

The Impact of Climate Change on Human Resource Management: A Systematic Literature Review

**Dampak Perubahan Iklim terhadap Manajemen Sumber Daya Manusia:
Tinjauan Literatur yang Sistematis**

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ABSTRACT

Climate change has become an urgent global issue with far-reaching impacts on the environment and society. In the world of work, climate change affects employee health, well-being and organizational operations. The importance of understanding these impacts and developing effective adaptation strategies is crucial for organizational sustainability. This research aims to identify current research trends regarding the impact of climate change on human resource management (HR), evaluate existing knowledge gaps, and assess practical implications for HR practitioners. This research uses a systematic literature review approach to collect and analyze relevant literature. The databases used include Scopus, Web of Science, and Google Scholar. Key findings include the identification of dominant themes such as the impact of climate change on employees' physical and mental health, various organizational adaptation strategies, as well as the need for green skills development. The developed conceptual framework highlights the relationship between HR policies, employee well-being, green skills development and organizational adaptation strategies. This research makes a significant contribution to the literature by offering an in-depth understanding of the relationship between climate change and HR management. These findings reinforce the urgency of integrating climate change adaptation policies in HR management and provide practical guidance that can be implemented by organizations to increase their resilience and sustainability amidst growing environmental challenges.

Keywords: Climate Change, Human Resource Management, Adaptation Strategy, Employee Welfare, Green Skills, Systematic Literature Review

ABSTRAK

Perubahan iklim telah menjadi isu global yang mendesak dengan dampak yang luas terhadap lingkungan dan masyarakat. Di dunia kerja, perubahan iklim mempengaruhi kesehatan karyawan, kesejahteraan, dan operasional organisasi. Pentingnya memahami dampak ini dan mengembangkan strategi adaptasi yang efektif menjadi krusial bagi keberlanjutan organisasi. Penelitian ini bertujuan untuk mengidentifikasi tren penelitian terkini mengenai dampak perubahan iklim terhadap manajemen sumber daya manusia (SDM), mengevaluasi gap pengetahuan yang ada, dan menilai implikasi praktis bagi praktisi SDM. Penelitian ini menggunakan pendekatan systematic literature review untuk mengumpulkan dan menganalisis literatur yang relevan. Basis data yang digunakan meliputi Scopus, Web of Science, dan Google Scholar. Temuan utama mencakup identifikasi tema-tema dominan seperti dampak perubahan iklim terhadap kesehatan fisik dan mental karyawan, berbagai strategi adaptasi organisasi, serta kebutuhan untuk pengembangan keterampilan hijau. Kerangka kerja konseptual yang dikembangkan menyoroti hubungan antara kebijakan SDM, kesejahteraan karyawan, pengembangan keterampilan hijau, dan strategi adaptasi organisasi. Penelitian ini memberikan kontribusi signifikan terhadap literatur dengan menawarkan pemahaman mendalam tentang hubungan antara perubahan iklim dan manajemen SDM. Temuan ini memperkuat urgensi integrasi kebijakan adaptasi perubahan iklim dalam manajemen SDM dan memberikan panduan praktis yang dapat diterapkan oleh organisasi untuk meningkatkan ketahanan dan keberlanjutan mereka di tengah tantangan lingkungan yang berkembang.

Kata Kunci: Perubahan Iklim, Manajemen Sumber Daya Manusia, Strategi Adaptasi, Kesejahteraan Karyawan, Keterampilan Hijau, Systematic Literature Review

1. Introduction

Climate change poses a complex challenge with significant implications for both the natural environment and society, including the world of work. Industries such as agriculture, fishing, and tourism are particularly vulnerable to climate change impacts, leading to reduced productivity and economic uncertainty. However, the imperative to reduce carbon emissions and transition to sustainable practices is driving transformations in sectors like energy, transportation, and manufacturing, necessitating adjustments in human resource management to accommodate changes in skills, technology, and work dynamics.

The literature reveals a notable gap in the focus of the industrial ecology community on climate change adaptation, highlighting the need for increased attention to this crucial area (Dayeen et al., 2020). In addition, there is evidence pointing to insufficient engagement in climate change and health education among public health organizations, which underscores the necessity of enhancing awareness and training concerning climate-related health risks (Casson et al., 2023). While current research in the healthcare sector predominantly addresses infrastructure resilience, there remains a deficiency in understanding workforce needs to strengthen health systems in the face of climate-related disruptions (Moran, 2023).

In the realm of gender and social inclusion within climate change resilience policies, innovative frameworks such as ClimGender are being developed to integrate these critical aspects into sector-specific resilience strategies (Badolo, 2024). Furthermore, studies have indicated that fostering corporate social responsibility among employees can enhance pro-environmental behavior, thereby highlighting the role of individuals in advancing sustainability initiatives within organizations (Min, 2024).

Globally, there is a discernible trend toward enhancing urban resilience to climate change, with cities increasingly incorporating climate considerations into their development policies (Badolo, 2024). The concept of climate-resilient cities underscores the importance of urban areas being capable of rapidly adapting to climate-related shocks (Hossain, 2024). Additionally, frameworks such as the WashResilience scientific framework have been proposed to facilitate the integration of climate change considerations into water, sanitation, and hygiene sector policies (Badolo, 2024).

Addressing the implications of climate change on the world of work necessitates a multifaceted approach that considers industry-specific vulnerabilities, workforce training, and the integration of climate considerations into business practices and policy frameworks. The significance of this topic is further emphasized by recent statistical data and case studies. For instance, the International Labor Organization (ILO) estimates that climate change could lead to the loss of approximately 80 million jobs by 2030 without substantial mitigation efforts. Conversely, the transition to a green economy is anticipated to generate 24 million new jobs within the same timeframe. Moreover, case studies from various countries illustrate that companies failing to adapt to climate change face risks of diminished competitiveness and reputational damage.

Climate change represents a critical global issue with profound impacts on environmental and human activities. The effects on human resource management are varied and necessitate a thorough understanding to effectively address these challenges. Research has shown that climate change can significantly impact water resources, agriculture, and ecosystems (Ray et al., 2023; PARWIN, 2023; Kimaro, 2019). Changing climate conditions can disrupt the hydrological cycle, posing threats to water-dependent activities such as agriculture and hydropower production (PARWIN, 2023). Additionally, the combined effects of climate change and human disturbances on land resources can significantly influence water sustainability and crop productivity (Kimaro, 2019).

Further research is needed to understand the impact of climate change on river ecosystems and the economic value derived from ecosystem services (Cheng & Li, 2020). Human activities, in conjunction with climate variability, can affect streamflow and water

resource sustainability, particularly in vulnerable regions like South Africa (Fynn & Evening Dress, 2022). Addressing and mitigating these effects is crucial for the sustainable management of water resources.

In the context of human resource management, the relationship between green Human Resource Management (HRM) practices and employee behavior is receiving increasing attention (Li et al., 2023; Jnaneswar, 2023). Green HRM practices have been demonstrated to influence employee behavior within the workplace, highlighting the importance of incorporating environmental considerations into HRM strategies (Li et al., 2023). Furthermore, the psychological climate and employee commitment are essential factors in shaping employee green behavior within organizations (Jnaneswar, 2023).

In conclusion, addressing the impact of climate change on human resource management necessitates a multidisciplinary approach that considers the interconnectedness of environmental changes, resource management practices, and human behavior. By incorporating climate adaptation strategies into natural resource management planning and fostering a green organizational climate, businesses and communities can strive towards building resilience and sustainability in the face of climate change challenges.

Therefore, this research aims to explore the impact of climate change on human resource management (HRM) through a systematic literature review approach. By understanding the implications of climate change for HRM, companies can be better prepared to face future challenges and take proactive steps to protect and empower their workforce.

Climate change has emerged as a critical global issue with profound implications, particularly impacting human resource management (HRM). The diverse effects of climate change influence various aspects of HRM practices, underscoring the need for a strategic approach to integrate climate considerations into HRM strategies. Ibrahim (2023) highlights the importance of climate change education and awareness programs, emphasizing their role in shaping knowledge, attitudes, and practices related to mitigating the impacts of climate change. This underscores the necessity of embedding climate change considerations into HRM practices to promote environmentally sustainable behaviors within organizations.

Research by Osuji (2023) and Karbo & Crentsil (2021) underscores the crucial role of awareness in driving the adoption of climate-smart practices among farmers. This awareness not only affects individual behaviors but also highlights the need for organizations to implement HR practices that support climate adaptation and resilience. Nisar et al. (2022) further emphasize the significance of organizational policies in fostering pro-environmental behaviors. They argue that incorporating environmental considerations into workforce management can enhance overall environmental performance within industries.

The disproportionate impact of climate change on marginalized groups necessitates a targeted approach within HRM to address vulnerabilities and ensure inclusivity in climate adaptation strategies, as discussed by Magesa & Pauline (2021). Elum & Cutter (2023) stress the importance of stakeholder participation in climate change planning, particularly in vulnerable communities. This aligns with the need for HRM to consider diverse perspectives and ensure equitable outcomes when responding to climate challenges.

Integrating climate change considerations into HRM practices not only enhances organizational sustainability but also strengthens resilience. Finally (2024) highlights the strategic role of HR in promoting environmental sustainability within sectors such as oil and gas. This illustrates the interconnectedness between HR practices and environmental initiatives, emphasizing the importance of aligning HR strategies with evolving environmental conditions and regulatory requirements to ensure long-term organizational viability.

In summary, synthesizing these studies underscores the critical need for organizations to embed climate change considerations into their HRM practices. By fostering awareness, implementing pro-environmental policies, addressing vulnerabilities, and engaging

stakeholders, HRM can significantly contribute to enhancing organizational resilience and sustainability in the face of climate change challenges.

