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Prioritize the enablers of the Carbon footprint of media institutes in the age of the climate crisis using AHP.

Sadiya Samdani and Dr B.S. Rathore, Mody University of Science and Technology, Sikar, Rajasthan

Abstract:

This article provides a comprehensive overview of the carbon footprint of media institutes and underscores the urgent need for sustainable practices in the context of the climate crisis. Media institutions significantly influence public opinion and behavior, making their environmental impact increasingly relevant. This research delves into the various aspects of carbon emissions associated with media institutes, including energy consumption, transportation, infrastructure, and waste management. It also explores the incorporation of sustainability into curricula and operational practices. In addressing the carbon footprint of media institutes during the climate crisis, the Analytical Hierarchy Process (AHP) method plays a significant role. This method allows us to prioritize the enablers contributing to green logistics and low-carbon emissions, aiming for net-zero emissions. Seventeen enablers were selected for the carbon footprint of media institutes, which can be divided into four clusters: Energy consumption, transportation, infrastructure, and waste management. The study involves input from nine experts who assess identified criteria on a comparative scale. Ultimately, the findings highlight the pivotal role that media institutes can play in promoting awareness and action towards environmental sustainability amidst the climate crisis challenges.

Keywords: Analytical Hierarchy Process (AHP), Carbon footprint, Media Institute, Climate Crisis, Sustainable Practices & Environmental Impact

1. Introduction

The urgency of addressing climate change has never been more pronounced in the contemporary era. As influential entities shaping public perception and behavior, media institutes bear a significant responsibility in promoting and adopting sustainable practices. The carbon footprint of these institutions, encompassing various facets such as energy consumption, transportation, infrastructure, and waste management, has become a critical area of focus. Through their operations and outreach, media institutes have a substantial environmental impact. This necessitates a transition towards more sustainable practices to mitigate their carbon emissions. With the increasing severity of the climate crisis, it is imperative for media institutes to not only report on environmental issues but also embody sustainability principles in their day-to-day operations. In the age of the climate crisis, the carbon footprint of media institutes has become a significant concern, with discussions on environmental impact intensifying in media discourse (Foxwell-norton, 2009). Scholars emphasize the need for media studies to address the eco-crisis and adopt greener practices, acknowledging the role of technologies in contributing to planetary decline. Analyzing greenhouse gas emissions, like in the Max Planck Institute for Astronomy case, is crucial for understanding and reducing the environmental impact of such institutions(Martin et al., 2022). The intersection of media, technology, and environmental sustainability is a key focus, with calls for integrating green practices into media ecosystems and bridging media practice with green cultural citizenship to combat the ecological crisis (Adam, 1975). This research aims to comprehensively analyze the carbon footprint of media institutes and identify key enablers that can facilitate a reduction in emissions. By adopting the Analytical Hierarchy Process (AHP) methodology, the study prioritizes these enablers, providing a structured approach to effectively evaluate and implement sustainability strategies. The AHP method, known for its robustness in decision-making processes, ranks the various factors contributing to the carbon footprint. This approach allows for a systematic assessment of enablers, categorized into four main clusters: energy consumption, transportation, infrastructure, and waste management. The study ensures a comprehensive and balanced analysis by engaging nine experts to evaluate these criteria on a comparative scale.

1.1 Research Objectives:

1. **Identify Key Enablers**: Determine the most significant factors reducing the carbon footprint of media institutes.
2. **Prioritize Actions**: Use the AHP method to prioritize these enablers, providing a clear roadmap for media institutes to follow.
3. **Promote Sustainable Practices**: Highlight the role of media institutes in fostering environmental sustainability through informed operational changes and educational initiatives.

The findings from this research are pivotal in guiding media institutes towards achieving net-zero emissions. These institutions can play a crucial role in addressing the climate crisis by integrating sustainable practices into their core operations and educational curricula. This study not only underscores the importance of reducing the carbon footprint of media institutes but also demonstrates how they can lead by example in the broader societal shift toward sustainability. This research endeavors to provide actionable insights and strategic priorities for media institutes, enabling them to reduce their carbon footprint effectively. Through the systematic application of the AHP method, the study offers a structured framework for implementing sustainable practices, thus contributing to the global effort against climate change.

