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Special Issue on

COMMERCIALIZATION OF EMERGING MATERIALS AND TECHNOLOGY FOR SUSTAINABLE FUTURE (ICCEMTSF)

Special Issue Editors-in-Chief

Dr.P. AROCKIA MICHAEL MERCY | Dr.A. DAYANA AMALA JOTHI Dr.A. SAVARIMUTHU | Dr. JOSEPH WILSON



# BODHI

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## **BIJRHAS**

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The journal welcomes publications of quality papers on research in humanities, arts, science. agriculture, anthropology, education, geography, advertising, botany, business studies, chemistry, commerce, computer science, communication studies, criminology, cross cultural studies, geography, demography, development studies, library science, methodology, management studies, earth sciences, economics, bioscience, entrepreneurship, fisheries, history, information science & technology, law, life sciences, logistics and performing arts (music, theatre & dance), religious studies, visual arts, women studies, physics, fine art, microbiology, physical education, public administration, philosophy, political sciences, psychology, population studies, social science, sociology, social welfare, linguistics, literature and so on.

Research should be at the core and must be instrumental in generating a major interface with the academic world. It must provide a new theoretical frame work that enable reassessment and refinement of current practices and thinking. This may result in a fundamental discovery and an extension of the knowledge acquired. Research is meant to establish or confirm facts, reaffirm the results of previous works, solve new or existing problems, support theorems; or develop new theorems. It empowers the faculty and students for an in-depth approach in research. It has the potential to enhance the consultancy capabilities of the researcher. In short, conceptually and thematically an active attempt to provide these types of common platforms on educational reformations through research has become the main objective of this Journal.

Dr. S. Balakrishnan

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#### Rev. Sr. Dr. Antony Pushpa Ranjitham CIC

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## "Good, Better, Best, Never Let it rest. Till your good is better and your better is best" - St.Jerome

Madoma Arts and Science College for women has achieved great heights in the academic and cocurricular realm. Ifeel elated and extremely happy that this college in collaboration with "Bodhi International Journal of Research in Humanities, Arts and Science" conducts a one day conference on the theme "Commercialization of Emerging Materials and Technology for Sustainable Future". Sustainable future is an approach to growth and human development that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs.

The aim is to have a society where living conditions and resources meet human needs without undermining planetary integrity. Sustainable development aims to balance the needs of the economy, environment, and society. I do believe, that this conference has the prime target to reach out to the young researchers of today, to make them aware of their innate potentialities and encourage them to build a serene and prosperous world of tomorrow. I hope this will become the "Power Bank" to inspire the young minds and instill in them hope and courage, create an ability to look for new horizons in life

I hope wish and pray this seminar provides ample opportunities for more reflections on their capacities and release more energy for better thinking and actualizing their potentialities. Let me take this opportunity to appreciate the college administration, the organizing committee members, members of the staff students all the contributors and participants. A big thanks to Bodhi International Journal of Research in Humanities, Arts and Science for their support and initiations. May this conference add one more pearl in the crown of Madonna Arts and Scorner College for women. May God bless you all abundantly.

**Yours in Christ** 

Sr Austip. Rayin \_\_\_\_

**Rev.Sr.Dr. Antony Pushpa Ranjitham** 



+Most Rev. Dr. Antony Pappusamy Archbishop Emeritus of Madurai

I am much delighted to know that Madonna Arts and Science College for Women organizes an International Conference on Commercializing Emerging Materials and Technologies for a Sustainable Future and brings out an International Journal which will be published as research papers presented at the Conference in March 14, 2025. At the very outset, let me congratulate the college on this significant academic initiative aimed at dissemination of the findings of academic research with a view to promoting a healthy intellectual discourse on the theme. I am happy that the collage has chosen a socially relevant theme for serious deliberations.

Commercializing Emerging Materials and Technologies for a sustainable future involves developing and using new materials and technologies to meet market needs in a cost-effective way. The goal is to create products that are reliable, durable, and environmentally friendly. Science and technology for a sustainable future help us understand our environment and our impact on it, which is essential for making smart decisions about how to use our resources. It can also help us to find solutions to the problems, such as climate change and pollution, and improve the quality of life for all people. It means moving towards a consistent resource-efficient circular economy, and by turning away from the predominantly linear economy which produces waste. We need a steady supply of food, clean water, clean air, and a healthy environment in which to thrive. By living sustainably, we plan not only for our own well-being but also that of our neighbours and future generations. Being environment-friendly, reducing energy consumption, using new renewable energies, using LED lights, reducing waste through new and more efficient designing, manufacturing, computers, servers, and associated subsystems that promotes substantial environmental benefits cannot be ignored in a climate change Global.

This present International Conference at Madonna College of Arts and Science for Women strikes on this chord. May this Conference be an eye-opener to all the speakers and participants of the Conference. I extend my best wishes to the organizers and the participants of the Conference. I take this opportunity to place on record my sincere appreciations to the Management, the Principal and the Staff for organizing an International Conference on such a socially relevant theme. Established in the recent past, the college has made rapid strides within a short span of time by conducting such useful programmes. Academic enterprise of this sort will no doubt prepare students of the future who would be socially committed, intellectually competent, affectively creative and emotionally compassionate. Wishing the college every success with the Conference and seeking God's blessings upon the college. May God Bless you in all your endeavors.

+ by pajepour Dam

+ Most Rev. Dr. Antony Pappusamy Archbishop Emeritus of Madurai



**Rev. Sr. Antony Maria Lilly** Secretary Madonna Arts and Science College for Women

I feel immensely happy to know of the Multidisciplinary International Conference on-Commercialization for Emerging Materials and Technology for Sustainable Future, organized by our Madonna Arts and Science College for Women. Whether we like it or not, we are living in the techno-tronic world. Science has advanced beyond our anticipation and has gone without boundaries. Scientific development and technological advancement are leading the humanity to the newer world. With the latest gadgets in science and technology and communication revolution the world has become a global village. The whole universe has shrunk into a microcosm. From Industrial Revolution to the current scenario of Robotic technology, mankind has marched ahead in its exploration of new heights in science and technology.

Multiple technologies only will survive and sustain in future with its resilience for the entrepreneurs, ICT professionals, industrialists and the trailblazers I Artificial Intelligence and Data Science. For sustainable brighter future and progress in holistic perspective, the commercialization of newer technologies will lend the helping hand. Even in the educational scenario, the concept of STEM-Science, Technology, Engineering and Mathematics orient the students developing the key skills and life skills to cope up with the challenges encountered in life. It's an apt approach to learning and integrating the thrust areas of research-cum-development. The recently introduced NEP-2025 also envisages the integrated holistic and multidisciplinary approach which underlines inclusive learning. At this juncture, I whole heartedly appreciate all those who are part of this creative endeavours and made the conference a mega success!

"Let noble thoughts come to us from all directions ". With solidarity and well wishes.

**Yours in Christ** 

Sr. Antony Maria Lilly

**Rev. Sr. Antony Maria Lilly** 



Dr. B. Sahaya Rani Fernando

Principal Madonna Arts and Science College for Women, Virahanur, Madurai

I am very much grateful to our Lord for having given me the opportunity to appreciate the wonderful task taken up by the faculty of Madonna Arts and Science College for Women, to bringout an International conference commercialising emerging materials and Technologies for a future on 14.03.2025.

At the outset I would like to comment on the title which is very much needed and apt for the current scenario. The staff members have been keen in choosing a right topic for this dynamic world. The topics for presentations and the multi-disciplinary conference in highly commendable discussions cover a wide range of collaboration will surely help in shaping a sustainable future. It is not only an opportunity for intellectual growth but also create a harmony in global growth.

I hope they will bring out new materials and technologies to meet out the needs of society keeping in mind the cost-benefit-effectiveness also. I wish the International Conference brought out by Madonna College will educate the participants to know about various chuologue and materials for sustainable future.

I appreciate all departments involved in their great accomplishment of bringing various colleges and students together to have an alarming discussions and making everyone understand the current scenario. My heartfelt thanks to Bodhi International Journal of Research in Arts and Science for their Co-operation and support in the regard.

I wish and pray that the International conference to be a great success and bring many more laurels Madonna Arts and Science College for Women.

God Bless you

Warm Regards

B. Saharja



Venkatapathy Kalyani

Manufacturing Engineering Leader New Product Launch Leader 8678 Windsor Hill Blvd. North Charleston, South Carolina: 29420

It is with great pleasure I appreciate Madonna Arts and Science College for women for organizing an international gathering on Commercialization of Emerging Materials and Technology for Sustainable Future (ICCEMTSF) 2K25. This dynamic discussions, keynote speeches, and panel sessions, covering a wide range of topics that are shaping the future. It hopes that through these exchanges, new collaborations will be formed, innovative solutions will emerge, and a shared vision for a better future will take shape. Bringing together such a diverse and esteemed group of participants from all corners of the world. This is not only an opportunity for intellectual growth but also for fostering global cooperation, understanding, and respect. I am confident that the conversations and collaborations sparked here will resonate long after the event concludes.

I extend my gratitude to all contributors, presenters, and organizers who have made this event possible, and I look forward to the fruitful discussions and impactful outcomes that will emerge from this intellectual exchange. Together, we are taking significant steps toward building a more interconnected and forward-thinking global community. Hoping to find the sessions insightful, the discussions enriching, and the experience both intellectually stimulating and personally rewarding. I like to extend my thanks to the members of the organizing team for their hard work.

Thank you for being a part of this exciting journey.

With Warm Regards

Venkalapath

Venkatapathy Kalyani



**Rev. Dr. Anbarasu** Principal Arul Anandar College, Karumathur

## "The meeting of two personalities is like the contact of two chemical substances: If there is any reaction, both are transformed." – Carl Jung

I am delighted in acknowledging the International Conference ICCEMTSF 2K25 organized by Madonna Arts and Science College for Women, on Commercialization of Emerging Materials and Technology for Sustainable Future. I appreciate the organizing committee for showing a keen interest in organizing a successful Conference and contributing new ideas and research findings. I extend my best wishes to them in their efforts to disseminate knowledge. I congratulate all the participants for their enthusiastic participation. The overall success of the conference depends on the cooperative endeavors of those engaged in its planning and organization.

Education consistently serves as a benchmark for progress and the acquisition of knowledge. The focus should be on research that aids society in developing innovative solutions. Embracing a fresh and creative perspective is crucial for successfully managing technological progress. This conference serves as a platform for an academic discourse focused on a sustainable future. The appropriate application of the Commercialization of Advanced Materials is also significant for investigating and examining different facets of research. The enthusiastic engagement of contributors and the educational community with a shared vision in this conference is profoundly inspiring. I extend my heartfelt appreciation to all individuals who have contributed through their research papers and active participation in this conference.

I am delighted that numerous esteemed educators, scholars and students from around the globe have gathered to exchange their knowledge and experiences, as well as to seek improved methods for a sustainable future. I sincerely wish for this International Conference to attain remarkable success, functioning not only as a platform for the exchange of knowledge and experiences in higher education but also as a basis for lasting collaboration and fellowship among educators committed to the essential and fulfilling task of educating and equipping our youth for a brighter future. I wish you all a fruitful and memorable conference experience.

**Yours in Christ** 





**Rev. Dr. Joseph John Kennady** 

Parish Priest 165, 5<sup>th</sup> Street NE, Kelliher, MN, USA

It is with immense joy and great honor that I extend my heartfelt felicitations to Madonna Arts and Science College for Women, in association with Bodhi International Journal, for organizing this prestigious International Conference on the Commercialization of Emerging Materials and Technology for a Sustainable Future.

The theme of this conference could not be more relevant in today's world, where the need for sustainable innovations and technological advancements is paramount. As we strive to balance progress with environmental responsibility, this gathering of scholars, researchers, and industry experts provides a vital platform to exchange groundbreaking ideas, share pioneering research, and explore transformative solutions that will shape a sustainable future.

The dedication and vision of the organizers in bringing together distinguished experts and enthusiastic learners from various disciplines deserve the highest commendation. This conference is not just an academic endeavor but a powerful initiative that bridges the gap between research and real-world applications, ensuring that emerging materials and technologies contribute meaningfully to society and the environment.

I firmly believe that the insights and deliberations shared during this conference will pave the way for new collaborations, inspire novel research, and ignite innovative thinking in the quest for sustainable progress. May this event be a grand success, fostering intellectual growth and contributing to the collective efforts in building a better tomorrow.

Wishing all the participants, organizers, and dignitaries an enriching and fruitful conference!

With warm regards,

**Rev.Dr. Joseph John Kennady** 



**Rev.P. Lawrence Antony** *Kath Pfarramt Sancta Familia, Pflugstraße 1, 60431 Frankfurt* 

To the esteemed organisers, participants and guests of the International Conference on Commercialisation of Emerging Materials and Technology for Sustainable Future (ICCEMTSF) at Madonna Arts and Science College for Women.

It is with great pleasure and respect that I extend my heartfelt congratulations on the occasion of this significant multidisciplinary international conference. In particular, I would like to acknowledge and commend the leadership and commitment of the Religious Sisters of Madonna Arts and Science College for Women in fostering such a vibrant and intellectually stimulating environment.

This conference, with its focus on the commercialisation of new materials and technologies for a sustainable future, is both timely and critical. The exploration of innovative solutions and the exchange of knowledge in this field are essential to address the pressing global challenges we face. I am confident that the discussions and collaborations fostered here will contribute significantly to the advancement of sustainable practices and technologies.

I commend the BODHI International Journal of Research in Humanities, Arts and Science for its association with this conference, which highlights the importance of interdisciplinary approaches to solving today's complex problems. The commitment to scholarly research and dissemination of knowledge is truly commendable.

May this conference be a resounding success, sparking new ideas, fostering collaboration and inspiring participants to drive positive change towards a more sustainable and equitable future. I wish you all fruitful deliberations and a memorable experience.

With Warm Regards

**Rev.P. Lawrence Antony** 

Dr. K. S. Joseph Wilson Associate Professor PG & Research Department of Physics



Arul Anandar College (Autonomous) Karumathur-625514 Madurai District. Tamil Nadu. Email: wilsonpra@yahoo.co.in



Message

10-03-2025

It is both an honor and a privilege to address you at this significant conference. The theme of the conference, "*The Commercialization of Advanced Materials and Technology for a Sustainable Future*," is of paramount importance not only to the scientific community but to the future of our planet.

Nature, in all its grandeur, showcases a harmonious and intricate design, with each element perfectly organized and interconnected. Its beauty is immeasurable. As we face the urgent challenges of resource depletion and environmental degradation, the need for innovative solutions has been more essential. The real challenge lies in the commercialization of the advanced materials and technologies. This process demands not only scientific and engineering expertise but also a profound understanding of market dynamics, policy frameworks, and investment strategies. Turning promising lab results into scalable, cost-effective solutions requires collaboration across industries, governments, and academic institutions.

One of the key areas where we can make an immediate impact is in the energy sector. Advanced materials such as high-efficiency solar cells, next-generation batteries, and hydrogen storage technologies have the potential to accelerate our transition to renewable energy. Yet, for these technologies to become widely accessible, we must address issues like production costs, scalability, and regulatory approval. Public-private partnerships and collaborative ventures are essential to overcome these hurdles. Commercializing these technologies is not just about profit but about creating systemic value that benefits society and the environment.

The road ahead is both challenging and exciting. It is up to us, as students, scientists and entrepreneurs, to harness the power of advanced materials and technology to create a future that is not only sustainable but also equitable and prosperous. I wholeheartedly congratulate and appreciate the organizing team for their untiring, dedicated efforts in organizing and conducting this conference successfully.

Let us continue this journey with determination and collaboration, shaping a bright future where sustainability and technological progress go hand in hand.

With regards,



#### Arockiasamy Arulandu

Ph.D Group Leader, Structural Biology International Centre for Genetic Engineering and Biotechnology (ICGEB) Aruna Asaf Ali Marg, New Delhi-110067, India.

Dear Esteemed Colleagues, Researchers, and Industry Leaders,

It is with great enthusiasm that I extend my best wishes for the International Conference on Commercialization of Emerging Materials and Technology for a Sustainable Future (ICCEMTSF 2K25). As we confront the pressing challenges of climate change, resource scarcity, and environmental degradation, the role of emerging materials and technologies in shaping a sustainable future has never been more vital.

In recent years, we have witnessed remarkable advancements in novel materials—from biomaterials to smart materials, from energy-efficient innovations to sustainable manufacturing processes. These breakthroughs have the potential to revolutionize industries and redefine the way we produce, consume, and interact with our environment. This conference provides a critical platform for exploring the intersection of research, development, and commercialization of these transformative technologies.

As we seek solutions to global challenges such as reducing carbon emissions, enhancing resource efficiency, and ensuring long-term environmental sustainability, emerging materials offer unparalleled opportunities. From next-generation batteries and carbon capture materials to green building technologies and sustainable agriculture, the applications are both vast and groundbreaking. ICCEMTSF 2K25 serves as a hub for collaboration among researchers, engineers, policymakers, and entrepreneurs—fostering dialogue that will drive innovation and real-world impact.