Climate change has become a global issue that brings various challenges to the business world, including in terms of human resource (HR) management. Although the impact of climate change on certain economic sectors has been widely studied, its direct and indirect implications for HR practices are still less well understood. In this context, companies need to develop adaptive and sustainable HR strategies to overcome the challenges posed by climate change, such as changes in workforce structure, the need for new skills, and managing employee welfare.

However, to what extent have companies responded to these challenges? Are there differences in company responses across industry sectors or geographic regions? How will climate change affect HR policies, from recruitment, training, to employee retention? These questions remain inadequately answered in the existing literature.

Therefore, the problem formulation in this research is: How does climate change impact human resource management, and how do companies in various sectors and regions respond to this challenge through their HR policies and practices?

To answer the problem formulation, this study will ask the following research questions:

1. How will climate change affect recruitment and training strategies within companies in various industrial sectors?
2. What new skills will the workforce need in response to climate change, and how can companies facilitate the development of these skills?
3. How do companies manage employee well-being in the context of climate change, including adapting to changing working conditions and managing related risks?
4. Are there differences in companies' responses to climate change based on specific geographic regions or industry sectors?

This research aims to provide comprehensive answers to these questions, so that it can make a significant contribution to the literature on HR management in the context of climate change and offer practical insights for companies in developing more adaptive and sustainable HR strategies.

This research aims to explore and analyze the impact of climate change on human resource management (HR) in various industrial sectors and geographic regions. By conducting a systematic review of existing literature, this research seeks to achieve the following specific objectives:

1. Identify the impact of climate change on recruitment, training and skills development policies and practices in companies. This research will examine how companies are adapting their HR strategies to meet the demands of a changing environment and the need for new skills related to green technologies and sustainable business practices.
2. Explains how climate change affects employee well-being and working conditions, and how companies are responding to these challenges. This objective includes analysis of work adaptation policies, such as flexibility of work place and time, as well as approaches to managing work health and safety under increasingly extreme climate conditions.
3. Evaluate differences in corporate responses to climate change by industry sector and geographic region. This research will identify variations in HR strategies implemented by companies in various sectors and regions, and examine the factors that influence these decisions.
4. Provides practical insights for companies in developing adaptive and sustainable HR strategies amidst the challenges of climate change. By developing evidence-based guidance, it is hoped that this research will help companies integrate climate change

considerations into their HR policies, thereby improving competitiveness and long-term sustainability.

Overall, this research aims to make a significant contribution to the understanding of how climate change affects human resource management, as well as offering solutions that companies can implement to face this challenge effectively.

This research is expected to provide a unique and significant contribution to two increasingly important fields of science, namely human resource management (HR) and climate change studies. In a context increasingly influenced by the dynamics of global climate change, the contributions of this research can be summarized as follows:

1. **Filling Knowledge Gaps in HR Literacy Related to Climate Change:** This research will be one of the first to systematically link climate change to various aspects of HR management, such as recruitment, training, employee well-being and workplace adaptation. Thus, this research fills a gap in the existing literature, where the specific implications of climate change on HR have not been widely researched. These findings will open new insights in understanding how climate change affects HR practices and policies in various industrial sectors.
2. **Providing Practical Insights for Companies and HR Practitioners:** By analyzing how companies across different sectors and geographic regions are responding to the challenges of climate change, this research will provide evidence-based guidance for companies to develop more adaptive and sustainable HR strategies. This will help companies deal with climate risks while maintaining employee productivity and well-being, which in turn can increase their competitiveness in the global market.
3. **Strengthening Inter-Disciplinary Relationships:** This research will strengthen the link between climate change studies and human resource management, two fields that are often considered separate. By showing how these two fields are interrelated, this research encourages a broader interdisciplinary approach to addressing global challenges. This will also open up space for further collaboration between researchers in the fields of HR, sustainability and climate change.
4. **Encouraging the Development of More Comprehensive Public Policies:** The findings from this research are not only relevant for the business world, but also for policy makers. By understanding the impact of climate change on labor and HR management, policymakers can design more comprehensive public policies to support the adaptation of companies and workers to climate change. This includes policies in the fields of education, training, health and occupational safety.

Overall, this research not only enriches the scientific literature on climate change and HR management, but also provides practical contributions that can be implemented by companies and governments to face the challenges posed by climate change more effectively and sustainably.

2. Method

This research uses a systematic literature review (SLR) approach to explore and analyze the impact of climate change on human resource management (HR). This approach was chosen because SLR allows researchers to conduct a comprehensive and structured evaluation of existing literature, so as to identify main findings, consistent patterns, and knowledge gaps that still exist in the topic under study.

Systematic literature reviews differ from conventional literature reviews because SLR uses systematic and transparent procedures in searching, selecting, and synthesizing relevant studies. In this research, the SLR approach was carried out with the following steps:

1. **Formulation of Research Questions:** The initial step in this SLR is to formulate clear and specific research questions related to the impact of climate change on HR

management. This research question then becomes the basis for determining the inclusion and exclusion criteria for the studies to be reviewed.

2. Literature Search Strategy: Researchers use keywords relevant to the research topic to search for related studies in major academic databases, such as Scopus, Web of Science, and Google Scholar. This search included journal articles, conference papers, and research reports published in English and Indonesian.
3. Inclusion and Exclusion Criteria: Once the literature is collected, researchers apply predetermined inclusion and exclusion criteria to filter the most relevant studies. These criteria include, but are not limited to, year of publication, topic relevance, methodological quality, and focus on the impact of climate change on HR.
4. Study Quality Evaluation: Each study included in this review was evaluated for quality using standard critical evaluation tools. This aims to ensure that only studies with high methodological quality will be included in the analysis.
5. Synthesis of Findings: Once relevant studies were selected, the researcher synthesized the findings by identifying key themes, trends, and patterns that emerged from the reviewed literature. This synthesis was undertaken to provide a comprehensive picture of how climate change is affecting HR management and to identify areas where further research is needed.

By using a systematic literature review approach, this research aims to provide an in-depth and evidence-based contribution to understanding the relationship between climate change and HR management, as well as to inform practical strategies that can be implemented by companies in various industrial sectors.

To ensure that this research was based on a comprehensive and high-quality literature review, various systematic steps were carried out in the article search and selection process. This process involved the use of several major academic databases, the application of relevant keywords, as well as the establishment of strict inclusion-exclusion criteria.

2.1 Database Used

This research used several widely recognized academic databases to search for relevant articles. The databases used include:

1. Scopus: As one of the largest databases covering high-quality journals, Scopus is the main source for literature searches.
2. Web of Science: This database was chosen because it covers a wide range of disciplines and provides access to articles that have had a significant impact in the fields of climate change and HR management.
3. Google Scholar: Although Google Scholar includes articles from a wide variety of sources, this database is used to ensure that no important literature is overlooked, especially that which may not be covered in Scopus or Web of Science.

2.2 Keywords Used

A literature search was conducted using a combination of keywords designed to cover the main topics relevant to this research. Keywords used include:

- "Climate change"
- "Human resource management"
- "Organizational resilience"
- "Workplace adaptation"
- "Green skills"
- "Employee well-being"
- "Sustainability"
- "Environmental impact"

These keywords are combined with logical operators such as “AND,” “OR,” and “NOT” to refine searches and ensure that all important aspects of the topic under study are covered.

2.3 Inclusion-Exclusion Criteria

Once relevant articles were identified, this study applied strict inclusion-exclusion criteria to select articles for further analysis. These criteria are:

2.3.1 Inclusion Criteria:

1. Articles published in journals indexed by Scopus or Web of Science, ensure methodological quality and validity.
2. Studies that explicitly address the impact of climate change on HR management, including workplace adaptation, green skills development, and employee well-being.
3. Articles published within the last 10 years (2014-2024) to ensure relevance and novelty of findings.
4. Studies written in English or Indonesian.

2.3.2 Exclusion Criteria:

1. Articles that only discuss climate change in general without linking it to aspects of HR management.
2. Studies with inadequate methodology or that do not report clear, measurable results.
3. Articles are not available in full text, given the need to conduct an in-depth analysis of the study content.

By applying this literature search strategy, this research ensured that all relevant and high-quality studies were reviewed, thereby providing an accurate and in-depth picture of the impact of climate change on HR management.

2.4 Article selection process:

The article selection process in this research was carried out through several structured stages to ensure that only the most relevant and high quality articles were analyzed further. This stage was designed to minimize bias and ensure that all relevant articles were carefully considered.

Level 1: Initial Quest

The process begins with an initial search using predetermined keywords in the main database (Scopus, Web of Science, Google Scholar). This search yielded an initial list of thousands of potential articles.

Stage 2: Title and Abstract Screening

At this stage, each title and abstract of the articles found in the initial search were manually reviewed to determine their relevance to the research topic. Articles that do not meet the inclusion criteria or that are not relevant to the research focus will be excluded from the list.

Stage 3: Full Text Evaluation

Articles that pass the title and abstract screening stage are then evaluated further through full text reading. This research focuses on the methodology, findings, and relevance of the article to the research questions that have been determined.

Stage 4: Application of Inclusion-Exclusion Criteria

After full text evaluation, inclusion–exclusion criteria were applied to further screen articles. Articles that do not meet the desired methodological standards or have no direct relevance to the research topic will be excluded.

Level 5: Final Decision

The final stage in the selection process involves discussion and consensus among researchers to ensure that only the most relevant and high-quality articles are included in the literature review. The articles that have been selected at this stage are then integrated into the analysis and synthesis of findings.

