AMITY JOURNAL OF ENERGY & ENVIRONMENT STUDIES

शान्तिरेव परमं सुखम्

Peace is the ultimate happiness

As the ongoing conflict in Ukraine casts a long shadow across the international stage, its ramifications stretch far beyond the battlefields, reaching even the pages of the Amity Journal of Energy and Environment Studies. In this turbulent time, it would be remiss to ignore the war's reverberations through the very systems we study and strive to protect.

The immediate impacts are stark. Fossil fuels, long the lifeblood of conflict, have again become pawns in a geopolitical game. Energy sanctions, supply chain disruptions, and the looming specter of a wider European conflict threaten to destabilize global energy markets. The environmental consequences are already worrisome, with surging emissions and the potential for longterm damage to fragile ecosystems.

But beyond the immediate crisis, the war casts a sharp spotlight on the deeper questions we, as energy and environmental scholars, must grapple with. Can this tragedy serve as a catalyst for the world to accelerate its transition to a cleaner, more sustainable energy future? How can we guarantee energy security without compromising environmental well-being? And what role can research, innovation, and policy play in mitigating the environmental consequences of future conflicts?

The Ukraine war presents a compelling, and unfortunately timely, case study in the intricate web of energy, environment, and conflict. It demands rigorous research, critical analysis, and bold solutions. Our journal, dedicated to the nexus of these issues, has a vital role to play in shedding light on the war's implications and exploring pathways towards a more secure and sustainable future.

In the coming months, we will be dedicating special issues and thematic sections to delve into the various facets of this crisis. We invite scholars, practitioners, and policymakers to submit their research, analyses, and perspectives on:

• The geopolitical, economic, and environmental repercussions of the war on global energy systems.

• Accelerating the transition to renewable energy in the face of energy insecurity. • The role of environmental diplomacy and resource management in conflict prevention and resolution.

• Building resilience in critical energy infrastructure against future conflicts and environmental threats.

• The ethical considerations of energy use and resource deployment in times of war.

This is not merely an academic exercise. The answers we seek have real-world consequences, impacting the lives of millions caught in the crossfire and shaping the trajectory of our planet for generations to come. By fostering a platform for diverse voices and critical thinking, we can hope to navigate this dark chapter and emerge with a clearer vision for a future where energy empowers, not destroys, and where environmental well-being is a cornerstone of peace and security.

In the face of this war's grim canvas, let us, as a community of scholars and stewards of our planet, raise the torch of knowledge and illuminate the path towards a more sustainable and peaceful future.

Best Wishes,

Dr. Sanjeev Bansal
Editor -In-Chief

Amity Journal of Energy and Environment Studies

Analytical Dissection On Climate Change

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"Climate Change is no longer a far off problem; it's happening here, it is happening now".
-Barack Obama

Climate of the Earth is changing at each place, there is a bit contrast amongst Climate and Weather, which is, climate is for a more extended period in a zone though weather continues evolving e.g., Arizona has a Dry Climate, Brazil has a Tropical Climate. Presently, it is a direct result of we people that there has been a considerable measure of impedance in the atmosphere of the Mother Earth, the essential reason for such change in the climate is because of different sorts of contamination and furthermore not utilizing the resources in an sustainable way. For the Greed of Vitality man has been using the resources without considering the result, which has landed us in the critical circumstance where the climate of the Earth has begun changing at a disturbing rate. Earth has received some exacting evidentiary spots because of contamination i.e., Environmental change, Global Warming, Ocean Acidification, Eutrophication and so on. In this paper, we have adopted Non-Doctrinal Research Methodology, the broad themes of the paper is researcher has Evidences of Climate Change and finding about the International Protocols and steps taken in the world like Kyoto Protocol and Paris Agreement etc. Another subject is be talking about the shortcomings and their critical aspects of the steps taken in the said protocols, and finally researcher will also be discussing about how to avoid the loopholes and how it can be made friendly with other developing nations, so that they are also able to follow the steps without much problems.

Keywords: Evidences, Measures Taken, Shortcomings, Loopholes, Critics, Nation friendly

INTRODUCTION

Individuals over the world are battling with the substances of Climate change. The poor in developing nations are hit hardest and confront troublesome difficulties: How to manage higher temperatures, changes in rain designs, rising ocean levels, and more incessant climate related catastrophes? How to adjust to environmental change? How to moderate the dangers for horticulture, nourishment, and water supplies?

Also, urban areas are developing and in 20 years, very nearly 5 billion individuals will live in urban areas that will radiate around seventy five percent of the world's greenhouse gasses. In question are late picks up in the battle against neediness, yearning and ailment, and the lives and job of billions of individuals in creating nations. Low carbon monetary improvement that is climate friendly and climate resilient will require tremendous jumps forward in development, learning sharing, and capacity building.

Amid the UN General Assembly session of 1990, there were a few transactions that were attempted with the point of making a formal collection of tending to the issue of environmental change. One of the consequences of the arrangements was the development of a body that would concoct a tradition that would manage environmental change; it was known as the Intergovernmental Negotiating Committee (INC).

This council took fifteen months to concoct a tradition for handling environmental change, and it suitably named it the Climate Change Convention. This tradition was then displayed before the UN Commission on Environment and Development (UN CED) for marking in 1992 - this was the well-known Earth Summit.

Greenhouse Gasses, for example, carbon dioxide (CO_2) assimilate warm (infrared radiation) Transmitted from Earth's surface. Increments in the atmospheric concentrations of these gases make Earth warm by catching a greater amount of this heat.

Human exercises—particularly the blazing of fossil fuels since the begin of the Industrial Revolution—have increased air CO_2 fixations by around 40%, with the greater part the expansion happening since 1970. Since 1900, the worldwide normal surface temperature has expanded by around 0.8 °C (1.4 °F). This has been joined by warming of the sea, an ascent in ocean level, a solid decrease in Arctic Ocean ice, and numerous other related Climatic Impacts. Much of this warming has happened in the most recent four decades. Point by point investigations have appeared that the warming amid this period is essentially a consequence of the expanded centralizations of CO_2 and other nursery gasses. Proceeded with discharges of these gasses will bring on additional environmental change, incorporating significant increments in worldwide normal surface

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temperature and critical changes in local atmosphere. The greatness and timing of these progressions will rely on upon many elements, and stoppages and increasing velocities in warming enduring 10 years then again more will keep on occurring. Long haul environmental change over numerous decades will depend fundamentally on the aggregate sum of CO2 and other greenhouse gasses transmitted as after effect of human exercises.

LITERATURE REVIEW

This research paper focuses on the evidences of climate change and how with the passage of time various countries both developed and developing countries have come with International Protocols to fight back Climate Change and make earth available in a better position for the upcoming generations. We have discussed about nearly all the relevant environmental protocols and also discussed about their shortcomings. We have analysed Inter governmental Panel on Climate Change to come to our conclusions. Also, we have analysed various renowned journals like The Astronomical Journal, IISD Earth Negotiations Bulletin and Marrakesh Accords to get our data and analyse it. Furthermore, we have assessed various articles and research papers and to cover the untouched portions.

DATA ANALYSIS

Research Aim and Structure

Climate Change is the most challenging issue humankind is facing in the world today. The National Green Tribunal and various International Organisations dealing with Climate are unable to slow down the climate change process. The shorelines all over the world are depleting and the polar ice caps are continuously melting at a rate never precedented before. The whole world is facing extremes of weather and loss of agriculture and vegetation.

Aim

This research paper aims to bring to light that Climate Change has been a grave issue from the previous century. We have brought to light all the major international conventions dealing with Climate, their development and what work have they done in the previous years. Furthermore, we have tried to provide some solutions which are needed to be enforced at all the levels immediately

so as to delay the Climate Change or to fight it and avoid the disaster which may be caused due to Climate Change.

Structure

With this objective structure of research mounted in this paper is as follows: Firstly, an overview of evidences and proof has been presented that Climate Change is real and it is happening every passing second. Secondly, we will discuss about the present protocols and its shortcomings with its present impact. And finally, we will be providing few of the available solutions to the problems mentioned in this research paper and how government can use them to help stop Global Climate Change.

EVIDENCES AND EFFECTS OF CLIMATE CHANGE

• Is the climate warming? Yes. Earth's normal surface air temperature has expanded by around 0.8 °C (1.4 °F) since 1900, with a lot of this expansion occurring since the mid-1970s. An extensive variety of different observations, (for example, diminished Arctic ocean ice degree and expanded sea heat content) and signs from the natural world, (for example, pole ward shifts of temperature-sensitive types of fish, well evolved creatures, mammals, insects and so forth.) together give indisputable proof of planetary-scale warming.

• Is climate change is largely caused by human activities? Yes, since the mid-1800s, researchers have realized that CO2 is one of the fundamental greenhouse gasses of significance to Earth's energy balance. Coordinate estimations of CO2 in the environment and in air caught in ice demonstrate that environmental CO2 expanded by around 40% from 1800 to 2012. Estimations of various types of carbon (isotopes) uncover that this expansion is because of human exercises. Other greenhouse gasses (outstandingly methane and nitrous oxide) are likewise expanding as an outcome of human exercises. The observed worldwide surface temperature ascend since 1900 is steady with point by point counts of the effects of the observed increment in environmental CO2 (and other human-incited changes) on Earth's energy balance.

• Changes in water availability for the 2090s relative to 1980-1999. Values are the median for 12 climate models. White areas are where less than two-thirds of the models agree and hatched areas are where 90 per cent of the models agree.

• Temperature, Precipitation, and Extreme Weather Observed (instrumental) data indicate that global near-surface air temperature has increased by approximately 1.08°F (0.6°C) since the late nineteenth century. Most of this increase has occurred in two periods, from about 1910 - 1945 and since 1976. Minimum temperatures in the latter half of the century have been increasing at nearly twice the rate of maximum temperatures, reducing the diurnal temperature range in many parts of the world. Increases in daily minimum temperatures are lengthening the freeze-free season in most mid- and high latitude regions. Instrumental records of precipitation on land show an increase of 0.5 to 1% per decade in much of the Northern Hemisphere mid- and high latitudes. In contrast, over much of the sub-tropical land areas rainfall decreased during the twentieth century. Over the latter half of the twentieth century it is likely that there has been a 2 to 4% increase in the frequency of heavy precipitation events reported by the available observing stations in the mid- and high latitudes of the Northern Hemisphere. However, the observed record shows no significant change in tropical and extra-tropical storm intensity, and no systematic changes in the frequency of tornadoes, thunder days, or hail events. Furthermore, the reporting of extreme events has changed substantially with time, making a trend analysis difficult.