2. Literature Review

In 2012, the Higher Education Funding Council for England (HEFCE) published several guides to assist institutions in reporting and reducing their emissions. These guides primarily focused on direct emissions, with mandatory targets for institutions to reduce their Scope 1 and 2 emissions by 34% below a 2005/06 baseline by 2020. They also addressed a limited number of Scope 3 sources, such as water and waste , transport, and procurement (Gupta, 2022). However, there is no specific international standard for carbon footprinting in higher education institutions (HEIs), leading practitioners to adapt methodologies originally designed for profit-making enterprises. This adaptation is often conducted with limited success, complicated by the unrestricted use of assumptions and caveats (Edwardsson, 2012).

One promising approach to generating more accurate assessments is the hybridization of input-output analysis (IOA) and life cycle assessment (LCA) theories, known as environmentally extended input-output analysis and life cycle assessment (EEIOA-LCA). This method is favored for its detailed assessments free from aggregation errors (Berners-lee et al., 2011) demonstrated the use of IOA, informed by readily available financial expenditure data, to assess the supply chain emissions of an Australian university without requiring additional informational inputs. This approach can measure the total environmental impacts of an institution's activities and highlight areas for improvement along the supply chain .

Despite its potential, there is a notable absence of empirically supported full-scale EEIOA-LCA institutional footprints in the literature. As institutions face increasing pressure to reduce emissions, they risk falling behind on pledged targets for direct emissions, which diminishes their ability to manage and reduce Scope 3 emissions effectively (Batmunkh, 2022). The priorities currently favored by universities—such as promoting growth and economic fortune—can conflict with the importance of carbon managemen. Estate growth, in particular, disproportionately magnifies Scope 3 emissions occurring upstream and downstream of the organizational boundary.

Universities serve multiple functions, influencing their activities and the GHG emissions they generate. The four primary functions of universities—education, research, governance, and enterprise result in diverse activities. Teaching activities, for example, require physical learning facilities (lecture theatres, libraries, ICT equipment) and a range of amenities to support student life (health and wellbeing services, sports and social services, retail, food and drink outlets). This array of amenities often leads to comparisons with small towns(Marks et al., 2020). Furthermore, the rise of internet access has led traditional universities to move activities online through distance-learning courses and Massive Open Online Courses (MOOCs).

The diverse infrastructure necessary for delivering degree programs adds to the complexity of HEI carbon footprinting. Additionally, the nature of research programs has a direct correlation with the energy intensity of activities, often leading to debates when comparing research-intensive institutions with teaching-intensive ones (Ridanpää, 2022). The varying specializations of universities, their demographic composition, and financial leverage further contribute to this complexity.

Examining university carbon management is crucial for continuing the debate on the role of HEIs in sustainability in the 21st century. By addressing these challenges, institutions can position themselves favorably to tackle future climate-related challenges. Universities play a vital role in providing technical solutions to climate-related issues and serve as pertinent case studies for assessing the relevance and applicability of carbon management standards. Their central role in education systems worldwide transcends political regimes and economic systems(Tavares et al., n.d.), making them a unique organizational form that can be studied universally and understood globally.

3. Enablers of Carbon Footprint Reduction in Media Institutes

In the quest to reduce the carbon footprint of media institutes, several key enablers span four main categories: Energy Consumption, Transportation, Infrastructure, and Waste Management. These enablers facilitate the implementation of effective sustainability practices and contribute significantly to environmental conservation efforts.

Table- 1. Enablers of Carbon Footprint Reduction in Media Institutes

Main Categories	**Sub-Categories**	**Description**	**Reference**
Energy Consumption (F1)	**F11 - Energy-Efficient Equipment**	Implementing energy-efficient equipment, such as LED lighting, computers, and broadcast equipment, is essential for reducing overall energy consumption. This equipment uses less power, resulting in lower carbon emissions.	(Johansson et al., 2019)
	F12 - Renewable Energy Sources	Utilizing renewable energy sources like solar, wind, and geothermal energy can drastically cut down on greenhouse gas emissions by reducing dependence on fossil fuels	(Benabdellah et al., 2021)(Chen, 2001) (Get & Right, n.d.) (Fiksel, 2009)
	F13 - Smart Energy Management Systems	These systems optimize energy use through automated controls and monitoring, ensuring energy is used efficiently and minimizing waste.	(Berners-lee et al., 2011)
	F14 - Energy Audits	Conducting regular energy audits helps identify inefficiencies and areas where energy consumption can be reduced, providing actionable insights for improvement.	(Edwardsson, 2012)
	F15 - Employee Awareness Programs	Educating employees about energy conservation practices and encouraging them to adopt sustainable behaviors contribute to energy reduction efforts.	**(Kitsis & Chen, 2021)**
	F21 - Public and Green Transportation Initiatives	Promoting the use of public transportation and green alternatives such as biking or	(Marks et al., 2020)(Jahnke et al., 2020)