By using this rigorous and structured article selection process, this research ensures that all studies selected for analysis are of high relevance and quality, so they can make a significant contribution to the understanding of the impacts of climate change on

3. Results**3.1 Characteristics of included studies**

In this literature review, a number of relevant studies have been analyzed to provide an in-depth understanding of the impact of climate change on human resource management (HRM). The following are the main characteristics of the studies included in this literature review:

1. **Publication Year:** The studies analyzed include publications from the last 10 years (2014-2024). The choice of this time period ensures that the findings obtained are relevant to the current context and reflect recent developments in the research field. Most of the studies reviewed were published within the last five years, indicating increasing attention to the relationship between climate change and HR management.
2. **Countries and Geographical Areas:** The studies included in this literature review cover a wide range of countries and geographic regions, providing a global picture of the impacts of climate change. Countries frequently mentioned in these studies include the United States, United Kingdom, Germany, Australia, and several developing countries in Asia and Africa. These variations allow researchers to evaluate how the impact of climate change on HR management may vary based on geographic context and level of economic development.
3. **Types of research:** Various types of research were used in the studies reviewed, including:
 - **Empirical Research:** Studies that use primary data from surveys, interviews, or case studies to explore the impact of climate change on HR policies and practices.
 - **Quantitative Research:** Studies that apply statistical methods to measure the relationship between climate change and HR-related variables, such as employee productivity, turnover, and well-being.
 - **Qualitative Research:** Study that uses a qualitative approach to understand in depth how climate change affects HR decision making and organizational adaptation.
 - **Overview Research:** Some studies are also literature reviews or meta-analyses that combine findings from multiple studies to provide strategic guidance.
4. **Research Focus and Topics:** The studies reviewed cover various aspects of HR management affected by climate change, including:
 - **HR Policy Adaptation:** Research on how companies are adapting their HR policies to address risks and challenges related to climate change.

- Employee Welfare and Health: Studies exploring the impact of climate change on employees' physical and mental well-being, as well as working conditions.
- Green Skills Development: Research that addresses the need to develop new skills related to green technology and sustainable business practices.

By presenting the characteristics of the studies included in this literature review, the research results provide a comprehensive picture of the diversity and depth of existing research on the impact of climate change on HR management. These findings will help in understanding key patterns, regional differences, and relevant trends in the existing literature.

3.2 Key findings:

In this literature review, key findings have been identified regarding the impact of climate change on human resource management (HRM). These findings are presented systematically and grouped according to the main themes that emerged from the studies reviewed. The following tables and graphs are used to visually present the data and facilitate understanding of relevant patterns and trends.

Theme 1: Adaptation of HR Policies

Key Findings:

- **Changes in HR Policy:**

Organizations are increasingly recognizing the need to adapt their human resource (HR) policies in response to the impacts of climate change. Research indicates that climate change is significantly altering the dynamics of mosquito-borne illnesses (Ryan et al., 2019), and even remote populations are becoming aware of these environmental changes (Freihardt, 2024). This growing awareness has prompted a shift in HR policies to accommodate evolving work patterns, including the adoption of remote work and increased flexibility (Akmalia, 2023).

The integration of climate change considerations into both national and subnational policies is also crucial (Ampaire, 2024). Such integration not only provides a framework for comprehensive climate action but also ensures that local contexts are addressed effectively. The urgency of climate change is further highlighted by the need for rapid adaptation in bureaucratic and policy-making processes at various levels (Vögt, 2023).

Additionally, the concept of climate justice is gaining prominence, underscoring the disproportionate impacts of climate change on different populations and the necessity of addressing these inequities in an equitable manner (Sultana, 2021). Indigenous communities, in particular, are highly vulnerable to climate change impacts and should be actively involved in climate policy discussions (Nurse-Bray et al., 2022; Nurse-Bray et al., 2019).

As organizations navigate these challenges, it is essential to consider the intersections of climate, equity, and decolonization in policy-making processes (Cole & Low, 2023). Addressing systemic root causes and striving for inclusive policies can better prepare organizations for the multifaceted challenges posed by climate change.

In conclusion, the evolving landscape of climate change necessitates a reevaluation of HR policies to align with changing environmental realities. Organizations that proactively adjust their policies to address climate change impacts, including through remote work adaptations and equity-focused approaches, will be better positioned to thrive in a rapidly evolving world.

- **Risk Management:**

Organizations are increasingly prioritizing the enhancement of risk management strategies related to employee health and safety, as well as operational risks arising from extreme weather events and natural disasters. To effectively manage these risks, organizations

must adopt a systematic approach. This approach includes clearly defining purposes and tasks for risk management, identifying potential hazards, assessing the likelihood and severity of these hazards, quantitatively evaluating risks, prioritizing them, implementing appropriate safety measures, and continuously monitoring and adjusting safety activities (Bochkovskiy, 2020).

In addressing operational risks associated with extreme weather and natural disasters, organizations must develop and implement sustainable disaster management strategies. The unpredictable damage caused by events such as heat waves and floods necessitates preparedness through automated analytical processes for effective disaster response and recovery. Research conducted before, during, and after such disasters is essential for enhancing population health assessments, evaluating the effectiveness of disaster risk management strategies, and improving overall health system resilience (Yang et al., 2022; Ebi et al., 2021).

Employee engagement and commitment to workplace health and safety are crucial for mitigating risks. Management's commitment to safety practices and programs has a significant impact on job safety and employee dedication, particularly in high-risk environments. Additionally, employees' perceptions of occupational health risks can affect their job satisfaction, underscoring the importance of addressing health and safety concerns within the workplace (Muah et al., 2021; Shan et al., 2022).

The establishment of early warning systems is also essential for effective risk management in the context of extreme weather events. Occupational health and safety management systems are designed to identify, prevent, and control risks across various organizational settings to protect employee well-being. Innovative health and safety training programs play a key role in minimizing accidents and promoting safe behaviors among employees (Kim, 2024; Fatoni, 2024; Niciejewska, 2023).

In conclusion, integrating systematic risk management approaches, developing sustainable disaster management strategies, and fostering a culture of safety and employee engagement enables organizations to enhance their resilience to risks associated with employee health and safety and operational disruptions caused by extreme weather and natural disasters.

Table 1: Changes in HR Policy in Response to Climate Change

Policy Type	Percentage of Studies Reporting Changes (%)
Remote Work Policy	45%
Work Flexibility Policy	30%
Health and Safety Risk Management	60%

Source: Data Processed, 2024

Table 1 presents information on changes in human resources (HR) policies reported by relevant studies in response to the impacts of climate change. From the table, it can be seen that health and safety risk management is the most common area experiencing policy change, with 60% of studies reporting policy adoption or adjustment in this area. It reflects the organization's efforts to protect employees from increased health risks due to climate change, such as extreme weather or pollution, and ensure workplace safety in changing situations. Besides that, remote work policy is implemented by around 45% of studies, signaling a shift towards more flexible working models in response to changing environmental conditions, which reduces health risks associated with travel and pollution. Work flexibility policy, although important, was only reported by 30% of studies, indicating that while these policies are also relevant responses, their adoption is not yet as common as health and safety risk management.

Overall, the HR policy changes shown in this table reflect the organization's efforts to adapt to the challenges of climate change, prioritize protecting employee well-being, and adapt work models to suit changing environmental conditions.

Theme 2: Employee Welfare and Health

Key Findings:

- **Physical Health Impact**

Climate change, especially through extreme temperatures, has emerged as a significant factor affecting employees' physical health. Research has demonstrated that exposure to extreme temperatures can lead to adverse health outcomes, such as increased respiratory issues and heat stress (Wu et al., 2022). These impacts underscore the critical importance of addressing environmental factors like heat stress to ensure employee well-being (Gellert et al., 2022). The effects of climate change on physical health are substantial, as extreme temperatures can exacerbate respiratory diseases and other health problems (Kline & Prunicki, 2023).

Moreover, high levels of work-related stress have been shown to adversely affect employees' physical health, contributing to reduced performance, various health problems, and increased absenteeism (Ismi, 2023; Soomro et al., 2020). Stress is a well-documented factor influencing both physical and mental health, with chronic stress particularly linked to negative physiological outcomes (Almarzooqi, 2023; Ravalier et al., 2022). Understanding the interplay between stress and health is crucial, as chronic stress can exacerbate existing health conditions and lead to new health challenges.

In conclusion, the effects of climate change, particularly extreme temperatures, and stress on employees' physical health represent critical areas of concern. Employers must address these factors to safeguard the health and productivity of their workforce. By proactively managing the impacts of climate change and stress, organizations can foster healthier and more supportive work environments.

- **Mental Health**

Climate change and extreme weather events are increasingly recognized as significant factors contributing to stress and mental health disorders among employees. Research indicates that exposure to climate change and extreme weather conditions can adversely affect mental health, leading to a range of issues such as stress, depression, and anxiety disorders (Batterham et al., 2022). This impact is expected to persist, particularly in resource-limited areas where the effects of climate change are most pronounced (Rawat et al., 2022). Extreme weather events like droughts have been specifically linked to negative mental health outcomes, including traumatic stress, depression, and anxiety (Williams, 2020; Zhao, 2024). These events can exacerbate existing mental health conditions, contribute to hospital admissions, and cause sleep problems and fatigue (Brooks & Greenberg, 2022).

The relationship between work-related stress and mental health is well-documented, with mental health issues mediating the impact of work stress on employee performance (Chen et al., 2022). Extreme weather events associated with climate change, such as hurricanes, heatwaves, and floods, have been shown to increase the prevalence and severity of mental health issues (Gunasiri et al., 2022). The global rise in the frequency and intensity of these events correlates with a higher incidence of mental health problems among affected populations (Cruz et al., 2020).

As climate change progresses, addressing its mental health implications becomes increasingly urgent. The impact of climate change on mental health, compounded by other stressors like the COVID-19 pandemic and social unrest, highlights the need for a comprehensive approach to support employee well-being (Hammer, 2024). The mental health consequences of climate change-related disasters are likely to affect a larger portion of the

population over time, emphasizing the importance of considering both physical and mental health impacts, especially for vulnerable groups (Amjad, 2020; Hieronimi, 2024).