• Glaciers, Lake-Ice and River-Ice Alpine and continental glaciers have retreated in response to twentieth century warming, although glaciers in a few maritime regions are advancing. Northern Hemisphere lake-ice and river-ice cover over the past century shows widespread decreases in duration, averaging about two fewer weeks of ice cover. Snow cover extent has decreased by about 10% since 1966.

• There has been a 10 to 15% decrease in ocean ice degree in the Arctic spring and summer since the 1950s and information from submarines demonstrate that there has been around a 40% decrease in Arctic ocean ice thickness in summer or early fall between the period 1958 to 1976 and in the mid-1990s, or a normal of around 1.57 inches (4 cm) every year. Other autonomous perceptions demonstrate a much slower diminish in winter ocean ice thickness of around 0.39 inches (1 cm) every year. Be that as it may, it is hard to evaluate the impact of the generous inter annual and between decadal inconstancies on these changes.

• Ocean level Rise In light of tide gauge information, the rate of worldwide normal ocean

level ascent amid the twentieth century is in the scope of 0.04 to 0.08 inches (1.0 to 2.0 mm) every year, with a focal estimation of 0.06 inches (1.5 mm) every year. In light of the couple of long tide gage records, the normal rate of ocean level ascent has been bigger amid the twentieth century than the nineteenth century.

Estimated millions of people per annum at risk globally from coastal flooding. Blue bars: numbers at risk without sea-level rise; purple bars: numbers at risk with sea-level rise.

• Biological Systems Available observational evidence indicates that regional changes in climate, particularly increases in temperature, have already affected biological systems in many parts of the world. Examples of observed changes include lengthening of mid- to high-latitude growing seasons, pole ward and altitudinal shifts of plant and animal ranges, declines of some plant and animal populations, and earlier flowering of trees, emergence of insects, and egg-laying in birds.

• Climate change, whatever the cause, has profoundly affected human societies and the natural environment in the past. Throughout history there are examples of societal collapse associated with regional changes in climate, ranging from the decline of the Maya in Mexico (linked to drought) to the disappearance of the Viking community from Greenland in the fifteenth century (linked to decreasing temperatures)285. Some of these regional climate changes occurred rapidly, on timescales similar to current rates of global climate change.

• Earth's lower air is getting to be distinctly hotter and moister accordingly of human discharged greenhouse gasses. This gives the potential for more vitality for storms and certain serious climate occasions. Steady with hypothetical desires, substantial precipitation and snowfall occasions (which increment the danger of flooding) and heat waves are by and large turning out to be more continuous. Drifts in extraordinary precipitation fluctuate from district to area: the most articulated changes are clear in North America and parts of Europe, particularly in winter.

PROTOCOL AND ITS SHORTCOMINGS:

Amid the UN General Assembly session of 1990, there were a few arrangements that were embraced with the point of making a formal assortment of tending to the issue of environmental change. One of the after effects of the transactions was the arrangement of a body that would concoct a

tradition that would manage environmental change; it was known as the Intergovernmental Negotiating Committee (INC) This board of trustees took fifteen months to think of a tradition for handling environmental change, and it apropos named it the Climate Change Convention. This tradition was then exhibited before the UN Commission on Environment and Development (UN CED) for marking in 1992 - this was the renowned Earth Summit.

UN Framework Convention on Climate Change (UNFCCC) was also surpassed by the (CCC) The Climate Change Convention. The CCC was also not much of a use as a dispute took place regarding that the Northern Countries were causing more pollution than that of the countries in the Southern Hemisphere, so now after all this the birth of the Kyoto Protocol took place.

The Kyoto Protocol came into force in 1995 after the Russian Federation ratified it, and it was adopted at the 3rd Conference of Parties (COP 3) in 1997 in Kyoto, Japan. The first commitment period of the Kyoto Protocol was from 2008-2012.The basic difference between the CCC and the Kyoto Protocol was that CCC was aimed at encouraging parties to reduce their GHG (greenhouse gasses) emissions, while KP was tailored to legally bind parties towards realizing their emission reduction targets. The Kyoto Protocol covers six Green House Gases, namely carbon dioxide, methane, nitrous oxide, hydrofluoracarbons, perfluorocarbons and sulphur hexafluoride. The Kyoto Protocol had some countries who, had been a part of it and were called the good people. But the Kyoto Protocol couldn't succeed because USA, Australia and China, among other countries, are some of the biggest polluters in terms of Green House Gas emissions, yet they have been playing cat and mouse with regards to being legally bound by the Kyoto Protocol. So, as these important countries are not playing a good role in following it hence it did not become much successful.

In a nutshell, the functional components of the Kyoto Protocol are known as the Kyoto Protocol Mecha¬nisms. These are the functional components that actually make up the Kyoto Protocol, and they are:

• Emissions Trading.

• Clean Development Mechanism (CDM).

• Joint Implementation (JI) let us first itemize the objectives of these mechanisms before delving into their details.

• To stimulate sustainable development through technology transfer and investment.

• To assist countries to reach their Kyoto commitments in a manner that is cost-effective.

• To encourage both the private sector and developing countries to contribute to emission reduction ef¬forts.

Other Conferences which took placed:

The journey to COP 18 and climate change process in general has been long, and it traces its roots to the UN Conference on Environment and Development held in May 1992 in Rio de Janeiro Brazil. The convention came into full force in 1994, and it established the Conference of the Parties (COP), the highest decision making pro¬cess in the convention.

a) COP 1: Establishing the Basics

The 1st COP (COP 1) was held in Berlin in 1995, and it aimed at addressing the member states' capacity in implementing the Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implemen¬tation (SBI). The 'Berlin Mandate' was the result of this meeting, with its main task being to draft a protocol or legal instrument to compel Parties to address climate change.

b) COP 2: Geneva Declaration

COP 2 was held in Geneva in 1996 and it focused on stressing the need to accelerate talks on how to strengthen Climate Change Convention.

c) COP 3: Kyoto Protocol

COP 3 was held in Kyoto in 1997 where the Kyoto Protocol was adopted. The protocol was instrumental in efforts aimed at curbing greenhouse gas emissions, and it came up with mechanisms such as emission trading, Clean Development Mechanism (CDM) and joint implementation.

d) COP 4: Plan of Action

COP 4 was held in Buenos Aires, Argentina in 1998 and aimed at strengthening the provisions of Kyoto Protocol through the adoption of a 2-year action plan.

e) COP 5:Finalizing the Kyoto Protocol

COP 5 was held in Bonn, Germany in 1999, and it set a timetable for completing work on the Kyoto Protocol.

f) COP 6: Kyoto Protocol Operation Rulebook

The first session of COP 6 took place in The Hague,

Netherlands in the year 2000. The negotiations took a politi¬cal turn with the US and EU, carbon credit and matters compliance taking the centre stage. The second session of COP 6 was held in Bonn, Germany and focused on flexible mechanisms, carbon sinks, compliance matters and funding the climate change process.

g) COP 7: Marrakech Accords

The COP 7 was held in Marrakech, Morocco in 2001 and it finalized on the Buenos Aires Action Plan and Ratifi¬cation of Kyoto Protocol. The convention also adopted the Marrakech Accords. The Marrakech Accords have provided guidelines specifically dealing with green house gases and how they must be managed, it has also mentioned that funds must be raised to support the plans which may help in stopping or delaying the rapid climate change.

h) COP 8: New Delhi Work Program

COP 8 was held in New Delhi India in 2002, and adopted the Delhi Ministerial Declaration & New Delhi Work Program. CoP-8 can be considered as a failure as India being a host failed to convince even small nations that it is adhering to the COP. A member country representative from Tuvalu stated " We find it a pity that the Delhi Declaration was not embellished with the same spice, flavours and delicious titbits so much a feature of Indian food".

i) COP 9: Adaptation Fund

COP 9 took place in Milan, Italy in 2003 and adopted among others the Adaptation Fund to support developing countries in adapting better mechanisms in curbing climate change.

j) COP 10: Post-Kyoto Mechanisms

COP 10 was held in Buenos Aires, Argentina in 2004, and it aimed at promoting climate change, mitigation and adaptation of cleaner mechanisms as well as post-Kyoto mechanisms.

k) COP 11: Montreal Action Plan

In 2005, COP 11 was held in Montreal Canada. It also marked the first meeting of the parties (MOP-1) to Kyoto Protocol. The conference produced the Montreal Action Plan.

l) COP 12: Nairobi Conference

The COP 12 was held in 2006 in Nairobi, where a 5 year plan was adapted. Major focus was done to develop clean development mechanism to fight Climate Change.

m) COP 13: Bali Action Plan

Year 2007 saw COP 13 being held in Bali, Indonesia where the post 2012 framework and Bali Action Plan was developed.

n) COP 14: Poznan Climate Change Conference

In 2008, COP 14 was held in Poznan, Poland. In the conference, the delegates proposed the modality for financ¬ing the poor nations in curbing climate change.

o) COP 15: Copenhagen Accord

COP 15 was held in Copenhagen Denmark in 2009, with an aim of establishing a global climate change agreement to succeed Kyoto Protocol. This, however, was not realized.

p) COP 16: Cancun Agreements

In 2010, COP 16 was held in Cancun Mexico.

q) COP 17: Durban Platform

COP 17 was held in Durban South Africa. A highlight of this conference was the creation of the Green Climate Fund.

r) COP 18

Between November 26 and December 7, 2012, COP 18 took places in Doha, Qatar, and it seeks to renew com¬mitments on the Kyoto Protocol. The nations have shown grave concerns regarding Climate Change and have requested for new commitments.

S) COP 19

The 19th meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES CoP19) is expected to take place in Panama in 2022.

MAJOR RESEARCH FINDINGS AND SOLUTIONS

• RENEWABLES ARE GROWING AND GETTING CHEAPER

Because of declining expenses and enhancements in renewable advancements, sun powered and wind activities are being implicit a larger number of spots the world over more economically than whenever ever. On top of that, if the cost of photovoltaic cells keeps on dropping as quickly as it has in the course of recent years then the use will become easier and people will use it efficiently.

- INCREASE USE OF SOLAR POWER

In many places across the United States, not only is solar power becoming more affordable than ever before, it's actually becoming cost competitive with most utility rates for energy from fossil fuel. When solar power costs the same (or less!) as purchasing power from the grid, it's called solar grid parity, and it's an important milestone in demonstrating the cost-effectiveness of harnessing the power of the sun.