Transportation (F2)		walking reduces the carbon footprint associated with daily commutes.	
	F22 - Electric and Hybrid Vehicles	Transitioning to electric and hybrid vehicles for company fleets and encouraging their use among employees can significantly reduce emissions from transportation.	(Berners-lee et al., 2011)
	F23 - Remote Work Policies	Implementing remote work policies decreases the need for commuting, leading to a substantial reduction in transportation-related emissions.	(Berners-lee et al., 2011)
	F24 - Sustainable Travel Policies	Adopting policies prioritizing sustainable travel options, such as using trains instead of planes for short distances, helps lower carbon emissions from business travel.	(Robinson et al., 2018)
	F25 - Travel Reduction Technologies	Leveraging technologies like video conferencing reduces the necessity for physical travel, thereby reducing associated emissions.	(Berners-lee et al., 2011)
Infrastructure (F3)	**F31 - Sustainable Building Design**	Designing buildings with sustainability in mind—using energy-efficient materials, natural lighting, and optimized ventilation systems—has the most significant impact on reducing the carbon footprint of infrastructure.	(Tavares et al., n.d.)
	F32 -Green Certifications	Obtaining green certifications (e.g., LEED, BREEAM) ensures that buildings meet high sustainability standards, though this sub-factor is more supportive than direct interventions like sustainable design.	(Robinson et al., 2018)
	F33 - On-Site Renewable Energy Generation	Generating renewable energy on-site through solar panels, wind turbines, etc., reduces reliance on non-renewable energy sources, further decreasing carbon emissions.	(Fatimah et al., 2020)
Waste Management (F4)	**F41 - E-Waste Management Partnerships**	Partnering with specialized companies to manage and recycle electronic waste ensures proper disposal and reduces the environmental impact of outdated and discarded electronics.	(Noor et al., 2012)
	F42 - Employee Training on Waste Management	Educating employees on waste segregation, recycling practices, and the importance of reducing waste helps ensure the effective implementation of waste management strategies.	(Polytechnique, 2013) (Katsikeas et al., 2016)(Singh, 2018)
	F43 - Sustainable Procurement Policies	Adopting procurement policies prioritizing eco-friendly and recyclable materials reduces waste generation at the source, making it a critical strategy for waste management.	(Paul et al., 2014)

	F44 - Comprehensive Recycling Programs	Implementing robust recycling programs ensures that waste materials are properly sorted and recycled, minimizing the amount of waste sent to landfills.	(Sodhi, 1998)

4. Detailed Analysis

4.1 Analytical Hierarchy Process

According to Saaty, 1980 "AHP is a method of decision-making that divides a challenging MCDM problem into a hierarchy." It is a theory based on the hierarchy and consistency of data, and it judges the data and provides a measure of its importance. AHP includes the opinions of all the experts in a final decision without having to produce their usability on various criteria by pairwise comparisons of different options (Melewar et al., 2013).

The first and foremost step in AHP is creating a hierarchical system in which the goal is kept at the first level. The criteria for selection are held at the second level and might consist of certain sub-criteria of their own. The sub-criteria should come at level 3 of the hierarchy because it is impossible to compare these factors directly. For example, the taxes and fines levied by the government cannot be compared directly with the integration of PDCA with VSM. Multi-criteria-decision analysis (MDCA) tools like AHP are significant in such conditions. Decisions involving the environment are often complex and have numerous stakeholders. The complexity and vitality of the issue make it essential for us to look for simple analytical techniques. Multi-criteria decision analysis (MCDA) methods are useful in assessing the value judgments of individual decision-makers and multiple stakeholders (Kiker et al., 2005).

Next, Create a pairwise comparison matrix using Saaty's nine-point scale (1–9), where 1 indicates equal importance, 3 indicates moderately greater importance, 5 indicates a strong greater importance, 7 indicates much greater importance, and 9 indicates greater importance. The values of 2, 4, 6, and 8 indicate the compromised values of importance.(Soltani et al., 2020). Table 2 represents the saateys scale for pairwise comparison matrices.