I look forward to engaging discussions, groundbreaking insights, and the formation of new partnerships that will guide us toward a more sustainable, prosperous, and resilient future. Wishing all of you a productive and successful conference.

Warm regards

Arockiasamy Arulandu



Arun Prasad Arockiasamy TAG CTI Lead -AIA & CIS Talent Acquisition Group, North America

I am thrilled to know about the upcoming conference that promises to be a significant event in the current scenario. In this fast-evolving generation, the importance of such conferences cannot be overstated. This conference will explore the latest trends, materials, technologies, and best practices in commercialization and sustainability, providing a platform for creating a lasting and sustainable future.

Technologies are at the forefront of innovation breakthroughs, and their commercialization is viewed as the heart of economic growth. The conference on emerging technologies is incredibly important in the current market. Emerging technologies are a promising substrate for innovation breakthroughs with the potential to transform multiple industries. The commercialization of these technologies is viewed as the heart of economic growth. It brings together experts to exchange and share their knowledge, experience, and research results on advancements in the fields of science, social sciences, and humanities.

Bringing together thought leaders and experts to discuss major challenges and innovations at such conferences are crucial as they address multiple topics and issues of interest in areas like machine learning, deep learning, data mining, big data analytics, and more. These discussions help in understanding the latest advancements and challenges, fostering collaboration, and driving innovation.

Finally I would like to congratulate Madonna College for taking this initiative. Their efforts in organizing this conference are commendable, and I wish them great success in their endeavour. This initiative not only highlights the importance of staying updated with the latest technological trends but also emphasizes the need for continuous learning and collaboration in today's fast-paced world.

Thanks & Regards,

Arun Prasad Arockiasamy TAG CTI Lead -AIA & CIS Talent Acquisition Group- North America



**Rev. Dr. P. Arockia Michael Mercy** HOD of Physics and Conference Chair Madonna Arts and Science College for Women

#### Acknowledgment

This International Conference of Madonna Arts and Science College has been brought together experts, thought leaders, passionate professionals, researchers and students from diverse institutions. Their hearted cooperation and dedication enabled us to publish this journal on time. On this auspicious occasion I would like to remember all of them with deep gratitude.

First and foremost, I express my deep sense of gratitude to Almighty God for His boundless inspiration and abundant blessings. I extend my sincere appreciation to Rev.Dr.Antony Pushpa Ranjitham, Superior General of CIC, Rev.Sr.Thanaseeli Sengol, Asst.Superior General, for their motivation and constant encouragement. I must express my very profound gratitude to Rev.Sr.Antony Maria Lilly CIC, Secretary, Madonna Arts and Science College for her support, valuable guidance and understanding throughout this conference. I am also grateful to Rev.Sr.Sahaya Mary CIC, Superior of Amali Convent for providing us with all the necessary facilities. I would like to express a deep sense of gratitude to Dr.Sahaya Rani, Principal, Madonna Arts and Science College for her unceasing encouragement, support and attention to edit and publish the journal.

It gives me immense pleasure to express my heartfelt gratitude to all our distinguished keynote speakers, presenters, and panelists for their valuable insights, expertise, and dedication to advancing knowledge in Commercialization of Emerging Materials and Technology for Sustainable Future. Your contributions are the heart and soul of this event.

I must take a moment to acknowledge the hard work and dedication of our organizing committee members from the departments of Mathematics, Physics, Computer Science, Commerce, Commerce with Computer Applications and Business Administration behind the scenes. Your hard work, attention to detail, and unwavering support have been crucial in bringing this conference to life. I also want to express our sincere appreciation to our sponsors and partners, who's generous support has enabled us to bring this event to life.

I would like to extend my hearty thanks to Bodhi Internal Journal and all delegates, Academic Officials and well-wishersfor their contributions in word and kind. I express my deepest gratitude to all those who have contributed directly or indirectly rendered their support to making this International Conference a reality.

P. Morey

Rev.Dr.P.Arockia Michael Mercy Conference Chair



## Editorial Note Bridging Innovation and Sustainability

As the world becoming more complex and catastrophic with devastating environmental depletion and degradation necessitates the urgent need for innovation in materials and technologies that promote sustainability.

An integrated team based approach to sustain the future with much of environment friendly, socially all inclusive mode of managing the innovative technology and materials coupled with accountability and responsible behavior would be the solution in safe guarding the future. The "International Multidisciplinary Conference on Commercialization of Emerging Materials and Technology for a Sustainable Future" is a pivotal gathering of minds aimed at addressing these very challenges. This conference brings to get her academicians, researchers, experts from diverse fields, scientists and technocrats—to explore how emerging materials and cutting-edge technologies can be harnessed to ensure a sustainable and prosperous future for all. Research and development are the critical break through that translate these innovations into commercially viable products and solutions. Commercialization is the bridge between discoveries and applications. Utilization of technologies and materials with the sense of responsibility and accountability to humanity would be the outcome of this conference.

The path forward would be to integration, collaboration, and support through concrete policies. This conference shed light on significant progress, but the challenges remain. The commercialization of emerging materials and technologies faces hurdles such as regulatory complexities, financial barriers, and the need for robust supply chains. As such, collaboration between various stakeholders—including researchers, industries, governments, and non-governmental organizations—is essential to overcome theposed challenges.

The articles presented offer a glimpse into the diverse range of technologies that are shaping the future. They highlight the significant strides being made in material innovations that reduce environmental footprints, enhance energy efficiency, and enable the use of sustainable alternative renewable energy resources in manufacturing processes.

Though the road to sustainable future is challenging, the tools and knowledge to navigate it are already within reach. The continuous effort to innovate, collaborate and to push forward the newly emerging materials and methods is the way possible to create a more sustainable world for generations to come

Jour Mhatthe

**Dr. A. Savarimuthu** Former Dean of Management studies St. Joseph's Institute of Mnagement, Trichy

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#### Aim & Objectives

Academic Excellence in research is sustained by promoting research support for young Scholars. Our Journal on Humanities, Arts and Science of research is motivating all aspects of encounters across disciplines and research fields in a multidisciplinary view, by assembling research groups and consequently projects, supporting publications with this inclination and organizing programmes. Internationalization of research work is the unit seeks to develop its scholarly profile in research through quality of publications. And visibility of research is creating sustainable platforms for research and publication, such as series of books; motivating dissemination of research results for people and society.

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# ORGAN TRANSPLANTATION-DONATION CONCISE AND LEGAL PERSPECTIVE

R. SUJATHA

Assistant Professor, Department of Life Science Ponnaiyah Ramajayam Institute of Science & Technology Madurai Campus, Thanjavur

#### Abstract

Donating an organ or a portion of an organ for transplantation into another person is known as organ donation. Organ donation and transplanted is a surgical proceeding ,organ donors are usually volunteered before their death or their family members donated .organ recipients are usually who are ill in the last stage organ failure. An organ of theirs to be removed, legally, under laws and followed some Act. The laws and rules governing organ donate transplantation and including Authorization committee, appropriate authority. Organ donation and transplantation has remodeled the lives of many around the world.

**Keywords:** organ transplantation, milestone, graft, deceased donor, religious, act, transplantation centre, milestones, organs, shortage, authority.

#### Introduction

Cells or tissues or organs are transplanted. The structure used for transplantation include individual cells, tissues, skin, kidney, heart, eye etc. With striking examples like Lord Ganesha and Guru Dadeech, who are regarded as the pinnacles of our rich culture. tradition, religion, spirituality, generosity, salvation, and science, organ donation and transplantation (ODT) has its origins in ancient Indian mythology. If organs of ethically high quality are removed from a person and transplanted to a recipient within a specified time window, precious human lives can be spared. The majority of organ transplants are now regarded as safe procedures that are considered therapy alternatives for thousands of individuals with medical indications rather than experiments. The theoretical idea of ODT, historical turning points, need, scarcity, key principles, and certain ethics are reviewed and discussed in this article.

#### Objective

• Organ transplantation is a surgical operation. Transplanted such as organs are cells, tissuses, skin, kindney, lung, heart eyes etc.

- Most of the organs are transplanted through relatives. Intermittent from such acceptable persons.
- Organs are donated one is living donors have be in good physical and mental health another one is deceased donors as an considered death.
- Transplant centre should be organ specialist and specialize in transplant medicine.
- Transplantation have myriad reasons of shortage. Transplatation are help by Act such as Anatomical gift act, NOTA, Omnibus budget reconciliation Act, THO Act.
- Point outs such successfully millistones.

#### **Organ Transplantation**

An organ transplant involves surgically removing a damaged or failing organ from the body and replacing it with a fresh one. Transplant also called graft (or) organ transplantation. A graft is similar to a transplant. It is the process of removing tissue from one part of a person's body (or another person's body) and surgically re- implanting it to replace or compensate for damaged tissue. Grafting is different from transplantation because it does not remove and replace an entire organ, but rather only a portion. If an organ transplant is in the future for you or a loved
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one, you are not alone. In 1954, a kidney was the first human organ to be transplanted. Liver, heart, and pancreas transplants were performed in the late 1960s, while lung and intestinal organ transplants began in the 1980s. Such organs are transplanting kidney, heart, lungs, liver, pancreas and intestines. Animal and artificial organs may also serve as transplantable organs.

## **Types of Organ Transplantation**

- Autograft: A transplant of tissue from the person to oneself (e.g., skin grafts, vein extraction for coronary artery by pass graft, etc.)
- Allograft: An organ or tissue that has been transplanted from a genetically non-identical member of the same species
- Isograft: Organs or tissues are transplanted from one to genetically identical other person (identical twin)
- Xenotransplant: When transplantation is performed between different species e.g., animal to human.

## **Organ Donation and Registration**

There are two ways to donate organs:

- 1. By pledging for OD when a person is alive
- 2. By consent of family after death.

## **Types of Donors**

## Living Donors

Candidates for living donors may include parents, kids, spouses, friends, coworkers, and even complete strangers. They should be in good physical and mental condition and free from diseases specific to their organs, high blood pressure, diabetes, cancer, HIV, and hepatitis. Usually at least eighteen years old.

People wish to donate their organs can donate in two ways:

- 1. Donate one-half of a paired organ set. Ex: Kidney
- 2. Donate a portion of an organ that will still be able to function without it. Ex: A portion of the liver

- Living Donor may to one kidney, segment of the liver, lobe of a lung, portion of the pancreas portion of the intestine. Living donation is major surgery.
- The first successful living-donor transplant was done between 23-year-old identical twins in 1954.

## **Deceased Donor**

If a person gave their consent before to their death, their organs may be given after they pass away. A person is considered dead once either the heart stops beating or brain function ceases (called brain death). After death, the organs are taken from the deceased person's body. If the deceased person's organ donation wishes are unknown, the hospital, physician. A family member will be contacted by the organ procurement organization to get permission to retrieve the organs. Multiple recipients can get organs from a single cadaveric donor. Usually, many organs can be recovered from a single cadaver, albeit the specific organs and tissues that can be recovered may vary depending on the cause of death or damage to an organ.

In 2002, more than 22,000 organs were recovered from 6,182 cadaveric donors.



## **Transplant Centers**

A transplant center is a hospital with staff that specializes in transplant medicine.

Your primary doctor or organ specialist can refer you to a transplant center that:

- is near your home
- specializes in your medical situation
- accepts your insurance

## **Organ Shortage**

The myriad reasons of shortage are administrative, legal, health system, and knowledge, attitude, and practice gap of stakeholders. Contrary to many studies, cultural, social, educational issues, language barrier, and religious concerns do not play a significant role in the decision for or against donation.

## **Certain Reasons for Shortage**

- The primary ethical dilemmas surrounding organ transplantation arise from the shortage of available organs.
- Lack of awareness of brain death concept among medical professionals and public
- A misapprehension about brain death
- Lack of system regarding identification and maintenance of brain dead donors
- Religious fallacies
- Out-of-pocket expenses
- Lack of system regarding identification and maintenance of brain dead donors
- Poor funding and budget due to competing need/demand.

# Aspects of Organ Donation and Transplantation from a Legal and Ethical Perspective

Law and lawyers have proven to be a mixed blessing in human organ transplantation. The Uniform Determination of Death and Uniform Anatomical Gift Acts, in particular, are largely to blame for the success of transplantation.

## The Uniform Anatomical Gift Act

The National Conference of Commissioners on Uniform State Laws began the process of formulating a model organ donation act on 1960s. In 1968 the Conference adopted the Uniform Anatomical Gift Act (UAGA). 23 By 1972 some version of the UAGA had been adopted in every state. In 1980, however, the National Conference of Commissioners on Uniform State Laws promulgated its Uniform Determination of Death Act (UDDA). The established medical standards must be followed for determining a person's death.

## National Organ Transplant Act

The primary federal regulation stems from the National Organ Transplant Act (NOTA or the Act), which Congress passed and President Reagan signed in 1984. Legislation regulating organ procurement and transplantation subsequently was introduced in both the House and Senate. House and Senate Conferees in October 1984 produced a compromise measure that was enacted as NOTA. NOTA enshrined OPOs (Organ Procurement Organizations) as the backbone of the organ procurement and distribution. NOTA provided that no more than two million dollars per fiscal year may be spent to support the Network system. The sale and acquisition of human organs and tissues for monetary gain is forbidden by NOTA.

## The Omnibus Budget Reconciliation Act

All transplanting hospitals have to be members of the OPTN and commit to following its regulations in order to be eligible for Medicare and Medicaid, according to the Omnibus Budget Reconciliation Act of 1986.

## The Act

Needs to ask the government-appointed authorisation for special permission.

- Regulation of transplant activities by forming an Authorization Committee (AC) and Appropriate Authority (AA.) in each State or Union Territory.
- Establishing an Authorization Committee (AC) and Appropriate Authority (AA) in every State or Union Territory to oversee transplant operations.
- The Authorization Committee is responsible for approving or disapproving transplants between donors and recipients.
- To approve or reject transplants between the recipient and donor.

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• Appropriate Authority: To regulate the removal, storage, and transplantation of human organs.

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• Congress passed the National Organ Transplant Act (1984).

Prohibited the sale of human organs and called for a national network to manage organ recovery and placement.

## Milestones

Year	Milestone
1963	First lung transplant
1968	First heart lung transplant
1989	Living donor liver transplant
1998	India's first successful lung transplant
2014	First successful uterine transplant resulting
	in live birth
2014	First successful penis transplant

## Conclusion

Now a days is a increase in deceased organ is need to make organ Transplantation reasonable to more candidates. More people to registes as organ donors. Organ transplantation some persons improve their quality of life. Hence organ donation is a noble act, gift to life and life line.

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## ENVIRONMENTAL IMPACT OF GLOBAL BUSINESS OPERATIONS

#### Mrs. M. SUGANYA

Scholar, Department of Management Studies Madurai Kamaraj University, Madurai

#### Abstract

The relationship between the operations of multinational corporations and environmental objectives is the subject of international businesses and environmental challenges. Businesses are compelled to be more ecologically conscious and take the future of resources into account in their operations due to the growing knowledge of environmental challenges and the associated organizations, international policies, and relationships. International laws, statements, and other influences have the power to alter how firms operate. Since at least three centuries ago, the story of international economic activity has been characterized by participation in global markets, internationalization and transfer of business activities across all geographic meridians, and encountering various and frequently uncertain environments. In order to preserve nature and promote growth, the earth, profit, and people are all involved. From this vantage point, this chapter gives a summary of global politics, relations, environmental issues, norms, and successful corporate examples that demonstrate environmental consciousness.

Keywords: international business environment, effects of globalization, issues

## Introduction

The impact on the environment is now a crucial factor in business. Businesses are under pressure to evaluate, address, and lessen their impact on the environment as society becomes more concerned about its condition. Environmental impact in business refers to the effects of business operations, practices, and products on the environment, including the consumption of resources, emission of pollutants, and contribution to climate change. The issues related to environmental impact in business are diverse and wide-ranging. They include resource depletion, pollution of air, water, and soil, habitat destruction, greenhouse gas emissions, waste generation, and the loss of biodiversity. They not only pose risks to the environment but also have significant social and economic implications. Ccompanies are actively looking for answers as they realize how important it is to address environmental effect.

## **International Business Environment**

Trading goods and services in a global marketplace is referred to as international business. It is also known as the globalization of commerce. An international business environment, or IBE, is the setting in which multinational corporations operate. It is essential to the growth and development of a nation. A variety of factors, including political hazards, cultural differences, exchange risks, and legal and taxes concerns, are present in an international business environment (IBE). Because the international business environment is so important to a nation's economy, it is therefore required that those in managerial positions focus on its components.

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## Effects of Globalization on the Environment Increased Transport of Goods

One of the main effects of globalisation is that it exposes companies to new markets where they can obtain labour, raw materials, and components as well as sell their products. Finished goods are now transported farther than ever before—possibly halfway around the world—due to these two realities. Local production, sales, and consumption were more common in the past. The environment may be impacted by this increasing freight transportation in a number of ways.