- THE ELECTRIC GRID IS EVOLVING

A smarter and more flexible electric grid is critical too. Smart grids improve energy efficiency, save money, and can improve reliability – all great reasons to move away from fossil fuels towards cleaner sources of energy. And since the grid is evolving and more renewable are being introduced, there is huge potential to revolutionize the energy market – for the benefit of the environment and economy.

- TRANSPORTATION IS MORE EFFICIENT AND PUBLIC TRANSIT IS GROWING

Huge investments in public transportation in countries like India and Colombia are helping contribute to energy conservation, land preservation, reduced air pollution, and so much more.

- RAIN WATER HARVESTING IS BEING IMPLEMENTED

Rain water harvesting has been made as a law in various countries and it has become for all the people to have rain water harvesting in their homes otherwise penalty may be imposed.

It is a major step towards helping the climate.

- WIND ENERGY

The use of Wind Energy as observed by the scientists reduces carbon emissions at a very huge level and maintains ecological balance, but only if we consider the carbon levels it is very helpful. But, sometimes the construction and infrastructure of the windmills itself causes eco logical damage. The international organisations and governments must try to solve it so that wind energy can be harnessed for the betterment of the society.

- ENERGY EFFICIENCY

The government must come with ideas which makes the usage of energy usage in an efficient manner. Like the usage of cars (car-pooling), electronic vehicle, innovation in industries must be done while discharging waste. Low noise refrigeration systems and cold storages must be developed, efficient washing machines, efficient public lighting systems, must be developed. People must be motivated to dry clothes in the sun instead of using dryers, these can be small measures which can be taken to reduce the use of energy. Use of air conditioning must be managed at public place, because improper usage of cooling systems causes increase in air temperatures which causes inefficient energy usage.

- WASTE MANAGEMENT & RECYCLING

The government must develop a highly efficient system of recycling and waste reduction so that the resources can be used judiciously. Furthermore, the production methods must be adapted as to consumption patterns. Over production leads to wastage, ultimately causing damage to the ecosystem.

USE OF AI TO REDUCE POLLUTION

Artificial Intelligence can be applied to solve traffic problems in modern cities. With the help of AI we can understand the routes of daily traffic and how a better infrastructure or diversion can reduce peak pollution at specific points and hence, can regulated it by diverting it. AI has also been developed in a manner where it can help to reduce deforestation with the means of remote sensing. The SilviaTerra application developed by Microsoft and co-founded by Max Nova and Zack Parisa uses artificial intelligence and satellite imaging to determine trees' number, size, type, and health status in forests. With the help of these apps and AI based technology we can give a promising future to the upcoming generation. As, we all know there is no Planet B, and there is only one Mother Earth.

TECHNOLOGY TRANSFER

Internationally, the commitments must be made so as to promote and provide the needy nations better technology to reduce the impact on the environment. Better, engines, equipment, techniques skills and knowledge must be provided to them. So, the weaker and technologically less advanced nations can at the beginning of their development are able to save their environment and ultimately help the whole globe in maintaining a better Global Climate. R&D must be done by advanced nations in the fields of better catalytic converters, cleaning systems, waste discharge

systems to achieve the least damaging way to the nature.

CONCLUSION

At last we would like to conclude by saying that, after doing research on the climate change and its evidences and impacts we have come to know that climate change is a very important issue which is needed to be taken care of, some ways by which climate can saved have been mentioned above. Saving the world requires well-informed citizens, using figures, facts, and a hands-on approach to educate your family, friends, and communities about the climate crisis. Maybe even writing for the local newspaper can also help in the development of better climate and at least the increasing rate of climate being damaged can be stopped a bit by providing the people a little more knowledge about the developments happening in the nature and the way it can affect them.

It must be brought to light that merely conventions and laws cannot fight Climate Change and there is a need is a need to think beyond development on earth in reference of industries. There are various communities specifically the poor people which are getting effected by the change. Climate Change is directly hitting the agriculture sector, by the means of, lack or excess rainfall, hailstorms, unprecedented summers, causing loss to farmers, overall increasing hunger and malnutrition. Climate change is causing shift in fishing areas, impacting the local population, business and again leading to indirect harm in the society. There have been increase in tidal floodings, landslides due to deforestation and soil erosion due to excessive construction and human invasion in the nature.

We must bring education to the society and implement laws which are not toothless. We must understand that as the "Climate Changes so should we". We must leave the age old practices of agriculture, mining, etc. and deploy more sustainable means so that climate change can be stopped, or at least delayed, considering the present circumstances. The International Protocols have failed to stop the rapid climate change, and has now led to an alarming situation. Furthermore, it is the small efforts that matter which we want to implement at a global level, so the usage of energy and resources must be adequately by the citizens itself, in this way helping the governments world-wide to getter a cleaner and better world.

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Role of HR in Monitoring Security Solutions in an Organization & Evaluating Gaps (With reference to IT sector)

Chanya Gambhir*   **Harshita****   **Anjali Gupta*****

Businesses today are operating in a dynamic environment, exposing them to risks related to cybersecurity. This has become a major point of concern for all the organizations, irrespective of their size or industry they are operating in. This paper focuses upon how role of HR is evolving from mere employee management to contribute in ensuring cybersecurity. HR practitioners can integrate their roles with specialists in other fields like IT and Industrial and Organizational psychologists (I-O) to increase an organization's capabilities to counteract the risks of cybersecurity. HR managers play an important role in educating and creating awareness among the end users of computer (employees) so that organizations are not exposed to the threat of cybercrimes. The paper is helping to identify the role of HR can help in mitigating the risks involving cybercrime in the IT sector.

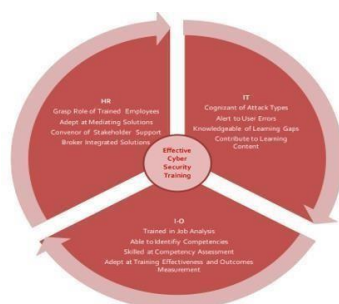Key words: Cybersecurity, Preventive measures, Cybersecurity awareness, Cybercrime

INTRODUCTION

This paper is bringing upon the newer aspects of HR in IT sector. It tells us about the cybercrime that has been impacting the industry in major factors. We have narrowed our study in terms of security, confidentiality and privacy that are the major areas affected due to cybercrimes in IT sector. The study emphasis upon how these crimes can be mitigated in IT sector and how HR's can be a supporting pillar contributing towards cybersecurity.

Proper awareness when complimented with right training is the key to protect the organization from cybercrimes. Unlike the traditional approach of IT team being held responsible for the cyber instances, modern approach expects different specialized fields integrating their skills to shield themselves from these crimes.

The diagram below represents the specialized fields in an organization whose skills if integrated, can help to frame effective policies to combat cybercrime.

Diagram 1: Interdisciplinary education and training model

Source: (Richard E. Beyer, 2015)

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CYBERCRIME IN IT SECTOR

A simple definition of what cybercrime is "Cybercrime is criminal activity that either targets or uses a computer, a computer network or a networked device." (Kaspersky, n.d.)

Cybercrime has become a prevalent issue and is on rise globally. Irrespective of the size or the industry, organizations operating in IT sector are still falling victims to these crimes. "Hackers are targeting this sector to get access to the ecosystem of global clients they serve" (Manishree Bhattacharya, 2019) This sector is dealing with loads of confidential information of clients (both domestic and international) making them the soft targets for hackers. These hackers are putting client's confidential information on stake along with the company's reputation.

Cybersecurity has thus become a need of the hour for the organization's operating in IT sector. They need to invest effectively and efficiently towards cybersecurity products. More emphasis should be placed by organizations upon data security and privacy to safeguard themselves from crimes that might cost them their reputation or backlashes from global regulation bodies.

TYPES OF CYBERHACKERS AND CYBERCRIMES IN IT SECTOR

IT sector is exposed to both cybercrimes and cyberhackers. While the former deals with the various attacks that this sector might face, the latter is emphasising upon who are the people behind these crimes. The diagrams below show the crimes and hackers disrupting this sector and putting its reputation on stake.

Diagram 2: Cybercrimes in IT sector

Diagram 3: Cyberhackers in IT sector

ROLE OF HR IN PREVENTION AND AWARENESS OF CYBERCRIME

The duty of the HR department is to serve the organization and it should focus primarily on the benefits of the organization rather than interests of the individuals. This study is focusing upon how HR can contribute towards ensuring cybersecurity in the organizations. HR is a role that is not merely limited to only employee engagement anymore, instead it has taken over the responsibility that traditionally lied with other department like IT team of the organization.

HR teams have now started to integrate their roles and responsibilities with other specialists in other fields in order to frame policies that would be in favour of both, the organization and employees. HR teams, IT teams and I-O teams are now integrating their skills to address the cybersecurity concerns prevailing currently.

HRs now prefer to hire employees who are well versed with the concept of cybersecurity and are working towards the same. As for the existing employees, HR teams are now formulating policies like training them on topics related to cybersecurity. This can be done when the SMEs of all the specialized fields come together and work towards the given objective.

"SMEs must first examine the job and specific cyber security functions by level for employees in the organization. This step is rooted in job analysis. I-O psychologists can play a crucial role in this phase of the process, due to their education and training related to job analysis. Second, I-O psychologists are especially capable of performing analysis where it may not exist and guiding SMEs to a clearer understanding of competencies required to successfully perform essential job functions. Third, when performing training needs analysis, it is crucial for those involved to assess whether employees competently perform role-required tasks. When performance gaps appear that are caused by competency deficits, the specialized training of I-O psychologists is invaluable for leading efforts to build gap-closing 11 training content. Fourth, training needs analysis serves as a basis upon which to develop objectives that impart specified knowledge, skills and attitude levels commensurate with task requirements. Fifth, SMEs must determine which methods best support objectives and conduct training. This step is advanced by the aforementioned employer survey, because it yields useful information about best practices. Sixth, SMEs must evaluate training effectiveness and determine whether it has produced anticipated outcomes, in terms of acquired knowledge, skills, abilities, attitudes and performance. I-O psychologists are proficient in processes used to measure the efficacy of education and training. Seventh, data are used to adapt training or adopt nontraining solutions." (Richard E. Beyer, 2015)

OBJECTIVE OF THE STUDY

- To study about the cyber security in the era where co-dependence on artificial intelligence has increased interconnection with human resource department.

- To study right people for the job position and tap cyber security expertise in the organization.

- To study the policies that can be formulated by HR in preventing cybercrimes in the organization.

LITERATURE REVIEW

1) Richard E. Beyer & Bradley J. Brummel These organizations cannot achieve their cyber security goals through hardware and information technology (IT) workers alone so all employees who use computer networks must be trained on the knowledge, skills and policies related to cyber security.