Table 2: Saatey's scale of importance for pairwise comparison matrices

Intensity of Importance on Scale	Definition
1	Equal Importance
3	Moderate Importance
5	Strong Importance
7	Very Strong Importance
9	Extreme Importance
2,4,6,8	Intermediate Values

Based on the survey data gathered, a pairwise comparison matrix was created concerning the objectives and constraints in each category. Comparative judgments were merged to build the matrix of the comparison judgment while evaluating the expert perspectives by applying the geometric mean to the views. Calculate the consistency to make sure the elements are prioritized consistently. The maximum Eigenvector or relative weights are calculated. Next, use the equation to determine the consistency index (CI) value for each order n.in equation (1) matrix. The equation can get the consistency ratio based on the CI and random consistency index (RI). The following are the equations:

$$CI = \frac{(\lambda_{max} - n)}{n-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

The consistency ratio can be calculated as

$$CR = \frac{CI}{RI} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where the arrangement of the matrix affects how the RI values vary, the value of RI for matrices of order (N) 1–10 are shown in Table 3 and was calculated by approximating random indices with a sample size of 500. The consistency ratio (CR) allowed range varies depending on the size of the matrix, i.e., 0.05 for a 3x3 matrix, 0.08 for a 4x4 matrix, and 0.1 for all larger matrices, n>=5. If the CR value is less than or equal to 5, it suggests that the matrix evaluation is reasonable or shows high consistency. However, if the CR is higher than the permissible number, there has been a matrix inconsistency, and the evaluation method needs to be evaluated, reassessed, and improved.

Table 3: Random consistency index values

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

AHP technique was used to solve a comparative matrix in factor prioritizing. Tables 4 to 8 have been used to calculate the parameters' goal matrix and consistency ratio.

Table 4: Pair-wise comparison matrix for Main Enablers

Main Enablers	F1	F2	F3	F4	Local criteria weight	Rank
F1	1	5	4	3	0.542329027	**1**
F2	0.20	1	0.50	0.33	0.084672702	**4**
F3	0.25	2	1	0.50	0.139696677	**3**
F4	0.33	3	2	1	0.233301595	**2**

Maximum Eigen value =4.05123 Consistency Index (CI) =0.01707

Table 5: Pair-wise comparison matrix for Energy Consumption

Energy Consumption	F-11	F-21	F-31	F-41	F-51	Local priority weight	Rank
F-11	1	0.33	2	0.50	0.20	0.125027581	5
F-12	3	1	2	4	2	0.38130985	1
F-13	0.50	0.50	1	1	1	0.142935627	4
F-14	2	0.25	1	1	1	0.155159736	3
F-15	3	0.50	1	1	1	0.195567206	2

Maximum Eigen value =5.334567 Consistency Index (CI) =0.08364

Table 6: Pair-wise comparison matrix for sub-factors of (F-2) Transportation

Transportation	F-21	F-22	F-23	F-24	F-25	Local criteria weight	Rank
F-21	1	0.50	0.33	0.33	0.50	0.086785057	5
F-22	2	1	3	0.50	2	0.252122746	2
F-23	3	0.33	1	0.50	3	0.200587965	3

F-24	3	2	2	1	3	0.345011042	1
F-25	2	0.50	0.33	0.33	1	0.115493191	4

Maximum Eigen value =5.34913 Consistency Index (CI) =008728

Table 7: Pair-wise comparison matrix for sub-factors of (F-3) Infrastructure

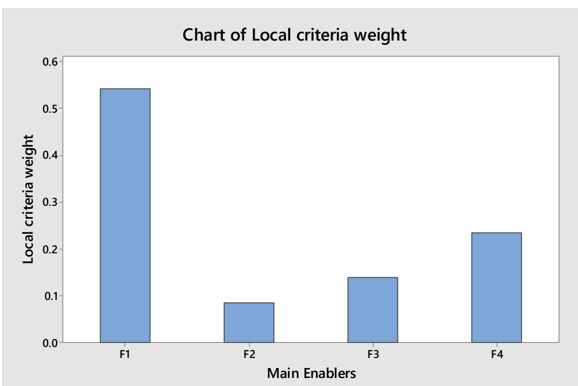
Infrastructure	F-31	F-32	F-33	Local criteria weight	Rank
F-31	1	3	2	0.538961039	1
F-32	0.33	1	0.50	0.163780664	3
F-33	0.50	2	1	0.297258297	2

