

## **Challenges & Opportunities – The Road Ahead for Management of Internet Waste & Carbon Emissions for a Safe & Green Digital World**

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### **Abstract**

Internet, the most powerful tool responsible for the growth and development of any facet of the economy at large is growing exponentially. It has become an indispensable part of our lives accelerating trade, easing faster communication, aiding research and providing recreation. The growing complexity of its services and our dependence have further led to new inventions namely as Internet of things (IOT), Artificial Intelligence (AI), Augmented Reality (AR), Metaverse, Block Chain Technology, Virtual Currency and Over the Top (OTT) Platforms. These new inventions coupled with regular innovations in form of updates and versions have surged the demand for uninterrupted supply of fast speed internet services across the globe. The telecom service providers are constantly on their toes for providing fast pace internet services with minimum glitches at affordable prices in order to win over its customers. Nothing in this world is free, is rightly applicable in our current case. Everything comes at cost of the another. It entirely depends on the fact that Is the cost feasible? If yes then how much & its impact on other variables. The same internet which is like a magic wand in the hands of its users, is also responsible for creation of wastes in the form of energy, land, material resources & time contributing to un amounteds tons of carbon emissions affecting the Green House Gases and ecological system. It is further giving birth to a new form of pollution under the name Internet Pollution.

Diagnostics of the issue paves the way for its treatment that needs to be done in the most effective & efficient manner. The journey to solve any problem isn't always easy due to presence of limiting factors. In the process of management of internet waste, numerous numbers of challenges have to be taken care of, coupled with the new horizons in name of opportunities which are yet to be explored. The present article is a step ahead to bring forth the challenges that come across in the course of minimising the CO<sub>2</sub> emissions resulting in use of Internet services and also suggests the possible ways to reduce its impact on the ecological system to continue our journey in creation of Green Planet with the help of Green Technology.

### **Key Words**

Internet Waste. Carbon Emissions. Internet Pollution. Sustainable Environment

## 1.0 Introduction

The modern Internet created by Vinton Cerf and Bob Kahn is said to have been derived as a result of series of developments in the ARPANET created in 1960's. The internet and web as synonymously used have completely different functions and existence. Internet serves the purpose of road that connects various territories of villages, towns and cities to connect as one for smooth & uninterrupted communication. Internet provides a connectivity to other computers on the web for storage and transfer of files over the web. Web or W3 or WWW is one of the applications out of many created on the internet. It is referred as an interconnected system created for public web pages over the internet. The web is dependent upon the internet where HTTP Protocol is used for transmission of the data through the medium of the browsers namely as Google Chrome, Mozilla Firefox and Internet Explorer. Tim Berners Lee is regarded as the Father of World Wide Web commonly known as WWW that gave the world the much-needed wings to fly.

The revolutionary internet on one hand gave enormous opportunities for constant upgradation in areas of science, research, banking, healthcare, tourism, media and entertainment and on the other has been constantly been another source of pollution creating Carbon Footprints. According to the studies conducted by Boston Consulting Group (BCG) and others worldwide, the digital activity is responsible for 2% of the Earth's CO<sub>2</sub> emissions and this would further increase due to the excessive use of internet services due to the Pandemic Covid- 19 that forced everyone to be on the web. Post Covid-19 it is estimated to be around 8% of the total Green House emissions. To make it simpler every google search is contributing to 0.2 grams of CO<sub>2</sub>.

Considering all the innovations around the world in areas of Green Earth with everything working towards the conservation of environment, our internet is certainly not Green having a zero-carbon impact. The biggest tech giants Google, Microsoft, Facebook, Mozilla, Meta are working constantly to be carbon negative so as to balance the ecological system by creating projects that offset the CO<sub>2</sub> emissions created through the use of internet services.

Internet pollution is considered to be the most emerging form of pollution yet being unheard by many. It refers to the emissions of GHG's through digital actions including infrastructure, energy resources and devices. A faster and smoother internet experience is based upon a firm infrastructure using the scarce and precious metals like steel, copper, mercury, aluminum along with regular supply of energy for transmission and storage of data at the data centers which further require advanced cooling system to manage the heat. Such energy generation is based upon burning of the fossil fuels which is further adding to the problem of unbalanced ecological system. All these resources combined are depleting day by day and affecting our ecological system in the ways that cannot be restored.