2) Caroline C Hartmann & Jimmy Carmenate Firms have begun appointing technology experts, creating board-level technology (IT) committees and delegating responsibilities to the audit committee as a means of managing cybersecurity risk. With the aim of understanding the current and future role of governance mechanisms in managing cybersecurity risks, this paper reviews the existing cybersecurity guidelines and regulations

3) Chris pace The continuing number of high-profile data breaches suggests that cybersecurity tools alone will not stop information leaking from companies. There is an important role for HR teams in encouraging and enforcing a more proactive, vigilant culture amongst the workforce and working more closely with IT to improve security practices.

4) Dimitri Percia David, Marcus Matthias Keupp, Alain Mermoud Cyber-security is a complex capability that is not readily created by the purchasing of technological components; rather, it is the skilled knowledge of how to organize and orchestrate these components that creates the actual defence. Furthermore, due to the swift technological evolution and short technology life-cycles of these components, knowledge required to produce cyber-security becomes obsolete

5) Haderlie, Donaven M & Cornelius, Andrew To provide solutions to these issues we focused our research on four components of workforce availability and competency: resume and transcript analysis, apprenticeships, cyber incident response plan development, and adversarial mindset training.

RESEARCH METHODOLOGY

Research Methodology is the process used to collect information and data for the purpose of decision making. This paper includes use of primary and secondary study.

For primary data we had made 150 questionnaires, mailed it to employees of IT sector and the data obtained was analyzed.

For secondary data we had studied various journals and the data obtained from that has been used to give an overview of the IT sector.

1. Primary Data

For primary data, 150 questionnaires were constructed. This questionnaire focused upon the role of HR and their teams in creating awareness and formulating policies ensuring cyber security in the organization.

The target respondents for the data collection are employees from the IT sector. Questionnaire method has been used as it is relatively a cheap and an easy source for data collection. The questionnaire was created and mailed to employees.

During the analysis of the data, data screening has also been undertaken as there were certain questionnaires which were either incomplete or not filled. 100 questionnaires have been evaluated on the basis of which the following data has been arrived upon.

2. Secondary Data

For the purpose of collecting secondary data related to cybersecurity in IT sector, national surveys conducted in India are chosen. The data has been studied and extracted from "Data Security Council of India (DSCI) and PricewaterhouseCoopers Private Limited (PwCPL) India". The data explicitly deals with the cybersecurity concerns in India. It

The following data represents the expenditure that is estimated to be made towards various sectors in India that are forecasted to be affected by cybercrime. It is evident that there is a significant growth in the expenditure in IT sector.
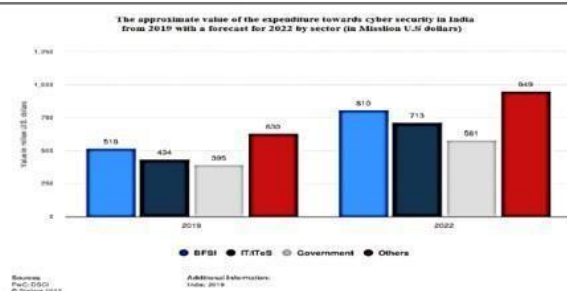
Source: PwC: DSCI

The following data represents employees' views on cyberattacks in their respective sectors and their views on securing Cloud of their organization.

Source: (Manishree Bhattacharya, 2019)

The following data represents employees' views on what could be the factor responsible for data leakages in IT sector

Source: (Manishree Bhattacharya, 2019)

The following data represents employees' views on cyber incidents in IT sector

Source: (Manishree Bhattacharya, 2019)

DATA ANALYSIS

Q. Age group of the employees

The very first question was the age of the employees. The employees within the age group 20-35 were shared the questionnaires to know about their perspective. Therefore, the employees between the age group 20-25 were 27.2% of the total employees who filled the questionnaires and between 25-30 were 66% and between 30-35 were 27.2% It was concluded that the majority of the employees answering the questionnaires were from age group 25-30.

Q. Do you think that in an organization employees should have knowledge about cyber security?

This question was mainly concerned with asking the employees their opinion whether they think that the employees should have the knowledge about cyber security or not. It was known that 89.3% of the employees agreed that the employees must have the knowledge of cyber security, 1.9% declined and 7.8% of the employees were not sure whether the knowledge of cyber security is must or not?

Q. Is there any proper training and awareness sessions held in your organization?

The third question was mainly the extension to the second question just to know whether their organizations conduct proper training and awareness sessions or not? Proper training and awareness sessions help the employees to be updated about the latest technology and to stay safe and secure from the cybercrimes. Feedback from the information security awareness training sessions should be regularly reviewed by the Information Security Manager to ensure continuous improvement in the organization. All employees must be briefed, as part of their induction, on the application of information system security policies and standards. Cyber security is not something that can be addressed in a single session; it is achieved and maintained through an ongoing program of targeted training and awareness sessions. If employees are fully trained and aware, they will be better prepared to identify that an incident is occurring and to handle an incident when it occurs.

While analysing the data it is known that there are 71.8% of the employees which says that proper training and awareness sessions are conducted in their organizations. Another point to be noticed is that 9.7% were the employees saying that there is no proper training and awareness sessions conducted in their organizations.

Whereas 18.4% are not sure whether training and sessions are conducted or not?

Q. According to you, what are the basic security trainings of an HR include?

This question emphasis on what type of security trainings must an HR include in an organization. There were four options given which included spotting malicious activities, maintaining email security and integrity, using proper security questions and all of the above. 88.3% of the total says all of the above, 3.9% for spotting malicious activities, 3.9% for maintaining email security and integrity and the remaining 3.9% for using proper security questions.

Q. Is there a strict punishment or penalty for failing to adhere to security measures in your organization?

The next question which was added in the questionnaire was asking whether there is a strict punishment or penalty for failing to adhere to security measures in their organization. Organizations take many precautions to avoid violating safety regulations, but what happens when an employee disregards these regulations in order to take short cuts or save time. Workplace safety is a shared responsibility between a company and its individual workers. Therefore, when employees do not comply with enforced safety rules and engage in high-risk behaviours (whether unknowingly or not), it could result in unnecessary hazards for themselves and the workers around them. However, there are many considerations for employers when it comes to disciplining workers for violating safety rules.

As per the response of the respondents, 56.3% of the total agrees that there is strict punishment in their organizations whereas 11.7% disagrees and 32% are not sure for this.

Q. What are the steps taken by your HR to prevent threat after terminating the employees?

This question emphasizes upon what were the steps taken by their HR to prevent threat after terminating the employees. The first step toward the creation of an effective employee termination program lies in the documentation of employment policies and processes. Employees can be held to many different standards depending on their level of employment and various responsibilities.

However, those standards must be clearly delineated so that employees know what to expect from HR. Properly recording incidents is vital to the overall termination process. All instances of violation should be recorded to establish just cause for employment termination, should it become necessary.

The respondents were provided with four options which included disable the employee's email id and login credentials, terminate VPN and remote access, change all access codes and PIN numbers which employee was aware of and all of the above. 82.5% of the total respondents agreed with all of the above, 9.7% agrees that the HR should disable the employee's email id and login credentials, 6.8% with changing all access codes and PIN numbers which employee was aware of and only 1% to terminate VPN and remote access.

Q. Does your HR team make sure that security department is equipped with right technological tools to detect security threats in your organization?

This question was an extension to the previous question where the respondents were asked that the HR team make sure that security department is equipped with right technological tools to detect security threats in the organization. The HR department is an important security link because they handle employee data from start to finish. This includes personal employee data like social security numbers and bank accounts, as well as business employee data like email accounts. This gives the HR team extra responsibilities in the way of IT security. Specific practices will be different for each company. But working with a managed IT services company to create and execute a security checklist will keep the business safe. HR & IT should work together to complete these tasks in a timely and correct manner. When an employee is terminated, maintaining transparency between HR & IT can lower the risk of an upset former employee mishandling company information.

Q. On what parameters does your HR ensure that every system and mobile device is connected to the office Wi-Fi?

This question was basically added in the questionnaire to know about the parameters used by HR to ensure that every system and mobile device is connected to the office Wi-Fi which consists of three options i.e., secured with PIN, secured with strong antivirus software and third to be the option of other. 52.4% of the respondents believe that HR ensures every system and mobile device connected to the office Wi-Fi is secured with PIN, whereas 31.1% agreed to secured with strong antivirus

software and 16.5% mentioned it as other.

Q. Do HR team in your organization track your browsing history and monitor online activities?

From the above analysis, it's been recorded that 66% of the total respondents agrees that HR team track their browsing history and monitor online activities in the organization, whereas 11.7% denies for it. The point of concern is that 22.3% actually did not know their activity is been tracked or not?

Q. Are cyber security related activities conducted timely in your organization?

Cyber security awareness training is important because it helps protect an organization from attacks and breaches. Regardless of size, organizations can find themselves susceptible to a cyber-attack. From the above analysis it is noted that 74.8% of the respondents agrees that cyber security related activities are conducted timely in the organization, 12.6% denies and the rest 12.6% cannot mention it clearly.

Q. Do HR team consider the job description before assigning authentication rights to employees in your organization?

The HR department is responsible for recruiting new talents into an organization. The HR should verify the applicant and make sure he fit in for the position and go with the flow of the organization. This question was added to the questionnaire to know if the HR considers job description before assigning authentication rights to employees in the organization. 73.8% of the total respondents believes that HR considers job description before assigning authentication rights to the employees, 6.8% believes that they don't consider whereas 19.4% respondents cannot clearly mention about this.

Q. Considering the current business environment, what would be the basic expectation from a new employee entering the organization in respect to cyber security?

This was a subjective question which was added in the questionnaire asking about the expectations from a new employee entering the organization in respect to cyber security. In this subjective question, respondents expressed their own views where some of them feels that the new employee must be

honest so that he does not indulge in hacking, few of them feels that the new employee must have proper knowledge of cyber awareness, some feels that at least the new employee must have basic knowledge of cyber security which includes basic email login security, maintaining safe and secure passwords and also two step email verification, adding to it few feels that the employee must have basic understanding of Algorithms related to cyber security and have a good knowledge about hacking and cracking, 10% of the respondents feels that the new employee must have completed a certified course on cyber security so that the organization need not invest a lot in training the employee and also 14% of the respondents feel the employee must be aware of all cyberattacks, have basic knowledge of IoT devices and networking devices.