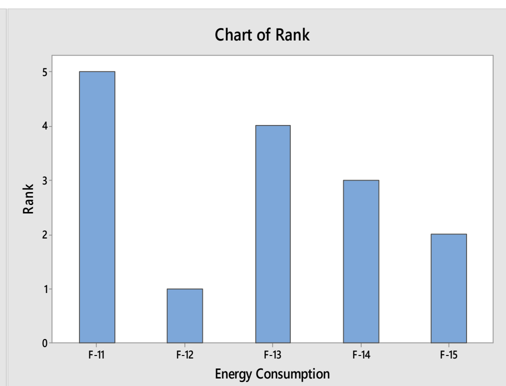
Maximum Eigen value =3.00920 Consistency Index (CI) =0.00460

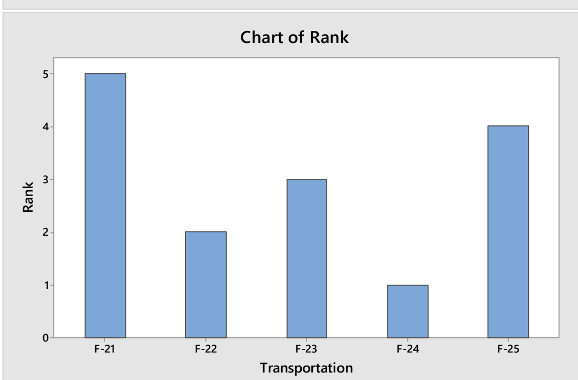
Table 8: Pair-wise comparison matrix for Waste Management (F4)

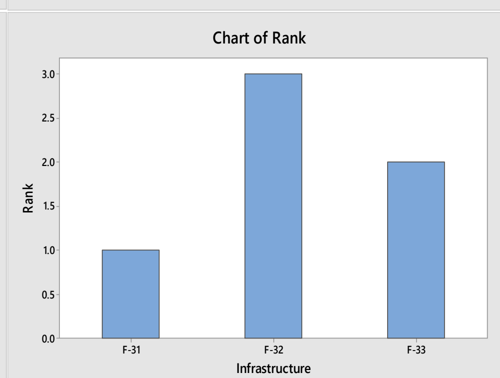
Waste Management (F4)	F41	F42	F43	F44	Local criteria weight	Rank
F41	1	2	0.50	2	0.269480519	2
F42	0.50	1	0.50	2	0.192775974	3
F43	2	2	1.00	3	0.416801948	1
F44	0.50	0.50	0.33	1	0.120941558	4

Maximum Eigen value =4.07121 Consistency Index (CI) =0.02373









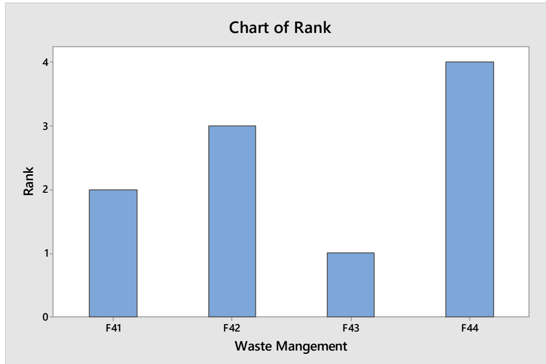


Figure -1 Bar Chart for enablers of carbon footprint reduction in Media Institute

5. Findings and Discussion

The Analytic Hierarchy Process (AHP) is a structured technique for organizing and analyzing complex decisions, using pair-wise comparisons to determine the relative importance of each criterion. Here, we apply AHP to prioritize the main enablers of carbon footprint reduction in media institutes: Energy Consumption (F1), Transportation (F2), Infrastructure (F3), and Waste Management (F4). Energy Consumption (F1) has the highest priority with 0.5423 weight, indicating that reducing energy consumption is the most critical factor for carbon footprint reduction in media institutes. Investments in renewable energy, energy-efficient equipment, and smart energy management systems are essential. Waste Management (F4) is the second most important enabler. Effective waste management practices, such as recycling programs, e-waste reduction, and sustainable procurement policies, are vital. Infrastructure (F3). ranks third, highlighting the importance of sustainable building practices, green certifications, and infrastructure upgrades to enhance energy efficiency and reduce carbon emissions. Transportation (F2) with Local Criteria Weight: 0.0847 is ranked fourth, suggesting that while transportation significantly contributes to carbon emissions, it is less critical than the other enablers. Promoting public transportation, remote work policies, and using electric vehicles can help mitigate transportation-related emissions. Energy consumption is the most crucial enabler for reducing the carbon footprint of media institutes, followed by waste management, infrastructure, and transportation. This prioritization helps media institutes focus their efforts and resources on the most impactful areas for achieving sustainability. The consistency index (CI) indicates that the pair-wise comparisons are consistent, as the CI value is low. This ensures that the calculated weights are reliable and accurately reflect the priorities of the enablers.

