Greening the Workforce: A Roadmap for Sustainable Employment in the Era of Environmental Challenges

Wisudani Rahmaningtyas[1]*, Hana Netti Purasani[2], Nina Farliana[3], Ratieh Widhiastuti[4]

[12]Departement of Office Administration Education, Faculty of Economics, Universitas Negeri Semarang
[3]Departement of Economics Education, Faculty of Economics, Universitas Negeri Semarang
[4]Departement of Accounting Education, Faculty of Economics, Universitas Negeri Semarang

E-mail: wisudani.rahmaningtyas@mail.unnes.ac.id

Abstract. The transition towards a sustainable workforce is imperative in addressing contemporary environmental challenges. This article explores the integration of green economy principles with the development of green employability skills to foster sustainability in the labor market. Utilizing a literature review approach sourced from Emerald, ScienceDirect, JSTOR, Elsevier, Google Scholar, and Sage Journal, this study examines existing research on the nexus between the green economy and employability skills. The findings reveal that aligning workforce development with green economy initiatives is essential for promoting environmental sustainability and economic resilience. Moreover, the literature underscores the significance of incorporating green employability skills, including proficiency in renewable energy technologies, environmental management, and sustainable resource utilization, into educational curricula and vocational training programs. Based on the synthesis of literature, this study recommends collaborative efforts among policymakers, educators, and industry stakeholders to design comprehensive training frameworks that equip individuals with the requisite skills for employment in environmentally conscious sectors. By prioritizing the integration of green economy principles and green employability skills, organizations can effectively cultivate a sustainable workforce poised to drive innovation and mitigate the adverse impacts of climate change.

Keywords: Green Skills, Sustainable Workforce, Employability Skills, Environmental Sustainability, Green Economy

K. B. Abiprayu and A. B. Setiawan (eds.), *Proceedings of the International conference of Economics Business and Economics Education Science (ICE-BEES-24)*, Advances in Economics, Business and Management Research 298,
https://doi.org/10.2991/978-94-6463-522-5_56

1 Introduction

Climate change and environmental degradation have become urgent global issues [1][2][3] with widespread impacts affecting various aspects of human life [4][5]. These phenomena not only create environmental problems but also pose serious challenges to public health [6][7][8], economic stability [9][10] and overall social well-being. Climate change is primarily caused by increased greenhouse gas concentrations in the atmosphere, largely resulting from human activities such as fossil fuel combustion, deforestation, and industrial activities. This has led to a significant rise in global average temperatures and triggered major changes in the Earth's climate system.

Climate change has contributed to increased frequency and intensity of natural disasters [11][10]such as storms, floods, and large-scale wildfires [12]. These disasters have serious consequences [13], including increased incidents of respiratory and cardiovascular diseases, spread of infectious diseases, and heat stress leading to fatalities. For instance, more frequent and intense heatwaves can cause acute medical conditions like heart attacks and strokes. Furthermore, climate change has exacerbated air quality through increased pollution and allergens [14], directly impacting respiratory health. Air pollution, especially in urban areas, is closely linked to rising prevalence of asthma, bronchitis, and other chronic lung diseases.

Environmental degradation also significantly threatens biodiversity [15] .Many species of animals and plants face extinction threats due to loss of their natural habitats [16] climate change, and human activities that disrupt ecosystems [17][18]. Diminishing biodiversity not only disrupts ecosystem balance but also eliminates potential natural resources valuable to humans [19] including food sources, medicines, and industrial raw materials. The loss of specific species can also affect other ecosystems dependent on those species, creating detrimental ripple effects. For example, the decline of pollinating insects can impact crop production dependent on pollination, ultimately affecting food security and agricultural economics.

Economically, climate change leads to significant losses [20]. Natural disasters often cause severe infrastructure damage [21] destroying homes, roads, and other public facilities, requiring substantial costs for repairs and reconstruction. For instance, storms and floods can result in billions of dollars in property and infrastructure damage, disrupting economic activities and compelling governments and the private sector to allocate substantial budgets for recovery [22]. The agricultural industry, highly dependent on weather conditions, is also affected by changing rainfall patterns and unpredictable temperatures, resulting in reduced crop yields and increased food prices [23]. Climate uncertainty makes it difficult for farmers to plan planting and harvesting seasons, impacting food security [24].