Q. In your point of view, what other measures (from the prevailing ones) should the HR team in your organization take to create awareness about cyber security in the organization?

This question was the extension of the previous question taking the views of the employees in the organizations about the measures the HR team should take to create awareness about cyber security in the organization. In relevance to this, 26% of the respondents feel that the HR team must conduct awareness sessions on regular basis which should be mandatory for the employees to attend, 14% feel that there should be workshops for the same, few of them feel to take a weekly session of cyber security and encourage employees to learn and do hands on practice on cyber security, whereas some of them feels that quizzes should be conducted about cyber security to have a check on what the employees know and where the requirement is to know more, few feels that the HR team must keep the employees updated about new technology for cyber security.

FINDINGS

After collecting the data from the primary source and interpreting the secondary data, we were able to find that ensuring cybersecurity is not a single department's responsibility. It is a collective task that needs to be taken care of by all the departments and every individual in the organization.

Since organizations in today's time are working in a very dynamic environment, cybersecurity has become all the more important and integral part for the survival. IT businesses are no exceptions to these. They too are prone to risks related to cybersecurity.

The data collected from primary sources are clear evidence that companies operating in IT sector still have

a long way to go. And with more new and advance cybersecurity crimes coming up, it is even more important for the organizations to develop software as well as create awareness among employees to combat these crimes in a long run.

LIMITATIONS OF THE STUDY

• Sample population chosen for the data is not enough to reach to an ultimate decision.

• Duration for data collection is not enough to reach to a definite conclusion.

• IT sector is a vast industry with numerous companies operating in it. All these companies could not be reached out to thus, analysis is done on the basis of responses of limited companies.

CONCLUSION

Human resource is one of the most important divisions of today's corporate environment. It is important to hire one of the best employees in the organization to have a better kind of service. it is clear that academic assistance is necessary for everyone in the organization. Developing an idea of growth is something that should be done in a precise way.

The study has put light upon the use of interdisciplinary approaches in an organization to effectively create awareness and frame training policies for the employees to combat cybercrimes. The study clearly states that IT sector is a soft target for the cyberhackers and it is important for this sector to take measures to protect its data from such crimes. HR's role is now shifting from employee engagement to training employees in respect to cybersecurity. Organizations can greatly decrease their expenditure on cybersecurity if they rightly train their employees. Organizations need to frame training programs to develop employee skills who are the end-users of computers in the organization.

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BLACK HOLE & Its effects on Universe : A Mysterious Force

Karan Raina**

The Research is focussed about black holes, type of black holes, how they are formed, and what happens if you enter a black hole. The main focus of this article is about a unique black hole spewing a fiery jet at another galaxy and the brightest-ever recorded gamma-ray burst. With the assistance of resident researchers, a group of space experts has found a remarkable black hole regurgitating a fiery stream at another galaxy. The black hole is facilitated by a galaxy around one billion light years from Earth named RAD12.These 'beast' black holes regurgitate immense planes made of electrons moving at extremely high rates at different systems, exhausting the fuel expected for future star development: cold gas and residue. We likewise examine the most splendid at any point recorded gamma-ray burst has researchers all over the planet scrambling to assemble and dissect information based on the thing is being known as a "once in a blue moon" occasion. One explanation the burst was such a ton more brilliant than some other recorded is the way (generally) close it ended up earthing, only two billion light years away, which is close for a gamma-ray burst.

Keywords: Black holes, Space, Solar system, Stars, Galaxy, Gamma – ray burst.

INTRODUCTION

The Milky Way could contain more than 100 million black holes; however, it is truly challenging to distinguish these ravenous monsters. At the core of the Milky Way lies a supermassive black hole — Sagittarius A*. The big structure is around 4 million times the mass of the sun and lies roughly 26,000 light-years away from Earth, as per a statement from NASA.

An unimaginably dense region of space where space is curved around it so completely and gravity becomes so strong that nothing, not even light, can escape. Mass is so great in such a small volume that the velocity needed to escape is greater than the speed light travels. People can't see black holes. They are invisible. Space telescopes with special tools can help find black holes. The special tools can see how stars that are very close to black holes act differently than other stars. The boundary of no escape is called the event horizon.

The event horizon of a black hole is the point of no return. Anything that passes this point will be gulped by the black hole and forever evaporate from our known universe. At the event horizon, the black holes gravity is strong to such an extent that no measure of mechanical power can survive or check it.

As per the Space Telescope Science Institute (STSCl) roughly one out of each and every thousand stars is sufficiently enormous to turn into a black hole. Since the Milky Way contains more than 100 billion details, our home galaxy should hold onto exactly 100 million black holes. However, recognizing black holes is a troublesome errand and evaluations from NASA recommend there could be upwards of 10 million to a billion heavenly black holes in the Milky Way. The nearest black hole to Earth is named "The Unicorn" and is arranged around 1,500 light-years away. The epithet has a double meaning. Not in the least does the black hole up-and-comer live in the group of stars Monoceros ("the unicorn"), its unquestionably low mass — multiple times that of the sun makes it almost stand-out.

OVERVIEW OF BLACK HOLES IN OUR UNIVERSE

1915: Einstein's Hypothesis of Gravity anticipated the chance of black holes, yet nobody accepted they really existed!

Karl Schwarzschild found the main current arrangement of general relativity that would portray a black hole.

David Finkelstein, in 1958, first distributed the translation of "black hole" as a locale of room from which nothing can escape.

Black holes were for quite some time thought about a numerical interest; it was only after the 1960s that hypothetical work showed they were a nonexclusive expectation of general relativity.

The disclosure of neutron stars by Jocelyn Ringer Burnell in 1967 started interest in gravitationally fallen minimized objects as a potential astrophysical reality. The main black hole known was Cygnus X-1, recognized by a few specialists freely in 1971

Today: NASA space telescopes have found proof for black holes all through the universe

*UI/UX Designer in Tata Consultancy Services

TYPES OF BLACK HOLES

There are 3 types of black holes –

1. Stellar-mass

Black holes are made when a monster star, ordinarily the mass of our Sun, dies. Its mass can depend on multiple times more than the mass of the sun. There might be many, numerous heavenly mass black holes in Earth's galaxy. Earth's galaxy is known as the Milky Way. A large portion of the star's air is blown into space as a cosmic explosion blast. The star's spent center implodes under its own weight.

2. Supermassive

The biggest black holes are designated "supermassive." These black holes have masses that are more than 1 million suns together. Researchers have found confirmation that each enormous galaxy contains a supermassive black hole at its middle. The supermassive black hole at the focal point of the Milky Way galaxy is considered Sagittarius A. It has a mass equivalent to around 4 million suns and would fit inside an exceptionally enormous ball that could hold a couple million Earths.

3. Mid-mass

An intermediate-mass black hole (IMBH) is a class of black hole with mass in the range 102–105 solar masses: significantly more than stellar black holes but less than the 105–109 solar mass supermassive black holes. Several IMBH candidate objects have been discovered in our galaxy and others nearby, based on indirect gas cloud velocity and accretion disk spectra observations of various evidentiary strength.

LITERATURE REVIEW

Zwart & McMillan (2000)states the Black Hole Mergers in the Universe which release large amounts of energy

Latif, Schleicher,Schmidt & J. Niemeyer study of 2013 stated the Formation of black holes in the early Universe

2022 news of Hubble Home explains the Use of hubble telescope and advanced technology in finding black holes.

Event Horizon Telescope study of 2022, explained EHT Arrays sites,the polarized images of black,Event horizon and its role in black hole

Quanta magazine (2022) detailed the role of astrophysics in blackhole.

As per latest wikipedia of 2022, Astronomers estimated that 100 million black holes wander among the stars in our Milky Way galaxy, however they have never convincingly recognized a detached black hole. Following six years of fastidious perceptions, NASA's Hubble Space Telescope has, unexpectedly, gave direct proof to a solitary black hole floating through interstellar space by an exact mass estimation of the ghost object.News from distinguished meandering black hole lies around 5,000 light-years away, in the Carina-Sagittarius twisting arm of our galaxy. In any case, its disclosure permits astronomers to estimate that the closest secluded stellar-mass black hole to Earth may be just about as close as 80 light-years away. The closest star to our nearby planet group, Proxima Centauri, is a little more than 4 light-years away.However, an estimated 100 million separated black holes meander our galaxy, finding the obvious mark of one is a needle-in-bundle look for Hubble astronomers.

RESEARCH METHODOLOGY

The study will focus on the overview of supermassive black holes, powerful gamma-ray bursts, Black holes discovered firing jets at the neighbouring galaxy, formation of black holes, event horizon, and singularity.

This Research will give us insight into black holes and help us to know more about the phenomena related to super massive black holes.

With the help of powerful telescopes, we can detect black holes by their effect on other matter nearby.

Data regarding the size of a black hole and how much radiation it can emit can be quantified by generating statistical data while differentiating black holes.

In this research, Measurable data is used to formulate the facts and uncover a pattern related to black holes.

There are several mysterious questions answered in this research

● To find out how much would you "weigh" in a Black hole?

● To Observe Formation of a black hole

● To see if you can survive in a black hole?

● To find out how are black holes studied?

● To check if our solar system safe from black holes?

● To uncover how does a black hole form?

● To find out what happens if two black holes collide?

● To Reveal the Most powerful gamma-ray burst ever seen

● To identify Black hole discovered firing jets at neighbouring galaxy

● To find out Which is the largest black hole in the universe?

● To see what is Inside a black hole?

How much would you "weigh" in a Black hole?

On Earth, let's say you weigh 150 lbs.

On the Moon, you'd weigh 25 lbs

On Jupiter, you'd weigh 350 lbs.

On the Sun, you'd weigh 4,000 lbs.

Near a Black Hole,

you'd weigh over

20 TRILLON POUNDS!!!

FORMATION OF A BLACK HOLE

Researchers think the littlest black holes shaped when the universe started.stellar black holes are made when the focal point of an extremely large star falls in upon itself, or breakdowns. At the point when this occurs, it causes a cosmic explosion. A cosmic explosion is a detonating star that shoots part of the star into space.

At last, by developing and consuming material planets, stars, other black holes. stargazers think they advance into the supermassive black holes that they distinguish at the focuses of most significant systems.

Can you survive in a black hole?

Nothing gets away from a black hole. Any excursion into a black hole would be one way. The gravity is serious areas of strength for excessively you were unable to return in reality to get back. Beside this, your body would be extended and annihilated by the distorting of space and how much radiation encompassing the event horizon.