Table 5 reveals that transitioning to renewable energy sources (F12) is the most critical strategy for reducing the carbon footprint of media institutes, followed by employee awareness programs and regular energy audits. Renewable energy sources are the highest priority of the strategies. This indicates that transitioning to renewable energy, such as solar and wind power, is media institutes' most impactful strategy for reducing carbon emissions. Investing in renewable energy infrastructure is essential for significantly reducing carbon footprint. Implementing smart energy management systems and investing in energy-efficient equipment are also important but rank lower in priority. These findings provide a clear roadmap for media institutes to focus their efforts and resources on the most impactful strategies for achieving sustainability and mitigating climate change.
Sustainable travel policies (F24) emerged as the most important strategy. These policies can include guidelines for reducing travel frequency, choosing environmentally friendly travel options, and promoting virtual meetings. The high priority indicates that comprehensive travel policies can significantly cut transportation emissions in media institutes. Electric and hybrid vehicles (F22) are the second most critical strategy. Transitioning to electric and hybrid company vehicles and encouraging their use among employees can substantially reduce emissions from business travel and daily commutes. F23 - Remote Work Policies rank third, underscoring their importance in minimizing transportation emissions. By allowing employees to work from home, media institutes can

significantly reduce daily commuting, a major source of transportation-related carbon emissions. Travel reduction technologies, such as video conferencing and other digital collaboration tools, are essential for reducing the need for physical travel. Although ranked fourth, these technologies support sustainable travel policies and remote work. Public and green transportation initiatives are the fifth priority.

Promoting public transit, cycling, carpooling, and other green transportation options can help reduce the carbon footprint, though it is less impactful compared to the other strategies in this analysis.

Sustainable building design (F31)is ranked as the most essential sub-factor. This high priority indicates that designing buildings with sustainability in mind—using energy-efficient materials, natural lighting, and optimized ventilation systems—significantly reduces the carbon footprint of media institutes. Emphasizing sustainable design from the outset can lead to substantial long-term benefits in energy savings and reduced emissions. F33 - On-Site Renewable Energy Generation. Is ranks second. This involves installing solar panels, wind turbines, or other renewable energy systems on the premises of media institutes. Generating renewable energy on-site can drastically reduce reliance on non-renewable energy sources, thus lowering carbon emissions. The relatively high weight of this sub-factor underscores its importance in achieving sustainability goals. F32 - Green Certifications are the third-ranked sub-factor. These certifications, such as LEED or BREEAM, recognize buildings that meet high sustainability standards. While necessary, green certifications alone have less direct impact than sustainable building design and on-site renewable energy generation. However, pursuing these certifications can improve building practices and operational efficiency, contributing to overall carbon footprint reduction.

F43 - Sustainable Procurement Policies are ranked as the most important sub-factor. This high priority indicates that sourcing sustainable materials and products can significantly reduce waste and overall sustainability. Media institutes can reduce waste generation at the source by implementing procurement policies that prioritize eco-friendly and recyclable materials. F41 - E-Waste Management Partnerships rank second. Establishing partnerships with specialized e-waste management companies ensures the proper disposal and recycling of electronic waste, critical for reducing the environmental impact of outdated and discarded electronic equipment. F42 - Employee Training on Waste Management ranks third. Educating employees about proper waste segregation, recycling practices, and the importance of reducing waste can lead to more effective implementation of waste management strategies. This sub-factor emphasizes the role of awareness and behavior change in achieving sustainability goals. F44 - Comprehensive Recycling Programs Comprehensive recycling programs are ranked fourth. While important, these programs have less direct impact than sustainable procurement policies and e-waste management partnerships. However, implementing robust recycling programs ensures that waste materials are properly sorted and recycled, reducing waste sent to landfills.

Conclusion

This comprehensive AHP analysis examines the main enablers for reducing the carbon footprint of media institutes across four critical categories: Energy Consumption, Transportation, Infrastructure, and Waste Management. The analysis reveals that energy consumption is the most critical category for reducing the carbon footprint of media institutes, followed by infrastructure, waste management, and transportation. Media institutes should focus on enhancing energy efficiency and adopting renewable energy sources. Concurrently, they should implement sustainable building practices and establish robust waste management strategies. Although transportation has the least relative importance, implementing sustainable travel policies and promoting electric vehicles are still vital for comprehensive carbon footprint reduction.