## 2.0 Challenges

The concept of internet pollution is still unknown and unrecognized to the world at large. The glitter & glamour initially looks appealing until being in it and witnessing the unseen and untold. Our changing dynamics for development have always showcased the challenges long after they have actually affected the world with its consequences. The following can be understood by sharing a glimpse of the hurdles in the pathway of understanding and educating the ill sides of the glorious Internet.

**First**, it is the unawareness among the people about the idea of the pollution through the use of internet services since being intangible for the most. But when studied closely, it contributes both tangible and intangible pollution. The functioning of continuous high speed data service is dependent upon high quality infrastructure using metals, cables, electricity, storage devices, cooling components which require constant upgrades. This means the outdated ones find themselves buried in the landfills contributing to the increased count of carbon emissions, pollution of land, in short waste. The unawareness among people is regarding the wastage that can be minimized by shutting down the devices when not in use which would save the energy that is generated by burning of fossil fuels. The closing of extra tabs on system can reduce the internet traffic and further provide more battery life to the equipment.

**Second**, the rate of technological change is growing at a much faster pace than it was thought to be. Every day there are new patents in areas of idea, designs, processes, packaging which have made people to be on their toes striving continuously to produce some kind of differentiation to stand a chance in the turbulent ocean of business uncertainty. This change adds to the amount of E waste in the form of older gadgets & equipment which could have been reused or recycled to avoid piling into the heaps of waste in the landfills.

**Third**, work culture across the globe have forced the people to be constantly available. The fast-paced internet service have given modern tools for working in the form of spreadsheets, econometric tools, software and applications. An email is the most common type of communication that has no cost to be paid. There are tons of E-Mails in each one's mailbox. Some being completely trash which will automatically be deleted after a certain time while others not being that important are even not read. The tons of attachments in form of files, photos are shared with masses keeping aside its cost to the environment in form of carbon emissions. A study shows the carbon cost of an email with an attachment of 1 MB is contributing 19 gms of CO<sub>2</sub> which may sound low but, when accounted for the entire world per second, the figures shall be alarming.

**Fourth**, the societal pressure of knowing everything in shortest span of time have given a boost to the growing need of faster internet services. Everything available at just a click away even when it may not be

desirable produces internet traffic on a huge scale. The concept of Fear of Missing Out (FOMO) needs to be catered, in order to prioritize what is actually needed and necessary.

**Fifth**, we live in a constant dynamic world that makes us constantly thriving for something more. This dynamism in today's era, especially after the birth of Covid-19 has made everyone available online. The traditional form of teaching and learning restricted to four walls have been replaced with own paced learning with gadgets. The banking services from the branches have flown wide and have found their place in E-Wallets making their presence in the banking laws of the nations. The real estate which was dependent upon physical visits of the clients have shifted to virtual visits.

**Six**, availability of reservoir for data storage keeps the hope of storing heaps of data without even whether the saved data serves some purpose or not. Unnecessary subscriptions to pages, multiple duplicate copies of files and photographs find themselves evenly placed in the storage. The tech giants like Microsoft and other organizations having their data centers in extreme oceans and Antarctic are constantly working on creating more data storage centers with natural cooling environment to not affect the users regarding shortage of storage medias. Not a day far when we might be utilizing the outer space and other planets to help out in data storage.

**Seven**, lack of regulatory attention by the government and other authorities across the globe have added to issue in many ways. The norms for plastic ban and use of single use plastics have been successful in looking for environmentally friendly materials and bringing the concept of reuse & recycle to the masses. Unfortunately, there has been no attention given to the internet waste where the concept of reuse and recycle of already available data can be implemented.

**Eight**, unconscious habits of each one of us to create back up of back up in case the backup is lost is a popular trend without realizing its cost. Keeping multiple tabs open while browsing because multitasking is great leads to more consumption of power to run the system. Subscribing to numerous numbers of website notifications even when not required create piles of unread e-mails affecting the storage capacity. Live streaming instead of downloading adds to massive internet traffic.