Currently, several economic sectors have entered a transition towards a more sustainable green economy [25]. One such sector is energy, where a shift from conventional [26] such as coal and petroleum towards renewable energy sources like solar and wind power is underway. This transformation aims to reduce greenhouse gas emissions and enhance availability of clean energy [27]. In the transportation sector, electric vehicles and renewable energy-based public transport are replacing conventional vehicles to reduce air pollution and dependency on fossil fuels [28]. The manufacturing sector

is also changing, with more companies adopting clean production practices and sustainable technologies to reduce waste and emissions [29][30] [31]. In agriculture, organic farming practices and advanced technologies help reduce environmental impact and improve crop yields [32]. Green building construction is also increasingly common, with buildings designed for energy efficiency and environmentally friendly building materials [33][34]. The financial sector is also involved in this transition by providing financing for sustainable projects and integrating Environmental, Social, and Governance (ESG) factors into investment decisions [35]. Similarly, the tourism sector is adopting sustainable tourism practices to preserve the environment and provide sustainable economic benefits to local communities [36].

The green economy is an economic model aimed at enhancing human well-being and social equality while significantly reducing environmental risks and ecological scarcities [37][38] [39][40]. This concept encompasses various aspects such as carbon emissions reduction, resource efficiency, renewable energy, and sustainable business practices [41][38][42]. The green economy strives to create an economic system that is not only financially beneficial but also environmentally friendly and sustainable in the long term.

Green job skills encompass both technical and non-technical abilities necessary to support and implement sustainable practices across various economic sectors [43][44][45]. Skills in environmental management are crucial, including the ability to identify, measure, and manage environmental impacts of industrial activities [46][47]. This includes knowledge of environmental regulations, waste reduction techniques, water and air treatment, and restoration of degraded ecosystems.

In terms of energy efficiency, green job skills involve techniques to improve energy use efficiency in production processes and business operations [48][49]. This includes energy audits, implementation of energy management systems, and adoption of technologies and practices that reduce energy consumption without sacrificing productivity [50][51].Principles of circular economy are also integral to green job skills, where individuals are taught to maximize the value of materials and products throughout their lifecycle through recycling, reuse, and product lifespan extension [52].

Non-technical skills are equally important in the context of green jobs [45][43]. These include effective communication, leadership in sustainability initiatives, waste management skills, and collaborative work in diverse teams [53]. Project management skills and problem-solving are also critical as many sustainability projects require complex planning and cross-functional and organizational coordination [54]. These skills are not only relevant to industries directly involved in environmentally friendly activities, such as renewable energy and waste management, but also to other sectors seeking to enhance sustainability of their operations [47][55][56]. For example, the manufacturing sector can implement clean and energy-efficient production practices [57], while service sectors like hospitality also require green skills [58]. Even the financial sector requires these skills to develop green investment products [59].

Green job skills are a vital component in advancing the global sustainability agenda [60][48] [61]. They ensure that the workforce is prepared to address complex environmental challenges and support the transition towards a greener and more sustainable

economy [53]. Therefore, education and training focused on green skills should be a priority for governments, industries, and educational institutions worldwide [62][63].

2 Method

The literature review approach is used to investigate the research question. Literature is gathered from multiple leading academic databases, including Emerald, ScienceDirect, JSTOR, Elsevier, Google Scholar, and Sage Journal. Searches are conducted using specific keyword combinations to ensure comprehensive coverage of relevant topics. Keywords used in the search include "green skills," "job skills," "green economy," and "sustainable development." The literature review process involves several steps. Firstly, extensive searches are conducted in the selected databases using the specified keywords. Search results are then filtered to include only peer-reviewed articles, ensuring the credibility and reliability of sources. Next, abstracts of the identified articles are reviewed to determine their relevance to sustainable workforce, green economy, and sustainable development. Articles deemed relevant are selected for full-text review. During the full-text review, detailed notes are taken on the main findings, methodologies, and conclusions of each article. This information is systematically organized and categorized based on emerging themes and topics from the literature. These themes are then analyzed to identify patterns, gaps, and trends in existing research. The literature analysis is conducted with the aim of synthesizing the current state of knowledge on how to develop a workplace environment that supports green jobs for sustainable and environmentally-based skills. This is achieved by identifying areas for further research and exploring opportunities for enhancing understanding in the field.

3 Result and Analysis

3.1 Transitioning Towards Sustainable Workforce

The transition towards a sustainable workforce is increasingly crucial in addressing the complexities of current global environmental challenges [64][65].With growing awareness of the negative impacts of climate change, environmental degradation, and dwindling natural resources, there is a rising understanding of the need to adopt economic models and work patterns that are more sustainable [66]. The importance of this transition lies not only in environmental protection but also in the ability to build a more stable economy resilient to change [67][68].By applying principles of the green economy and strengthening skills relevant to sustainability, communities can create economically sustainable jobs [69]. Moreover, transitioning towards a sustainable workforce also helps enhance resilience to climate change and shifts in global market demands, enabling individuals and businesses to better adapt to unforeseen challenges [70]. Therefore, through cross-sector collaboration involving government, private sector, academia, and civil society, this transition can be effectively supported and implemented.