**Increased emissions:** A product's fuel consumption and greenhouse gas emissions increase with its distance of travel. A report by the International Transport Forum predicts that by 2050, transportation-related CO2 emissions will rise by 16%. It has been demonstrated that these emissions have a major effect on biodiversity and are a contributing factor to pollution, climate change, and ocean acidification globally.

Habitat destruction: Roads, bridges, and other infrastructure are necessary for transportation, particularly when it is land-based. Such infrastructural expansion may result in pollution and habitat loss, among other problems. The likelihood of significant oil spills or leaks that harm the fragile marine environment increases with the number of ships that go by sea.

**Invasive species:** Every shipping container and vessel offers a chance for a living thing, whether it be a plant, animal, or fungus, to go to a new area where it might spread and become invasive without the checks and balances that might exist in its natural habitat.

## **Economic Specialization**

The ability of countries and geographical areas to concentrate on their economic strengths while depending on trading partners for commodities they don't produce themselves is one of the oftenoverlooked consequences of globalization. This economic specialization frequently increases efficiency and production.

Brazil's growing cattle ranching industry, which needs a lot of land for grazing, is causing illegal deforestation there. An excessive reliance on cash crops like coffee, cocoa, and other fruits has led to habitat destruction, particularly in tropical regions; overfishing in coastal regions, including Southeast Asia, has greatly decreased fish populations and contaminated the ocean.

It's important to keep in mind that globalization has made it possible for some countries to focus on producing different energy commodities, such lumber, natural gas, and oil. Countries that prioritize "energy security" and rely heavily on energy sales to finance their national budgets are more likely to implement market-interfering policies, such as subsidies or legislation, that make the switch to renewable energy more challenging.

## **Decreased Biodiversity**

Global biodiversity is being diminished by a number of factors, including increased greenhouse gas emissions, ocean acidification, deforestation (as well as other types of habitat loss or destruction), climate change, and the introduction of invasive species. The most recent Living Planet Report from the World Wildlife Fund states that since 1970, the numbers of all organisms—including fish, amphibians, reptiles, birds, and mammals—have dropped by 68%. A disproportionate amount of biodiversity has been lost in Latin America and Africa, two quickly developing regions that are crucial to international trade, particularly among fish, reptiles, and amphibians that are sensitive to environmental changes.

## **Increased Awareness**

Globalization has raised environmental consciousness globally, despite the fact that many of its effects have been detrimental to the environment. People may now more easily observe the repercussions of environmental habitat loss, deforestation, and climate change than ever before because to increased connection and increased international travel rates. New laws, rules, and procedures to restrict adverse impacts have resulted from this.

# Internationalization Business Environmental Issues

Today's businesses have a crucial obligation to address environmental challenges. Companies can address environmental issues through various strategies and initiatives that prioritize environmental sustainability, promote responsible practices, and drive positive change.

Doing environmental impact assessments is one crucial strategy. These evaluations assist businesses in comprehending the precise environmental impacts of their operations, goods, and services. Organizations can minimize adverse impacts and maximize resource utilization by recognizing and assessing their environmental impact. Reducing environmental impact often involves adopting sustainable production methods and technologies. Businesses can collaborate with suppliers who follow environmental ethical standards and support sustainable raw material procurement by incorporating sustainability into their supply chain management.

## **Environmental Impact Assessment**

An important technique for assessing possible environmental problems as a result of planned projects, laws, or activities, as well as the effects of commercial operations on the environment, is the Environmental Impact Assessment (EIA). It enables businesses and decision-makers to evaluate the effects on the environment and make wise decisions that support sustainable development. Analyzing how humans affect the environment is one of the main components of an EIA. It considers the behaviors and activities of people, groups, and sectors of the economy that lead to environmental issues. Policymakers and other stakeholders can create plans to reduce adverse effects and encourage sustainable activities by having a thorough grasp of how humans affect the environment.

Additionally, EIA takes into account how planned projects or policies may affect the entire world. It acknowledges that environmental problems transcend national borders and can have significant repercussions. Decision-makers can implement policies that support global environmental goals and agreements by evaluating the effects on a global scale, such as ecosystem devastation, biodiversity loss. and climate change. Assessing the environmental impact of corporate operations is very important. It assists businesses in determining how their activities, goods, and services affect the environment.

#### **Environmental Issues in Business Management**

The key approach to managing environmental issues in business is conducting an environmental impact assessment. By assessing the potential impact of business activities on the environment from their operations, products, and services, companies can identify areas where improvements can be made. Environmental impact assessments help businesses understand the specific problems in the environment that their activities may contribute to impact of business activities on environment

Adopting procedures that give resource efficiency, waste reduction, and the utilisation of renewable energy sources top priority would help businesses manage their environmental impact more effectively. Businesses can lower their environmental effect, save money, and enhance their reputation by incorporating sustainability into their operations.

Businesses should incorporate environmental factors into their overall business strategy and decision-making procedures in order to successfully address environmental issues. Setting specific

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environmental objectives, putting environmental management systems in place, and routinely tracking and reporting on results are all necessary for this. Businesses should make sure that environmental factors are balanced in their core business operations by implementing sustainable practices and including environmental measures in performance evaluation.

### Conclusion

One significant factor that has influenced the modern world is global trade, but its environmental impact cannot be ignored. As the world grapples with the challenges of climate change, resource scarcity, and biodiversity loss, it is imperative to find ways to make global trade more environmentally sustainable.

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## **RISK MANAGEMENT IN INTERNATIONAL SUPPLY CHAINS**

#### **RISHAL R B**

BBA (Logistics & Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **VENGADESH S**

BBA (Logistics & Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

## **B. VAIRAMUTHU**

Assistant Professor, Department of Business Administration Subbalakshmi Lakshmipathy College of Science, Madurai

#### Abstract

Risk management in international supply chains is essential to ensure the smooth flow of goods and services across borders. The complexity of global supply chains, with multiple stakeholders, regulations, and geopolitical factors, increases exposure to various risks such as disruptions, delays, financial losses, and compliance issues. These risks can stem from factors like natural disasters, political instability, currency fluctuations, transportation failures, or cyber threats. To mitigate these risks, businesses adopt various strategies, including diversifying suppliers, building inventory buffers, implementing flexible logistics, and utilizing advanced technologies like predictive analytics and blockchain for better visibility and transparency. Additionally, strong relationships with suppliers and stakeholders, along with effective communication, can help in navigating uncertainties. A comprehensive risk management framework also involves regular assessments, scenario planning, and the development of contingency plans. Incorporating risk management into the decision-making process allows companies to identify potential threats early and respond proactively, reducing vulnerability and improving resilience in the face of disruptions. As international supply chains continue to evolve, a robust risk management strategy is increasingly vital for companies to maintain competitiveness and ensure sustainability. **Keywords:** risk management, financial losses, cyber threats, cyber threats, cyber threats

#### Introduction

This paper examines the Globalization has expanded supply chains across multiple countries, making businesses dependent on international suppliers, logistics networks, and regulatory policies. While globalization has increased efficiency and costeffectiveness, it has also introduced new risks. Companies must proactively identify, assess, and manage these risks to prevent disruptions.

## Types of Risks in International Supply Chains Financial Risks

Financial risks arise due to fluctuations in currency exchange rates, trade restrictions, and supplier financial instability. A sudden depreciation of currency or an increase in tariffs can increase supply chain costs. Additionally, economic downturns may lead to supplier bankruptcies, causing supply chain disruptions.

#### **Operational Risks**

Operational risks involve disruptions in production, transportation, and logistics. Supplier failures, quality issues, and transportation delays due to congestion or natural disasters can significantly impact supply chains. Cyber security threats, such as hacking or data breaches, also pose a risk to digital supply chain systems.

#### **Political & Regulatory Risks**

Political risks arise from government regulations, trade policies, and geopolitical conflicts. Countries frequently impose tariffs, import/export restrictions, and sanctions, affecting supply chain efficiency. Regulatory risks include compliance with labor laws, environmental policies, and international trade agreements.

## **Environmental & Natural Disaster Risks**

Environmental risks, such as hurricanes, earthquakes, and floods, can disrupt supply chain operations. The COVID-19 pandemic highlighted the vulnerabilities of global supply chains to unexpected disruptions. Climate change-related risks, such as extreme weather events, also pose long-term threats to supply chain stability.

## **Risk Assessment & Identification**

To manage risks effectively, businesses use several risk assessment techniques:

Supply Chain Mapping: Identifying critical suppliers, transportation routes, and potential bottlenecks.

Risk Matrices: Assessing risks based on their likelihood and impact.

Predictive Analytics: Using AI and data analytics to detect early warning signals and predict potential disruptions.

## Strategies to Mitigate Risks Supplier Diversification

Relying on a single supplier increases vulnerability. Companies should establish relationships with multiple suppliers across different regions to reduce dependency and mitigate supply chain disruptions.

## **Inventory Management**

Holding safety stock can help absorb short-term supply chain disruptions. While the Just-in-Time (JIT) model focuses on efficiency, a Just-in-Case (JIC) approach ensures businesses have backup inventory during crises.

## **Digitalization & Technology**

Technologies such as blockchain, AI-driven demand forecasting, and IoT sensors provide real-time supply chain visibility. Predictive analytics can identify risks in advance and help companies take proactive measures.

### **Strong Contracts & Compliance**

Having legally binding contracts with suppliers ensures accountability and minimizes legal risks. Compliance with international regulations and ethical sourcing practices strengthens supply chain resilience.

## Case Studies of Supply Chain Disruptions COVID-19 Pandemic

The pandemic caused significant disruptions in global supply chains due to factory shutdowns, labor shortages, and increased demand for essential goods. Companies with diversified suppliers and strong digital infrastructure were better able to adapt.

## Suez Canal Blockage (2021)

The Ever Given, a massive container ship, blocked the Suez Canal for six days, delaying global trade. This event highlighted the importance of alternative shipping routes and supply chain flexibility.

## Semiconductor Shortage (2020-2022)

A shortage of semiconductor chips disrupted industries like automotive and electronics. Companies began reshoring manufacturing and securing long-term contracts to reduce reliance on a single supplier.

#### **Best Practices for Risk Management**

To build resilient supply chains, companies should adopt the following best practices:

## **Continuous Monitoring**

Tracking global economic, political, and environmental conditions.

#### **Collaborative Partnerships**

Strengthening relationships with suppliers and logistics providers.

#### **Investing in Digital Tools**

Leveraging AI, IoT, and blockchain for enhanced visibility and risk detection.

## **Crisis Management Plans**

Developing emergency response strategies to handle supply chain disruptions effectively.

## **Conclusion & Recommendations**

Risk management in international supply chains is crucial for long-term business success. Companies must proactively identify risks, implement mitigation strategies, and leverage technology for better resilience. By adopting predictive analytics, diversified sourcing, and strong supplier relationships, businesses can minimize disruptions and maintain a competitive advantage.

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## **ENVIRONMENTAL DEVELOPMENT**

#### S. ANUSHIKA

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

#### A. NIVETHA

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

### A. NIHILA

Assistant Professor of Commerce Madonna Arts and Science College for Women, Madurai

#### Abstract

Environmental development refers to the integration of sustainable practices into economic, social, and technological progress, aimed at preserving natural ecosystems while promoting human well-being. As the global population continues to grow and industrialization accelerates, the need for environmentally conscious development becomes more urgent. This paper explores the concept of environmental development, focusing on strategies and practices that balance economic growth with environmental preservation. Key areas of discussion include renewable energy, sustainable agriculture, waste management, conservation of biodiversity, and green technologies. The paper also highlights the importance of environmental development presents significant challenges, such as resource depletion and climate change, it also offers opportunities for innovation, green job creation, and long-term ecological health. Ultimately, environmental development aims to ensure a harmonious relationship between human progress and the planet's capacity to support life, ensuring a sustainable future for generations to come.

Keywords: sustainability, renewable energy, climate change, conservation

#### Introduction

Environmental development is a crucial concept that focuses on ensuring that development meets the needs of the present without compromising the ability of future generations to meet their own needs. This paper investigates sustainable environmental development, which balances economic growth, social equity, and environmental protection. With the increasing impact of climate change, pollution, and resource depletion, this subject has gained significant importance in recent years. The introduction sets the tone for understanding the challenges and solutions related to environmental sustainability.

# Theoretical Framework of Environmental Development

Environmental development draws on various theories and approaches, including the concept of

sustainable development as articulated in the 1987 Brundtland Report. This section explores the evolution of environmental development, from early conservationist approaches to modern sustainable development strategies that emphasize the integration of social, environmental, and economic goals. Furthermore, it explores frameworks such as the Triple Bottom Line (TBL) and the Circular Economy, which have gained traction in recent years.

#### Key Challenges in Environmental Development

Several challenges impede progress toward sustainable environmental development. This section outlines the major obstacles, including:

• Climate Change: The global warming crisis caused by increased greenhouse gas emissions

leads to rising sea levels, more frequent natural disasters, and disruptions to biodiversity.

- **Pollution and Waste Management:** Air, water, and soil pollution contribute to health risks and environmental damage. Inefficient waste management systems also exacerbate these issues.
- **Resource Depletion:** Overexploitation of natural resources, including deforestation, fossil fuel depletion, and biodiversity loss, threatens the stability of ecosystems.
- Social and Economic Inequality: Environmental degradation disproportionately affects marginalized communities, creating a complex interplay between environmental and social justice.

# Sustainable Development Goals (SDGs) and their Role

The United Nations' SDGs, adopted in 2015, provide a roadmap for global sustainable development. This section discusses how SDGs 13 (Climate Action), 14 (Life Below Water), and 15 (Life on Land) directly contribute to environmental development. The SDGs provide a global framework for addressing environmental challenges and encourage nations to integrate sustainability into national policies.

## Strategies for Promoting Sustainable Environmental Development

Addressing the environmental challenges requires concerted efforts from governments, industries, and individuals. This section highlights key strategies for promoting sustainable environmental development:

- **Renewable Energy Transition:** Moving away from fossil fuels to renewable energy sources such as solar, wind, and hydropower can significantly reduce carbon emissions.
- **Sustainable Agriculture:** Promoting practices like agroforestry, organic farming, and permaculture helps preserve biodiversity and soil health while providing food security.

• **Circular Economy:** Emphasizing waste reduction, recycling, and reusing materials can reduce the ecological footprint of industries.

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• Green Urbanization: Developing smart cities with sustainable infrastructure, energy-efficient buildings, and green spaces is critical for reducing environmental impacts.

## Case Studies of Successful Environmental Development Initiatives

This section discusses several case studies where environmental development strategies have been successfully implemented:

- Germany's Energiewende: Germany's transition to renewable energy has been one of the most ambitious efforts to combat climate change and reduce fossil fuel dependence.
- Costa Rica's Conservation Policies: Costa Rica has successfully integrated environmental protection with economic development by focusing on ecotourism and biodiversity conservation.
- China's Green Development Initiatives: As a major industrial nation, China has increasingly focused on green development, including investments in renewable energy and electric vehicles.

# Future Prospects and Innovations in Environmental Development

Innovations in technology and policy are key to overcoming current challenges and advancing sustainable development. This section explores emerging trends such as:

- Carbon Capture and Storage (CCS): Technologies that capture CO2 emissions from power plants and other industrial processes are being developed to mitigate climate change.
- **Eco-innovation:** Businesses and governments are investing in eco-friendly innovations that reduce environmental impacts while promoting economic growth.
- Circular Economy Business Models: New business models focused on product life

extension, sharing economies, and sustainable design are gaining traction.

## Conclusion

Environmental development is a complex, multifaceted issue that requires a collaborative approach involving governments, industries, and individuals. Sustainable development is not just about preserving the environment but also ensuring social equity and economic viability. This paper has outlined the key challenges and strategies in promoting environmental sustainability and has discussed the role of emerging technologies and policy frameworks in shaping a sustainable future.

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## **GLOBAL TRADE REGULATIONS AND COMPLIANCE**

#### **BAVIYA A**

BBA (Logistics and Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### SRI AKILANDESHWARI S

BBA (Logistics and Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **B. VAIRAMUTHU**

Assistant Professor, Department of Business Administration Subbalakshmi Lakshmipathy College of Science, Madurai

#### Abstract

This paper explores how Global trade regulations and compliance play a crucial role in facilitating international trade while ensuring legal, ethical, and security standards are met. As businesses expand across borders, they must navigate complex trade laws, customs procedures, and regulatory frameworks set by international organizations, national governments, and trade agreements. Institutions such as the World Trade Organization (WTO), regional trade blocs, and free trade agreements (FTAs) establish rules that govern tariffs, import/export restrictions, and dispute resolution mechanisms. A key aspect of trade compliance Is customs regulations, which require businesses to accurately classify goods under the Harmonized System (HS), determine their value, and comply with duties and tariffs. Additionally, governments enforce sanctions, embargoes, and trade restrictions to regulate interactions with specific countries, entities, or individuals. Companies must also comply with product standards and safety regulations such as ISO certifications, CE marking, and FDA approvals to meet international quality requirements. Another critical area is anti-corruption and ethical trade practices, with laws like the U.S. Foreign Corrupt Practices Act (FCPA) and the UK Bribery Act prohibiting bribery and unethical business conduct. With the rise of digital trade, compliance with data protection laws and ecommerce regulations has also become essential. In response to increasing complexities, businesses are adopting Internal Compliance Programs (ICP), leveraging artificial intelligence (AI), blockchain and automation to streamline compliance processes and reduce risks. Emerging trends, such as sustainability regulations (e.g., the EU Carbon Border Adjustment Mechanism – CBAM), are reshaping trade policies.

