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## **Relationship Between Carbon Emissions and Digitization**

**Raj Kumar Gupta**

**\*\*Assistant Prof. Madhyanchal Professional University, Faculty of engineering and Technology, School of Computer Science Engineering, Bhopal, M.P.\*\***

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### **ABSTRACT**

The environmental impact of digitalization and the associated carbon emissions are indeed valid and have gained increasing attention in recent years. The rapid growth of technology and the widespread use of digital services contribute to the overall carbon footprint of various industries. Here's an overview of the key points in your study paper: Highlight the global concern about carbon emissions and their impact on climate change. Emphasize that carbon emissions are not only tied to traditional sources but also linked to digital activities. Define digital carbon emissions as the CO<sub>2</sub> emissions resulting from digitization processes. Discuss how the advancement of technology has contributed significantly to these emissions. Provide insights into the role of the tech industry in global carbon emissions. Discuss specific examples or data that illustrate the impact of digital services on carbon emissions. Explore how different regions are affected by higher rates of carbon emissions from digitization. Highlight any disparities or specific areas where the impact is more pronounced. Delve into the specific ways in which digitization contributes to carbon emissions. Discuss the life cycle of digital technologies, from production to usage and disposal, and how each phase contributes to emissions. Explore potential solutions and strategies to reduce digital carbon emissions. Discuss initiatives taken by the tech industry or governments to address this issue. Consider the role of sustainable practices, energy efficiency, and the development of green technologies. Provide a comprehensive analysis of the overall global digital carbon footprint. Discuss trends over time and potential future scenarios based on current trajectories.

**Keywords:** digital carbon footprint, CO<sub>2</sub> emissions, Rapid growth of technology, Digital services

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### **Introduction:**

The digital transformation and the widespread adoption of technologies such as the Industrial Internet of Things (IIoT), smart manufacturing, smart banking, digital twins, and Industry 4.0 have indeed brought about significant advancements and possibilities. However, the flip side of this technological revolution is the increasing concern over the environmental impact, particularly in terms of carbon emissions and their contribution to global warming.

#### **Carbon Footprint of Digitalization:**

The exponential growth in data processing and digitization has led to a surge in energy consumption in data centers and other digital infrastructure, resulting in a substantial carbon footprint. The manufacturing, operation, and disposal of electronic devices also contribute to environmental degradation.

#### **Environmental Impacts and Global Warming:**

Carbon dioxide (CO<sub>2</sub>) emissions are a major contributor to global warming, which, in turn, has far-reaching consequences. The rise in global temperatures leads to climate change, affecting weather patterns, ecosystems, and overall environmental stability.

#### **Rising Sea Levels and Impact on Coastal Areas:**

One of the direct consequences of global warming is the melting of polar ice caps and glaciers, contributing to rising sea levels. This poses a significant threat to coastal areas, with projections suggesting that islands and beaches could be submerged in the next few decades.

#### **Need for Carbon Emission Management:**

Given the urgency of addressing climate change, there is a pressing need to manage and reduce carbon emissions. This requires a comprehensive approach that considers the environmental impact of various sectors, including the digital realm.

#### **Challenges in Current Remedies:**

Efforts to mitigate carbon emissions are hindered by the paradox that increased digitization, while offering efficiency and convenience, also contributes to the problem. Balancing technological advancements with environmental sustainability poses a complex challenge.

#### **Impact on Society:**

The consequences of global warming, including rising sea levels and extreme weather events, directly impact communities worldwide. Addressing these issues requires a collective effort to minimize carbon emissions while ensuring sustainable development.

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## OBJECTIVES:

Case study on carbon emission and how to minimised.

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## METHODOLOGY:

### *DEVELOPING CARBON-FREE DIGITALIZATION*

To implement measures that reduce the carbon footprint associated with technology.