The significance of this transition extends beyond environmental protection to building a more stable economy resilient to change [71]. By adopting principles of the green economy, such as energy efficiency, use of renewable resources and waste reduction [41], this transition can create jobs that are not only environmentally friendly but also contribute to long-term economic stability [72]. For instance, jobs in renewable energy sectors like solar and wind power not only reduce carbon emissions but also create new sustainable employment opportunities. Strengthening skills relevant to sustainability is key to creating an adaptive and resilient workforce [73]. Education and training focused on green technologies, natural resource management, and sustainable business practices will prepare individuals to face changes in the global job market [74][75].

Training programs and certifications in sustainability can enhance the competitiveness of workers in the labor market [76], while promoting innovation and efficiency across various economic sectors. Equipping individuals and businesses with the knowledge and skills to adapt prepares them to tackle unforeseen challenges such as natural disasters or environmental policy changes. This is crucial not only for environmental sustainability but also for business continuity and community economic well-being. Effective implementation of this transition requires cross-sector collaboration. Governments, the private sector, academia, and civil society must work together to develop supportive policies, invest in green technologies, and establish relevant education programs. Governments can play a key role by setting regulations that promote sustainable business practices and providing incentives for green investments. The private sector can contribute through innovation and the adoption of environmentally friendly business practices, while academia can provide necessary research and education. Civil society, through advocacy and active participation, can ensure that this transition is sustainable and inclusive.

3.2 The Roadmap for Greening the Workforce

The effectiveness of the roadmap for greening the workforce depends significantly on various factors, particularly government policies and regulations [77]. Strong governmental support plays a pivotal role in shaping the environment for sustainable practices to thrive [78][79][80]. Policies that offer tax incentives for investments in green technologies and sustainable initiatives provide financial motivation for businesses to adopt environmentally friendly practices. By reducing the financial burden and incentivizing sustainable investments, governments encourage businesses to innovate and transition towards greener operations [81][82]. Furthermore, regulations that mandate or encourage eco-friendly practices ensure compliance across industries. These regulations set standards for emissions, waste management, and resource usage, pushing companies to implement sustainable measures as part of their operational strategies. This regulatory framework not only fosters environmental responsibility but also levels the playing field by ensuring that all businesses adhere to similar standards, preventing unfair competition based on unsustainable practices. Moreover, government funding

for research and development in sustainable technologies and practices accelerates innovation. It supports the development of new green technologies, sustainable materials, and efficient processes, which are crucial for businesses aiming to reduce their environmental footprint while maintaining competitiveness. By investing in R&D, governments contribute to the growth of a sustainable economy and provide businesses with the tools and knowledge necessary to implement effective green strategies.

The role of higher education institutions in preparing the future workforce for sustainable employment is crucial and multifaceted [83][84]. Universities and colleges serve as foundational pillars in equipping students with the necessary knowledge, skills, and perspectives to tackle environmental challenges effectively [85]. Firstly, these institutions offer a range of relevant courses and academic programs focused on sustainability [86][87]. These include disciplines such as environmental science, renewable energy technologies, sustainable business practices, green engineering, and ecological economics [88][89]. Through these courses, students gain theoretical knowledge and practical skills essential for understanding and implementing sustainable practices in various industries. Moreover, higher education institutions play a pivotal role in conducting research on environmental technologies and solutions. Faculty members and researchers collaborate on projects aimed at developing innovative approaches to environmental issues.

This research contributes to the advancement of green technologies, sustainable agriculture methods, waste management systems, and more [90]. It not only expands the knowledge base but also fosters technological innovations that can be applied in real-world scenarios to promote sustainability. Additionally, universities and colleges foster partnerships and collaborations with industry stakeholders. These partnerships facilitate knowledge exchange, internships, and collaborative research projects that bridge academic theory with practical application. Industry partnerships provide students with hands-on experience and exposure to current sustainability practices and challenges faced by businesses. This experiential learning enhances their employability and prepares them to contribute effectively to sustainable initiatives upon graduation [91][92][93]. By integrating these components — relevant coursework, impactful research, and industry partnerships — higher education institutions contribute to building a skilled and adaptive workforce capable of addressing complex environmental challenges. They play a pivotal role in nurturing future leaders, innovators, and professionals who are committed to advancing sustainability across various sectors of the economy.