**Keywords:** world trade organisation (WTO), free trade agreements (FTAS), harmonized system (HS), embargoes, foreign corrupt practices act (FCPA), internal compliance programs (ICP), carbon border adjustment mechanism (CBAM)

#### Introduction

Global trade regulations and compliance govern international commerce by establishing rules, standards, and enforcement mechanisms to ensure fair, legal, and ethical trade. These regulations cover tariffs, trade agreements, customs procedures, export controls, sanctions, product safety, and intellectual property protection. Compliance is crucial for businesses to avoid legal penalties, gain market access, and maintain trust with partners and consumers. Governments and international organizations, such as the World Trade Organization (WTO), oversee these regulations to prevent unfair trade practices. By adhering to global trade laws, companies can operate smoothly, minimize risks, and contribute to a stable and transparent global economy.

# **Objective of Global Trade Regulations and Compliance**

• To Ensures fair trade by restricting practices like dumping (selling goods below cost) and unfair subsidies that distort market competition.

- To Provides a stable regulatory environment that attracts foreign investment, enhances business confidence, and promotes economic growth.
- To Facilitates smoother trade by standardizing tariffs, reducing import/export restrictions, and promoting free trade agreements (FTAs).
- To Ensures that imported and exported goods meet safety, health, and environmental requirements, protecting consumers and promoting sustainable trade.

## Major Global Trade Regulations World Trade Organisation Rules

World trade regulations, governed primarily by the World Trade Organization (WTO), establish a framework for fair and predictable global trade by setting rules on tariffs, market access, intellectual property, and dispute resolution. These regulations promote non-discrimination through principles like Most-Favored Nation (MFN) and National Treatment while ensuring transparency and reducing trade barriers. They also regulate anti-dumping measures, subsidies, and customs procedures to prevent unfair trade practices. Additionally, agreements like GATS (for services) and TRIPS (for intellectual property) standardize trade rules across industries. Compliance is enforced through the WTO's dispute settlement system, ensuring stability and fairness in international commerce.

## **Regional Trade Agreements**

Regional Trade Agreements (RTAs) play a crucial role in global trade regulations and compliance by facilitating preferential trade arrangements among member countries, typically within specific geographic regions. These agreements aim to reduce or eliminate tariffs, reduce trade barriers, and enhance economic cooperation, thus fostering increased trade flows and investment among participating nations. RTAs can take various forms, including Free Trade Agreements (FTAs), Customs Unions, and Common Markets.

## **Free Trade Agreement**

Free Trade Agreements (FTAs) are treaties between countries that promote international trade by reducing or eliminating tariffs, import quotas, and other trade barriers. These agreements boost economic growth by increasing market access, encouraging foreign investments, and providing consumers with a wider range of goods and services at competitive prices. FTAs also strengthen diplomatic ties and create job opportunities. However, they can negatively impact domestic industries by exposing them to foreign competition, leading to job losses and trade imbalances. Additionally, they may raise environmental concerns due to increased industrial activities. While FTAs drive global economic integration, governments must implement policies to ensure fair trade practices and sustainable development.

## Sanction and Embargoes

Sanctions and embargoes are trade restrictions imposed by governments or international organizations to influence a country's behaviour, often in response to political, economic, or security concerns. Sanctions can be partial or targeted, affecting specific industries, individuals, or financial transactions, while embargoes are broader and involve a complete ban on trade with a country. For example, the United Nations (UN), European Union (EU), and United States (US) frequently impose sanctions on nations involved in human rights violations, terrorism, or nuclear proliferation, such as Iran, North Korea, and Russia. These measures can restrict exports, freeze assets, or limit access to international financial systems. While sanctions and embargoes aim to pressure governments into compliance, they can also impact global trade, supply chains, and economic stability. Businesses engaged in international trade must ensure compliance with these restrictions to avoid legal penalties and reputational risks

## Compliance framework and standard Custom Compliance

Customs compliance in global trade ensures that businesses adhere to international and national regulations when importing and exporting goods. It involves documentation, proper accurate classification of goods under the Harmonized System (HS Code), correct declaration of duties and taxes, and compliance with security programs like Authorized Economic Operator (AEO) and C-TPAT. Customs authorities also enforce trade policies such as sanctions, embargoes, and anti-dumping measures to protect domestic industries and national security. With the rise of e-commerce and digital trade, customs compliance is increasingly reliant on electronic declarations and automated systems.

## **Export Control Regulations**

Export control regulations in global trade govern the transfer of goods, technology, and services across borders to prevent unauthorized access to sensitive items. These regulations aim to protect national security, prevent the proliferation of weapons, and ensure compliance with international agreements. Countries impose export controls on military equipment, advanced technology, and restricted goods, requiring businesses to obtain licenses for specific exports. Violating export controls can lead to penalties, including fines severe and trade restrictions. Compliance with these regulations is essential for businesses to avoid legal risks, maintain global trade partnerships, and uphold international security standards.

## Anti Corruption Laws

Anti-corruption laws in global trade regulations ensure ethical business practices by preventing bribery, fraud, and illicit financial activities in international transactions. Key laws include the U.S. Foreign Corrupt Practices Act (FCPA) and the UK Bribery Act, which prohibit bribing foreign officials to gain business advantages. These regulations require companies to implement compliance programs, conduct due diligence, and maintain accurate financial records. Violations can result in heavy fines, legal action, and reputational damage. Strict enforcement of anti-corruption laws promotes fair competition, protects investors, and strengthens global trade integrity.

# Challenge in Global Trade Regulations and compliance

## **Complexity in Regulation**

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One of the biggest challenges in global trade regulations and compliance is the complexity of laws and policies that vary across countries. Each nation has its own trade regulations, tariff structures, import/export requirements, and customs procedures, making it difficult for businesses to ensure full compliance. Companies engaged in international trade must navigate multiple legal frameworks, including sanctions, anti-dumping laws, intellectual property rules, and environmental regulations.

## **Tariff and Trade Barriers**

Tariffs are taxes imposed on imported goods, making them more expensive and affecting market competitiveness. Trade barriers include quotas, import restrictions, licensing requirements, and nonmeasures stringent safety tariff like and environmental standards. Protectionist policies, such as those seen in trade wars, can disrupt supply chains and limit market access for businesses. Companies must stay updated on evolving tariff policies and regulatory changes to avoid financial losses and compliance risks while optimizing their global trade strategies.

## **Custom and Border Delays**

Customs and border delays are a significant challenge in global trade, often caused by complex documentation requirements, strict security checks, and regulatory inspections. Different countries have varying customs procedures, and compliance with import/export regulations, tariffs, and trade restrictions can slow down shipments. Factors like incorrect paperwork, misclassification of goods, and evolving trade policies further contribute to delays.

## **Supply Chain Disruption**

Supply chain disruptions in global trade occur due to factors such as geopolitical tensions, natural disasters, pandemics. trade restrictions. and transportation bottlenecks. These disruptions can lead to delays in the movement of goods, increased costs, and shortages of critical raw materials. Regulatory changes, such as new tariffs, export controls, or sanctions, further complicate compliance and trade operations. Businesses must adapt by diversifying suppliers, investing in digital supply chain management, and ensuring compliance with evolving trade regulations.

## **Data Privacy and Digital Trade Issues**

Data privacy and digital trade issues have become major challenges in global trade regulations and compliance due to differing laws on data protection, cybersecurity, and cross-border data transfers. Regulations like the General Data Protection Regulation (GDPR) in the EU and the California Consumer Privacy Act (CCPA) impose strict rules on how companies collect, store, and share personal data across borders. Some countries enforce data localization laws, requiring companies to store data within national borders, complicating global operations.

## **Corruption and Fraud Risk**

Corruption and fraud risks pose significant challenges in global trade regulations and compliance, as unethical practices like bribery, embezzlement, and financial fraud can undermine fair competition and legal trade. Many countries enforce strict anti-corruption laws, such as the Foreign Corrupt Practices Act (FCPA) and the UK Bribery Act, which prohibit bribing foreign officials and require transparency in business dealings.

## Recent Trends and Case Studies in Global Trade Regulations and Compliance

## **Digital Trade and E-Commerce Regulation**

Digital trade and e-commerce regulations are evolving to address data privacy, taxation,

cybersecurity, and consumer protection in global markets. Laws like the General Data Protection Regulation (GDPR) and data localization policies require businesses to store and manage customer data securely, affecting cross-border digital trade. Governments are introducing digital services taxes (DSTs) and regulating e-commerce tariffs to ensure fair taxation of multinational companies.

## **Cybersecurity and Consumer Protection**

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Cybersecurity and consumer protection are critical aspects of global trade regulations, ensuring safe and transparent digital transactions. With the rise of cyber threats, governments enforce strict data security laws, such as the EU's NIS2 Directive and the U.S. Cybersecurity Framework, requiring businesses to implement robust security measures to prevent data breaches and fraud. E-commerce platforms must also comply with consumer protection laws that mandate fair pricing, secure payment systems, and transparent policies on data usage. Regulations

# Intellectual Property (IP) Rights and Digital Content Regulation

Intellectual Property (IP) Rights and Digital Content Regulation are essential for protecting creative works, trademarks, and innovations in global trade. Laws like the U.S. Digital Millennium Copyright Act (DMCA) and World Intellectual Property Organization (WIPO) agreements regulate online content usage, preventing digital piracy and counterfeit goods. E-commerce platforms must ensure that sellers comply with trademark, patent, and copyright laws to avoid infringement issues. Governments also enforce content moderation policies to prevent unauthorized distribution of digital media.

## **Consumer Rights and Fair Competition**

Consumer rights and fair competition regulations ensure transparent, ethical, and competitive markets in global trade. Governments enforce consumer protection laws that mandate fair pricing, clear

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product information, secure payment systems, and refund policies to prevent fraud and deceptive business practices. Regulations like the EU Consumer Rights Directive and U.S. Federal Trade Commission (FTC) guidelines require e-commerce platforms to safeguard consumer interests. Fair competition laws, such as antitrust regulations, prevent monopolistic practices and ensure equal market opportunities for businesses. Companies must comply with these laws by promoting honest advertising, ethical trade practices, and nondiscriminatory pricing, ensuring consumer trust and a level playing field in global commerce.

## Strategies for Effective Trade Compliance Harmonization of trade laws

Harmonization of trade laws ensures consistency and efficiency in global trade by aligning regulations across countries through free trade agreements World Trade (FTAs), Organization (WTO) guidelines, and regional trade blocs like the EU, ASEAN, and USMCA. It reduces compliance burdens for businesses by standardizing tariffs, procedures, product customs standards, and intellectual property protections, making crossborder trade smoother. By eliminating regulatory conflicts and simplifying documentation, harmonized trade laws promote fair competition, enhance supply chain efficiency, and attract foreign investment. Governments and businesses benefit from increased trade transparency and reduced legal risks, fostering economic growth in the global marketplace.

## **Clear and Transparent Policies**

Clear and transparent trade policies are essential for ensuring predictability, compliance, and fair competition in global trade. Well-defined regulations businesses understand tariffs, help customs procedures, trade restrictions, and legal obligations, reducing confusion and minimizing the risk of noncompliance. Governments must ensure that trade laws are easily accessible, regularly updated, and consistently enforced to create a stable business environment. Transparency in policymaking,

including stakeholder consultations and public disclosures, builds trust between regulators, businesses, and consumers.

# Robust Enforcement and Anti-Corruption Measures

Robust enforcement and anti-corruption measures are essential for ensuring fair, transparent, and compliant global trade. Governments enforce antibribery laws like the Foreign Corrupt Practices Act (FCPA) and the UK Bribery Act to prevent unethical business practices, fraud, and illicit financial activities. Strict monitoring, regular audits, whistleblower protections, and penalties deter corruption in trade operations. Advanced technologies such as blockchain and AI-driven compliance systems enhance transparency in transactions and customs processes.

## **Public -Private Collaboration**

Public-private collaboration plays a crucial role in enhancing global trade regulations and compliance by fostering cooperation between governments, businesses, and trade organizations. Through joint policy development, regulatory consultations, and information sharing, both sectors can create practical, business-friendly trade laws that promote compliance while encouraging economic growth.

## Sustainability and ESG Compliance

Sustainability and ESG (Environmental, Social, and Governance) compliance have become essential in global trade regulations, requiring businesses to adopt eco-friendly, ethical, and transparent practices. Governments and trade organizations enforce regulations like the EU Carbon Border Adjustment Mechanism (CBAM) and global supply chain due diligence laws to reduce carbon emissions, prevent labour exploitation, and ensure responsible sourcing.

## **Digitalization of Trade Compliance**

Digitalization of trade compliance enhances efficiency, transparency, and accuracy in global trade by leveraging technology-driven solutions such as

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blockchain, AI, big data analytics, and automated customs systems. Governments and businesses use electronic trade documentation, e-invoicing, and AIpowered compliance monitoring to streamline customs clearance, reduce errors, and detect fraud. Blockchain technology ensures tamper-proof records, improving supply chain transparency and regulatory adherence.

## Summation

Global trade regulations ensure fair, transparent, and efficient commerce by governing tariffs, customs, export controls, and compliance standards. With evolving trends in digitalization, ESG, and cybersecurity, businesses must adapt to regulatory changes. Harmonized laws, enforcement, and publicprivate collaboration promote sustainable trade, minimize risks, and enhance global economic stability and growth.

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## **ARTIFICIAL GENERAL INTELLIGENCE**

### M. DIVYA BHARATHI

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

#### **M. HANISHMA**

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

#### Dr. A. DAYANA AMALA JOTHI

Head & Assistant Professor of Commerce Madonna College, Madurai

#### Abstract

Artificial general intelligence (AGI), which would be an intelligent system that can learn and solve problems like humans. It covers the definition of AGI, the progress made so far in Al, and challenges remaining in developing AGI. If developed, artificial general intelligence (AGI) has the potential to transform a wide range of sectors, including healthcare, financial decision-making, and scientific research. However, there are significant technological obstacles in the way of fully implementing AGI, and addressing significant ethical issues is necessary to ensure its safe and advantageous growth. AGI is expected to advance significantly over the next ten years, according to experts, although reaching fully human-level AGI is still challenging and will take more research.

Keywords: artificial general intelligence (AGI), technical challenges, ethical considerations

## The Potential of AGI Introduction

The journey of Al started in the 1950s with the intention of building machines that can carry out tasks that would normally require human intelligence. Learning, reasoning, problem-solving, perception, and language comprehension are some of these tasks. From basic rule-based systems to sophisticated machine learning models that can learn from data, Al has changed over time.

Today, Al is everywhere, from our smartphones to our cars, and is transforming industries such as healthcare, finance, and transportation.

#### **Father of Al**

John McCarthy is often called the "Father of Artificial Intelligence". He coined the term "artificial intelligence" in 1956.

## Understanding AGI

**Definition of AGI:** A hypothetical kind of intelligent agent is called artificial general intelligence, or AGI. Any intellectual work that humans can complete may be learnt by an AGI if it were to become a reality. An autonomous system that outperforms humans in most economically valuable jobs is another definition of artificial general intelligence (AGI).

The Significance of AGI: Because it places artificial intelligence on level with human capabilities, AGI is seen as a major turning point in the field of artificial intelligence. AGI systems can therefore think, understand, learn, and use their intelligence to solve problems in a manner similar to that of humans in a particular circumstance. The development of AGI would mark a major turning point in the history of technology. As it would be the first time that machines could truly think and learn like humans.

#### The Journey towards AGI

**Historical Progress:** The path to achieving AGI remains a topic of debate among scientists. Opinions range from AGI being far away, to possibly emerging within a decade, to "sparks of AGI already visible in current LLMs Over the years, we have seen significant advancements Al, from the development of machine learning algorithms to the

creation of deep learning models that mimic the human brain.

**Current State of AGI:** Even though Al research has advanced significantly, there are still many obstacles to overcome before AGI can be achieved, including data restrictions, hardware limitations, and ethical concerns. Despite these obstacles, scientists remain hopeful about the development of AGI and are constantly striving to make it a reality.

#### The Potential of AGI :



The Potential of AGI: AGI has enormous and revolutionary potential. AGI has the potential to improve problem-solving in a wide range of fields, accelerate scientific breakthroughs, and transform entire industries. Its ability to adapt and learn can result in previously unheard-of levels of creativity and efficiency.