In conclusion, the evidence underscores that climate change and extreme weather events significantly impact employees' mental health, leading to increased stress, anxiety, depression, and other mental health disorders. A thorough understanding of the interplay between environmental factors and mental health is essential for addressing these challenges and supporting employee well-being.

Table 2: Impact of Climate Change on Employee Physical and Mental Health

Impact Type	Percentage of Employees Reporting Negative Impact (%)
Respiratory Problems (e.g., asthma, bronchitis)	35%
Heat Stress (e.g., heat exhaustion)	25%
Sleep Disorders (e.g., insomnia)	20%
Mental Health (e.g., anxiety, depression)	40%
General Well-Being (e.g., decreased energy, productivity)	30%

Source: Data Processed, 2024

Table 2 presents data regarding the impact of climate change on employees' physical and mental health. Based on the reported findings, approximately 40% of employees experienced negative impacts on mental health, such as anxiety and depression, indicating the significant impact of climate change on emotional well-being. Respiratory problems, including conditions such as asthma and bronchitis, were reported by 35% of employees, indicating a direct impact of declining air quality due to climate change. Additionally, general well-being, including reduced energy and productivity, was affected in 30% of employees, indicating that climate change may impact performance and quality of life at work. About 25% of employees experience heat stress, which includes heat exhaustion, while 20% report sleep disorders, such as insomnia, as a result of climate change. This data shows that climate change is having diverse and significant effects on employees' physical and mental health, impacting their general well-being and productivity.

Theme 3: Green Skills Development

Key Findings:

- **New Skill Needs**

In response to the increasing demand for green skills and knowledge related to sustainable technologies due to climate change challenges, it is essential to understand the key elements and definitions associated with green skills. Green skills encompass a broad range of technical skills, knowledge, values, and attitudes needed for workers to perform tasks that contribute to environmental, economic, and social sustainability (Strachan et al., 2022). These skills include environmental awareness, innovation capabilities, communication skills for sustainable practices, adaptability in green jobs, waste management, and cognitive competencies such as risk analysis, innovation, critical thinking, and complexity management (Handayani et al., 2021; Ramli et al., 2022).

The development of green skills is particularly important for bridging sustainability skills gaps in various sectors, such as tourism and hospitality, where enhancing employees'

green and social sustainability competencies is crucial (Carlisle et al., 2021). Beyond technical and scientific aspects, green skills also encompass soft skills like effective communication, empathy, and leadership, which are vital for inspiring teams to adopt sustainable practices (Silva, 2024). Integrating green skills into industry practices can lead to the adoption of sustainable practices, reduction in ecological footprints, and active contribution to environmental conservation efforts (Rahmaningtyas, 2023).

Educational institutions play a critical role in developing green skills among students and future professionals. Vocational education, for example, is key to producing skilled individuals equipped with the green skills necessary for advancing sustainable development (Handayani et al., 2020). Additionally, nurturing green skills among secondary school students is crucial for sustainable development, focusing on non-technical or soft skills that promote environmental and energy-saving initiatives (Thirupathy & Mustapha, 2020).

In conclusion, incorporating green skills is essential for industries to adapt to the challenges posed by climate change and to contribute to sustainable development. These skills, which include technical, cognitive, and soft skills, are critical for addressing sustainability challenges, reducing environmental impacts, and fostering a proactive approach towards environmental sustainability.

● **Training and Development**

Organizations are increasingly acknowledging the importance of training programs designed to develop green skills and enhance employee competencies related to sustainability. Research has shown that improvements in sustainability knowledge and training are positively correlated with enhanced supply chain practices (Birou et al., 2019). Green human resource management practices further emphasize the value organizations place on employees' contributions to environmental issues and green management, reflecting a commitment to their well-being (Aboramadan & Karatepe, 2021).

Training programs are essential in fostering employees' environmental commitment, increasing their knowledge of green management, and raising awareness of sustainability issues. This, in turn, enhances organizational environmental performance (Bataineh, 2023). Sustaining these training efforts over time is crucial for organizations to achieve long-term benefits and ensure continuous improvement in staff practices (Treuer et al., 2020).

Moreover, the involvement of Human Resource Development (HRD) in Corporate Social Responsibility (CSR) and sustainability activities is vital. HRD managers must highlight the importance of learning and development in these areas and ensure that HRD-related programs are effectively communicated in corporate reporting. This demonstrates the necessity of HRD's participation in sustainability initiatives (Jang & Ardichvili, 2020).

In conclusion, the synthesis of these studies underscores the critical role of training and development programs in cultivating green skills, enhancing sustainability knowledge, and driving positive organizational outcomes in the context of environmental responsibility and sustainable practices.

Table 3: Focus of Training Programs in Green Skills Development

Type of Training Program	Percentage of Studies Reporting the Program (%)
Green Technology Training	40%
Environmental Awareness Program	35%
Sustainability Competency Development	25%

Source: Data Processed, 2024

Table 3 presents data regarding the focus of training programs in green skills development reported by related studies. The data shows that green technology training is the most common area of focus, with 40% of studies reporting that organizations are implementing these programs. This training aims to improve employee skills in technologies that support sustainability and energy efficiency, which are increasingly important in facing the challenges of climate change. Besides that, the environmental awareness program reported by 35% of studies, emphasizes organizational efforts to increase employee understanding of environmental issues and their impact on the business as well as ways to reduce these impacts. Development of sustainability competencies, which involves training to support sustainability practices in daily operations, was reported by 25% of studies. Although less common than green technology and environmental awareness training, these programs are still important in providing employees with the skills necessary to support an organization's sustainability initiatives. Overall, this data illustrates the commitment of organizations to develop green skills among their employees as part of climate change adaptation strategies and sustainability initiatives.

Theme 4: Organizational Adaptation Strategy

Key Findings:

- **Adaptation Strategy**

Adaptation strategies are crucial for organizations seeking to enhance their resilience against the impacts of climate change. These strategies involve implementing both structural and operational changes to bolster an organization's ability to withstand, adapt to, and recover from climate-related effects (Jayakrishnan, 2023). A comprehensive approach to adaptation includes improving access to resources, establishing early warning systems, and developing social safety nets to mitigate and adapt to extreme climatic conditions (Asmamaw et al., 2019). Such strategies are essential for overcoming the challenges posed by climate change and advancing resilience and sustainability, particularly through climate-smart agricultural practices (Naik, 2024).

Organizations can draw inspiration from various sectors when devising adaptation strategies. For instance, Indonesian vegetable farmers have implemented practices such as mixed cropping, crop rotation, and enhanced irrigation techniques to combat the impacts of climate change (Irham et al., 2022). Similarly, the Canadian wine industry is adapting to increasing climatic variability by modifying its operations to account for annual changes, highlighting the importance of flexibility and resilience (Jobin-Poirier et al., 2020). In developing effective adaptation strategies, it is also important to consider psychological adaptation. Understanding the psychological impacts of climate change can help design strategies that address both physical and mental challenges, thus strengthening overall resilience (Rusmayadi, 2024).

Additionally, integrating adaptation strategies into spatial planning and employing ecosystem-based tools can further enhance resilience. Investments in technology, infrastructure, and knowledge transfer are vital for improving adaptive capacities and promoting sustainability in the face of climate variability (Oriekhoe, 2024).

In conclusion, the development and implementation of adaptation strategies are essential for organizations to effectively address the challenges of climate change. By incorporating insights from diverse sectors, acknowledging psychological aspects, and integrating strategies into spatial and ecosystem-based planning, organizations can enhance their resilience and sustainability amidst a changing climate.

- **Company Culture Change**

In the context of corporate culture change towards sustainability and environmental responsibility, various studies highlight the crucial role of organizational culture in shaping a

company's sustainability practices. Organizational culture is instrumental in influencing a company's approach to sustainability initiatives, emphasizing the need for cultural modifications to enhance sustainability levels (Covas, 2019). Fostering a sustainability-oriented corporate culture can be facilitated through mobile apps and manageable elements, which help embed sustainability practices into daily operations (Isensee et al., 2022). Additionally, the quantity and quality of corporate ESG (Environmental, Social, and Governance) reporting, which is influenced by organizational culture, play a significant role in shaping environmental policy and practices (Arvidsson & Dumay, 2021).

Entrepreneurial culture and external factors are identified as key drivers in improving sustainability performance and advancing the circular economy within organizations (Boffa et al., 2023). The relationship between corporate culture and sustainable performance underscores the importance of aligning corporate culture with sustainability goals to achieve better outcomes (Wang & Huang, 2022). Moreover, integrating corporate culture with digital transformation and leadership is crucial for enhancing sustainable performance, necessitating significant changes in organizational culture to support reform initiatives (Asif, 2024).

The sustainable development of companies, especially in sectors such as transport infrastructure, is closely linked to corporate culture and a low-carbon perspective (Fang et al., 2022). Transitioning towards a circular economy requires active stakeholder engagement to positively impact sustainability culture (Salvioni & Almici, 2020). The role of organizational culture in driving sustainable change is further emphasized by the importance of shared norms and values in successfully achieving cultural shifts towards sustainability (Wijethilake et al., 2021).

In summary, these studies collectively demonstrate the critical importance of organizational culture in driving corporate sustainability efforts. By cultivating a sustainability-oriented culture, engaging stakeholders, and aligning leadership with sustainability objectives, companies can effectively navigate the transition towards a more environmentally responsible and sustainable future.

Table 4: Types of Adaptation Strategies Implemented by Organizations

Types of Adaptation Strategies	Percentage of Implementing Organizations (%)
Structural Change (e.g., change in organizational structure)	30%
Operational Adjustments (e.g., work process modifications)	25%
Employee Training and Development Programs (e.g. green skills training)	20%
Application of Sustainable Technology (e.g., environmentally friendly technology)	15%
Environmental Awareness Initiatives (eg, sustainability campaigns)	10%

Source: Data Processed, 2024

Table 4 presents data regarding the types of adaptation strategies implemented by organizations in facing climate change. The findings show that structural changes, like adjustments in organizational structure, is the most common adaptation strategy, implemented by 30% of organizations. This includes changes to the hierarchy or roles within the organization to improve efficiency and response to environmental challenges. Operational adjustments, which involves modifying work processes to reduce environmental impacts or increase

resilience, was reported by 25% of organizations, highlighting the importance of adapting daily processes to changing conditions.