Despite the numerous benefits of transitioning to sustainable practices, several challenges and potential barriers must be addressed to facilitate widespread adoption [94]. One significant challenge is the resistance from businesses to adopt green practices. This resistance can stem from concerns over initial costs, perceived operational disruptions, or reluctance to deviate from traditional business methods that have proven successful in the past. Overcoming this resistance often requires demonstrating the long-term financial and operational benefits of sustainability, as well as providing support and guidance on how to effectively implement green initiatives without compromising profitability.

Another critical challenge is ensuring that the workforce possesses the necessary skills and competencies required for green jobs [95]. The rapid evolution of sustainable technologies and practices necessitates ongoing education and training programs. Higher education institutions, vocational training centers, and industry partnerships play a vital role in offering courses and certifications that equip individuals with skills in renewable energy, resource management, eco-design, and sustainable business practices. Addressing this skills gap is essential for maximizing employment opportunities in the green economy.

Small and medium-sized enterprises (SMEs), in particular, often face financial challenges when transitioning to sustainable practices. The initial investment required for upgrading technologies, implementing energy-efficient solutions, or obtaining eco-certifications can be daunting without external support. Governments, financial institutions, and international organizations can mitigate these financial constraints by providing incentives, grants, low-interest loans, or technical assistance tailored to SMEs. These financial mechanisms can help SMEs overcome barriers to entry into the green market and facilitate their long-term sustainability efforts.

4 Conclusion

In conclusion, advancing towards sustainable employment requires concerted efforts and collaboration across sectors to overcome challenges and capitalize on opportunities. By integrating policies, education, and cross-sectoral partnerships, societies can pave the way for a sustainable future where economic prosperity aligns with environmental stewardship and societal well-being. To enhance the roadmap for sustainable employment and ensure its successful implementation, several key recommendations can be put forward:

Strengthening Policy Support: Governments play a crucial role in creating an enabling environment for sustainable practices. This includes introducing and enforcing policies that incentivize businesses to adopt green technologies and practices while penalizing activities that harm the environment. Examples of effective policies could include tax incentives for renewable energy investments, subsidies for sustainable agriculture practices, and regulations that mandate environmental impact assessments for new developments. Clear and consistent policy frameworks provide businesses with certainty and motivation to invest in sustainability, contributing to long-term environmental and economic benefits.

Expanding Educational Offerings: Higher education institutions are pivotal in preparing the future workforce for sustainable employment. To meet the evolving demands of the green economy, universities and colleges should expand their curriculum to incorporate more programs and courses focused on sustainability. This includes integrating sustainability principles into existing disciplines such as engineering, business management, and agriculture, as well as developing new interdisciplinary programs that address emerging environmental challenges. Practical training, internships, and hands-

on projects should also be emphasized to equip students with practical skills and real-world experience in implementing sustainable practices.

Promoting Cross-Sector Collaboration: Collaboration between businesses, academia, government, and civil society is essential for advancing sustainable employment initiatives. Encouraging partnerships and knowledge exchange across sectors can facilitate the development and adoption of best practices in sustainability. Industry-academic partnerships, for example, can lead to collaborative research projects that drive innovation in green technologies. Government-supported platforms that bring together stakeholders from different sectors can promote dialogue, identify common challenges, and develop joint solutions to accelerate the transition towards a low-carbon and resource-efficient economy.

