	68.451	7.698		8.892	<.001
	HR training and development	.194	.202	.094	.958	.340
	Stakeholder Perceptions	-.541	.159	-.414	-3.408	<.001
	Moderating Composite	.004	.001	1.185	6.518	<.001

a. Dependent Variable: Solar PV adoption

Discussion

Based on past literature reviews, the constructs of solar awareness training, technical training for capacity building, and professional training for efficiency and performance were all significantly and positively correlated with solar PV adoption. These results were supported by Simpson et al. (2021), who researched factors affecting off-grid renewable access by young populations in Tanzania, with results showing that lack of awareness and innovative financing mechanisms were some of the factors affecting access. The Chi-Square test further revealed that HR training and development dimension was strongly associated with solar PV adoption, χ^2 (2546, N = 152) = 2739.667, $p < .05$. This was expected based on previous empirical literature review and is supported by Majid, (2020), whose study on renewable energy for sustainable development indicated that technical skills availability was an obstacle to deployment of solar technology with the study providing helpful information for improvement of solar PV adoption policies.

ANOVA analysis results indicated no significant differences in the means across the demographic variables of gender, level of education, monthly farmer incomes, level of responsibility, and years of service in the County and solar PV adoption. Amrutha and Geetha (2020) reviewed green human resource management and its sustainability, and the results supported a need for organizational green training and green practices for improved organizational performance. Ahmed et al. (2022) indicated significant differences in adoption levels across different levels of education, with a higher education group being more likely to adopt solar energy than those with lower education.

Regression results indicated that it significantly predicted solar PV adoption, R^2 = .718, F (1,150) = 382.125, $p < .05$; β = 1.739, $p < .05$. The findings determined that the influence of HR training and development dimension on solar PV adoption in Uasin Gishu County was positive and significant. Tang *et al*. (2018) indicated that HR development positively influences the adoption of solar PV and a significant relationship between consumers' awareness training, green product awareness training, and consumer purchasing decisions on green and renewable energy products, including solar PV. Results further indicated that the existence of HR training policies positively impacted employee performance in the energy sector.

Regression further showed that the HR training and development coefficient was statistically significant (β = 1.739, p<.05), indicating that the HR training and development explained solar PV adoption. Analysis of global data on education and training on renewable energy technologies in a study (Lucas et al., 2018) showed that technical and professional employee shortages were mainly in the developing world. Hence, stakeholders need to facilitate access to green energy education and training to address future needs.

This study sought to determine the moderating influence of stakeholder perceptions on the relationship between HR training and development and solar PV adoption in Uasin Gishu County, Kenya. The Chi-Square test of association found that the two variables were strongly associated {χ^2 (3618, N = 152) = 3751.939, $p < .05$}. The results of ANOVA did not reveal any significant differences in the means for solar PV adoption across all demographic variables for the stakeholder perceptions. However, the results of linear regression indicated that stakeholder perceptions significantly and negatively moderated the relationship between HR training and development and solar PV adoption in Uasin Gishu County, Kenya, R^2 = .899, F (3,148) = 208.614, $p < .05$; β = -.541, $p < .05$, implying that 89.9% of the proportion

in solar PV adoption in Uasin Gishu County, Kenya could be explained by changes in HR training and development moderated by the stakeholder perceptions. The beta coefficient (β) value was significant and negative at -.541. Mean statistics on perception of acceptance of climate change indicated that climate change was now largely accepted as a reality. However, Mitter et al. (2019) indicated that farmer acceptance of climate change reality is slow and based on local conditions that influence their behavioral attitudes based on local socio-environmental and cognitive interpretation of climate information. Risk perception of natural disasters was supported by Chowdhury *et* al. (2020), who examined the risk perception of the health impacts of climate change due to riverbank erosion and cyclones that led to the relocation of people and attendant health challenges. Chandel et al. (2022) looked at the beliefs and perceptions of Ethiopian pastoralists on the changes in the region's climate manifestations. They concluded that the pastoralists knew about the climate and the likely ensuing risks.

Conclusion

The study investigated and determined the influence of HR training and development on the adoption of solar PV technology, and findings revealed that HR training and development significantly influenced solar PV adoption. Therefore, the study rejected the hypothesis that HR training and development did not significantly influence solar PV adoption. The multiple linear regression results indicated that the changes in solar PV adoption could be explained by the HR training and development dimension of strategic leadership and confirmed that HR training and development dimension was a good predictor of solar PV adoption. It is therefore concluded that HR training and development dimension items, such as training and developing a core team of technicians and experts to guide the County and fill the skills gap for professional cadre employees in Climate Smart Agriculture (CSA) for solar PV adoption, would be beneficial for UG County. Based on the study findings, it is recommended that the Uasin Gishu County top leadership allocate and invest more resources in training climate change and solar technology technicians and experts for climate change mitigation.