Event horizon

The event horizon of a black hole is the final turning point. Anything that passes this point will be gulped by the black hole and always evaporate from our known universe. At the event horizon, the black hole's gravity is strong to such an extent that no measure of mechanical power can survive or balance it.

Singularity

A singularity is a point in space where there is a mass with boundless density. This would prompt a spacetime with a boundless bend. Singularities are anticipated to exist in black holes by Einstein's hypothesis of general relativity, which is a

hypothesis that has excelled at matching exploratory outcomes.
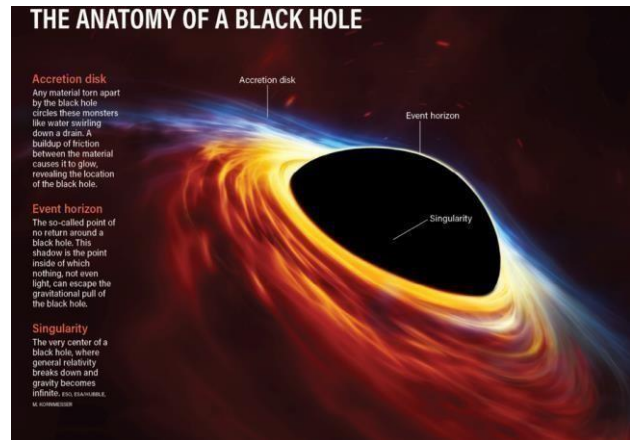
How are black holes studied?

Using strong observatories on the planet, astronomers can see the jets of plasma that black holes flew into space, detect the ripples in space-time from black holes colliding, and may soon even peer at the disc of disrupted mass and energy that surrounds the black hole's event horizon, the edge beyond which nothing can.

Will the sun in our solar system turn into a black hole?

Our Sun isn't qualified for turning out to be even a black hole. A star should be something like multiple times the mass of sun to make itself transform into a black hole. All things being equal, our sun will transform into a red monster (after approximately 5 billion years). It is estimated that our sun like each star will likewise run out of fuel and in this way as a remainder it will leave a red giant.

As it exhausts its hydrogen fuel, our Sun will begin consuming helium, expand in size and momentarily become a red monster (goliath in size, however not in mass), most likely surpassing the size of the circle of Venus. Be that as it may, when the helium fuel is depleted, the Sun will psychologist to a white midget, still glowing due to the huge measure of intensity caught inside, yet done consuming any fuel. In this way a long cooling process starts, which addresses the end stage for a star like our Sun.

Bigger stars might have sufficient mass to create the important tensions and temperatures somewhere inside their center to meld heavier components, e.g., oxygen and carbon. Be that as it may, our Sun is only excessively little for this, so no such combination will happen.

Black hole enters our solar system

If a Black Hole has entered our solar system we will eventually begin feeling it. Furthermore, mankind, the same as the Earth might have their days counted. We would quickly feel it before it entered our planetary group, however, in some cases, individuals forget that

Black Holes have different gravitational fields, on account of their mass.

Implying that a stellar Black Hole can enter our planetary group however we would just notify it after some time.Jupiter would shield us from a portion of those stones, but not every one of them.

Furthermore, eventually, as the Black Hole drew sufficiently near, we would begin feeling its gravitational impacts on the Earth. Like tremendous tremors.

How long we would stay alive would all rely upon numerous things. Circles… Things in the Black Hole way… What might be between the Earth and the Black Hole… If the Earth would come excessively near the Black Hole or not…In any case, eventually, all life on this planet would end, seeing that when the sun went by we also would go with it, eventually occur.

Two Black Holes Collide

It is workable for two black holes to impact. When they come so close that they can't get away from one another's gravity, they will converge to become one greater black hole. Such an event would be very rough. In any event, while mimicking this event on strong powerful computers, we can't completely grasp it. Nonetheless, we truly do realize that a black hole consolidation would create enormous energy and send monstrous waves through the space-time texture of the Universe. These waves are called gravitational waves.

No one has seen the impact of black holes yet. Nonetheless, there are many black holes in the Universe and it isn't silly to accept that they could impact. As a matter of fact, we are aware of universes in which two supermassive black holes move perilously near one another. Hypothetical models anticipate that these black holes will be winding toward one another until they eventually impact.

Gravitational waves have never been straightforwardly noticed. Nonetheless, they are a basic forecast of Einstein's hypothesis of general relativity. Recognizing them would give a significant trial of how we might interpret gravity. It would likewise give significant new experiences in the material science of black holes. Enormous instruments equipped for distinguishing gravitational waves from space have been inherent ongoing years. Much more impressive instruments are under development. The second they recognize their most memorable gravitational wave, you make certain to find out about it!

Most powerful gamma-ray burst ever seen

On Oct. 9, a beam of light more energetic than astronomers had ever seen zipped past our planet, temporarily blinding detectors on several NASA satellites. The beam came from a gamma-ray burst, the most energetic type of explosion known to occur in the universe (apart from the Big Bang), which is believed to accompany the birth of some black holes.

In no time, many telescopes all around the world were pointing toward the burst's source, affirming that this, without a doubt, was something to really remember. The event, authoritatively named GRB221009A, has since acquired the nickname BOAT ("most brilliant ever"), and astronomers trust it will assist with revealing insight into the awesome physical science behind these disastrous peculiarities. Furthermore, the data from this event may help resolve an ongoing mystery regarding GRBs. Whereas most gamma-ray bursts have been observed in distant galaxies, some appear as lonely flashes from intergalactic space. This has brought up issues about the genuine starting points and distances of GRBs, with numerous astronomers speculating that specific short blasts begin in the intergalactic medium (IGM). In any case, these outcomes recommend that short GRBs might have been more normal in the past than anticipated.

We conducted a three-step keyword search within the Scopus database to identify relevant sources. More specifically, we searched for literature on

(1) creative spaces in educational contexts,

(2) creative spaces in work or office environments, and

(3) special forms like innovation or idea labs. We conducted a three-step keyword search within the Scopus database to identify relevant sources.

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The exceptionally long GRB 221009A is the brightest GRB ever recorded and its afterglow is smashing all records at all wavelengths. Because this burst is so bright and also nearby, we think this is a once-in-a-century opportunity to address some of the most fundamental

questions regarding these explosions, from the formation of black holes to tests of dark matter models."

As a result of its relative closeness to Earth, this event is likewise a remarkable chance to concentrate on the beginning of the components heavier than iron (which structure in the insides of stars) and whether they come from neutron-star consolidations alone or falling stars too. Last, yet not least, this event likewise prompted aggravations in the World's ionosphere that impacted long-wave radio transmissions and created extremely high-energy.

Black hole discovered firing jets at neighboring galaxy

With the assistance of resident researchers, a group of astronomers has found a novel black hole at the core of a far-off galaxy that is shooting an adjoining galaxy with a stream of plasma moving at close to light speed.The black hole is facilitated by a galaxy around one billion light years away from Earth named RAD12.

The unique black hole is situated in the galaxy RAD12, and its plasma stream is assaulting the adjoining galaxy RAD12-B. Situated around 1 billion light-years from Earth, the two worlds are amidst an impact and consolidation. The figuring out addresses the main opportunity a stream has been seen rising up out of the focal point of one galaxy and striking another enormous galaxy.Astrophysical planes are made out of ionized gas and electrons and are generally found two by two moving in inverse headings at relativistic paces near the speed of light. What makes what is going on the RAD12 novel is that its black hole is by all accounts catapulting just a single stream, which is coordinated toward RAD12-B. Why this stream is solo is at present a secret. The peculiar idea of RAD12's stream was first seen in 2013 and was found in both optical information from the Sloan Computerized Sky Overview and radio information from the Extremely Enormous Array FIRST Review.
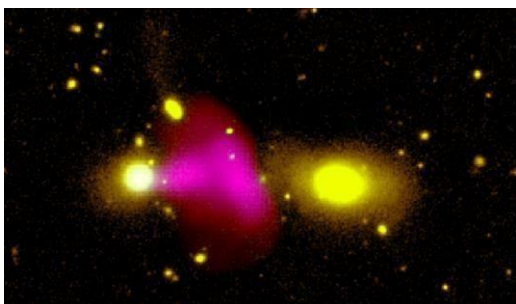

Fig: RAD12's jet

Reason

Jet-galaxy interaction triggers young star formation that shows up in ultraviolet-optical colours, but RAD12 does not seem to show any. This is possibly because the companion galaxy is too big or gas-poor for the jets to initiate visible galaxy-wide young star formation, the astronomers say.

Inside a black hole

The singularity at the focal point of a black hole is a definitive dead zone: where matter is compacted down to an endlessly small point, and all originations of existence are totally separate. There is no such thing as furthermore, it. Something needs to supplant the singularity, yet we're not precisely certain what.

As the issue crushes down under the colossal gravitational load of a falling star, it meets an obstruction. The discreteness of room time prevents matter from arriving at anything more modest than the Planck length (around 1.68 times 10^-35 meters). All the material that has at any point fallen into the black hole gets packed into a ball not a lot greater than this. Completely minute, yet entirely most certainly not vastly minuscule.Einstein's overall relativity says that when the matter is pulled into a black hole, its data is obliterated - yet quantum mechanics says that can't occur.Therefore, black holes are an inconceivable hypothetical jungle gym for astrophysicists and mathematicians

RESEARCH FINDINGS

Our Galaxy could contain over 100 million black holes, though detecting these gluttonous beasts is very difficult.

A black hole is the most mysterious and challenging topic in space research. Nowadays Modern telescopes are more efficient than older technology as we can see better images and data regarding black holes which would eventually help us to know more about these enormous beasts.

AIM

This paper seeks an overview of black holes and recent discoveries that can help us get more data and information related to black holes and how they are formed in our universe.

STRUCTURE

With this objective structure of research mounted in this paper is as follows: Theories about black holes are discussed, The main reasons for the formation of black holes are identified, Different types of black holes are mentioned, Black holes are discovered firing jets at the neighbouring galaxy, gamma-ray burst, event horizon, and singularity.

CONCLUSION

Humans continue to search for and study black holes to determine the fate of matter as it falls into black holes, how powerful jets form, and what role black holes play in the formation of the early universe.

Black holes are Powerful Beasts that can tear apart anything that comes in their way we don't know how much time our solar system has till a Black hole enters our solar system.

At the Center of a black hole is a definitive dead zone: where matter is compacted down to a limitlessly little point, and all conceptions of time and space completely break down. And if it doesn't exist then Something needs to replace the singularity, however, we're not precisely certain what.We still don't have the proper type of equipment to know more about black holes closely and what other secrets our universe carries.