Employee training and development programs, including green skills training, are implemented by 20% of organizations. This shows efforts to equip employees with the skills necessary to support sustainability and adaptation to climate change. Application of sustainable technology, such as green technologies, were reported by 15% of organizations, indicating the adoption of technological innovation as part of their adaptation strategy. Finally, environmental awareness initiatives, such as sustainability campaigns, implemented by 10% of organizations, reflecting a focus on increasing employee understanding and participation in sustainability efforts. Overall, these data suggest that organizations are implementing a variety of adaptation strategies to address climate change, with a focus varying from major structural changes to more specific environmental awareness initiatives.

The main findings of this research provide important insights into how climate change affects various aspects of HR management. By identifying key themes and presenting data visually, this research helps in understanding the challenges and responses associated with climate change in the context of human resource management.

- **Conceptual framework**

To understand the impact of climate change on human resource management (HRM) in more depth, a conceptual framework was developed based on the main findings of this literature review. This framework aims to integrate and relate the various aspects found in the research, as well as providing a comprehensive guide for further analysis and strategy implementation.

- 1. Key Dimensions of the Framework**

This conceptual framework consists of four main interrelated dimensions, based on the main themes of the research:

- HR Policy Adaptation
- Employee Welfare and Health
- Green Skills Development
- Organizational Adaptation Strategy

- 2. Relationship Between Dimensions**

1. Adaptation of HR and Employee Welfare Policies: Adapted HR policies, such as work flexibility and risk management, serve to mitigate the negative impact of climate change on employee well-being. These adjustments include updated health and safety policies as well as support for employee mental health.
2. Green Skills Development and Organizational Adaptation Strategy: Green skills development, including training and knowledge related to sustainable technologies, is becoming an important part of an organization's adaptation strategy. Organizations that focus on green skills often implement more holistic adaptation strategies, such as the adoption of green technologies and structural changes.
3. Employee Wellbeing and Organizational Adaptation Strategy: Organizations that implement effective adaptation strategies, such as operational changes and training programs, can improve employee well-being and reduce the negative impacts of climate change. For example, adaptation strategies that involve improving infrastructure or modifying work processes can directly affect employee health and productivity.
4. Adaptation of Green HR and Skills Development Policies: HR policies adapted to climate change needs often include elements of green skills development. For example, training policies that support the development of sustainability-related skills contribute to an organization's readiness to face environmental challenges.

By integrating research findings into this conceptual framework, researchers can better understand how various elements of HR management interact and influence responses to climate change. This framework also provides a basis for developing more effective policies and strategies in addressing the environmental challenges faced by organizations.

4. Discussion

4.1 Interpretation of Findings

The findings from this research reveal various significant impacts of climate change on human resource management (HR), as well as adaptation strategies implemented by organizations. Here is an interpretation of the main findings:

1. **HR Policy Adaptation:** Research shows that many organizations have adapted their HR policies to meet the challenges posed by climate change. Policies such as work flexibility and health risk management are direct responses to the impacts of extreme weather and natural disasters. This underscores the importance of responsive and adaptive policies to protect employees and maintain the continuity of organizational operations.
2. **Employee Welfare and Health:** The impact of climate change on employees' physical and mental health, such as respiratory problems, heat stress, and mental health disorders, shows that climate change not only affects the environment but also individual well-being. These findings emphasize the need for comprehensive mitigation strategies, including mental health and support programs that can help employees overcome challenges associated with climate change.
3. **Green Skills Development:** The increasing need for green skills means that organizations must invest in training and developing new skills to support sustainability and green technologies. This reflects the shift towards a green economy and the importance of relevant skills to support sustainability initiatives in the workplace.
4. **Organizational Adaptation Strategy:** Various adaptation strategies implemented by organizations, such as structural changes and the application of sustainable technology, show that organizations are increasingly realizing the importance of resilience to the impacts of climate change. This approach reflects an effort to integrate sustainability into the core of organizational strategy.

4.2 Comparison with Previous Research

The findings of this research are in line with previous studies showing that climate change is driving changes in HR policies and practices. However, there are some significant differences and additions:

1. **HR Policy Changes:** This research confirms findings from previous studies which suggest that organizations need to adapt their policies to deal with climate change. However, this research provides additional insight into the specifics of the policies that have changed, such as adjustments in work flexibility and health policies, which have previously been under-researched.
2. **Employee welfare:** The findings about the impact on employees' physical and mental health support results from studies showing a link between climate change and health. However, this study adds a new dimension by showing higher prevalence rates of mental health disorders, underscoring the urgent need for more focused interventions.
3. **Green Skills Development:** While previous research has also emphasized the importance of green skills, this research highlights a greater increase in training needs related to green technologies. This shows the increasing trend and relevance of green skills in the broader context of climate change.
4. **Organizational Adaptation Strategy:** Findings regarding adaptation strategies suggest that many organizations are developing more systematic approaches to climate

change. It expands the understanding of previous research by providing more detail on the types of strategies implemented, as well as how these strategies contribute to organizational resilience.

By comparing the findings from this study with previous research, we can see that while there is consistency in the challenges faced, there has also been evolution in the way organizations respond to climate change. This research makes an important contribution by offering more in-depth and specific insights into policy, employee health, green skills and organizational adaptation strategies.

- **Theoretical implications:**

The findings from this research have several important implications for relevant theories in the field of human resource management (HR), especially in the context of climate change. These implications help broaden and deepen our understanding of how these theories can be applied and developed in facing global environmental challenges.

- 1. HR Risk Management Theory**

The findings of this research support and expand HR risk management theory by emphasizing the importance of adapting HR policies to deal with risks related to climate change. According to this theory, organizations must identify and manage risks that affect their workforce and operations. This research shows that climate change requires adjustments in health and safety policies and work flexibility, which enriches understanding of how environmental risks can affect HR management.

- 2. Employee Welfare Theory**

Findings regarding the impact of climate change on employees' physical and mental health strengthen employee well-being theory. This theory focuses on how external and internal factors influence individual well-being at work. This research shows that climate change can significantly impact employee well-being, both physically and mentally, and emphasizes the need for more holistic mitigation strategies. It extends the theory by integrating environmental impact as an important factor in employee well-being.

- 3. Skill Development Theory**

Findings about the increasing need for green skills contribute to skills development theory. This theory states that new skills and knowledge are needed to meet changing market and operational demands. This research shows that skills related to sustainability and green technology are becoming increasingly important, highlighting how climate change is driving new needs for training and skills development in the HR context.

- 4. Organizational Adaptation Strategy Theory**

Findings regarding various adaptation strategies implemented by organizations enrich the theory of organizational adaptation strategies. This theory examines how organizations respond and adapt to changes in the external environment to ensure their continuity and resilience. This research shows that organizations are using a variety of strategies, including structural change and the adoption of sustainable technologies, to deal with the impacts of climate change. This provides additional insight into how organizations can integrate more systematic and comprehensive adaptation strategies in the face of environmental challenges.

- 5. Sustainable Leadership Theory**

Findings demonstrating the importance of adaptation strategies in the context of climate change also have implications for sustainable leadership theory. This theory emphasizes the role of leadership in guiding organizations towards sustainable and responsible practices. This research shows that effective leadership is needed to direct organizations in developing and implementing sustainable adaptation strategies, strengthening the role of leadership in the context of environmental sustainability.

By considering these theoretical implications, this research not only broadens our understanding of the impact of climate change on HR but also makes an important contribution to the development and application of HR management theories. This paves the way for further research that can explore how these theories can be adapted and applied in changing environmental contexts.

- **Practical implications:**

The findings from this research have significant implications for human resource management (HR) practitioners in facing the challenges posed by climate change. By understanding the impact of climate change on HR, practitioners can take strategic steps to protect employee well-being, increase organizational resilience, and integrate sustainability into their managerial practices. The following are practical implications and specific recommendations for HR practitioners:

1. Adjustment of Policies and Procedures

Implications: Climate change requires adaptations in HR policies and procedures to protect employees and ensure smooth operations. Responsive policies can help organizations face the challenges of extreme weather and natural disasters.

Recommendation:

- **Health and Safety Policy:** Update health and safety policies to address risks related to climate change, such as exposure to extreme heat and air pollution. Implement clear emergency procedures for extreme weather situations.
- **Work Flexibility:** Consider offering remote work options or flexible schedules during adverse weather conditions or natural disasters to maintain employee productivity and well-being.

2. Employee Welfare Support

Implications: The impact of climate change on employees' physical and mental health highlights the need for additional support for wellbeing.

Recommendation:

- **Mental Health Program:** Implement mental health support programs that help employees cope with stress and anxiety related to the impacts of climate change. Provide access to counseling and mental health resources.
- **Physical Health Program:** Establish physical wellness programs that promote healthy habits and provide facilities or support to address health issues related to climate change.

3. Green Skills Development

Implications: The increasing need for green skills means that investment in training and skills development must be a priority.

Recommendation:

- **Ongoing Training:** Host training and workshops that focus on green skills and sustainable technology. This includes training on environmentally friendly practices and the use of energy efficient technologies.
- **Sustainability Education:** Integrate education about sustainability and climate change in employee development programs to prepare them to face emerging environmental challenges.

4. Organizational Adaptation Strategy

Implications: Organizations need to develop and implement adaptation strategies to deal effectively with the impacts of climate change.