## **Challenges in Achieving AGI**

**Technical Challenges:** The low efficacy of solely statistical techniques is one of the theoretical and methodological obstacles facing the field of AGI development. Autonomous learning, flexibility, and critical cognitive skills are need to reach AGI. Significant progress in Al research and development is necessary to meet these difficulties.

**Ethical Considerations:** AGI would also carry a significant potential of abuse, catastrophic mishaps, and social unrest. As we get closer to developing artificial general intelligence (AGI), it is imperative that we think about the moral ramifications of this technology and set rules and regulations to guarantee its safe and advantageous application.

### The Future of AGI

**Predictions and Speculations:** The development of AGI will accelerate significantly over the next ten years. In fact, specialists estimate that by 2030, there is a 25% chance that Al will resemble a person. The prospect of developing artificial general intelligence (AGI) is ever more plausible as we continue to advance Al.

**Preparing for AGI:** It is up to society and the AGI developers to figure out how to make it work. Our goal with AGI is to enable humanity to thrive as much as possible in the cosmos. We want AGI's governance, access, and advantages to be widely and equitably distributed. This calls for thorough planning and preparation in addition to candid conversations regarding the ramifications of artificial general intelligence.

#### Conclusion

With its unparalleled capacity for problem-solving, AGI has the potential to completely transform a number of industries. Concerns about employment and ethics, however, highlight how crucial cautious regulation is. The secret to responsible integration is striking a balance between autonomy and governance. Complicating matters further is the controversy around the sentience of AGI. It takes a careful balancing act between advancement and caution to navigate this terrain.

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## A STUDY ON EMPLOYER AND EMPLOYEES RELATIONSHIP IN HCL INOSYSTEM LTD

#### M. DURGA

Head & Assistant Professor of BBA Madonna Arts and Science College for Women, Madurai

#### Abstract

The purpose of this research is to discuss the significance of the employer-employee relationship and the part it plays in a company's expansion. The paper further emphasizes the significance of job satisfaction in fostering positive relationships between the two parties and offers recommendations to business owners on how to effectively manage this relationship. A survey focused on relationships was developed for the purpose of this study. The objective of the survey was to assess the perspectives of business owners regarding relationships and to ascertain whether they consider these relationships to be a crucial factor in the success of their enterprises. The survey also sought to assess the level of job satisfaction among the employees. In the research, job satisfaction was recognized as a reliable measure of positive relationships between employees. The study discovered that company owners all had a favourable opinion of the importance of relationships to their company since they help it expand. The workers expressed a high degree of job satisfaction.

#### Introduction

When an employer recruits a new worker, he is beginning a new relationship in addition to bringing a new member of the workforce. Employers and employees must inevitably build relationships because they frequently work in close quarters. Effectively managing these relationships is essential for achieving business success, as robust connections can result in enhanced employee satisfaction and potentially higher levels of productivity. To fully realize these advantages, it is essential to consider the dynamics of the relationship between employer and employee. Employer-employee relations pertain to the interactions and communications that occur between representatives of the workforce and those of the management. Employee relations largely encompass the collaboration between employees and employers. The current objective of the European Union's social policy is to establish a framework of collective accountability between employers and employees regarding workplace practices, conditions, and various aspects of professional life. This principle of collective accountability is referred to as co-determination.

#### **Company Profile**

HCL Infosystems Ltd stands as a trailblazer in the Indian IT sector, having been established in 1976. For more than twenty-five years, we have designed and executed solutions for various market segments utilizing a diverse array of technologies in India. We have consistently led the way in the adoption of innovative technologies and solutions. HCL Infosystems (HCLI) leverages 27 years of expertise in navigating the dynamic IT landscape, fostering robust customer relationships, and delivering stateof-the-art technology at competitive prices, all supported by a superior service and support framework. HCL currently stands as the leading information technology company in the country. It provides a comprehensive solution for its varied clientele, catering to a wide range of needs. HCLI offers a comprehensive range of products, along with robust sales and support capabilities, to meet the needs of customers, whether they are part of a large multi-location enterprise, a small to medium-sized business, a small office, or a home setting.

## **Problem Statement**

This initiative assists management in addressing any issues that may arise during the employment period concerning the relationship between employees and employers. It encompasses personal grievances or disputes related to the interpretation or implementation of any terms outlined in this agreement or contract.

## Need for the Study

- To identify the effectiveness of Employee-Employer relationship in the organization.
- To know the employees view towards the management concern on welfare.
- To understand the extent of participative management practiced in the organization.
- To find out the employees opinion towards the flexibility of HR policies in the organization.
- To know the opinion towards the leadership style adopted in the organization.

## Scope of the Study

The study focuses on the understanding the need for good relationship between the employer & employee in the organization and to strengthen or improve the work in progress.

## **Objectives of the Study**

- To study the importance of employer-employee relation.
- To study the employer employee relations in "HCL".
- To study different aspects including in employer-employee relation.
- To study its impact on the performance of the employees.
- It is advisable to propose various measures to enhance the effectiveness of employer-employee relations in the event of any discrepancies.

## **Research Design**

Research design is a conceptual structure with in which research is conducted. It constituted the blue print for collection measurement and analysis of data. The type of research design used is descriptive research. Descriptive research encompasses various types of surveys and investigative inquiries aimed at gathering factual information. The primary objective of descriptive research is to provide an account of the current state of affairs as they exist at this moment. The research was carried out within the organization to investigate self-perceptual abilities and to evaluate the employer-employee relationship at HCL. The topic primarily relies on the primary data collected through the method of personal interviews.

## Sources of Data

The research work has utilized data gathered from both primary and secondary sources.

- Primary Data
- Secondary Data

## Statistical Methods used to Analyse the Data

- Percentage Analysis
- Weighted Average Analysis
- Chi-Square Analysis

## Limitations of the Study

- The study is purely of qualitative nature as it depends on the perception of the employees.
- As the topic is a sensitive one and purely psychology based data can be collected only through the personal interview method which had been very difficult due to the assigned quotas to the individuals and deadlines of projects.

In order to explain the topic and questionnaire, on an average 15-20 minutes of time should be spared for each interview

## **Data Analysis and Interpretation**

Once the data has been gathered, the researcher proceeds to the analysis phase. The examination of data necessitates several interconnected processes, including the creation of categories, the application of these categories to unprocessed data via tabulation, and the formulation of statistical inferences. Tabulation refers to the segment of the technical process in which categorized data is organized into table format. Following the analysis of the data, the researcher is required to elucidate the findings in relation to a specific theoretical framework. This process is referred to as interpretation. The data has been collected from 100 clients of HCL, Chennai, through questionnaire.

The data thus collected was in the form of master table. That made possible counting of classified data easy. From the master table various summery tables were prepared. They have been presented along with their interpretation in this manner.

## Findings, Suggestions and Conclusion

- Most of the respondents 65 % are male and 35% are female.
- The chart shows that 75% of the employees are age between 21-40 years.
- About 65 % of the respondents are satisfied with management.
- The study authenticates that most of the respondents 70% are satisfied with the management for provided facilities at workplace.
- It is clearly stated that most of the respondents saying very compatible with the employ 1 prefer training with the organization.
- Around 72 % of the respondents are saying employer easily solves the problem.
- Around 76 % of the respondents are satisfied with salary and work timings.
- 60% of the respondents satisfied with the problem solving skills of the Employer.
- Most of the employee's prefer to work in future.
- 60% of the respondents saying Boss are strict.
- 60% of the respondents are willing to work with Friendly Boss.
- 60% of the respondents are satisfied with the Training Program.
- 54% respondents are satisfied with the Company rules & regulations.

- 54% respondents are satisfied with the Company Transport Facilities.
- 54% respondents are satisfied with the Company Canteen Facilities.

## Suggestions

- Treat employees like humans first and realize they have a personal life; they get sick themselves or have others in the family that may be sick. Make sure employees know they are approachable regarding these issues (your door is always open) and come to an amicable agreement regarding this or any other problems that may arise.
- Employees like to know that working hard is noticed so every so often give them a pat on the back for their efforts and show you really appreciate all they do. If our company is highly successful show it by giving out a bonus or raise.
- Keep your finger on the pulse of the people working for you so you can see trouble (perhaps coworkers not getting alone or a troublemaker in the office) before it's reported to you.
- Never chastise an employee in front of their coworkers.

## Conclusion

The connection between employers and employees is an essential element of a thriving work environment. Research consistently indicates that a constructive and healthy relationship between employers and employees results in enhanced job satisfaction, increased productivity, and overall success for both sides. Effective communication, recognition and rewards for hard work, clear expectations for roles, opportunities for skill development, fair conflict resolution, and adherence to legal requirements are all factors that contribute to a positive employer the benefits employees, and of a positive Building relationship. and maintaining the relationship requires ongoing effort and commitment from both employer and employees, and the benefits of a positive relationship can be seen in improved job

performance, reduced turnover, and greater overall job satisfaction.

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## **RISH OF ARTIFICIAL INTELLIGENCE**

#### G. S. NANDHINI

UG Student, Department of Commerce Madonna Art's and Science College for Women, Madurai

#### S. RAMYA

UG Student, Department of Commerce Madonna Art's and Science College for Women, Madurai

#### A. NIHILA

Assistant Professor of Commerce Madonna Arts and Science College for Women, Madurai

#### Abstract

The rise of Artificial Intelligence (AI) marks a transformative epoch in the technological landscape, reshaping industries, societies, and the global economy. AI encompasses various subfields, including machine learning, natural language processing, robotics, and computer vision, enabling machines to perform tasks traditionally requiring human cognition. This revolution has led to profound advancements across multiple domains, from healthcare and finance to autonomous transportation and entertainment. The integration of AI into everyday life raises both unprecedented opportunities and significant challenges, such as ethical concerns, job displacement, data privacy issues, and biases in decision-making algorithms. This paper explores the development and impact of AI, examines the potential benefits and risks it presents, and delves into the ongoing debate surrounding its governance, regulation, and societal implications. Ultimately, understanding the rise of AI is crucial for navigating its future trajectory, ensuring it contributes positively to humanity's well-being and progress.

**Keywords:** artificial intelligence (AI), machine learning, deep learning, natural language processing (NLP), automation, robotics

#### **Introduction to AI**

Artificial Intelligence (AI) has emerged as one of the most revolutionary forces of the 21st century, transforming the way we live, work, and interact with the world around us. From autonomous vehicles to virtual assistants and predictive algorithms, AI has steadily advanced from a niche area of research to a pervasive presence across all industries. The rise of AI is driven by the rapid growth of computational power, the availability of vast amounts of data, and significant improvements in machine learning and deep learning techniques.

In its broadest sense, AI refers to the development of systems that can perform tasks typically requiring human intelligence, such as problem-solving, decision-making, pattern recognition, and natural language understanding. AI technologies are now embedded in everyday applications, enhancing productivity, creativity, and efficiency in sectors like healthcare, finance, education, manufacturing, and entertainment.

Despite the profound benefits AI brings, its rapid expansion also raises important ethical, social, and economic questions. Issues such as job displacement due to automation, concerns about privacy and security, and the potential for algorithmic bias require careful consideration. Furthermore, there are growing calls for responsible AI governance and regulation to ensure that these technologies are developed and used in ways that are equitable and beneficial for society.

This paper explores the rise of AI, examining its historical development, current applications, and potential future impact. It also discusses the challenges and opportunities that AI presents, emphasizing the need for a balanced approach that maximizes its benefits while mitigating its risks.

## **History of AI Development**

The concept of AI dates back to ancient mythology, but its modern foundation was laid in the 1950s with Alan Turing's work on machine intelligence. The Dartmouth Conference in 1956 is considered the birth of AI as an academic field.

## **Machine Learning and Deep Learning**

Machine learning is a subset of AI that enables systems to learn from data. Deep learning, a branch of machine learning, uses neural networks to simulate human brain function, leading to advancements in speech recognition and image processing.

## AI in Healthcare

AI is revolutionizing healthcare by enabling early disease detection, robotic surgeries, and personalized treatment plans. AI models help predict diseases such as cancer using medical imaging.

## AI in Finance

AI is transforming finance through algorithmic trading, fraud detection, and customer service automation. Banks use AI chatbots for customer queries and AI-driven risk assessment for loans.

## AI in Manufacturing

Smart factories use Al-powered robots to improve efficiency and precision. Al-driven predictive maintenance reduces downtime and operational costs.

## Ethical Concerns of AI

AI raises ethical concerns such as bias in algorithms, data privacy, and job displacement. Ensuring transparency and fairness in AI models is crucial for responsible AI deployment.

## Future of AI

The future of AI includes advancements in quantum computing, autonomous systems, and AI-human collaboration. AI is expected to revolutionize multiple industries and become an integral part of daily life.

## **Challenges and Limitations**

Despite AI's progress, challenges such as data privacy, regulatory frameworks, and ethical concerns must be addressed to ensure safe AI development.

## Conclusion

AI is a transformative force, impacting industries and society. While it offers immense benefits, ethical and regulatory measures are necessary to harness its full potential responsibly.

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## A COMPREHENSIVE ANALYSIS OF INNOVATION WITH IN THE CONTEXT OF GLOBAL MARKETS

Mrs. N. GAYATHRI

Assistant Professor of B.Com CA Madonna Arts & Science College for Women, Madurai

#### Abstract

Embracing innovation and engaging in international business are crucial strategies for gaining a competitive edge in today's unpredictable market landscape. The company of today is pursuing innovation both domestically and internationally to enhance its competitiveness on a global scale. Consequently, integrating this concept into the strategies of international companies has become a significant concern in contemporary times. Innovation, knowledge, and technology are critical concepts within the realm of international business, and both domains are vital for attaining competitive advantages in today's business landscape. Cantwell emphasizes that the processes of innovation and internationalization have become progressively interconnected as essential catalysts for development, tracing their influence from the onset of the first industrial revolution to the current informational business. The generation of knowledge in the domain of business research is progressing rapidly, yet it continues to exhibit fragmentation and an interdisciplinary nature. The challenge of evaluating the comprehensive evidence in a particular domain of business research is given for eviews as a research methodology. **Keywords:** innovation, international business, systematic review, multinational corporation, knowledge

Introduction

Innovation serves as the foundation for growth, enabling organizations to navigate market fluctuations and equipping them for sustained longterm development. Even though it is extremely challenging to do, business model innovation can provide a competitive edge provided it is sufficiently unique and challenging for both newcomers and established firms to imitate. Many inventive organizations have been prompted by new models of innovation to alter their approach to finding new ideas. They have adopted open search methods, which entail utilizing a variety of external players and sources to achieve innovation. The discipline of international business studies gained significant recognition during the 1980s and early 1990s, largely due to the expansion of multinational corporations. Within this context, two theoretical models hold significant importance. Firstly. the gradual internationalization model, also known as the Uppsala model, posits that internationalization occurs as a step-by-step process, commencing in

foreign markets that are geographically closer to the domestic market. Secondly, there are born global firms, which are defined as companies that engage in international activities at or shortly after their establishment, typically within three years of founding, and derive at least twenty-five percent of their total sales from international markets. A substantial body of literature exists regarding this concern.

## **Research Method**

In this analysis, a systematic search was carried out in Web of Science of Clarivate Analytics, including documents published from January 01, 1993 to December 31, 2020. Birkle et al. claim that Web of Science is the world's oldest, most used and reliable database of research publications (around 34000 journals today). The query used in this systematic literature review is as it follows: TS = ("Innovation"AND "International Business"). Consequently,<math>TS = Topic; and the search terms "innovation" and "international business" were combined with the

Boolean Operator "AND". Therefore, literature search was based on two simultaneous topics, "innovation" and "international business" (as stated in the title of the publication, the abstract, the author keywords and/or the keywords plus). Each document has been published between 1993 and 2020, since the first contribution was published in 1993. A total of 847 related documents were found. Thus, it can be affirmed that the importance and size of the literature on innovation and international business is more relevant. Different criteria for inclusion and exclusion are considered in this study. The process is described through the PRISMA flowchart (Fig. 1). Excluding meetings, books, review articles, editorial materials, and others, the reviewing process generated 630 articles. Only articles published in Business Economics have been considered due to its prominent research area regarding the topics of this paper; bearing this in mind, the number of the articles was reduced to 291. Each article is composed in English, in accordance with the findings of Tenzer et al. [33], which indicate that 75% of publications in the social sciences are authored in this language. Consequently, the total number of articles was restricted to 264. At last, each article was read in its entirety and various articles were excluded based on full-text or abstract due to their irrelevant nature to the research; thereby, the final sample has been finally reduced to 236 articles. Other criteria, as open access or funding agencies, have not been considered in this research work.





One by one, data of each article were extracted, transferred, and sorted into Microsoft Excel spreadsheet for further analysis. Therefore, a wide Excel database was created with specific information for each article: journal, title, authors' keywords, keywords plus, year of publication, and author information (number, name, affiliation, and country).