References

Aarakit, S. M., Ntayi, J. M., Wasswa, F., Muyiwa, S. A., & Ssennono, V. F. (2021). Adoption of solar photovoltaic systems in households: Evidence from Uganda. *Journal of Cleaner Production*, *329*(129619), https://doi.org/10.1016/j.jclepro.2021.129619

Ahmed, Y., Ebrahim, S., & Ahmed, M. (2022). Determinants of solar technology adoption in rural households: The case of Belesa districts, Amhara region of Ethiopia. *Cogent Economics & Finance, 10*(1), doi: 10.1080/23322039.2022.2087644.

Amrutha, V. N., & Geetha, S. N. (2020). A systematic review on green human resource management: Implications for social sustainability. *Journal of Cleaner Production, 247*, 119131 doi: 10.1016/j.jclepro.2019.119131.

Bhattachryya, S. S., & Jha, S. (2018). Literature review of strategic leadership models. Strategic leadership models and theories: Indian Perspectives. *Emerald Publishing Limited, Bingley*, 19–27. https://doi.org/10.1108/978-1-78756-259-220181004

Chandel, A. S., Haleke, M. G., Bedecha, T. G., Dejene, T., Hordofa, E. G., & Leta, D. B. (2022). Perceptions of pastoralists about climate change in Ethiopia: A case study of

Saba Boru district. *Indian Journal of Ecology, 49*(3), 673-681

Chowdhury, M. A., Hasan, M. K., Hasan, M. R., & Younos, T. B. (2020). Climate change impacts and adaptations on the health of Internally Displaced People (IDP): An exploratory study on coastal areas of Bangladesh. *Heliyon, 6*(9), e05018.

Chu, Z., Wang, L., & Lai, F. (2018). Customer pressure and green innovations at third party logistics providers in China: The moderation effect of organizational culture. *The International Journal of Logistics Management, 0* (0). https://doi.org/10.1177/14657503231156875

Elahi, E., Khalid, Z., & Zhang, Z. (2022). Understanding farmers' intention and willingness to install renewable energy technology: A solution to reduce the environmental emissions of agriculture. *Applied Energy, 309*, 118459, https://doi.org/10.1016/j.apenergy.2021.118459.

Fanzo, J., Davis, C., McLaren, R., & Choufani, J. (2018). The effect of climate change across food systems: Implications for nutrition outcomes. *Global Food Security, 18*, 12-19.https://doi.org/10.1016/j.gfs.2018.06.001.

Fierros-Gonzalez, I., & Lopez-Feldman, A. (2021). Farmers' perception of climate change: A review of the literature for Latin America. *Frontiers in Environmental Science, 9,* (205) https://doi.org/10.3389/fenvs.2021.672399.

Ghimire, L. P., & Kim, Y. (2018). An analysis of barriers to renewable energy development in the context of Nepal using AHP. *Renewable energy, 129*, 446- 456.

Girardeau, H., Oberholzer, A., & Pattanayak, S. K. (2021). The enabling environment for household solar adoption: A systematic review. *World Development Perspectives, 21,* 100290.

Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2013). *Strategic Management: Competitiveness & globalization (11 ed.).* Stamford: Cengage Learning

Huda, M. (2019). Empowering application strategy in the technology adoption: insights from professional and ethical engagement. *Journal of Science and Technology Policy Management, 10*(1), 172–192.

Hussain, M., Butt, A. R., Uzma, F., Ahmed, R., Irshad, S., Rehman, A., & Yousaf, B. (2020). A comprehensive review of climate change impacts, adaptation, and mitigation of environmental and natural calamities in Pakistan. *Environmental monitoring and assessment, 192*(1), 1–20.

Hyun, S., Taghizadeh-Hesary, F., & Shim, H. S. (2021). Modeling solar energy system demand using household-level data in Myanmar. *Economic Analysis and Policy, 69,* 629-639.

Iwamoto, H., & Suzuki, H. (2019). An empirical study on the relationship of corporate financial performance and human capital concerning corporate social responsibility: Applying SEM and Bayesian SEM. *Cogent Business & Management, 6*(1), 1656443.