5 References

1. Leiserowitz A. Fighting climate change: Human solidarity in a divided world International Public Opinion, Perception, and Understanding of Global Climate Change. UN Rep. 2007;3(1):40. Available: https://core.ac.uk/download/pdf/6248846.pdf h
2. Gaite JM, Wiratma HD, Subandi Y. Peran New World Together (Nwt) Dalam Menangani Isu Kerusakan Lingkungan Di Bali. ARMADA J. Penelit. Multidisiplin. 2023;1(6):491-500. doi: 10.55681/armada.v1i6.590.
3. Siregar LS. Efek Perubahan Iklim terhadap Produktivitas Pertanian di Asia Tenggara. 2024;1:1-13.
4. Surmaini I, Runtunuwu E, Las E. Efforts of agricultural sector in dealing with climate change. 2011.
5. Handmer J et al. Changes in impacts of climate extremes: human systems and ecosystems. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Spec. Rep. Work. Groups I II Intergov. Panel Clim. Chang. 2012:231-290.
6. Tsagkaris MY et al. Detection of SARS-CoV-2 in wastewater raises public awareness of the effects of climate change on human health: The experience from Thessaloniki, Greece. J. Clim. Chang. Heal. 2021;2:100018.
7. Drewry MJ et al. Public understanding of climate change and health in the Caribbean: Results and recommendations from a 10-country perceptions survey. J. Clim. Chang. Heal. 2022;6:100155.
8. Takahashi B et al. Climate change and public health in South America: a scoping review of governance and public engagement research. The Lancet Regional H. 2023. doi: 10.1016/j.lana.2023.100603.
9. Hrabok VI, Delorme M, Agyapong A. Threats to mental health and well-being associated with climate change. J. Anxiety Disord. 2020;76:102295.
10. Bufalo G, Ceci C, Orlando G. Addressing the financial impact of natural disasters in the era of climate change. North Am. J. Econ. Financ. 2024;73:102152.
11. Mallucci E. Natural disasters, climate change, and sovereign risk. J. Int. Econ. 2022;139:1291. doi: 10.1016/j.jinteco.2022.103672.

12. McNaught J et al. Innovation and deadlock in governing disasters and climate change collaboratively-Lessons from the Northern Rivers region of New South Wales, Australia. Int. J. Disaster Risk Reduct. 2024;105:104366.
13. Dewi R, Ma'ruf A. Analisis Penciptaan Green Jobs (Pekerjaan Hijau) di Indonesia Menggunakan Model Skenario Investasi Hijau. J. Econ. Res. Soc. Sci. 2017;1(1):53-64. Available: http://repository.umy.ac.id/handle/123456789/8776?show=full.
14. Sadatshojaie MR, Rahimpour A. CO2 emission and air pollution (volatile organic compounds, etc.)–related problems causing climate change. In Current trends and future developments on (bio-) membranes, Elsevier, 2020:1-30.
15. Wang K et al. Biodiversity conservation in the context of climate change: Facing challenges and management strategies. Sci. Total Environ. 2024;173377.
16. Rather AA et al. Ensemble modelling enables identification of suitable sites for habitat restoration of threatened biodiversity under climate change: A case study of Himalayan Trillium. Ecol. Eng. 2022;176:106534
17. Trenberth KE, Fasullo JT. Applications of an updated atmospheric energetics formulation. J. Clim. 2018;31(16):6263-6279. doi: 10.1175/JCLI-D-17-0838.1.
18. Prakash S. Impact of Climate Change on Aquatic Ecosystem and Its Biodiversity: an Overview. Int. J. Biol. Innov. 2021;03(02). doi: 10.46505/ijbi.2021.3210.
19. Aulia A et al. Sikap Mahasiswa Unnes Terhadap Isu-Isu Konservasi Biodiversitas. J. Anal. 2024;3(1):134-140. Available: http://jurnalilmiah.org/journal/index.php/Analis.
20. Septiana TC. Lesson Learned Peralihan Mata Pencaharian Masyarakat Sebagai Ketahanan Terhadap Perubahan Iklim Kelurahan Mangunharjo. J. Wil. dan Lingkung. 2013;1(2):123. doi: 10.14710/jwl.1.2.123-140.
21. Cvetkovic V, Mijalkovic S. Spatial and temporal distribution of geophysical disasters. J. Geogr. Inst. Jovan Cvijic, SASA. 2013;63(3):345-359. doi: 10.2298/ijgi1303345c.
22. Armal S et al. Assessing property level economic impacts of climate in the US, new insights and evidence from a comprehensive flood risk assessment tool. Climate. 2020;8(10):1-20. doi: 10.3390/cli8100116.
23. Wijayanti I, Nursalim I. Bertahan dalam krisis iklim: relasi gender perempuan petani stroberi menghadapi dampak perubahan iklim. J. Ris. Sosiol. Progresif Aktual. 2023;5(1):90-102.
24. Lee CC, Zeng M, Luo Y. How does climate change affect food security? Evidence from China. Environ. Impact Assess. Rev. 2024;104:107324.
25. Yan L, Wang S, Wu J. Dynamics of green transition based on stock-flow consistent model considering compound risks. Econ. Anal. Policy. 2024;82:530-553.
26. Li B et al. The future of Green energy: A panel study on the role of renewable resources in the transition to a Green economy. Energy Econ. 2023;127:107026.
27. Shah A et al. Inositol Pyrophosphates: Energetic, Omnipresent and Versatile Signalling Molecules. J. Indian Inst. Sci. 2017;97(1):23-40. doi: 10.1007/s41745-016-0011-3.
28. Dincer I, Rosen MA. Thermodynamic aspects of renewables and sustainable development. Renew. Sustain. Energy Rev. 2005;9(2):169-189.
29. Garetti M, Taisch M. Sustainable manufacturing: trends and research challenges. Sustain. Manuf. trends Res. challenges. Prod. Plan. Control. 2012;23(2–3):83-104.
30. Javaid M et al. Understanding the adoption of Industry 4.0 technologies in improving environmental sustainability. Sustain. Oper. Comput. 2022;3:203-217.
31. Debnath AB et al. A grey approach to assess the challenges to adopting sustainable production practices in the apparel manufacturing industry: Implications for sustainability. Results Eng. 2024;22:102006.
32. Gamage O et al. Role of organic farming for achieving sustainability in agriculture. Farming Syst. 2023;1(1):100005.