## **Research Results**

## **General Results**

Fig. 2 shows the number of articles on innovation and international business published each year over time. 236 articles were published during the study period 1993-2020, with no consistent trend of the number of articles published, that is to say, with some ups and downs. 80% of the total articles reviewed (189) were published during the last ten years (2011-2020). The largest number of articles was published during 2020 (43 articles), followed by 2018 (31 articles), 2015 and 2019 (both with 21 articles), and finally 2017 (15 articles). There was a lack of publications during the following years: 1994, 1995, 1998, and 2001. Qualitative, quantitative and mixed methods are included in these articles (for instance, case study, literature review, bibliometric study, or regression analysis, among others).



Fig. 2. Number of articles published each year

The first article was published in the Strategic Management Journal by Hagedoorn ; this article presents interfirm strategic alliances in the international business area and their relationship with innovative efforts. The second article was published in the Journal of International Business Studies by Buckley and Casson [35], regarding international joint ventures in terms of the accelerating pace of technological innovation. The quantity of authors associated with each article is displayed in Table 1. The number of authors ranged from 1 to 9, with a predominance of two (35.59%) and three (30.93%) authors per article, that is to say, over 65% of the articles published. Besides, the mean of authors per article is considered to be 2.44.

Number of authors	Number of articles	Weight (%)
1	49	20.76%
2	84	35.59%
3	73	30.93%
4	20	8.47%
5	6	2.54%
6	2	0.85%
7	0	0.00%
8	1	0.42%

1

236

0.42%

100.00%

Table 1. Number of authors per article

Following the previously mentioned line of thought, Table 2 shows the most relevant journals for research topic. The major journals included in this study are Journal of International Business Studies (48 articles; 20.34%), International Business Review (32 articles; 13.56%), International Marketing Review (14)articles; 5.93%), Management International Review (12 articles; 5.08%), Journal of International Management (8 articles; 3.39%), and Multinational Business Review (8 articles; 3.39%). These are believed to be the top six academic journals and represent more than a half (52%) of the total scientific production.

Table	2.	Principal	journals
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Journal	Number of articles	Weight (%)
Journal of International Business Studies	48	20.34%
International Business Review	32	13.56%
Multinational Business Review	8	3.39%
Thunderbird International Business Review	7	2.97%
Journal of World Business	6	2.54%
Entrepreneurial Business and Economics Review	5	2.12%
Organization Studies	4	1.69%
Management and Organization Review	3	1.27%
Review of International Business and Strategy	2	0.85%
International Journal of Human Resource Management	2	0.85%
Others Journals (with one article each)	57	23.94%
	236	100.00%

## Table 3. Main authors

Number of Articles Published	Authors
5	Knight, Gary A.
4	Buckley, Peter J.; Cantwell, John
3	Coviello, Nicole; Kim, Daekwan; Kolk, Ans; Lewin, Arie Y.; Luo, Yadong; Massini, Silvia; Mudambi, Ram; Peeters,

9

	Carine; Tippmann, Esther
2	Aggarwal, Vijita; Barnard, Helena; Birkinshaw, Julian M.; Casson, Mark C.; Cavusgil, S. Tamer; Ciabuschi, Francesco; Forsgren, Mats; Geppert, Mike; Giblin, Majella; Gotz, Marta; Jean, Ruey-Jer Bryan; Jin, Zhongqi; Kapoor, Madhavi; Kedia, Ben L.; Khan, Zaheer; Lee, Jeoung Yul; Lorenz, Melanie P.; Lundan, Sarianna M.; Monaghan, Sinead.; Musteen, Martina; Ning, Lutao; Parente, Ronaldo Couto; Park, Taekyung; Peng, Mike W.; Perez-Nordtvedt,

Eight journals have published at least three articles (Thunderbird International Business Review, Journal of World Business, Entrepreneurial Business and Economics Review, Organization Studies, Industry and Innovation, Competitiveness Review: An International Business Journal, the Journal of Business Research, and the Management and Organization Review. Eleven journals have published two articles, and finally fifty-seven journals have published only one article. Table 2 also indicates that this study is related to other topics. The 236 articles were written by 575 authors. Table 3 shows the most relevant authors to the research topic. Authors such as Knight, Gary A.; Buckley, Peter J.; Cantwell, John; Coviello, Nicole; Kim, Daekwan; Kolk, Ans; Lewin, Arie Y.; Luo, Yadong; Massini, Silvia; Mudambi, Ram; Peeters, Carine; and Tippmann, Esther, have each one three or more publications during the 1993-2020 period. Fig. 3 represents the most productive universities. It is important to mention that in this study the first university of each author has been selected, rejecting other additional institutions according to the author's institutional information. Thus, the first institution is the University of Reading with a total of eight articles published, followed by the University of Manchester, University of Leeds, and Uppsala University (each one with six articles); after them, the Duke University, the Rutgers University, and the Temple University.

**Innovative activities of multinational corporations** A classic topic in international business research is the multinational corporation. The broadest area of research examines the connection between innovation and multinational corporations. As noted by Venaik et al., the literature on international business has increasingly highlighted the significance of learning and innovation in influencing the performance of multinational corporations. It is common to conceive multinational corporations as a set of geographically disseminated subsidiaries that are combinations of heterogeneous technology competencies and product market responsibilities or, in previous years, as firms that control and manage production establishments located in at least two countries. The competitive success of a multinational corporation depends on its capacity to effectively utilize existing knowledge and integrate it with insights from various other locations.

## International value chains

Businesses have been putting strategies into place more frequently in recent years to capitalise on the comparative benefits of different locales. This results in a wider geographic dispersion of firms' activities, with direct implications for creative industries' global value. Buckley introduces the idea of a global factory as a framework that enables multinational corporations to unify their global strategies by integrating innovation, distribution, and the production of goods and services. The global value chain concept recognizes that such value-creating chains were not restricted solely to commodities but could also be extended across manufacturing and indeed to services.

## **Innovation in Emerging Economies**

Emerging economies are low-income, rapid-growth countries using economic liberalization as their primary engine of growth. Emerging markets, or emerging economies, have been a major growth opportunity in the global economic order since the end of the 20th century. Their potential has led to a shift in multinational corporations looking to do business in emerging economies, which has benefited many stakeholders. However, the characteristics of emerging market multinational enterprises' internationalization have both positive and negative development consequences in their home countries.

## **Cross-border Knowledge**

In addition, the rapid reshaping of the global economic order requires fundamental changes in international business; as a result, innovation networks will require novel reconfigurations The dynamics of place, space and organization continually generate new domains within which knowledge is leveraged in unique ways. Knowledge circulates through two types of networks; on the one hand, organization-based linkages, or in other words, pipelines. Accordingly, digital platforms and ecosystems are a major venue for innovation and have considerable implications for international business.

#### Discussion

The article conducts a thorough analysis of the literature on the connection between international business and innovation. Utilizing a qualitative and interpretative methodology, significant evolutionary trends have been identified and are elaborated upon comprehensively. A total of 236 articles were published throughout the study period from 1993 to 2020. The highest volume of articles was released in 2020, underscoring the relevance of the topic. Additionally, this section is enhanced by the inclusion of the latest research. An overview of the knowledge structure of innovation and international business is given by the research's findings. This new conceptual approach is confirmed due to the necessity of the adoption of a more holistic view of global value chains since this action will provide a clearer picture of how the organization and outcomes of innovative activities have evolved in this specific context.

## **Recommendations for Future Research**

This study has strong implications for researchers. Bearing in mind the results of this investigation, it is recommended to expand the scope of this specific study to related innovation and international business topics targeting opportunities for improvement in both areas. There are multiple themes that require further research. Thus, future studies should deepen into the relationship between those specific topics, although this subject could not be an easy one.

## Conclusions

To compete worldwide, businesses look for innovation both domestically and internationally. Innovation is therefore essential for breaking into foreign markets. Four themes of research within a thorough and multifaceted framework are found in this systematic literature review, which demonstrates that innovation and international business do, in fact, have a strong relationship: cross-border knowledge, global value chains, innovative practices of multinational firms, and innovation in emerging economies. As a result, integrating innovation into the strategies of multinational corporations is a major concern nowadays, particularly in light of the complex and ever-changing world we live in.

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## DATA ANALYSIS

#### S. KAVITHA

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

### S. ALAGUMEENA

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

## Dr. A. DAYANA AMALA JOTHI

Head & Assistant Professor of Commerce Madonna College, Madurai

#### Abstract

This paper explores the role of data analysis in enhancing business decision-making. We focus on several techniques, including statistical analysis, predictive modeling, and data visualization, to provide insights that can guide strategic business decisions. Through a series of case studies and practical applications, we highlight how data analysis tools can be leveraged across industries. Finally, we discuss the challenges and opportunities in implementing data-driven strategies in the modern business landscape.

Keywords: data analysis, data-driven decision making, predictive modelling

## Introduction

Data analysis is the process of inspecting, cleaning, transforming, and modeling data to discover useful information, draw conclusions, and support decisionmaking. In today's data-driven world, the ability to effectively analyze data has become an essential skill across numerous fields, including business, healthcare, education, finance, and technology. The growing availability of vast amounts of data, coupled with advanced tools and technologies, has transformed data analysis from a niche activity to a core component of strategic planning and operational efficiency.

The process of data analysis involves several stages, including data collection, data cleaning (removing inaccuracies or incomplete data), exploration (identifying patterns and trends), and finally, data modeling and interpretation. With techniques such as statistical analysis, machine learning, and data visualization, analysts can uncover insights that drive better decision-making, optimize processes, predict trends, and solve complex problems. The increasing complexity of data sources, such as social media, IoT devices, and online transactions, has led to the need for more advanced data analysis tools. Today, tools like Python, R, and machine learning algorithms are widely used to analyze large, unstructured datasets that would otherwise be impossible to process manually. As businesses and organizations continue to rely on data to guide decisions, mastering data analysis has become crucial for competitive advantage and innovation.

In summary, data analysis is not only a technical skill but also a vital aspect of strategic decisionmaking. By transforming raw data into actionable insights, it enables organizations to stay competitive, improve efficiency, and drive growth in an increasingly complex and data-rich environment.

#### **Literature Review**

- Data Analytics in Business: A review of existing research on the importance of data analysis in business.
- **Business Intelligence**: Discuss the concept of business intelligence and how it integrates with

data analysis tools (e.g., dashboards, reporting tools).

- **Predictive Analytics**: A section on the role of predictive analytics in forecasting trends and making future decisions.
- **Data Visualization**: Explain how visual tools like dashboards, charts, and graphs make it easier for decision-makers to interpret data.

## Methodology

- Data Collection Methods: Discuss the techniques for collecting business data, including surveys, transactional data, social media metrics, and third-party data sources.
- Data Cleaning and Preprocessing: Outline steps involved in cleaning and preparing data for analysis, including handling missing values, outliers, and normalizing data.
- Analysis Techniques: Detailed description of the statistical methods and machine learning algorithms used for data analysis, including regression analysis, clustering, classification, and time-series forecasting.
- **Case Study Overview**: Brief introduction to the case studies examined in the paper, providing real-life examples of businesses applying data analysis.

## **Data Analysis Techniques**

- **Statistical Analysis**: Overview of descriptive statistics, hypothesis testing, and correlation analysis.
- **Predictive Modeling**: Discuss machine learning algorithms like linear regression, decision trees, random forests, and neural networks.
- **Data Visualization**: Explanation of key visualization tools like Tableau and Power BI, and how they are used to present complex data in an understandable format.
- Challenges in Data Analysis: Identify common challenges such as data quality issues, overfitting models, and handling large data sets.

# Case Study 1: Data-Driven Decision Making in Retail

- **Background**: Discuss the retail industry's need for data analysis in inventory management, customer segmentation, and sales forecasting.
- Analysis and Findings: Showcase the use of data analytics in predicting demand for products, identifying sales patterns, and improving stock levels.
- **Outcome and Business Impact**: How the business leveraged the analysis for improved profits and customer satisfaction.

# Case Study 2: Predictive Analytics in Financial Services

- **Background**: Financial institutions use data analysis for risk management, fraud detection, and customer credit scoring.
- Analysis and Findings: Discuss how predictive models were employed to predict defaults, assess customer creditworthiness, and detect anomalies.
- Outcome and Business Impact: Highlight the improvements in risk management and operational efficiency due to data-driven insights.

## **Results and Discussion**

- **Key Insights**: Summarize the main findings from the case studies, emphasizing how data analysis contributed to business success.
- Implications for Businesses: Discuss the potential impact of data-driven decision-making on various industries, and the need for businesses to invest in data infrastructure and skilled analysts.
- **Challenges**: Analyze some of the challenges businesses face when adopting data analysis techniques, such as data privacy issues, technology gaps, and resistance to change.
- **Opportunities**: Discuss the future potential of emerging technologies (e.g., AI, big data analytics) in transforming business strategies.

## Conclusion

- **Summary of Findings**: Recap the key points of the paper, emphasizing the importance of data analysis for business decision-making.
- Future Research Directions: Suggest areas for further research, including the integration of AI and machine learning into traditional business processes.
- **Final Thoughts**: Conclude by reiterating the value of data-driven decision-making in the modern business world.

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## DIGITALIZATION AND AUTOMATION IN LOGISTICS

### S. LALITHA

Assistant Professor of Commerce Madonna Arts and Science College for Women, Madurai

#### Abstract

Corporate competitiveness is significantly impacted by the quality of logistical operations. The quick growth of informatics and its technological foundation are tied to the understanding of logistics' function as a material and information movement. The evolution of information technology can be linked to the existence of standardised data communications networks, web-based cloud solutions, distributed intelligent hierarchical systems, a range of management and control solutions, automatic identification systems, network communication systems, GPS tracking systems, cyber-physical systems, and intelligent devices. Better working solutions, real-time administration of vast volumes of data through Internet of Things applications, and the use of simulation techniques for in-the-moment decision-making are all further benefits of digitisation in logistics. It goes without saying that these changes will have a big impact on how the economy, employment market, and competitive environment all operate.

**Keywords:** digitization role in the growth of logistic sector, digitization internet of things economic changes, impact of digitalization

## Introduction

Globalization is now seen everywhere in Economic World as crucial and ongoing reason for any company improvement. As a part of globalization, Modern information base and technologies have a considerable impact on the life of the economy and society, under the influence of which the existing economy and the way of life of the people are changing. As the current and future modernization of the transport sector, it is now real time to apply new types and methods of relations between transport organizations and consumers. Moreover, the digitalization of the transport sector will serve to optimize transport and logistics costs. Modern information systems are characterized by the creation of a single information space for all participants in the interaction. The breadth of the country's territory and the need to cover the most remote areas with transport services are increasing the dependence of the transport infrastructure on high information technology.

#### Digitization Role in the Growth of Logistic Sector



India is fast moving towards digitalization in the twenty-first century. It describes how digital technology can be used to alter a company's business model and open up new avenues for generating income and value. We can define it as the process of a company going digital. Since smart phones and tablets are now commonplace, digitisation has made it possible for us to locate anything in our home with a single click. The most comforting thing for folks these days is that they can work from home and just sit back and unwind instead of having to wait in queue for hours.

Since digitalisation is a revolutionary development and a noteworthy item, its effects are evident in every area. With the aid of smart sensors and communication devices, it has aided in increasing the product's reach among consumers for
more convenience and accessibility. It also has an impact on the logistics industry. The new constant is change. The logistics sector is now able to provide customers with total satisfaction thanks to innovative techniques for data collecting and analysis.

The 7Rs—Right Cost, Right Place, Right Product, Right Quality, Right Condition, Right Customer, and Right Time—are the foundation of the logistics industry. For the logistics and transportation sector, this topic of time and speed is obviously not new. The seven R's of business logistics have been around for a while: the right product or item in the right amount to the right customer in the right condition at the right place at the right time at the right cost, isn't that right? When these seven R's are closely examined, it becomes evident that a loss will be deemed irreparable if any of the aforementioned Rs are absent.

Document scanning, digital signatures, RFID, bar codes, electronic chips, radio frequency, and other new technologies have made the logistics industry more adaptable, quick, and dependable. With the advent of smart containers, real-time weather data feeds, and GPS navigation that aids in tracking the movement of goods and couriers, the logistics sector has undergone significant digital transformation. Automated electronic data interchange from ship to ship and ship to shore has improved efficiency, security, and safety insurance.

Logistics companies in India must deal with daily issues including meeting customer demands and expectations by offering efficient services as a result of growing globalisation. The strain has decreased as a result of technological advancements in logistics operations at various stages, as new graduates are being hired with highly qualified professional labour. Technology adoption and use have improved the capacity to interact with clients in an efficient manner.

The "Make in India" movement is generating more investment, jobs, and e-commerce platforms that offer an online solution for the logistics industry's smooth order-to-invoice operations.