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A Study Of Disruptive Technology in the Streaming Industry on Netflix

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Although there is still some confusion regarding the fundamentals of disruptive innovation and there is no conclusive theory, the concept has attracted a lot of interest over the years from academics and practitioners. According to Netflix, customers who had been utilizing the company's streaming services had been doing so in HD. This study intends to examine how the field of video streaming platforms and the idea of disruptive innovation are related. The example of Netflix launching a novel and disruptive business model will be used to investigate this connection further. Currently, Netflix is responsible for up to one-third of all internet traffic in North America.

Netflix, in contrast to these other businesses, focuses exclusively on producing high-quality media material, the kind of entertainment that is typically created by Hollywood studios and extensive television networks. To get a thorough understanding, the presented study will examine and analyse the existing literature surrounding the notion of disruptive innovation, including contributions and points of view from various authors.

INTRODUCTION

The scholarly research now available suggests that new media technologies are changing how people interact with television (Ellingsen, 2014; Tefertiller, 2018). Currently, several media businesses provide high-quality streaming services that may be accessed on several digital devices (Groshek and Krongard, 2016). However more people are preferring this type of technology than conventional media (PwC, 2019), but it still represents a branch of the market that is quite competitive. To provide customers with a wide selection of media, several companies, such as Amazon Prime Video, Youtube, and Netflix, are continually upgrading their technologies (Tefertiller, 2018) Additionally, these businesses implemented their offerings over time by releasing mobile apps with customised recommendation systems to improve user experience, keep current customers, and draw in new ones (Camilleri and Falzon, 2020). The above study intends to examine how the field of video streaming platforms and the idea of disruptive innovation are related. We will take Netflix as an example to further investigate such links because it employed video streaming to launch a new and disruptive business model (Christensen, Raynor, and McDonald, 2015). To arrive at a thorough understanding of disruptive innovation, the offered work will first review and analyse the body of previous research, taking into account contributions and various points of view from many writers.

INTRODUCING THE CONCEPT

The idea of disruptive innovation (DI) has garnered considerable attention over the years among both academics and practitioners (Christensen et al., 2018), although a common misunderstanding about its basic principles, as well as the lack of a definitive theory, persists (Christensen, 2006; Raynor, 2011). The concept was originally introduced by Christensen in the 1990s, when he examined the failure of hard disk market leaders in competing with new entrants (Christensen, 1997). He also outlined the idea that emerging technologies can generate a new market, or fundamentally alter an existing one (Nagy, Schuessler and Dubinsky, 2016). In other words, DI is identified as a phenomenon able to successfully convert a product or service which was previously so complex and cost intensive that relatively few individuals could have access to it, making it cheaper and more accessible to a wider audience (Christensen, 2012). Hence, as outlined by Charitou and Markides (2003), Danneels (2004) and Adner (2002), DI is a process that enables the expansion and development of new markets , as well as the introduction of new functions which, in turn, lead to the disruption of existing dynamics. However, talking about a new technology which approaches a market, it is appropriate to differentiate between sustainable and disruptive. The former is an innovation which aims at the same audience and brings improvements in a product or service's attributes that customers already value; while disruptive

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DEFINING DISRUPTIVENESS:

Disruption is when an extreme idea is brought that revolutionises and changes the existing market drastically. For a company to sustain itself and grow at the same time, it must learn how to innovate itself with changing times. Innovation may not lead to profitable results but it is a risk companies have to take. (Assink, Marnix. (2006)). Disruptive innovation is consumer-centric that provides an easier way to access services and products by them. (Dr.S., Mohanavel. (2020)). Many factors can drive disruption in the market that ranges from the globalised economy, consumers, price and the resources available. Though these factors are interrelated and get affected by each other broadly, they can bring a big change in both market and society. (Millar, Carla & Lockett, Martin & Ladd, Ted. (2017)).

NETFLIX AS A DISRUPTOR:

Netflix follows a Subscription based video model though initially started as a DVD rental service which didn't charge high late fees like its competitors. (Oat, E. (2013)). This model charged a small amount of fee to access an unlimited amount of data. This made consumers 'binge watch' or consume - continuous long hours of content. No longer do they have to wait for the next episode but can watch entire seasons without any breaks. (Sim, G. (2016)).

Netflix's strategy is to provide recommendations based on reviews and the history of the consumer giving a personalised effect to its consumers. Using Big Data Analytics, Netflix tries to understand the algorithms(consumer behaviour) to provide suitable suggestions.(Maddodi, S. (2019)).

THEORIES AND ADOPTION OF DISRUPTIVE TECHNOLOGY PROCESS

Disruptive technology leading to disruptive innovation happens to be a slow process. Initially, it usually is challenging to understand that technology, where to apply and use it, and how to make good use of it. In later stages, with more applicabilities, these technologies overthrow existing or dominant technologies, gaining more popularity and more ways for adoption.

NEW MARKET/LOW-END DISRUPTION

Disruptive technologies are focused on low-end or new market disruption, which further transforms the entire industry. Low-end disruption happens when businesses at the low-end use technology as a disruptor.

New market technological disruption happens when new technology is used in new market segments.

NOT EVERY INNOVATION IS DISRUPTION

Depending upon the fact that technological innovation is creating an impact and transforming the activities conducted everywhere, innovation becomes a disruption.

It is the adaption and acceptability of technological innovation that disrupts and transforms functions and activities.

DISRUPTIVENESS IN VIDEO STREAMING

There was a time when people used to go to stores to buy or rent DVDs. But now, we have video streaming platforms competing with each other and have overthrown the DVDs. The use of technology in such OTT platforms has transformed and revolutionised the movie and TV-watching experience.

THE CASE OF NETFLIX

Netflix started in 1997 targeting early adopters and providing a DVD rental service. Consumers had the ease to browse a collection of movies and select the desired one; the DVD was then dispatched directly to their home address.

This later increased their costs which made them suffer. So they decided to go with an online subscription-based streaming service in 2007. They wanted to save costs and eliminate the factor of 'delayed fees' for videos like in Blockbuster.

Netflix became a disruptor with the use of technology and redesigning its entire business model.

Price-sensitivecustomers as themaintarget

The main target audience of Netflix was consumers who did not have the time to go to a store to rent a movie but were looking for cheap entertainment. The reality of innovation and disruption is that technology is not a competitive advantage unless it is proprietary. Netflix benefited from a first-mover advantage into (a) first the realm of mail subscription DVD rentals; and (b) second into OTT video streaming subscription services. [Fragata, Y., & Gosselin, F. (2018)] It provided relatively low prices thus capturing a huge consumer base which was looking for affordable entertainment options. From low-end to mainstream

In only a few short years, television content migrated from physical DVDs to streamed content that was stored on servers – the Cloud – and accessible by computers, smartphones, tablets, and Internetaccessible television sets. [Osur, L. (2016)] Netflix up-ended both the TV industry's traditional

content release structures and viewers' habits. By shifting TV distribution to the Internet, Netflix drastically increased the control viewers have over where, when, and on what devices viewers watch TV. Now, Netflix is one of the OTT platforms which is used by the masses thus making it a huge success. Online advertising in video streaming The staggering behavioural shifts are a catalyst for changing business models and evolving strategies among the platforms that are lucky enough to have captured the highest numbers of subscribers. With eager viewership and more leisure time on subscribers' hands, platforms face large questions on business implications and debates on how to capitalize on these rising numbers. [Benedek, M. (2022, February 24)] To continue their growth, all platforms are examining advertising models to reap revenue and produce high-quality content. Netflix with its personalization algorithms may provide audience-specific ads in the future.

CONCLUSION

We would like to conclude that Netflix has truly been a disruptive technology that has brought down the shutters of traditional brick and mortar shops and has created a new market of online streaming. Since Netflix, the market of video streaming has been changing constantly. Big Data and Data analytics has played a pivotal role in understanding consumer behaviour.

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The Impact of Extreme Weather Events on Business in India

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In recent years, India has been experiencing an increase in extreme weather conditions, such as cyclones, floods, and droughts, which have been linked to global warming.The country has also been facing the consequences of global warming, which have manifested in the form of rising sea levels and temperatures. These extreme weather events have had a significant impact on Indian businesses, causing damage to infrastructure, disrupting supply chains, and negatively affecting economic growth.One of the most significant effects of extreme weather conditions and global warming on Indian businesses is the disruption of supply chains. Floods and cyclones have caused significant damage to transportation networks and infrastructure, leading to delays in the transportation of goods and services. These disruptions have resulted in increased costs for businesses, as they are forced to find alternative methods to transport their goods and services.Extreme weather conditions and global warming are having a profound effect on Indian businesses, leading to disruptions in supply chains, increased costs, reduced economic growth, and increased insurance premiums. Businesses need to be proactive in adapting to these changes, investing in disaster preparedness and risk management strategies, and exploring alternative business models that are less susceptible to the impact of extreme weather events.

INTRODUCTION

The expression "extreme weather events" has been in the news on an almost continuous basis in the recent past, with one natural calamity or the other striking a different part of the world and causing widespread death and destruction. Given that the impact of such events is multi-dimensional viz. their effects are experienced on multiple levels such as social, economic, financial, environmental, etc., it is but obvious that such calamities do not affect only those people or communities who suffered immediate losses as a direct result of the catastrophic event, but also indirectly affect everyone else.But before discussing the impact of extreme weather events and getting into the debate of how deeply humans are involved in these happenings and what can be done about the same, it is important to start by defining what an extreme weather event is in the first place.

Extreme weather events are unusual, severe or unexpected weather patterns that are different from average weather conditions. They can include heat waves, droughts, floods, hurricanes, tornadoes, heavy snowfall and more. Such events can have significant impacts on the environment, human health and the economy. Global warming, on the other hand, refers to the long-term increase in the average temperature of the Earth's surface, caused primarily by human activities such as the burning of fossil fuels, deforestation and industrial processes. Global warming is one of the main causes of extreme weather events. A warming planet increases the likelihood and severity of many types of extreme weather, including heat waves, droughts, floods and storms. Extreme weather is therefore a consequence of global warming.(Huber, D. G., & Gulledge, J. ,2011).

This literature review examines the impact of extreme weather events on business in India and identifies the measures taken to mitigate these impacts.