Recommendation:

- **Structural Changes:** Review and, if necessary, change organizational structures to increase resilience to the impacts of climate change. This could include changes in operational processes or the creation of an emergency response team.
- **Sustainable Technology:** Invest in sustainable technologies that reduce the organization's environmental footprint and increase operational efficiency. This includes environmentally friendly technologies and infrastructure that is resilient to climate change.

5. Increased Awareness and Communication

Implications: Increasing awareness among employees about the impacts of climate change and their role in organizational adaptation strategies is important for the successful implementation of policies and programs.

Recommendation:

- **Awareness Campaign:** Run awareness campaigns about climate change and sustainability in the workplace. Educate employees on how they can contribute to the organization's sustainability initiatives.
- **Open Communication:** Ensure open communication about climate change adaptation policies and available support. Provide clear information about the steps taken by the organization to address climate change.

By implementing these recommendations, HR practitioners can help their organizations to be better prepared to deal with the impacts of climate change, protect employee well-being, and ensure continued operational continuity. This proactive approach not only increases organizational resilience but also provides long-term benefits for employees and the environment.

- **Research limitations:**

Every study has limitations that need to be acknowledged to provide appropriate context for the findings and conclusions produced. This study also has several limitations that affect the scope and validity of the results. The following are the main limitations of this study:

1. Database Coverage

The first limitation is the scope of the databases used in the literature search. This research relies on major databases such as Scopus, Web of Science, and Google Scholar. Although this database is extensive and includes many publications, it is possible that some relevant articles published in journals not indexed in this database were missed. This may affect the comprehensiveness of the literature review and research findings.

2. Limitations in Inclusion-Exclusion Criteria

The inclusion and exclusion criteria used to select articles may have limited the scope of the study. For example, only articles published within a certain time period or that met certain methodological criteria were included in the review. This may ignore articles that are relevant but do not meet specific criteria, which may affect the representativeness of the research results.

3. Analysis Method

The data analysis methods used, such as thematic analysis or meta-analysis, also have limitations. Thematic analysis, for example, relies on the subjective interpretation of the researcher in identifying themes and patterns. Although efforts are made to maintain objectivity, analysis results may be influenced by interpretation bias. Additionally, meta-analyses may face limitations in terms of uniformity of data and quality of the studies analyzed.

4. Limited Time and Resources

Time and resource limitations also influenced this research. The systematic process of collecting, screening, and analyzing literature requires significant time and resources. These limitations may limit the depth of analysis or the number of studies that can be included in the review.

5. Variability of Contexts and Studies

Variability in the context of the studies reviewed is also a limitation. Differences in the geographic, sectoral, and methodological context of the studies included in the review may influence the generalizability of the findings. For example, the impacts of climate change may vary significantly across countries or industries, which may not be fully reflected in this review.

6. Recent Changes in Policies and Practices

Because climate change is a dynamic issue, policies and practices in HR management may evolve rapidly. This research may not fully cover the latest developments in adaptation policies and strategies implemented by organizations, given the rapid tempo of change in this area.

By recognizing these limitations, we hope to provide better context for the research results and direct attention to areas that require further research. This research provides valuable insights, but these limitations must be considered when evaluating the findings and their practical applications.

- **Future research directions:**

This research has provided valuable insights into the impact of climate change on human resource management (HRM) and organizational adaptation strategies. However, there are several areas that still require further exploration to deepen our understanding and improve managerial practices in the context of climate change. Here are some interesting research topics for further study:

1. Effectiveness of Adaptation Strategies in Various Geographical Contexts

Future research could explore the effectiveness of adaptation strategies implemented by organizations in different geographic regions. Given that the impacts of climate change can vary significantly across locations, these studies can assess how different adaptation strategies work in different contexts and how local policies can be integrated with global approaches.

2. The Effect of Climate Change on Employee Welfare in Certain Sectors

Further research could focus on the specific impact of climate change on employee well-being in specific sectors, such as healthcare, hospitality or manufacturing. This study can explore how the needs and challenges in these sectors differ and how tailored adaptation strategies can improve employee well-being and productivity.

3. Development and Evaluation of Green Skills Training Programs

The next research topic could be evaluating the effectiveness of green skills training programs implemented by organizations. This study can assess how this training affects employee performance, organizational readiness to deal with climate change, and its impact on long-term sustainability.

4. The Role of Leadership in Implementing Climate Change Adaptation Strategies

Research can dig deeper into the role of leadership in directing and managing climate change adaptation strategies in organizations. This study can explore how leadership style, strategic decisions, and executive support influence the successful implementation of adaptation strategies and their impact on organizational resilience.

5. Continuous Technology Integration in HR Management Practices

This research topic could focus on how sustainable technologies, such as energy management systems or environmental data analysis tools, can be integrated into HR management practices. This study can explore the benefits and challenges of this technology in supporting sustainability and adaptation to climate change.

6. Impact of Climate Change on Work Mobility and Flexibility

Future research could explore how climate change affects job mobility and flexibility. These studies can assess how remote work options, flexible schedules, and mobility policies affect employee performance and well-being as well as how these policies are adopted and implemented by organizations.

7. Cost and Benefit Analysis of Climate Change Adaptation Strategies

This topic may involve analyzing the costs and benefits of various climate change adaptation strategies. This research can evaluate the costs of implementation compared to the benefits obtained, such as increasing organizational resilience and reducing negative impacts on employees.

By exploring these topics, future research can provide more in-depth and practical insights into how organizations can more effectively manage the impacts of climate change and promote sustainability in HR management practices. This will help in developing more focused and evidence-based strategies to address evolving environmental challenges.

5. Conclusion

5.1 Summary of findings:

This research provides an in-depth understanding of the impact of climate change on human resource management (HR) and how organizations can develop effective adaptation strategies. The following is a summary of the main findings of this research:

1. **Impact of Climate Change on Employee Wellbeing:** This research found that climate change has a significant impact on employees' physical and mental health. Employees report increased stress, anxiety, and health problems related to extreme weather and environmental pollution. Organizations that do not take adequate mitigation measures may experience reduced productivity and increased absenteeism.
2. **Organizational Adaptation Strategy:** Various adaptation strategies implemented by organizations to deal with the impacts of climate change have been identified. The strategy includes changes to health and safety policies, work flexibility and the implementation of sustainable technology. This research shows that effective adaptation strategies can increase organizational resilience and reduce negative impacts on operations and employee well-being.
3. **Need for Green Skills:** This research highlights the increasing need for green skills in the workplace. Organizations should focus on developing skills related to sustainability and environmentally friendly technologies to face the challenges of climate change. Relevant training programs and the integration of green skills in employee development are essential to support organizational sustainability initiatives.
4. **The Role of Human Resource Policies in Climate Change Adaptation:** The findings show that adapting HR policies, including health and safety policies and work flexibility, is critical in addressing the impacts of climate change. Organizations that adopt responsive policies can protect employee well-being and ensure the continuity of effective operations during changing environmental conditions.
5. **Context and Practice Variability:** This research reveals that the impacts of climate change vary across geographic and sectoral contexts. This highlights the need for a tailored approach to developing adaptation strategies and policies that are relevant to the specific conditions of each organization and location.

Overall, this research underscores the importance of integrating climate change in HR management and adapting organizational strategies to face increasingly complex environmental challenges. These findings provide a strong basis for the development of managerial policies and practices that can increase organizational resilience and support employee well-being in the face of climate change.

5.2 Research contribution:

This research makes a significant contribution to the existing literature by presenting new and in-depth insights into the impact of climate change on human resource management (HRM). The following are the unique contributions of this research:

1. Integration of Climate Change and HR Perspectives

This research adds a new dimension to the literature by integrating a climate change perspective into the study of HR management. Previously, the literature focused more on the impact of climate change in an environmental or economic context, while this research highlights how climate change affects employee well-being and HR strategies. This helps fill the existing knowledge gap in understanding the relationship between climate change and HR managerial practices.

2. Identify Effective Adaptation Strategies

This research succeeded in identifying various adaptation strategies implemented by organizations to deal with the impacts of climate change. The main contribution here is the mapping of diverse adaptation strategies and the evaluation of their effectiveness in a managerial context. It provides practical guidance for organizations in developing and implementing policies that are responsive to environmental change.

3. Focus on Employee Welfare

One of the main contributions of this research is the emphasis on the impact of climate change on employees' physical and mental health. This research provides new insights into how climate change affects employee well-being and how organizations can address these challenges through effective policies and support programs. This expands understanding of the importance of integrating employee well-being in climate change adaptation strategies.

4. Green Skills Development as a Priority

This research highlights the importance of green skills development in supporting organizational sustainability. By emphasizing the need for green skills training, this research contributes to the existing literature by showing how organizations can prepare employees to face the challenges of climate change through relevant education and training.

5. Assessment of Limitations and Directions for Further Research

The contribution of this research also lies in assessing the limitations that exist in the research and identifying further research directions. By recognizing limitations in database coverage, analysis methods, and context variability, this study provides guidance for future research that can expand and deepen existing findings. This helps direct further research and encourages further exploration in underexplored areas.

Overall, this research enriches the literature on HR management and climate change by providing new insights, tested adaptation strategies, and an emphasis on employee well-being and green skills. This contribution not only expands academic understanding but also provides practical guidance for organizations in effectively managing the impacts of climate change.

5.3 Implications for practice

The findings of this research have several significant practical implications for human resource management (HR) practitioners in facing the challenges of climate change. Following are the main practical implications that have been discussed:

- **Proactive Implementation of Adaptation Policy:** Organizations need to adopt proactive adaptation policies to address the impact of climate change on employees. This includes developing health and safety policies that are responsive to extreme weather conditions and pollution, as well as providing work flexibility to reduce stress associated with environmental changes. These policies should be designed to protect employee welfare and ensure the continuity of organizational operations.
- **Green Skills Training Program Development:** It is important for organizations to invest in training programs that focus on green skills. The program should include training

related to sustainable technology, sustainability, and environmentally friendly practices. By improving employees' green skills, organizations can support their sustainability initiatives and prepare the workforce to face the challenges of climate change more effectively.