33. Oluwatoyin Omole F et al. Sustainable Urban Design: a Review of Eco-Friendly Building Practices and Community Impact. Eng. Sci. Technol. J. 2024;5(3):1020-1030. doi: 10.51594/estj.v5i3.955.
34. Srivastava A et al. Green buildings: Eco-friendly technique for modern cities. Sustain. Smart Cities India Challenges Futur. Perspect. 2017:415-432.
35. Baczewska-Dabrowska AH, Gworek B, Dmuchowski W. The Use of Mosses in Biomonitoring of Air Pollution in the Terrestrial Environment: A Review. Ochr. Sr. i Zasobow Nat. 2023;34(2):19-30. doi: 10.2478/oszn-2023-0005.
36. Pan PC et al. Advances and challenges in sustainable tourism toward a green economy. Sci. Total Environ. 2018;635:452-469.
37. Victor PA, Jackson T. A Commentary on UNEP's Green Economy Scenarios. Ecol. Econ. 2012;77:11-15. doi: 10.1016/j.ecolecon.2012.02.028.
38. Khoshnava SM et al. Contribution of green infrastructure to the implementation of green economy in the context of sustainable development. Sustain. Dev. 2020;28(1):320-342.
39. Sulich A. The green economy development factors. Proc. 32nd Int. Bus. Inf. Manag. Assoc. Conf. IBIMA 2018 - Vis. 2020 Sustain. Econ. Dev. Appl. Innov. Manag. from Reg. Expans. to Glob. Growth. 2018:6861-6869.
40. Adamowicz M. Green Deal, Green Growth and Green Economy as a Means of Support for Attaining the Sustainable Development Goals. Sustain. 2022;14(10). doi: 10.3390/su14105901
41. Loiseau E et al. Green economy and related concepts: An overview. J. Clean. Prod. 2016;139:361-371. doi: 10.1016/j.jclepro.2016.08.024.
42. Mikhno I et al. Green Economy In Sustainable Development And Improvement Of Resource Efficiency. Cent. Eur. Bus. Rev. 2021;10(1):99-113. doi: 10.18267/j.cebr.252.
43. Hamid MZA et al. Generic green skills in teaching and learning: Meaning and implementation. Univers. J. Educ. Res. 2019;7(12 A):121-126. doi: 10.13189/ujer.2019.071915.
44. Muaddab H. Promoting Green Skill and Green Vocational Education for A Circular Economy: A Literature Review. 2024;01(January):8-20.
45. Zolkifli H et al. Generic Green Skills: Industry and perspectives on technical education and vocational training (TVET). TVET@Asia. 2016;6(6):1-13. Available: www.tvet-online.asia.
46. Dlimbetova G et al. Green skills for green economy: Case of the environmental education role in Kazakhstan's economy. Int. J. Environ. Sci. Educ. 2016;11(8):1735-1742. doi: 10.12973/ijese.2016.550a.
47. Mohd Zubir MZ et al. Dimension of green skills: Perspectives from the industry experts. J. Tech. Educ. Train. 2021;13(1):159-166. doi: 10.30880/jtet.2021.13.01.017.
48. Auktor GV. Green Industrial Skills for a Sustainable future. United Nations Ind. Dev. Organ. 2020. Available: https://www.unido.org/sites/default/files/files/2021-02/LKDForum-2020_Green-Skills-for-a-Sustainable-Future.pdf.
49. Bassi F, Guidolin M. Resource efficiency and circular economy in european smes: Investigating the role of green jobs and skills. Sustain. 2021;13(21). doi: 10.3390/su132112136.
50. Backlund S et al. Extending the energy efficiency gap. Energy Policy. 2012;51(51):392-396. doi: 10.1016/j.enpol.2012.08.042.
51. Moya D et al. Analysis of the Ecuadorian energy audit practices: A review of energy efficiency promotion. Renew. Sustain. Energy Rev. 2016;62:289-296. doi: 10.1016/j.rser.2016.04.052.
52. Crippa CM, Drąsutė V. Circular Economy, Education for Sustainable Development and Green Skills: T(h)REE Elements for a Better Future. 2020.