LITERATURE REVIEW

India is particularly vulnerable to the negative effects of climate change, due to its diverse geography, socio-economic profile, and range of climatic conditions. Over the past century, India has experienced a significant increase in temperatures, with a trend of 0.66°C per hundred years. This increase in temperature exacerbates the impacts of climate change, which are already worsened by the increasing frequency and severity of extreme weather events. (Dube, Lokesh. ,2019). The impact of climate change on the Indian economy is significant and can hamper the country's development. The country is highly vulnerable to climate change, with a wide range of physical features and socio-economic conditions that worsen its effects. Climate change has a direct impact on key sectors of the Indian economy, such as agriculture, tourism, energy, and infrastructure. (Sharma, Manisha & Singh, Rasal & Kathuria, Abha. ,2022).

In 2018, Kerala experienced higher than usual rainfall during the monsoon season, which led to increased water storage in reservoirs. However, the floods in Kerala were the result of extreme weather conditions, such as abnormally high levels of rainfall during the

monsoon season and extreme rain in the state.(Mishra, Vimal & Aadhar, Saran & Shah, Harsh & Kumar, Rahul & Pattanaik, D. & Tiwari, Amar. ,2018)

Climate-induced disasters like flash floods, debris-flow and landslides are common in the Himalayas, and especially the states of Uttarakhand and Himachal Pradesh. These disasters can cause loss of lives and damage to property. Heavy downpours during the monsoon season, caused by extreme weather conditions, are a characteristic of the Himalayas. Human settlements are located along the streams of big rivers or unstable slopes, which are highly violent during the monsoon. Changes in climatic conditions due to human activities like population growth and unmitigated deforestation have impacted daily life in the region. Two deadly cloudburst-triggered flash floods in the Kedarnath and Badrinath valleys in 2011 caused devastation to settlements, agricultural fields, and thousands of lives. (Sati, Vishwambhar. ,2013)

DATA ANALYSIS

• Effects on Indian Business and Economy

Indian businesses will face an impact of Rs 7,138 billion over the next 5 years due to climate change. This cost is almost 3 times the net profits of India's top 100 companies and estimates that sectors like agriculture, FMCG, textiles and aviation will be most affected by climate change (Energy Economic Times. ,2021).A study conducted by the Indian Institute of Technology (IIT) Delhi has found that climate change will have a significant impact on India's manufacturing industry, with a potential loss of $26 billion in revenue by 2030 (Outlook India,2021).

According to a study, more than 60% of Indian firms have identified and can manage climate-related market risks. The study found that companies in the automobile, energy, and financial sectors are more capable of managing these risks, while firms in the consumer and real estate sectors are lagging behind. About 39% of companies have prepared themselves for the physical risks arising from climate change, while 26% of firms have prepared themselves for the risks arising from transition to a low-carbon economy. The study also revealed that small businesses are less prepared to deal with climate risks than larger businesses.(Prasad, S. ,2021). India's gross domestic product (GDP) has been reduced by 3% due to global warming. India's economic growth has been

affected by natural disasters and severe climate conditions such as floods, heatwaves, and droughts.(Lahiri, T. ,2021)

• Response of Indian Businesses

According to a sustainability report by Deloitte, Indian company executives have listed climate change as their top priority. The report states that nearly 40% of the respondents believe that climate change could potentially damage their brand reputation and lead to financial losses. Additionally, the study revealed that over 70% of the companies have developed a sustainability strategy to deal with the effects of climate change. The report highlights that businesses that incorporate sustainable practices into their operations will be better positioned to thrive in the long term. (India Today, 2023)

But it would be incorrect to conclude right away that all is well. A recent study by Willis Tower Watson (WTW) found out that while 61 percent of the Indian companies listed on the stock exchanges had the necessary mechanisms in place to identify, assess and manage climate risks, only half the companies have set carbon emissions commitments, while the rest are unclear about their stand on the subject.

This brings to the fore a more worrisome conclusion: that while the above-mentioned companies have set up some form of mechanism that would help them to deal with climate risks at some point in the future, some of them lack any concrete plans to deal with the climate crisis as it is unfolding in the current moment and may have established the said mechanisms only for the fulfilment of certain legal obligations (which have been elaborated upon subsequently in the article) or in a possible bid to attract investors or customers to their products or services, an old marketing trick popularly called "greenwashing."

• Response of the Indian Government

The Indian government has been very proactive in taking steps which mark a clear shift in favour of a pro-environment, pro-sustainability government policy and hold out the hopes for a green future.

India has pledged to implement the Paris agreement by reducing its emission intensity by 33-35% by 2030 compared to 2015 levels. As part of its efforts, India is investing in renewable energy sources and phasing out some thermal power plants to produce 40% of its energy needs through renewable sources in the coming years. These actions demonstrate India's commitment to reducing its carbon footprint and adopting sustainable energy production methods.(Murty, Ayapilla. ,2022).

Shortly after the Paris accords were signed in 2015, the Indian and the French governments jointly launched the

International Solar Alliance, with the aim of "ground rules, norms and standards for solar energy, in order to obtain a rapid and massive deployment in countries that are rich in solar resources but where the risks are still seen as high." (France Diplomacy, 2019) It aims to obtain and deploy funds for the establishment of solar power projects in its 123 member countries so as to help them attain their full solar energy potential as well as reduce their dependence on non-renewable sources of energy.

On the home front, in 2021, the Securities and Exchange Board of India (SEBI) introduced the "ESG" (meaning Environmental, Social and Governmental) reporting structure by the name of the Business Responsibility and Sustainability Report, which became operational from the fiscal year 2022-23 onwards, which is roughly based upon the "Task Force on Climate-Related Financial Disclosures", a globally adopted protocol which requires companies to report their sustainability performance as a part of their financial filings.

- *India's vulnerability to climate change*

A recent report by the Intergovernmental Panel on Climate Change (IPCC) has stated that India is the most vulnerable country to climate change. The report highlights that the country has already been experiencing extreme weather events such as floods, heatwaves, and droughts, which are expected to intensify in the future.(Dutta, A. ,2022).According to an another report by the Indian Ministry of Earth Sciences, India has been experiencing an extreme weather event almost every day, including heatwaves, thunderstorms, floods, landslides, and cyclones. The frequency of these events is expected to increase due to climate change, which poses a significant risk to the country's population, infrastructure, and economy.(Tucker, A. ,2022).

Global warming is making India more vulnerable to extreme weather conditions such as heatwaves and heavy rainfall. These climate changes can lead to a significant loss of human life and severely impact the country's economy and that the increase in extreme weather events is a direct result of the world's average temperature rise, with India being one of the most affected countries.(Rao, M. ,2021)

RECOMMENDATIONS

The phasing out of old, obsolete technologies and their replacement with newer, more energy-efficient and environment-friendly ones is a gradual process that involves the expenditure of efforts, expertise, and funds. While big corporations and billion-dollar businesses can easily cope with such changes and even pioneer some of them, the smaller ones may be left lagging behind due to insufficient funds and the inability to take on the costs involved in purchasing new technology and training their personnel to use the same. One of the solutions that is coming to increasing prominence nowaday as a way out of this fund crunch faced by small and medium-sized businesses still in the middle of this replacement process is green finance.

"Green finance" refers to financial instruments and services that support environmentally sustainable and socially responsible initiatives, businesses, and projects. This type of finance is aimed at promoting environmentally-friendly practices, addressing climate change and contributing to a sustainable future. Green finance encompasses a wide range of financial products, including green bonds, loans, insurance, and investment funds, which are used to finance renewable energy, clean technology, sustainable agriculture, and other green initiatives.(Ravichandran, Shankar & Roy, Mandira. ,2022).

Other solutions include:

1. Education Sustainable Development

2. Green marketing

3. Green recruitment

4. Green operations

5. Rapid action by the government

These may be explained as follows-

1. Education Sustainable Development has the potential to create a sustainable workforce and increase the competitiveness of Indian businesses. By promoting sustainable practices, ESD can lead to the development of green technologies and innovation, which can provide new opportunities for growth and create jobs in a green economy.(Dhiman, Manisha & Goyal, Bathinda. ,2022).

2. Green marketing in India arises from the increasing demand for sustainable and environmentally-friendly products and services. As the awareness of environmental issues and climate change grows, consumers are becoming more conscious of their purchasing decisions and are actively seeking products that are environmentally sustainable.Green marketing involves promoting products and services that are eco-friendly, and their sustainable

features, to consumers. (Kirmani, Mohd & Rehman, Asad. ,2013)

3. Green recruitment and selection involve hiring employees with a passion for sustainability and the skills needed to implement green initiatives. Green training and development provide employees with the knowledge and skills necessary to work sustainably. Green compensation and benefits can include incentives for environmental sustainability, such as telecommuting, carpooling, and biking to work. Green employee engagement involves creating a culture of environmental responsibility and empowering employees to take initiative in promoting sustainability.(Matani, Raghda & Salunkhe, Harshal & Kazi, Faroza. ,2012)

4. Green operations can include a range of sustainable practices such as energy-efficient manufacturing processes, sustainable sourcing of raw materials, waste reduction and recycling, and responsible disposal of hazardous waste. By adopting green operations, businesses can reduce their carbon footprint and conserve natural resources, resulting in significant cost savings and improved environmental outcomes.(Nusraningrum, Dewi & Santoso, Sugeng & Gunawijaya, Jajang & Gading, Delita & Buan ,2021)

5. The government needs to take rapid action in response to global negotiations and India's potential vulnerability to the effects of climate change. There is sufficient scientific knowledge available to plan and implement adaptation practices in India, and propose a strategy for mainstreaming adaptation into the planning process.(Chaturvedi, Rajiv & Kattumuri, Ruth & Ravindranath, Darshini. ,2014)

CONCLUSION

In conclusion, Indian businesses are facing significant challenges in the form of extreme weather events and global warming. The impact of climate change is being felt across key sectors of the economy, and is resulting in enormous economic losses, as well as the disruption of livelihoods and social well-being. However, there are also opportunities for businesses to adapt to these challenges and contribute to a more sustainable future. By adopting sustainable business practices, investing in renewable energy, and developing

climate-resilient infrastructure, businesses in India can not only mitigate the effects of climate change but also thrive in a more sustainable and resilient economy. The Indian government has also pledged to take action in mitigating the effects of climate change, making it imperative for businesses to act in tandem with government initiatives.

It is important to address climate change by promoting a green future. This involves adopting sustainable and environmentally-friendly practices in all aspects of life, including business operations, transportation, and energy production. Transitioning to a green future involves reducing carbon emissions and the negative impact on the environment and will require a collective effort from individuals, businesses, and governments to make this a reality. A green future will not only help address climate change, but also create a healthier and more sustainable world for future generations.

In the end, it is vital that Indian businesses recognize the urgency of climate change and take decisive action towards achieving a more sustainable and resilient future.

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