#### **Review of Literature**

According to (Kaplan and Haenlein, 2019), AI is defined as, systems ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation Colloquially, the term AI is applied when a machine mimics cognitive functions that humans associate with other human minds, such as for learning and problem solving.

**Di Vaio and Varriale (2020)** have highlighted the relevance of rethinking and redesigning data management by adopting digital platforms for port operations in the sea-land SC.

**Fu et al., 2022** Additionally, Block chain technology could help small- and medium-sized enterprises (SMEs), addressing their time-consuming, costly, and finance constrained issues.

### **General Impact**

- The Internet of Things market is expected to reach over \$621 billion by 2030, according to Statista.
- According to an Accenture analysis, the Industrial IoT (IIoT) could boost the global economy by \$14.2 trillion by 2030, with the two sectors having the biggest potential benefits being manufacturing and healthcare.
- A McKinsey analysis estimates that by 2025, IoT applications will generate between \$3.9 trillion and \$11.1 trillion in annual economic effect.
- The quantity of direct and indirect taxes paid to the government is also impacted by increased industry efficiency.
- The total amount spent by enterprises on IoT development was \$159 billion in 2021 and is projected to increase at a rate of 26.7% per year to \$412 billion in 2025.

### **Impact of Digitalization and Logistics**

Digitalization has emerged as a game-changer in the transport and logistics industry, reshaping traditional practices and paving the way for enhanced efficiency, transparency, and customer satisfaction. Businesses looking to stay competitive in this fastpaced climate must integrate digital technologies as the globe grows more interconnected. This article examines the significant effects of digitalization on logistics and transportation as well as the industry's prospects.

### **Streamlined Operations**

Streamlining logistics processes is one of the biggest effects of digitalisation. Businesses may automate procedures, optimise routes, and better control inventory levels with the help of digital solutions like Warehouse Management Systems (WMS) and Transportation Management Systems (TMS). Organisations can save operating expenses, minimise errors, and increase overall efficiency by digitising procedures.

### **Real-Time Tracking and Visibility**

Real-time asset and shipment tracking is made possible by digitalisation, providing organisations with previously unheard-of operational visibility. Logistics companies can track the location and condition of goods in the supply chain via GPS and RFID technologies. In addition to increasing accountability, this visibility enables businesses to act swiftly and nimbly in the face of delays or interruptions.

### **Enhanced Data Analytics**

Data has proliferated as a result of the digital transformation of logistics and transportation. Large volumes of data about consumer preferences, business performance, and market trends can now be gathered and analysed by companies.

### **Improved Customer Experience**

Customer expectations have changed in the digital age. Customers want smooth communication, realtime updates, and quicker deliveries. Better communication between logistics companies and their clients is made possible by digital systems, which allow for prompt shipment status updates and effective inquiry processing. Businesses may improve the general customer experience and promote happiness and loyalty by utilising digital tools.

# **Cost Efficiency and Resource Management**

Cost effectiveness in the transportation and logistics industry is greatly aided by digitalisation. Businesses can lower operating costs and maximise resource allocation by automating procedures and applying data-driven insights. A few instances of how digital tools can assist businesses in cutting expenses without sacrificing service quality are effective route planning, load optimisation, and predictive vehicle maintenance.

### Future Innovations and Challenges

The transportation and logistics industry is ready for further innovation as digitalisation develops. The management and transportation of commodities could be completely transformed by emerging technology like drone delivery, driverless cars, and blockchain apps. But for businesses pursuing digital transformation, issues like cybersecurity threats and the requirement for ongoing staff training continue to be crucial factors.

## Conclusion

The field of logistics and transportation is experiencing significant changes caused by the digitalization. Technologies of stream processes management that involve a high degree of human physical labor which do not allow interactive monitoring of operations and quality control of their execution, and paperwork flow, become inefficient and outdated already. Cutting -edge Application of Information and communication technology increasingly determines the level of competitiveness of logistics companies. The degree of digitalization largely determines the speed, accuracy of operations, and provides opportunities to develop adaptability and flexibility of supply chain. This leads to new perspectives for companies and their customers: risk management based on rating and user community engagement, joint developments, forms of self-

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# **CROSS CULTURE MANAGEMENT IN DIGITAL WORLD**

#### M. MATHUMATHI

Assistant Professor of Commerce Madonna Arts and Science College for Women, Madurai

#### Abstract

This paper discuss cross – cultural management with respect to information technology to develop cross – cultural management system to improve accessibility of its contents and bridge the gap between two cultures. The cross – cultural management brings issues like misunderstanding, attitude, miscommunication etc., which cause conflict in any global organization. The factors behind these conflicts are like beliefs, culture, background and sometimes religion etc., they believe that digitalization significantly simplifies cross-cultural communication processes including facilitating language barriers problems. Analyses of the opportunities presented by emerging technologies in the age of digital globalisation are part of the results discussion. The main problem is that how to capture cultural knowledge and its presentation. This research purpose guideline to avoid the pitfalls of these challenges.

Keywords: cross – cultural management, cultural diversity, cross-culture issues and it, cross - cultural workforce

### Introduction

Globalization made the world to become more connected and integrated and with reducing country borders obstacles it continuously encourage and makes a golden opportunities for the different organizations that have the enough capacity to expand globally to generate more profit and to spread the culture of their countries globally and to benefit from the innovative ideas of the foreign workers and to know different strategies for running the business activities. As the global economy has grown there has been a rapid increase of international corporations who are eagerly want to gain a strong reputation globally, and this strong desire to expand globally has caused international businesses having a more culturally diverse workforce. Due to cultural diversity, the awareness that is related to how to manage adaption to local culture has increased together with organizations desire of knowledge of the benefits of conducting localization process to make the international business activities successful (Axelrod, 1997) As a result, the concept crossculture has generated, a meaning of the interplay of different cultures and the characteristics of these contexts. Organizational culture has during the last decades got the awareness of many scholars and

managers globally because without a wise crosscultural management.

#### **Review of Literature**

Wang, L., & He, X. (2021). Overcoming Communication Barriers in Cross-Cultural Leadership: Insights from Multicultural Teams.

One of the key components to create an advantage is to make the employment connected to the organization (Farren, 2020).

Chen, H., & Lin, Y. (2022). Enhancing Cross-Cultural Leadership Competencies through Cultural Immersion Programs.

Dynamics. Liu (2024) highlights the role of cross-cultural training in enhancing employee performance and communication in multinational corporations

# Theoretical Aspects of Cross-Culture Management

Culture is considered a social pattern that is heritage within a society. It determines what is important and unimportant, what is right and wrong, what is acceptable and unacceptable. Culture includes explicit and tacit values, norms, attitudes, beliefs, behaviors and assumptions.

It is believed that culture has a significant role in determining whether certain international economic

endeavours succeed or fail. Cultural diversity has an impact on an organization's performance (Adler & Gundersen, 2008). A culturally diverse employees that are coming from many different nations and working in an international organization could result in making low performance and organizational inefficiency which that will lead to the international business activities failure because of the culture clash among the different culturally diverse employees (Buckley et al, 2017). Misunderstandings within the culturally varied workforce can lead to a variety of confrontations. Thus, it is of importance that organizations develop an effective way to manage the diversity to get a competitive leverage, (Buckley et al, 2017). Companies that are working and operating around the world are from time to time forced to rebuild their strategies and keep their employees updated to meet the continual changes in demand. Workforces are becoming progressively multicultural, therefore function as successfully as possible in many cultural contexts, it is crucial to comprehend diversity, (Isaac, 2020).

## **Corss – Cultural Issues and IT**

The cross - cultural management is becoming more complex due to globalization cultural diversity. Globalization has a lot of opportunities and challenges. On the other side companies are depending on their skill employees as the moment of knowledge economy is very slow.n this context, it is essential to understand cultural differences as cultural understanding will enhance the reliability and trust level which leads to profit to the company. The cross-cultural management brings issues like misunderstanding, attitude, miscommunication etc., which cause conflict in any global organisation. Ultimately suffer the loss of revenue and customer trust. The factors behind these conflicts are like beliefs, culture, background and sometimes religion etc., The traditions and norms effect strategies and dealings executed by businesses. Without a doubt, technology is the use of tools like text messaging, Internet, email, the and cell phones for communication and connection.

Cross-cultural According to, management explains the behaviour of people in organizations around the world and shows people how to work in organizations with employees and client populations from many different cultures. There are diverse areas whereby variances in management towards approaches, conducts, working, communication problems and cultural implications can be grasped. Cross-cultural variances arise from the different backgrounds of each culture. Because of the dissimilarities in cultures, there might be some sort of misapprehensions among people employed in the same organization due to their unlike values, norms, beliefs and backgrounds, etc.

Cullen and Parvoteeah in have described that international business management is attached with the circle of spotted cultural behaviours because culture is signified in terms of the persistent and collective beliefs, customs, standards, and symbols that escort the everyday life of different crowds of people. International managers have to select and adjust their approaches lined up with each country's culture. The outmoded tactics used by management to manage culturally dissimilar workforce are proving insufficient and may not be able to solve the difficulty of cross-cultural diversity in the age of globalization. In by Choi and Chang it was illustrated that organizational culture openly effects the approaches and drives of employees towards innovation.

### **Proposed Solution**

The aim of this research is to discover the challenges of cross-cultural management issue in the era of information technology. The most important cultural clash is lack of culturally specific system. For instance, none of these systems are fully capable of classifying and organising material for cross-cultural user. In Western culture this problem is not very much acute but in non-Western culture, it is very confusing and perplexing resulted retrieval of information is not up to mark.

Hofstede's cultural dimensions and GLOBE research are important researches which deal cultural

differences. Hofstede's theory got a lot of criticism although widely cited in the field of cross-cultural management. Researchers use Hofsted's Model without keeping in mind that his model is not only too rigid but also has very general views about different cultures. It is an appropriate model. For Cultural based knowledge management system being a business model as it is too old now. However, Cultures can be characterized in a number of ways. Hofstede's dimensions are individualismcollectivism, power distance, uncertainty avoidance, and masculinity femininity.

Culturally specific study is an important phenomenon in research, but researcher neither considers it to be an essential element, .The studies by show researcher face difficulties in the successful integration of cross-cultural management. On the other side the cross-cultural management researchers focus their study on organizational culture .In this context, Hofstede's work can be used to bridge the gap between culture and management for initial understanding.

As we know there are two types of knowledge, namely tacit and explicit knowledge. Tacit knowledge resides in the mind of individual and is difficult to capture and document. Whereas Explicit knowledge can be captured and documented. We are using both types of knowledge to achieve successful cultural knowledge.

### **Cross - Cultural Diversity**

**Ethnicity:** When we discuss globalization, this is the first type of diversity that springs to mind. The same company employs people from several nations. Language and cultural obstacles will exist.

**Race:** Having people with diverse skin tones contributes to diversity in this way as well. Discrimination on this grounds has occurred in numerous locations.

**Education:** Some employees may have varying educational backgrounds. Managers have to interact with each of these individuals in a variety of ways.

Generations: It requires effort to interact with workers of diverse generations as well. The

expectations that each generation has for the job vary.

**Gender:** Many places still discriminate against women, particularly when it comes to pay. These days, we are discussing more than simply the two genders. Effective management must address this variety.

**Sexual Orientation:** Businesses must treat persons with different sexual orientations equally as society grows more accepting of them. Their demands and expectations must be taken into consideration by managers.

**Disabilities:** Individuals with disabilities will require extra care and consideration. Businesses must also make sure that these individuals have a comfortable environment to work.

# Cross - Cultural Workforce

# Self-Awareness

Attempting to interact with others from different cultural backgrounds, this is crucial. Managers must understand that a variety of factors influence their own customs, practices, and culture. Despite what one might wish to think, it is not a universal phenomenon. It is simple to comprehend other people and their behaviour if you are able to admit your own cultural prejudice. Influential elements including geography, religion, climate, and politics can affect a person's behaviour, language, and other traits. Understanding that you will look different to someone from a different culture is the first step in effective cross-cultural management.

### **Crossing Language Barriers**

Employees from different cultures work together, language might be the largest obstacle. They might not be as fluent even if you teach them the same language. Furthermore, slang that is incomprehensible to others may be used by those who speak that language as their first language. Not everyone can grasp the language when it is spoken quickly, even with language instruction. In order for everyone to comprehend, it is imperative that you, as the manager, insist that everyone speak slowly. One obstacle that cross-cultural management needs to address is this one.

#### **Equal Opportunities for All**

Everyone must be given equal opportunities for employment, promotions, and pay increases in order for cross-cultural management to be effective. To get the most out of a diverse workforce, the business must demonstrate that it treats everyone equally. Even inadvertent prejudice must be avoided by managers when evaluating candidates for promotions or other benefits. All employees will treat individuals from other cultures with the same respect after the organisation does this. It serves as a means of conveying to them that all employees are treated equally in management.

#### Watch for Unconscious Bias

Favouritism is not limited to situations involving hiring, promotions, or pay increases. It can even occur in day-to-day employment. It is evident that prospects for others are significantly reduced when a team has a greater number of people from a particular culture. Someone with the majority of the group will be assigned a difficult task that will earn them recognition from management. Ensuring equal participation in every team is one method. Seminars on unconscious prejudice can be held by the organisation as part of cross-cultural management.

#### **Resolve Conflicts Immediately**

Even when everyone working there is from the same location, conflicts are still occur. It is impossible to prevent conflicts when there are employees from different countries or cultures. There may be miscommunications because of the differences in their communication styles. Workplace pressure can quickly turn minor disagreements into disputes. Even if the offender is a member of the majority group, addressing these problems right away and severely punishing them is one way to demonstrate excellent cross-cultural management.

#### **Provide Cross-Cultural Training**

Cross-cultural training is one technique to prevent when employees problems from different backgrounds are working together. Training on how to communicate with people of other ethnicities is a necessary component of the cross-cultural management process. Workers need to be aware of how individuals in other nations respond or communicate their feelings. Better communication and mutual understanding among team members will result from this. While some themes are quite appropriate in other countries, they may not be in others.

#### **Team Building Activities**

Engaging in team-building exercises is a great method to make sure that everyone in the team is on the same page. You can engage the team members in a variety of activities. They might take place indoors or outdoors, or they can be virtual. These kinds of activities encourage informal discussions about one another's families and other subjects. Employee friendships are more likely to be fostered by topics unrelated to the workplace. You can experiment with activities that are more common among a minority ethnic group. This aids people in greater understanding and familiarity with their culture.

#### **Involve Employees in the Process**

Despite management's best efforts, cross-cultural management is impossible. Employee cooperation is the only way for it to succeed. Involving them in the activity is the greatest option. Effective communicators must be chosen by managers and the responsibility of interacting with given individuals from diverse cultural backgrounds. These folks are able to put everyone at ease and enquire about any issues they may be having. Speaking with team leaders and supervisors on a regular basis to learn about problems in their teams that require quick fixes is another method to involve employees.

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# Conclusions

We understand that cross-cultural differences create communication barriers, which leads to non-effective communication among different cultures. If any company work outside its country, normally employees are locals but managers are is from origin of the country. This study glances over cross cultural issues and purposed a model to bridge the gap between cross-cultural management in the era of IT. As this is just a starting point and there is a need for empirical research. We hope that this study will give benefits to academia and industry by enhancing the cultural–awareness and deep understanding of cultural differences which enables different cultures can work together.

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# NOVEL DESIGN OF MULTIBAND F-SLOTTED AND MINIATURIZED MICROSTRIP PATCH ANTENNA FOR X AND KU-BAND APPLICATIONS

#### V. MALATHI

UG Student, Department of Physics Madonna Arts and Science College for Women, Madurai

#### **M. JEYASUDHA**

UG Student, Department of Physics Madonna Arts and Science College for Women, Madurai

#### Dr. P. AROCKIA MICHAEL MERCY

Head & Assistant Professor of Physics Madonna College, Madurai

#### Abstract

This article presents a study on an innovative design of a multiband slotted microstrip patch antenna. It describes a multi ultra-wideband antenna that has been compressed and developed, featuring double F-slots, four rectangular slots, and corner cutouts on the patch utilizing a partial ground plane. The proposed multiband microstrip patch antenna is capable of resonating at six distinct frequencies ranging from 8 GHz to 19 GHz within the X and Ku bands, demonstrating reflected power levels of  $-23.8351 \, dB$ ,  $-32.9380 \, dB$ ,  $-14.6726 \, dB$ ,  $-22.2810 \, dB$ ,  $-19.0592 \, dB$ , and  $-18.8137 \, dB$  at frequencies of 8.6181 GHz, 12.3116 GHz, 14.1960 GHz, 15.6281 GHz, 18.1910 GHz, and 18.9447 GHz, respectively. Furthermore, the performance of the proposed multiband patch antenna has been validated through the analysis of its radiation pattern and efficiency based on measured results. The compact size, lightweight design, and cost-effectiveness of this antenna make it appealing for applications in radar engineering, police speed measurement, military uses, navigation, weather forecasting, satellite communication, spacecraft, and wireless computer networks.