### **3.0 Opportunities**

**First** creation of waste solution through technology is the smart way of tackling the issues of waste management. All kinds of waste in present times are being treated to their maximum capacity with the help of advanced IOT. This not only contributes to elimination of waste but also provides avenues in areas of

management of waste which may be utilized for the greater good in terms of usefulness, cost and efficiency. Waste can never turn into zero but efforts can be made to reduce it as far as possible.

**Second** management of internet waste is yet an unexplored area that needs to find its course. In today's times of environment & energy conservation, sustainable practices, environment friendly goods and services, environment consciousness where everything revolving around minimization of waste and maximization of output with the use of upgraded technology in every area, it becomes of utmost important to understand the dynamics of internet waste. Huge amount of research is possible to understand the impact of growing internet on our ecological and economic systems.

**Third**, creation of awareness among the ignorant people for waste generated and resources wasted can sort out the issue of further adding to the already precedent problem. Since masses are not aware about the consequences of the newest form of pollution, its not feasible to make people restrict their usages and utilize it for the utmost necessity. Awareness programs and campaigns can be conducted with the support of organizations and eminent personalities to draw the attention of the users for the common good.

**Fourth**, monitoring of I- Waste & emissions becomes utmost important before implementing any action plan for its control as it requires the exact nature of the problem and its gravity. Proper quantification of data shall help the researchers and law-making bodies to make adequate plan of action for its redressal. In the current world of Artificial Intelligence, Augmented Reality and Internet of Things, technology can be considered as biggest support system for recording & analyzing any amount of data.

**Fifth**, supporting work culture in form of avoidance of unnecessary mails, duplication of files and folders, notifications etc. shall contribute immensely in controlling internet traffic and carbon emissions at a significant level. The global pandemic has made everyone dependent upon mails and messages to the greatest level creating more internet waste. An appropriate work culture eliminating the use of excess mails, drives and folders will not only give a chance for personal interaction among the people but also help in reduction of carbon emissions and electricity consumption.

**Sixth**, Enactment of adequate rules, regulations and guidelines similar to any of environment protection laws across the globe that help in conservation and protection of environment shall further help in curbing the carbon emissions through the use of computer and technology. Such rules and protocols should be executed worldwide to have a greater impact for our generations to come.

**Seventh**, Change is inevitable and necessary for a long-term sustainable future. Changing mindset of people will have a long way to go than any rules and regulations made by national or international organizations.

All it requires is awareness among the people for its impact on life of individuals and community at large. Though there is a long way to go but as it is said a work well begun is half done.

#### **4.0 Conclusion**

Technology being the ultimate and the most powerful tool in the hands of the human civilization has not only made the lives easier but also has created more avenues for further progress and advancement of the species Homo Sapiens. With every day bringing something new to the table is always a challenging task for all the entrepreneurs across the world and the rising requirements of sustainable and green global economy makes it more complex. The internet services have outgrown in its demand over the last decade and it is growing at an exponential rate each day. Such soaring demands have added to the issues of carbon emissions and affecting the greenhouse gases by adding a new category of pollution as Internet Pollution. The internet giants have been constantly developing data centers and servers within the oceans to have a steady supply with automatic cooling system for their uninterrupted supply affecting the marine life as well as loss of precious metals and land resources. The road to green and sustainable earth for a better tomorrow is a roller coaster ride having multiple blocs in between in the form of unawareness among the users regarding its correct and conscious use, work culture, missing regulatory framework, business dynamism etc. The difficulties define the next coarse of action and generate more innovative practices with economy. Believing in its truth the future ride of the journey of internet can be made with an attempt to reduce the CO<sub>2</sub> emissions thereby living the booming management concept of zero waste or negative waste. This can be achieved through the same internet services available using advanced concepts of IOT, AR and AI. Regular monitoring of I waste and carbon emissions with the help of a standard regulatory body will not only act as a principal guideline to work in a unified direction but also help in establishing a bench mark for other nations to further explore the area of waste management.

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