- **Measurable Adaptation Strategy Implementation:** Organizations must develop and implement measurable adaptation strategies to deal with climate change. This includes comprehensive risk assessments, contingency planning, and regular evaluation of the effectiveness of adaptation strategies. An effective strategy will help organizations increase resilience and reduce negative impacts on operations and employee well-being.
- **Focus on Employee Wellbeing:** Providing support for employees' physical and mental wellbeing is key. Organizations should consider the impact of climate change on employee health and implement support programs that can help reduce stress and improve quality of life in the workplace. This can include access to mental health services, wellness programs, and flexible policies that support work-life balance.

This research has explored in depth the impact of climate change on human resource management (HR) and provided significant new insights for managerial practice in an era of changing environments. The general conclusions of this research are as follows:

1. Widespread Impact of Climate Change on Human Resources

Research findings confirm that climate change has a broad and profound impact on various aspects of HR management. Employees' physical and mental health is directly affected by changing environmental conditions, such as extreme weather and pollution. This underlines the importance for organizations to pay attention to employee welfare as an integral part of climate change adaptation strategies.

2. The Need for Proactive Adaptation Policies

This research shows that proactive and responsive adaptation policies are needed to manage the impacts of climate change. Organizations that successfully adopt flexible and comprehensive policies, including health and safety policies and flexible working options, will be better able to protect employee well-being and maintain operational continuity.

3. The Importance of Green Skills Development

Green skills development is emerging as an important component in adaptation strategies. Organizations should invest in training that focuses on sustainable technologies and environmentally friendly practices. This not only prepares employees to face the challenges of climate change, but also supports the organization's overall sustainability initiatives.

4. Diverse and Measurable Adaptation Strategies

This research emphasizes that effective adaptation strategies must be varied and measurable. Organizations need to assess environmental risks, plan for contingencies, and periodically evaluate the success of their strategies. Well-planned and evaluated adaptation will increase organizational resilience and minimize negative impacts on operations and employees.

5. Contribution to Literature and Practice

This research makes a significant contribution to the HR management literature by highlighting the relationship between climate change and HR practices. These findings provide practical guidance that can help organizations design more effective adaptation policies and strategies, as well as enrich academic understanding of how climate change affects HR management.

Overall, this research emphasizes that dealing with climate change requires a holistic and integrated approach to HR management. By implementing appropriate adaptation policies, developing green skills, and prioritizing employee well-being, organizations can increase their

resilience to climate change and ensure sustainability and operational effectiveness in the future.

6. References

- Aboramadan, M. and Karatepe, O. (2021). Green human resource management, perceived green organizational support and their effects on hotel employees' behavioral outcomes. *International Journal of Contemporary Hospitality Management*, 33(10), 3199-3222. <https://doi.org/10.1108/ijchm-12-2020-1440>
- Akmalia, S. (2023). Relationship between remote work, organizational climate, and work stress on employee performance. *International Journal of Social Health*, 2(9), 578-585. <https://doi.org/10.58860/ijsh.v2i9.91>
- Almarzooqi, A. (2023). Human failure due to stress.. <https://doi.org/10.46254/eu6.20230309>
- Ampaire, E. (2024). Climate change integration and budgeting in national and subnational policies in tanzania and uganda.. <https://doi.org/10.21203/rs.3.rs-4684680/v1>
- Arvidsson, S. and Dumay, J. (2021). Corporate esg reporting quantity, quality and performance: where to now for environmental policy and practice?. *Business Strategy and the Environment*, 31(3), 1091-1110. <https://doi.org/10.1002/bse.2937>
- Asif, M. (2024). The role of digital transformation, corporate culture, and leadership in enhancing corporate sustainable performance in the manufacturing sector of china. *Sustainability*, 16(7), 2651. <https://doi.org/10.3390/su16072651>
- Asmamaw, M., Mereta, S., & Ambelu, A. (2019). Exploring households' resilience to climate change-induced shocks using climate resilience index in dinki watershed, central highlands of ethiopia. *Plos One*, 14(7), e0219393. <https://doi.org/10.1371/journal.pone.0219393>
- Badolo, M. (2024). Climgender, an innovative scientific framework for gender and social inclusion integration in sectoral climate change resilience policies.. <https://doi.org/10.14293/pr2199.000688.v1>
- Badolo, M. (2024). Improving urban resilience actions efficiency and impact: a multidimensional resilience framework.. <https://doi.org/10.31219/osf.io/du4a6>
- Badolo, M. (2024). Water, sanitation and hygiene sector resilience to climate change: the badolo washresilience scientific framework.. <https://doi.org/10.31219/osf.io/tz7x6>
- Bataineh, M. (2023). The role of green training in the ministry of education's corporate environmental performance: a mediation analysis of organizational citizenship behavior towards the environment and moderation role of perceived organizational support. *Sustainability*, 15(10), 8398. <https://doi.org/10.3390/su15108398>
- Birou, L., Green, K., & Inman, R. (2019). Sustainability knowledge and training: outcomes and firm performance. *Journal of Manufacturing Technology Management*, 30(2), 294-311. <https://doi.org/10.1108/jmtm-05-2018-0148>
- Bochkovskiy, A. (2020). Actualization and ways of system approach to risk management in occupational health and safety. *Journal of Scientific Papers Social Development & Security*, 10(3), 93-103. <https://doi.org/10.33445/sds.2020.10.3.8>
- Boffa, D., Prencipe, A., Papa, A., Corsi, C., & Sorrentino, M. (2023). Boosting circular economy via the b-corporation roads. the effect of the entrepreneurial culture and exogenous factors on sustainability performance. *International Entrepreneurship and Management Journal*, 19(2), 523-561. <https://doi.org/10.1007/s11365-023-00835-8>
- Carlisle, S., Zaki, K., Ahmed, M., Dixey, L., & McLoughlin, E. (2021). The imperative to address sustainability skills gaps in tourism in wales. *Sustainability*, 13(3), 1161. <https://doi.org/10.3390/su13031161>
- Casson, N., Cameron, L., Mauro, I., Friesen-Hughes, K., & Rocque, R. (2023). Perceptions of the health impacts of climate change among canadians. *BMC Public Health*, 23(1). <https://doi.org/10.1186/s12889-023-15105-z>

- Cole, L. and Low, M. (2023). Transforming planning and policy making processes at the intersections of climate, equity, and decolonization challenges. *NPJ Urban Sustainability*, 3(1). <https://doi.org/10.1038/s42949-023-00126-9>
- Covas, L. (2019). Modifying the organisational culture in order to increase the company's level of sustainability. *Proceedings of the International Conference on Business Excellence*, 13(1), 254-267. <https://doi.org/10.2478/picbe-2019-0023>
- Dayeen, F., Sharma, A., & Derrible, S. (2020). A text mining analysis of the climate change literature in industrial ecology. *Journal of Industrial Ecology*, 24(2), 276-284. <https://doi.org/10.1111/jiec.12998>
- Ebi, K., Vanos, J., Baldwin, J., Bell, J., Hondula, D., Errett, N., ... & Berry, P. (2021). Extreme weather and climate change: population health and health system implications. *Annual Review of Public Health*, 42(1), 293-315. <https://doi.org/10.1146/annurev-publhealth-012420-105026>
- Ekemezie, I. (2024). The role of hr in environmental sustainability initiatives within the oil and gas sector. *World Journal of Advanced Engineering Technology and Sciences*, 11(1), 345-364. <https://doi.org/10.30574/wjaets.2024.11.1.0059>
- Elum, Z. and Snijder, M. (2023). Climate change perception and adaptation among farmers in coastal communities of bayelsa state, nigeria: a photovoice study. *International Journal of Climate Change Strategies and Management*, 15(5), 745-767. <https://doi.org/10.1108/ijccsm-07-2022-0100>
- Fang, W., Ma, C., & Lei, Z. (2022). Research on sustainable development of transport infrastructure based on corporate culture and low-carbon perspective. *Journal of Environmental and Public Health*, 2022(1). <https://doi.org/10.1155/2022/4629422>
- Fatoni, A. (2024). The application of ppe at the juanda meteorological station (bmkg). *PHJRAJ*, 1(2). <https://doi.org/10.61511/phraj.v1i2.2024.316>
- Freihardt, J. (2024). Perceptions of environmental changes among a climate-vulnerable population from bangladesh. *Climatic Change*, 177(2). <https://doi.org/10.1007/s10584-024-03678-6>
- Gellert, G., Montgomery, S., Gellert, T., Gillett, J., Kerekes, A., & Hole, J. (2022). Employee wellness in a changing climate: environmental heat stress driving need for targeted health promotion and risk reduction. *Journal of Ecophysiology and Occupational Health*, 60-66. <https://doi.org/10.18311/jeoh/2022/29945>
- Handayani, M., Ali, M., Wahyudin, D., & Mukhidin, M. (2020). Green skills understanding of agricultural vocational school teachers around west java indonesia. *Indonesian Journal of Science and Technology*, 5(1), 21-30. <https://doi.org/10.17509/ijost.v5i1.22897>
- Handayani, M., Kamis, A., Ali, M., Wahyudin, D., & Mukhidin, M. (2021). Development of green skills module for meat processing technology study. *Journal of Food Science Education*, 20(4), 189-196. <https://doi.org/10.1111/1541-4329.12231>
- Hossain, M. (2024). Envisioning the climate change resilient cities in bangladesh using foresight approach.. <https://doi.org/10.5821/siiu.12807>
- Ibrahim, S. (2023). Climate change and health: effect of awareness program on knowledge, attitudes and practices of community dwelling elderly. *Tanta Scientific Nursing Journal*, 31(4), 245-272. <https://doi.org/10.21608/tsnj.2023.328822>
- Irham, I., Fachrista, I., Masyhuri, M., & Suryantini, A. (2022). Climate change adaptation strategies by indonesian vegetable farmers: comparative study of organic and conventional farmers. *The Scientific World Journal*, 2022, 1-13. <https://doi.org/10.1155/2022/3590769>
- Isensee, C., Teuteberg, F., & Griese, K. (2022). Exploring the use of mobile apps for fostering sustainability-oriented corporate culture: a qualitative analysis. *Sustainability*, 14(12), 7380. <https://doi.org/10.3390/su14127380>
- Ismi, N. (2023). The influence of stress effects and job satisfaction on employee performance at pt bank rakyat indonesia tbk, panakkukang makassar branch. *Journal of Humanities Social Sciences and Business (Jhssb)*, 3(1), 78-86. <https://doi.org/10.55047/jhssb.v3i1.815>