Jaleha, A., & Machuki, V. N. (2018). Strategic leadership and organizational performance: A

critical review of the literature, *ESJ*, *14*(35), https://doi.org/10.19044/esj.2018.v14n35p124

Kukal, M. S., & Irmak, S. (2018). Climate-driven crop yield, yield variability, and climate change impact the US Great Plains agricultural production. *Scientific reports*, *8*(1), 1-18.

Kumar, P., & Zattoni, A. (2018). Corporate governance, boards of directors, and firm performance: Avenues for future research. *Corporate Governance an International Review 26*(6), 394-396, doi:10.1111/corg.12262

Lucas, H., Pinnington, S., & Cabeza, L. F. (2018). Education and training gaps in the renewable energy sector. *Solar Energy*, *173*, 449-455.

Majid, M. A. (2020). Renewable energy for sustainable development in India: Status, prospects, challenges, employment, and investment opportunities. *Energy, Sustainability and Society*, *10*(1), 1–36.

Mishra, P. (2017). Green human resource management: A framework for sustainable organizational development in an emerging economy. *International Journal of Organizational Analysis*, *25*(5), 762-788. https://doi.org/10.1108/IJOA-11-2016-1079

Mitter, H., Larcher, M., Schönhart, M., Stöttinger, M., & Schmid, E. (2019). Exploring farmers' climate change perceptions and adaptation intentions: Empirical evidence from Austria. *Environmental management*, *63*(6), 804-821.

Murey, E., Kurgat, A., & Mulongo, L. (2020). Adoption of green energy practices in informal settlements for sustainable development in Kenya. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, *51*(1), 98-114.

Pascaris, A. S., Schelly, C., Burnham, L., & Pearce, J. M. (2021). Integrating solar energy with agriculture: Industry perspectives on the market, community, and socio- political dimensions of agrivoltaics. *Energy Research & Social Science*, *75*, 102023, DOI:10.1016/j.erss.2021.102023.

Pascaris, A. S., Schelly, C., & Pearce, J. M. (2020). A first investigation of agriculture sector, perspectives on the opportunities and barriers for agrivoltaics. *Agronomy, 10*(12), 1885 http://dx.doi.org/10.3390/agronomy10121885.

Ricart, Sandra, Jorge Olcina, and Antonio M. Rico (2018). Evaluating public attitudes and farmers' beliefs towards climate change adaptation: Awareness, perception, and populism at European level. *Land 8*(1), 4.

Roscoe, S., Subramanian, N., Jabbour, C. J., & Chong, T. (2019). Green human resource management and the enablers of green organizational culture: Enhancing a firm's environmental performance for sustainable development. *Business Strategy and the Environment, 28*(5), 737–749.

Schindele, S., Trommsdorff, M., Schlaak, A., Obergfell, T., Bopp, G., Reise, C., ..., Weber, E. (2020). Implementation of agrophotovoltaics: Techno-economic analysis of the price-performance ratio and its policy implications. *Applied Energy*, *265*, 114737.

Sekiyama, T., & Nagashima, A. (2019). Solar sharing for both food and clean energy production: Performance of Agri-voltaic systems for corn, a typical shade-intolerant crop. https://doi.org/10.3390/environments6060065.

Shao, Z. (2019). Interaction effect of strategic leadership behaviors and organizational culture on IS-Business strategic alignment and Enterprise Systems assimilation. *International Journal of Information Management, 44,* 96–108.

Simpson, N. P., Rabenold, C. J., Sowman, M., & Shearing, C. D. (2021). Adoption rationales and effects of off-grid renewable energy access for African youth: A case study from Tanzania. *Renewable and Sustainable Energy Reviews, 141,* 110793.

Tang, G., Chen, Y., Jiang, Y., Paillé, P., & Jia, J. (2018). Green human resource management practices: Scale development and validity. *Asia Pacific Journal of Human Resources, 56*(1), 31-55.

Trencher, G., Vincent, S., Bahr, K., Kudo, S., Markham, K., & Yamanaka, Y. (2018). Evaluating core competencies development in sustainability and environmental master's programs: An empirical analysis. *Journal of Cleaner Production, 181,* 829–841.

Van Dun, D., & Kumar, M. (2021). Enablers of industry 4.0 technology adoption: transformational leadership and emotional intelligence. *Academy of Management Annual Meeting Proceedings 2021*(1), 13696. doi:10.5465/AMBPP.2021.13696abstract

Zander, K. K., Simpson, G., Mathew, S., Nepal, R., & Garnett, S. T. (2019). Preferences for and potential impacts of financial incentives to install residential rooftop solar photovoltaic systems in Australia. *Journal of Cleaner Production, 230,* 328–338.