53. Sern LC et al. Green Skills for Green Industry: A Review of Literature. J. Phys. Conf. Ser. 2018;1019(1). doi: 10.1088/1742-6596/1019/1/012030.
54. Adhya A et al. Defining Sustainable Urbanism: towards a responsive urban design. Proc. Conf. Sustain. Built Environ. 2010. Available: http://ipac.kacst.edu.sa/eDoc/2010/183239_1.pdf.
55. Ibrahim M. Interactive effects of human capital in finance–economic growth nexus in Sub-Saharan Africa. J. Econ. Stud. 2018;45(6):1192-1210. doi: 10.1108/JES-07-2017-0199.
56. Handayani MN et al. Industry perceptions on the need of green skills in agribusiness vocational graduates. J. Tech. Educ. Train. 2020;12(2):24-33. doi: 10.30880/jtet.2020.12.02.003.
57. Akyazi T et al. Identifying Future Skill Requirements of the Job Profiles for a Sustainable European Manufacturing Industry 4.0. Recycling. 2022;7(3). doi: 10.3390/recycling7030032.
58. Cabral CJ, Jabbour C. Understanding the human side of green hospitality management. Int. J. Hosp. Manag. 2020;88:102389.
59. Chioma N. Green Administrative Skill Management and Employee Performance in Manufacturing Firm South Nigeria. 2024;9(3):1-17.
60. Pavlova M. Fostering inclusive, sustainable economic growth and '"green"' skills development in learning cities through partnerships. Int. Rev. Educ. 2018;64(3):339-354. doi: 10.1007/s11159-018-9718-x.
61. Kwauk C, Casey O. A new green learning agenda: Approaches to quality education for climate action. Cent. Univers. Educ. Brookings Inst. 2021:1-103. Available: https://acces.bibl.ulaval.ca/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED610523&lang=fr&site=ehost-live.
62. Mian SH et al. Adapting universities for sustainability education in industry 4.0: Channel of challenges and opportunities. Sustain. 2020;12(15). doi: 10.3390/su12156100.
63. Boitard F, Rosso R. Accelerating the Shift to a Green Economy in the EU Neighbourhood. Opportunities and Challenges for Integrating Sustainability and Green Skills in Education, Training, and Employment Policies. Pathways Green. Labour Mark. 2023:74-72.
64. van der Klink JJL et al. Sustainable employability – definition, conceptualization, and implications: A perspective based on the capability approach. Scand. J. Work. Environ. Heal. 2016;42(1):71-79. doi: 10.5271/sjweh.3531.
65. Fleuren BPI et al. Unshrouding the sphere from the clouds: Towards a comprehensive conceptual framework for sustainable employability. Sustain. 2020;12(16):1-27. doi: 10.3390/SU12166366.
66. Anwar M. Green Economy Sebagai Strategi Dalam Menangani Masalah Ekonomi Dan Multilateral. J. Pajak dan Keuang. Negara. 2022;4(1S):343-356. doi: 10.31092/jpkn.v4i1s.1905.
67. McQuaid RW, Lindsay C. The concept of employability. Urban Stud. 2005;42(2):197-219. doi: 10.1080/0042098042000316100.
68. Poschen P. Decent work, green jobs and the sustainable economy: Solutions for climate change and sustainable development. Routledge; 2017.
69. Sugianto AE et al. Transformasi Ekonomi: Membangun Kesejahteraan Masyarakat Melalui Pendekatan Ekonomi Hijau. J. Ekon. dan Pembang. Indones. 2024;2(2):234-243.
70. Rhee CS et al. Corporate social responsibility and sustainable employability: Empirical evidence from Korea. Sustain. 2021;13(14):1-14. doi: 10.3390/su13148114.
71. Hazelzet E et al. Effectiveness of interventions to promote sustainable employability: A systematic review. Int. J. Environ. Res. Public Health. 2019;16(11). doi: 10.3390/ijerph16111985.