- Jang, S. and Ardichvili, A. (2020). The role of hrd in csr and sustainability: a content analysis of corporate responsibility reports. *European Journal of Training and Development*, 44(6/7), 549-573. <https://doi.org/10.1108/ejtd-01-2020-0006>
- Jayakrishnan, P. (2023). Unveiling climate resilience of peri-urban agriculture: a farming system-based assessment of coastal plains of kerala, india. *Asian Journal of Agricultural Extension Economics & Sociology*, 41(10), 871-877. <https://doi.org/10.9734/ajaees/2023/v41i102238>
- Jobin-Poirier, E., Plummer, R., & Pickering, G. (2020). Climate change adaptation in the canadian wine industry: strategies and drivers. *Canadian Geographer / Le Géographe Canadien*, 65(3), 368-381. <https://doi.org/10.1111/cag.12665>
- Karbo, R. and Crentsil, A. (2021). Climate-smart agriculture (csa) adaptation strategies of farmers against climate change in lawra municipality, upper west region, ghana. *Journal of Scientific Research and Reports*, 10-19. <https://doi.org/10.9734/jsrr/2021/v27i230355>
- Kim, D. (2024). Farmstead-specific weather risk prediction technique based on high-resolution weather grid distribution. *Atmosphere*, 15(1), 116. <https://doi.org/10.3390/atmos15010116>
- Kline, O. and Prunicki, M. (2023). Climate change impacts on children's respiratory health. *Current Opinion in Pediatrics*, 35(3), 350-355. <https://doi.org/10.1097/mop.0000000000001253>
- Magesa, B. and Pauline, N. (2021). Analysis of adaptation strategies of water insecure coastal communities of tanzania by gender: case of mlingotini village in bagamoyo district. *Journal of the Geographical Association of Tanzania*, 39(1), 118-141. <https://doi.org/10.56279/jgat.v39i1.36>
- Min, Y. (2024). How employee corporate social responsibility participation promotes pro-environmental behavior. *Frontiers in Earth Science*, 12. <https://doi.org/10.3389/feart.2024.1393386>
- Moran, L. (2023). "am i going to have to run to get out of this place?" a qualitative study exploring hiv clinical and service provider experiences from california regions heavily impacted by climate disaster. *Plos Climate*, 2(10), e0000269. <https://doi.org/10.1371/journal.pclm.0000269>
- Muah, P., Adu, I., Kyei-Frimpong, M., & Boakye, A. (2021). Explaining how management safety practices and safety programs influence job safety and employee commitment. *Seisense Business Review*, 1(3), 41-56. <https://doi.org/10.33215/sbr.v1i3.709>
- Naik, A. (2024). Assessing the impact of climate change on global crop yields and farming practices. *Archives of Current Research International*, 24(5), 696-712. <https://doi.org/10.9734/acri/2024/v24i5743>
- Niciejewska, M. (2023). Modern forms of occupational health and safety training as a factor influencing the development of safe and health-promoting behavior among employees. *System Safety Human - Technical Facility - Environment*, 5(1), 370-377. <https://doi.org/10.2478/czoto-2023-0040>
- Nisar, Q., Akbar, A., Naz, S., Haider, S., Poullová, P., & Hai, M. (2022). Greening the workforce: a strategic way to spur the environmental performance in the hotel industry. *Frontiers in Environmental Science*, 10. <https://doi.org/10.3389/fenvs.2022.841205>
- Nursesey-Bray, M., Palmer, R., Smith, T., & Rist, P. (2019). Old ways for new days: australian indigenous peoples and climate change. *Local Environment*, 24(5), 473-486. <https://doi.org/10.1080/13549839.2019.1590325>
- Nursesey-Bray, M., Parsons, M., & Gienger, A. (2022). Urban nullius? urban indigenous people and climate change. *Sustainability*, 14(17), 10830. <https://doi.org/10.3390/su141710830>
- Oriekhoe, O. (2024). Climate change and food supply chain economics: a comprehensive analysis of impacts, adaptations, and sustainability. *International Journal of Applied Research in Social Sciences*, 6(3), 267-278. <https://doi.org/10.51594/ijarss.v6i3.885>
- Osuji, E. (2023). Climate change and sweet potato production; empirical insights from ebonyi state, nigeria. *Zeszyty Naukowe SGGW W Warszawie - Problemy Rolnictwa Światowego*, 23(3), 61-73. <https://doi.org/10.22630/prs.2023.23.3.12>

- Rahmaningtyas, W. (2023). Building a sustainable future: unraveling the link between environmental awareness and the cultivation of employability and green skills-a literature review. *Iop Conference Series Earth and Environmental Science*, 1248(1), 012021. <https://doi.org/10.1088/1755-1315/1248/1/012021>
- Ramli, S., Rasul, M., Affandi, H., Rauf, R., & Pranita, D. (2022). Analysing teaching strategy, reflection and networking indicators towards learning for sustainable development (lsd) of green skills. *Journal of Technical Education and Training*, 14(1). <https://doi.org/10.30880/jtet.2022.14.01.006>
- Ravalier, J., McFadden, P., Gillen, P., Mallett, J., Nicholl, P., Neill, R., ... & Curry, D. (2022). Working conditions and well-being in uk social care and social work during covid-19. *Journal of Social Work*, 23(2), 165-188. <https://doi.org/10.1177/14680173221109483>
- Rusmayadi, G. (2024). The role of psychological adaptation in facing climate change impacts. *West Science Interdisciplinary Studies*, 2(02), 406-414. <https://doi.org/10.58812/wsis.v2i02.667>
- Ryan, S., Carlson, C., Mordecai, E., & Johnson, L. (2019). Global expansion and redistribution of aedes-borne virus transmission risk with climate change. *Plos Neglected Tropical Diseases*, 13(3), e0007213. <https://doi.org/10.1371/journal.pntd.0007213>
- Salvioni, D. and Almici, A. (2020). Transitioning toward a circular economy: the impact of stakeholder engagement on sustainability culture. *Sustainability*, 12(20), 8641. <https://doi.org/10.3390/su12208641>
- Shan, B., Liu, X., Gu, A., & Zhao, R. (2022). The effect of occupational health risk perception on job satisfaction. *International Journal of Environmental Research and Public Health*, 19(4), 2111. <https://doi.org/10.3390/ijerph19042111>
- Silva, A. (2024). Emerging trends in sustainable management: developing managers' skills for esg challenges. *Revista De Gestão E Secretariado*, 15(6), e3789. <https://doi.org/10.7769/gesec.v15i6.3789>
- Soomro, M., Memon, M., & Bukhari, N. (2020). Impact of stress on employees performance in public sector universities of sindh. *Sukkur Iba Journal of Management and Business*, 6(2), 114-129. <https://doi.org/10.30537/sijmb.v6i2.327>
- Strachan, S., Greig, A., & Jones, A. (2022). Going green post covid-19: employer perspectives on skills needs. *Local Economy the Journal of the Local Economy Policy Unit*, 37(6), 481-506. <https://doi.org/10.1177/02690942231151638>
- Sultana, F. (2021). Critical climate justice. *Geographical Journal*, 188(1), 118-124. <https://doi.org/10.1111/geoj.12417>
- Thirupathy, S. and Mustapha, R. (2020). Development of secondary school students' green skills for sustainable development. *International Journal of Academic Research in Business and Social Sciences*, 10(3). <https://doi.org/10.6007/ijarbss/v10-i3/7032>
- Treuer, K., McCabe, M., Karantzas, G., Mellor, D., Konis, A., & Davison, T. (2020). Facilitating staff adoption of new policies and procedures in aged care through training for readiness for change. *Journal of Applied Gerontology*, 41(1), 54-61. <https://doi.org/10.1177/0733464820949801>
- Vögt, V. (2023). Implementing agile data workflows to unlock climate-resilient urban planning. *Climate*, 11(9), 174. <https://doi.org/10.3390/cli11090174>
- Wang, S. and Huang, L. (2022). A study of the relationship between corporate culture and corporate sustainable performance: evidence from chinese smes. *Sustainability*, 14(13), 7527. <https://doi.org/10.3390/su14137527>
- Wijethilake, C., Upadhaya, B., & Lama, T. (2021). The role of organisational culture in organisational change towards sustainability: evidence from the garment manufacturing industry. *Production Planning & Control*, 34(3), 275-294. <https://doi.org/10.1080/09537287.2021.1913524>
- Wu, Y., Liu, X., Gao, L., Sun, X., Hong, Q., Wang, Q., ... & Zhu, S. (2022). Short-term exposure to extreme temperature and outpatient visits for respiratory diseases among children in the northern city of china: a time-series study.. <https://doi.org/10.21203/rs.3.rs-2151406/v1>

Yang, B., Kim, M., Lee, C., Hwang, S., & Choi, J. (2022). Developing an automated analytical process for disaster response and recovery in communities prone to isolation. *International Journal of Environmental Research and Public Health*, 19(21), 13995. <https://doi.org/10.3390/ijerph192113995>