Each category has been analyzed using specific sub-factors to determine their relative importance and effectiveness in achieving sustainability goals. Prioritizing energy-efficient equipment and renewable energy sources is essential for reducing energy consumption. Implementing smart energy management systems and conducting regular energy audits further enhance efficiency. While important, employee awareness programs support these primary strategies by fostering a culture of energy conservation. Sustainable travel policies and adopting electric and hybrid vehicles are the most impactful strategies for reducing transportation-related carbon emissions. Promoting remote work policies and implementing travel reduction technologies also significantly contribute to minimizing the environmental impact of transportation. While beneficial, public and green transportation initiatives are less critical than the top strategies. Sustainable building design is paramount for reducing the carbon footprint within infrastructure. This strategy should complement on-site renewable energy generation to decrease reliance on non-renewable energy sources further. Though important for validating sustainability efforts, green certifications play a supportive role compared to the other sub-factors. Sustainable procurement policies are crucial for effective waste management, as they reduce waste generation at the source. Establishing e-waste management partnerships ensures proper disposal and recycling of electronic waste. Employee training on waste management and comprehensive recycling programs support these strategies by promoting proper waste segregation and recycling practices.

Following the prioritized strategies identified through this AHP analysis, media institutes can significantly reduce their carbon footprint and contribute to broader climate change mitigation efforts. These strategies enhance operational efficiency and foster a culture of sustainability within the organization. Implementing these insights will enable media institutes to lead by example, promoting environmental stewardship and sustainable practices in an era dominated by the climate crisis. Information and Communication Technology (ICT) also plays a crucial role in measuring and managing carbon emissions, with online carbon footprint calculators aiding in tracking and advising mitigation practices. Environmental communication is highlighted as a significant tool to sensitize individuals and organizations about reducing their carbon footprint, emphasizing the role of communication in achieving this goal. Moreover, the development of smart applications and tools can streamline processes, reduce errors, and minimize wastage, ultimately decreasing the carbon footprint of media institutes. By combining energy consumption models with audience behaviour, media organizations can assess and reduce their carbon emissions, with interventions like promoting eReaders over PCs showing significant potential for emission reduction.

References

Adam, M. (1975). *The Image of Climate Crisis in Media : A Conceptual Metaphor Analysis*. *5691*.

Batmunkh, A. (2022). *Carbon Footprint of The Most Popular Social Media Platforms*.

Benabdellah, A. C., Zekhnini, K., Cherrafi, A., Garza-Reyes, J. A., & Kumar, A. (2021). Design for the environment: An ontology-based knowledge management model for green product development. *Business Strategy and the Environment*, *30*(8), 4037–4053. https://doi.org/10.1002/bse.2855

Berners-lee, M., Howard, D. C., Moss, J., Kaivanto, K., & Scott, W. A. (2011). Science of the Total Environment Greenhouse gas footprinting for small businesses — The use of input – output data. *Science of the Total Environment, The*, *409*(5), 883–891. https://doi.org/10.1016/j.scitotenv.2010.11.023

Chen, C. (2001). Design for the environment: A quality-based model for green product development. *Management Science*, *47*(2), 250–263. https://doi.org/10.1287/mnsc.47.2.250.9841

Edwardsson, M. P. (2012). *Media processes for content production Studies of structures and climate impacts*. *december*.

Fatimah, Y. A., Govindan, K., Murniningsih, R., & Setiawan, A. (2020). Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia. *Journal of Cleaner Production*, *269*, 122263. https://doi.org/10.1016/j.jclepro.2020.122263

Fiksel, J. (2009). *Design for Environment: A Guide to Sustainable Product Development* (2nd ed.). McGraw-Hill Education.

Foxwell-norton, K. (2009). *The global alternative and community media sector : Prospects in an era of climate crisis*.

Get, D. W., & Right, F. (n.d.). *Design for Environment - Do We Get the Focus Right ? 1*, 1–4.

Gupta, P. (2022). *Role of Media and Indigenous Communities to Combat Climate Change*. *11*(05), 56–60. https://doi.org/10.7753/IJSEA1105.1001

Jahnke, K., Fendt, C., Fouesneau, M., Georgiev, I., Herbst, T., Kaasinen, M., Kossakowski, D., Rybizki, J., Schlecker, M., Seidel, G., Henning, T., & Kreidberg, L. (2020). *An astronomical institute's perspective on meeting the challenges of the climate crisis*. *4*(September).