72. Weick V. Green Economy and sustainable development. In Waste Management and the Green Economy. Edward Elgar Publishing; 2016.
73. Naz SA et al. Navigating the Intersection of Sustainability and Human Resources to Foster Responsible and Eco-Friendly Management: Green Employability and Green Jobs. Innov. Hum. Resour. Manag. SMEs. 2024:185-211.
74. Ghosal S, Moran P, Bartlett C. Employment security, employment and sustainable competitive advantage. INSEAD, Fontainebleau, Fr.; 2000.
75. Ybema KF et al. HR practices for enhancing sustainable employability: implementation, use, and outcomes. Int. J. Hum. Resour. Manag. 2020;31(7):886-907.
76. Delmas MA, Pekovic S. Environmental standards and labor productivity: Understanding the mechanisms that sustain sustainability. J. Organ. Behav. 2013;34(2):230-252.
77. Koontz TM. Collaboration for sustainability? A framework for analyzing government impacts in collaborative-environmental management. Sustain. Sci. Pract. Policy. 2006;2(1):15-24.
78. Quan SX et al. Firm sustainable development and stakeholder engagement: The role of government support. Bus. Strateg. Environ. 2018;27(8):1145-1158
79. Shah SS, Asghar Z. Individual attitudes towards environmentally friendly choices: a comprehensive analysis of the role of legal rules, religion, and confidence in government. J. Environ. Stud. Sci. 2024. doi: 10.1007/s13412-024-00913-5.
80. Guerin TF. Improving environmental performance in the minerals supply chain using a lifecycle approach: The role of fuel and lubricant suppliers in enabling sustainable development. 2009
81. Kolcava T, Bernauer D. Greening the economy through voluntary private sector initiatives or government regulation? A public opinion perspective. Environ. Sci. Policy. 2021;115:61-70.
82. Mont O, Power K. The role of formal and informal forces in shaping consumption and implications for a sustainable society. Part I. Sustainability. 2010;2(7):2232-2252. doi: 10.3390/su2072232.
83. Ahmad T. Scenario based approach to re-imagining future of higher education which prepares students for the future of work. High. Educ. Ski. Work. Learn. 2020;10(1):217-238. doi: 10.1108/HESWBL-12-2018-0136.
84. Römgens I et al. Unraveling the concept of employability, bringing together research on employability in higher education and the workplace. Stud. High. Educ. 2020;45(12):2588-2603.
85. Annan-Diab C, Molinari F. Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals. Int. J. Manag. Educ. 2017;15(2):73-83.
86. Yarime M et al. Establishing sustainability science in higher education institutions: Towards an integration of academic development, institutionalization, and stakeholder collaborations. Sustain. Sci. 2012;7(SUPPL. 1):101-113. doi: 10.1007/s11625-012-0157-5.
87. Evans TL. Competencies and pedagogies for sustainability education: A roadmap for sustainability studies program development in colleges and universities. 2019;11(19).
88. Louw W. Green curriculum: Sustainable learning at a higher education institution. Int. Rev. Res. Open Distance Learn. 2013;14(1):1-15. doi: 10.19173/irrodl.v14i1.1310.
89. Franco K et al. Higher education for sustainable development: Actioning the global goals in policy, curriculum and practice. Sustain. Sci. 2019;14(6):1621-1642.
90. Ramos TB et al. Experiences from the implementation of sustainable development in higher education institutions: Environmental Management for Sustainable Universities. J. Clean. Prod. 2015;106:3-10. doi: 10.1016/j.jclepro.2015.05.110.

91. Yang H et al. Enhancing the learning and employability of hospitality graduates in China. J. Hosp. Leis. Sport Tour. Educ. 2016;19:85-96.
92. Spanjaard N et al. Experiential learning: Helping students to become 'career-ready'. Australas. Mark. J. 2018;26(2):163-171.
93. Lu HF. Enhancing university student employability through practical experiential learning in the sport industry: An industry-academia cooperation case from Taiwan. J. Hosp. Leis. Sport Tour. Educ. 2021;28(August 2020):100301. doi: 10.1016/j.jhlste.2021.100301.
94. Blok V et al. From best practices to bridges for a more sustainable future: Advances and challenges in the transition to global sustainable production and consumption: Introduction to the ERSCP stream of the Special volume. J. Clean. Prod. 2015;108:19-30. doi: 10.1016/j.jclepro.2015.04.119.
95. Asonitou S. Employability Skills in Higher Education and the Case of Greece. Procedia - Soc. Behav. Sci. 2015;175:283-290. doi: 10.1016/j.sbspro.2015.01.1202.