#### Several key points are highlighted:

1. **Carbon Emissions from Technology:** The text recognizes that technology is contributing to carbon emissions, thereby exacerbating global warming. It stresses the importance of finding effective solutions to protect people worldwide in the short and long term.
2. **Corporate Initiatives:** Some larger organizations, such as Google, Amazon, and Facebook, are mentioned for their efforts to reduce carbon emissions. Strategies include focusing on environment-effective methods in data centers, managing power consumption, and relocating data centers to cooler climates to save energy.
3. **Renewable Energy Sources:** The text advocates for the use of climate-friendly solar solutions to power digital services. It suggests that the adoption of solar power can significantly reduce the carbon footprint associated with technology.
4. **Individual Responsibility:** The text encourages individual users to consider their impact on the environment. It mentions that mobile phone usage contributes to the carbon footprint and suggests limiting phone charging and usage to when needed. Conserving electricity is presented as a simple and safe way for individuals to manage their digital carbon footprint.
5. **Potential Savings and Rebound Effects:** A study by EY is referenced, indicating that rebound effects could reduce potential energy savings from energy-efficient technologies. The concept of 'sustainable digitalization' is introduced as a way to achieve decarbonization and foster an eco-friendly future by 2030.
6. **Call for Innovation:** The text concludes by urging developers and innovators to focus on creating devices that consider and effectively reduce the digital carbon footprint. The development of such devices is presented as a means to save lives in the context of the environmental impact of technology.

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## Internet Usage through Mobile Apps

**Electricity Consumption:** Mobile phones contribute significantly to daily electricity consumption due to wireless network connections.

#### Power Consumption Factors:

- The need for more power to ensure network connections reach their destination.
- Copper lines and fiber optic cables contribute to power consumption.
- Distance affects power coverage, impacting carbon emissions and power usage.

**Carbon Footprint:** Mobile phones and their network infrastructure contribute significantly to the carbon footprint of digital technology.

#### Cloud Computing:

**Carbon Footprint:** Cloud computing applications are associated with a significant carbon footprint.

#### Definition of Cloud Computing:

- Storing data in remote computers accessible from any location.
- Technology allowing data backup for remote access.

#### Power Consumption Challenges:

- Cloud computing is described as a power-intensive technology.
- Servers need to be constantly connected to the internet for data accessibility.

#### Impact on Carbon Emissions:

- The continuous growth of cloud computing applications leads to an increase in the digital CO2 footprint globally.
- Leading companies like Microsoft and Amazon contribute to this growth.

**Continued Growth and Impacts:**

- Steady growth in cloud computing services results in more server usage.
- The increased number of users and server usage contributes to a growing digital carbon footprint.

**Concerns and Implications:**

- The growth of cloud computing services poses a risk to the global environment.
- Efforts are needed to address the rising digital carbon footprint and its potential impact on the planet.

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**Conclusion**

Globalization, digitalization, and technology in contributing to the increase in the carbon footprint. It is clear that you acknowledge the impact of these factors on global warming and the importance of finding solutions.

Here are a few suggestions to enhance your conclusion:

**Emphasize the Urgency:**

Highlight the urgency of addressing the issue by underlining the immediate and long-term consequences of the growing carbon footprint. This can help create a sense of urgency among readers.

**Call to Action:**

Encourage readers to take action. Whether it's individuals making sustainable choices in their daily lives or businesses implementing eco-friendly practices, a call to action can inspire change.

**Highlight Positive Examples:**

Mention specific examples of companies or organizations that have successfully implemented solutions and achieved a significant reduction in their carbon emissions. This adds credibility to your argument and provides real-world evidence of effective strategies.

**Policy Recommendations:**

Elaborate on the need for comprehensive laws and regulations at both organizational and governmental levels. Discuss potential policy recommendations that could incentivize sustainable practices and penalize carbon-intensive ones.

**Global Collaboration:**

Emphasize the importance of global collaboration. Global issues like climate change require international cooperation. Mention the significance of countries working together to create and enforce policies that address the carbon footprint on a global scale.

**Highlight the Benefits:**

Briefly discuss the potential benefits of reducing the carbon footprint, not just in terms of environmental impact but also in terms of economic, social, and health benefits. This can appeal to a broader audience.

**Reiterate the Importance:**

Reinforce that addressing the carbon footprint due to technology should be a top priority for ensuring global sustainability and preventing further damage to the environment.

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