Johansson, I., Mardan, N., Cornelis, E., & Kimura, O. (2019). *Designing Policies and Programmes for Improved Energy Efficiency in Industrial SMEs*. https://doi.org/10.3390/en12071338

Katsikeas, C. S., Leonidou, C. N., & Zeriti, A. (2016). Eco-friendly product development strategy : antecedents , outcomes , and contingent effects. *Journal of the Academy of Marketing Science*, 660–684. https://doi.org/10.1007/s11747-015-0470-5

Kiker, G. A., Bridges, T. S., Varghese, A., Seager, P. T. P., & Linkov, I. (2005). Application of multicriteria decision analysis in environmental decision making. In *Integrated environmental assessment and management* (Vol. 1, Issue 2, pp. 95–108). John Wiley & Sons, Ltd. https://doi.org/10.1897/IEAM_2004a-015.1

Kitsis, A. M., & Chen, I. J. (2021). Do stakeholder pressures influence green supply chain Practices ? Exploring the mediating role of top management commitment. *Journal of Cleaner Production*, *316*(June), 128258. https://doi.org/10.1016/j.jclepro.2021.128258

Marks, L. U., Clark, J., Livingston, J., Oleksijczuk, D., Hilderbrand, L., & Marks, L. U. (2020). *Streaming Media ' s Environmental Impact Media + Environment Blog Update from Laura Marks : Calculating and Mitigating Our Streaming Carbon Footprint the greenhouse gas emissions resulting from streaming video . Despite corporate-led hopes that informatio*. *2*(1), 1–17.

Martin, P., Brau-nogu, S., Coriat, M., Garnier, P., Hughes, A., & Tibaldo, L. (2022). *The carbon footprint of IRAP*. *April*, 1–42.

Melewar, T. C., Alwi, S., Hsu, P. F., & Lin, F. L. (2013). Developing a decision model for brand naming using Delphi method and analytic hierarchy process. *Asia Pacific Journal of Marketing and Logistics*, *25*(2), 187–199. https://doi.org/10.1108/13555851311314013

Noor, N. A., Kasolang, S., & Jaffar, A. (2012). Green lean total quality information management in Malaysian automotive companies. *Procedia Engineering*, *41*(Iris), 1708–1713. https://doi.org/10.1016/j.proeng.2012.07.372

Paul, I. D., Bhole, G. P., & Chaudhari, J. R. (2014). A Review on Green Manufacturing: It's Important, Methodology and its Application. *Procedia Materials Science*, *6*(Icmpc), 1644–1649. https://doi.org/10.1016/j.mspro.2014.07.149

Polytechnique, E. (2013). Combining lean and green in manufacturing : a model of waste management. In *IFAC Proceedings Volumes* (Vol. 46, Issue 9). IFAC. https://doi.org/10.3182/20130619-3-RU-3018.00164

Ridanpää, J. (2022). *' Carbon footprint nationalism ': re-conceptualizing Finnish nationalism and national pride through climate change discourse*. https://doi.org/10.1080/14608944.2021.1937974

Robinson, O. J., Tewkesbury, A., Kemp, S., & Williams, I. D. (2018). Towards a universal carbon footprint standard : A case study of carbon management at universities. *Journal of Cleaner Production*, *172*, 4435–4455. https://doi.org/10.1016/j.jclepro.2017.02.147

Singh, M. D. (2018). *GREEN MANUFACTURING PRACTICES IN SMES OF INDIA -A LITERATURE GREEN MANUFACTURING PRACTICES IN SMES OF INDIA -A LITERATURE REVIEW*. *September*. https://doi.org/10.26488/IEJ.6.10.5

Sodhi, M. (1998). *Lmmd*. *47*(2), 115–118.

Soltani, M., Aouag, H., & Mouss, M. D. (2020). An integrated framework using VSM, AHP and TOPSIS for simplifying the sustainability improvement process in a complex manufacturing process. *Journal of Engineering, Design and Technology*, *18*(1), 211–229. https://doi.org/10.1108/JEDT-09-2018-0166

Tavares, A. O., Areia, N. P., Mellett, S., James, J., Intrigliolo, D. S., Couldrick, L. B., & Berthoumieu, J. (n.d.). *The European Media Portrayal of Climate Change : Implications for the Social Mobilization towards Climate Action*. 1–13.