*Keywords*: rectangular microstrip patch antenna, double f slots, rectangular slots, corner cuttings, return loss, vswr, gain, radiation efficiency, x and ku bands

#### Introduction

А significant advancement in wireless communication systems is the development of the microstrip patch antenna, which is evolving to meet the demanding requirements of modern antenna technology. In contemporary wireless communication systems, antennas are widely utilized due to their advantageous characteristics, including a low profile, lightweight design, consistent performance, cost-effectiveness, ease of fabrication, and seamless integration with circuits. As wireless communication devices have become integral to our daily interactions, there is an increasing demand for low-profile, miniaturized antennas that can operate across multiple and wide frequency bands. Typically, communication systems functioning in the X-band require separate antennas for each frequency band. However, it is more efficient to design a single antenna capable of operating across multiple frequencies, as the necessity for such multifunctional systems continues to grow [1]. A microstrip patch antenna, in its basic configuration, consists of a radiating patch situated on one side of a dielectric substrate, with a ground plane located on the opposite side. In terms of geometry, the patches of microstrip antennas can take on both conventional and unconventional forms. The most prevalent regular shapes include rectangular, square, circular, elliptical, and triangular configurations, among others. These shapes have been extensively studied, and the design methodologies are well established. Such antennas are commonly utilized in various applications, including aviation, automotive, missile technology, security devices, and numerous other fields. Regularly shaped antennas are more widely used due to their ease of analysis and typically symmetrical radiation patterns. In contrast, irregularly shaped patch antennas are designed with specific dimensions to achieve particular antenna characteristics, such as compactness, wideband performance, and multi-resonant functionality [2].

The recent allocation of spectrum for ultrawideband (UWB) radio communication has sparked renewed interest in UWB antenna technology. Numerous designs for UWB antennas have been proposed in recent times. However, conventional UWB antennas tend to operate as "multinarrowband" systems, which limits their ability to effectively receive a single coherent signal throughout their entire operational bandwidth. Additionally, there is a pressing need for improved high-frequency cutoff performance in UWB systems to enhance the signal-to-interference ratio (SIR), particularly in light of the increasing demand for higher frequencies in data communications to mitigate interference from other indoor radio signals. Furthermore, it is essential for the performance and behavior of UWB antennas to remain stable and predictable across the designated frequency band. Key requirements for the successful transmission and reception of UWB pulses include the minimization of pulse distortion, adequate impedance matching, consistent gain across the bandwidth, and linear phase characteristics. Lastly, maintaining a compact antenna size without sacrificing performance is another critical consideration in the design process [3].

The Federal Communications Commission (FCC) recognizes that the ultra-wideband (UWB) wireless communication band functions within the frequency range of 3.1 to 10.6 GHz, characterized by extremely low power emission levels. This band may experience interference from adjacent communication systems, including the WiMax communication system operating between 3300 and

3600 MHz, the WLAN systems at 5150 to 5820 MHz and 5720 to 5870 MHz, the X-band ranging from 7250 to 8400 MHz, Wi-Fi frequencies between 5470 and 5725 MHz, and the C-band spanning 3700 to 4200 MHz [4].In reference [5], V. Bhanumathi and S. Swathi have developed an Inverted L-Shaped patch antenna positioned atop the substrate, featuring a U-Slot etched into the infinite ground plane. This configuration achieves a maximum return loss of -24 dB within the frequency range of 5 to 8 GHz, while maintaining a compact size of  $24 \times 36 \times 1.6$  mm, with a modified ground structure deemed suitable for Ultra-Wideband (UWB) applications. In [6], Kumar Gautam and colleagues proposed an Inverted L-Shaped Slotted Microstrip Patch Antenna with a Defected Ground Structure (DGS) for X-Band applications, which records return loss values of -18.16 dB and -30.55 dB at frequencies of 8.15 GHz and 10.84 GHz, respectively. This antenna has a compact size of  $16 \times 18.02 \times 1.6$  mm and a ground structure measuring  $16 \times 18.2$  mm, making it applicable for UWB applications. In [7], Janvi Meena and collaborators introduced a Slotted Patch Antenna resonating at frequencies of 9.0 GHz and 10.14 GHz, achieving return loss values of -15.92 dB and -14.84 dB, respectively, along with a peak gain of 7.50 dB and a bandwidth of 1.41 GHz. This antenna features a reduced size of  $30 \times 30 \times 1.6$  mm and a ground structure of  $30 \times 30$  mm, suitable for X-Band applications. In [8], Brijesh Mishra and colleagues presented a Gap Coupled Swastika-Shaped Patch Antenna for X and Ku Band applications, which operates within the frequency ranges of 10.25-12.4 GHz, 11.74-13.52 GHz, and 10.74–13.63 GHz, with resonant frequencies of 11.3 GHz, 12.6 GHz, and 12 GHz. The antenna exhibits peak gains of 3 dBi, 5 dBi, and 5.13 dBi, along with maximum radiation efficiencies of 88.4%, 89.2%, and 87.2%, respectively, and has substrate dimensions of  $20 \times 20 \times 1.6$  mm with a ground plane of  $20 \times 20$  mm. [9] Shahid Ullah and colleagues have introduced a straightforward z-shaped meander monopole antenna characterized by high efficiency and an exceptionally wide bandwidth. This design achieves an impressive bandwidth of 19.9 GHz, spanning from 2.8 GHz to 22.7 GHz. The concept of a transformer is employed to ensure optimal matching within a specialized microstrip feeding line, which is also effective in achieving a broad bandwidth, utilizing substrate dimensions of  $38 \times 35 \times 1.57$  mm. Additionally, a Microstrip Patch Antenna (MPA) featuring a hybrid fractal slot configuration (Koch-Minkowski and Koch-Koch) is incorporated, along with a partial ground plane, to facilitate wideband applications.

The limitations of the aforementioned antenna review indicate that the dimensions of the ground plane and the thickness of the substrate are substantial, resulting in increased antenna loss and diminished radiation efficiency. To mitigate these losses and improve radiation efficiency, it is essential to reduce the size of the antenna, encompassing both the patch and the ground plane. This paper is structured around this principle, and the simulation results demonstrate significant improvements in radiation efficiency and a reduction in return loss across multiple bands, in line with the previous analysis. The primary objective is to achieve size reduction and enhance radiation efficiency across multiple bands, facilitating multi-tasking capabilities. In our innovative antenna design, various strategies for size reduction in the patch have been introduced, including the incorporation of double F shapes and four rectangular slots at the base of the patch, as well as corner cuts on both sides of the patch to enable multi-band functionality. The simulated and enhanced results are evaluated based on return loss, Voltage Standing Wave Ratio (VSWR), gain, directivity, and radiation efficiency. This approach yields the advantage of reduced return loss and improved radiation efficiency across multiple bands. A comprehensive analysis of different antenna design parameters has been conducted to optimize performance for Radar and Satellite applications.

#### Antenna Design and Theory



Fig 1. Conventional Antenna Structure

Fig.1 illustrates a microstrip patch antenna without a partial ground, maintaining the original patch configuration The proposed antenna features a double F-slotted patch design, incorporating four rectangular slots located at the bottom of the patch, along with cuts at the left and right corners. It is fed by a microstrip line to achieve a 50-ohm impedance, ensuring optimal impedance matching. For this design, an FR4-epoxy substrate with a dielectric constant of 4.4 has been selected, with a height of h= 1.43 mm. The dimensions of the substrate are 40 mm in length and 26 mm in width The antenna is engineered with double F slots and a partial ground plane to meet the requirements for radar and Kuband applications, operating over a wide frequency range of 8-19 GHz. A rectangular microstrip patch antenna is introduced, featuring an innovative deformity incorporated into the patch through the use of a partial ground plane. Figu.2 presents the front view of the antenna with a partial ground, designed to achieve X and Ku-band characteristics, improve return loss, and increase the antenna's radiation efficiency.



Fig 2. Proposed Antenna Structure

The upgraded proportions of all the antenna parameters are declared in the table.1

Table 1. Measurements of depicted Microstrip
Patch Antenna (MPA)

Antonna dosign naromotors	Designed Values		
Antenna design parameters	(mm)		
Substrate material	FR4-epoxy		
Substrate Thickness (h)	1.43		
Length of the substrate	40		
Width	26		
Length of the patch	19.3		
Width of the patch	19.27		
Length of the ground	16.2		
Width of the ground	12.12		
Feed length, L	19.2		
Feed Width, W	3		
Vertical Right & Left Slot1	3.14		
length			
Vertical Right & Left Slot1	1.1		
width	1.1		
Vertical Right & Left Slot2	3.01		
length	5.71		
Vertical Right & Left Slot2	1.1		
width	1.1		



Fig .3 Graph showing Return Loss Vs Frequency

The graph depicted in Fig.3 illustrates the simulated return loss on the Y-axis in relation to frequency on the X-axis, demonstrating that the proposed antenna exhibits characteristics suitable for both X and Ku bands. The return loss is optimized through the incorporation of a double F-shape design, featuring two rectangular slots positioned on both the left and right sides at the base of the patch, along with corner cuttings. This configuration enables the antenna to resonate at six distinct frequencies: 8.6181 GHz, 12.3116 GHz, 14.196 GHz, 15.6281 GHz, 18.1910 GHz, and 18.9447 GHz, with corresponding return losses of -23.8351, -32.9380, -14.6726, -22.2810, -19.0592, and -18.8137, respectively. Consequently, the results from the HFSS simulation validate that the desired multiband return loss has been successfully achieved.

# VSWR of designed antenna

VSWR is a critical factor for the effective operation of an antenna, indicating that the impedance matching between the source and the feed is optimal. It illustrates the antenna's performance characteristics and behavior. Fig.4 presents the analysis of VSWR. The values recorded at the preferred multiband frequencies are 1.11 at 8.61 GHz, 0.39 at 12.31 GHz, 1.33 at 15.62 GHz, and 1.94 at 18.19 GHz, respectively. Therefore, the proposed antenna demonstrates the ability to achieve the desired VSWR results. Special Issue 5

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(c) At 14.150 GHz, (d) At 13.0261 GHz, (e) At 18.1910 GHz, (f) At 18.9447 GHz.

The three-dimensional radiation patterns for both the elevation and azimuthal planes of the proposed antenna are depicted in the figures above. radiation patterns These provide a visual representation of the antenna's radiation characteristics in relation to spatial dimensions. They illustrate how the antenna emits and receives energy throughout space.



### Conclusions

In this research study, the incorporation of slots results in a slight reduction of the effective patch size; however, it significantly enhances the antenna's performance, leading to the emergence of multi-band resonant frequencies, minimal return loss, and outstanding radiation efficiency. The proposed compact rectangular microstrip patch antenna, designed with double F slots, four rectangular slots, side cuttings, and a partial ground plane, effectively covers a frequency range from 8 GHz to 19 GHz, making it well-suited for X and Ku band applications. This design achieves an impressive efficiency of 96%. The high radiation efficiency, ultra-wideband capability, and stable radiation pattern, along with low return loss, indicate that the proposed antenna is particularly advantageous for applications in radar, microwave imaging, satellite communications, and more.

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# ARTIFICIAL INTELLIGENCE IN DIGITAL BANKING

#### A. SELSHIYA

UG Student, Department of Commerce Madonna Art's and Science College for Women, Madurai

#### **R. LAKSHMI SHANMUGAPRIYA**

UG Student, Department of Commerce Madonna Art's and Science College for Women, Madurai

#### A. NIHILA

Assistant Professor of Commerce Madonna Arts and Science College for Women, Madurai

#### Abstract

Artificial Intelligence (AI) is transforming the digital banking sector by enhancing customer experience, optimizing processes, and reducing risks. This paper explores the integration of AI in digital banking, focusing on chatbots, predictive analytics, fraud detection, and personalized financial services. Through a review of current literature and case studies, this paper highlights the benefits and challenges of AI adoption in banking.

Keywords: artificial intelligence, digital banking, machine learning, fraud detection, chatbots, predictive analytics

#### Introduction

Digital banking has rapidly evolved with the adoption of AI technologies. The shift from traditional to digital banking is driven by the need for efficiency and enhanced customer experience. This paper aims to analyze the role of AI in digital banking and its impact on efficiency, security, and personalization of services. An overview of AI applications in digital banking, followed by a discussion on benefits, challenges, and future trends.

# Applications of AI in Digital Banking Chatbots and Virtual Assistants

- AI-powered chatbots handle customer inquiries, reducing wait times and operational costs.
- Example: Bank of America's "Erica" chatbot.

#### **Predictive Analytics for Customer Insights**

- Machine learning algorithms predict customer behavior, enabling personalized financial advice.
- Example: Wells Fargo's AI-based recommendations.

#### **Benefits of AI in Digital Banking**

- **Operational Efficiency:** Automation of routine tasks reduces costs.
- Enhanced Security: AI-driven systems can detect threats proactively.
- **Customer Experience:** Personalization through AI boosts customer satisfaction.

#### **Challenges and Risks of AI Adoption**

- **Data Privacy Concerns:** Compliance with GDPR and data protection regulations.
- Ethical Issues: Bias in AI algorithms.
- **High Implementation Costs:** Investment in AI infrastructure and training.

#### Future Trends in AI and Digital Banking

- **AI and Blockchain Integration:** Enhancing security and transparency.
- **Hyper-Personalization:** Using AI to offer individualized banking experiences.
- Voice Banking: Expansion of AI in voice recognition services.

# Conclusion

- **Summary:** AI has revolutionized digital banking by offering automation, enhanced security, and personalized services.
- **Future Outlook:** Continued AI adoption will depend on addressing ethical and regulatory challenges.

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# **GLOBAL IMPACT OF E-COMMERCE**

#### Mrs. M. SAILAJA

Assistant Professor of BBA Madonna Arts and Science College for Women, Madurai

#### Abstract

*E-Commerce may have vibrant economic impact in the forthcoming years. It will modify the outline of business forever. It has widely affected the information technology, economic, social and E-commerce has encouraged the productivity growth worldwide in the 21st century. The significance of e-commerce in the global economy is underscored by the swift expansion and proliferation of internet usage over the past ten years. The surge in e-commerce has also led to a heightened utilization of various other media for commercial transactions, including the telephone, television, fax, and electronic payment systems. E-commerce has emerged as a fundamental component of the global economy. The influence of e-commerce on the worldwide economy is extensive. One method to assess the influence of e-commerce has a significant impact on the global market as the global economy grows and becomes more interconnected. In ways that were before impossible, distant nations can now trade and build commercial partnerships. E-commerce's influence on international investing is expected to grow significantly as the global economy develops and unites. Everything from the cost of doing business to the quality of services that companies may offer to the methods of marketing has been impacted by e-commerce. These changes will not go away; on the contrary, staying ahead of the curve will become more difficult.* 

#### Introduction

The ongoing expansion of the world economy and its increasing interconnectedness has resulted in a significant influence of e-commerce on the global market. Countries that are geographically distant can now engage in trade and form business partnerships in ways that were previously unattainable. The influence of e-commerce on global investment is set to emerge as a significant element as the world economy continues to grow and integrate. The ultimate effect of e-commerce will be to create a more equitable environment for economically disadvantaged nations. The expansion of ecommerce infrastructure into even the most remote communities will diminish the impact of borders and political authority on business success. Instead, a company's effectiveness in online marketing, its capacity to cultivate a loyal community, and its ability to establish enduring relationships with its target audience will become the primary determinants of success. Success in e-commerce will primarily favor those who demonstrate adaptability, welcome change, and are prepared to experiment

with innovative marketing strategies and platforms to broaden and enhance their audience engagement. It's conceivable that traditional brick-and-mortar shopping will undergo an even more drastic change in the near future, either completely disappearing or becoming less important than internet purchasing.

#### **Social Media Marketing**

The process of increasing website traffic or attention via social media platforms is known as social media marketing. Social media marketing initiatives typically focus on developing content that captures interest and motivates readers to disseminate it within their social networks. A corporate message circulates among users and is likely to resonate due to its perception as originating from a reliable, thirdparty source rather than directly from the brand or company. This type of marketing is propelled by word-of-mouth, indicating that it generates earned media instead of paid media. Social media has emerged as a readily available platform for individuals with internet connectivity. Enhanced communication for organizations promotes brand

recognition and frequently leads to better customer service. Furthermore, social media acts as a costeffective medium for organizations to execute their marketing campaigns. The development of a social media strategy presents an excellent opportunity for innovation and should not hinder the initiation of the process. Achieving agreement on social strategy within a corporation has the potential to become a significant obstacle. Social media, in a business context. refers to technology that enables communication, sharing, and the establishment of connections between brands and their customers. Individuals predominantly make purchases from those they favor, and social media plays a crucial role in establishing, nurturing, and enhancing these relationships.

### **Banking and Financial System**

It is expected that the Indian Banking System will be globally competitive. Technology is the key to competitiveness of banking and finance system. Indian players are keeping pace with global leaders in the use of banking technology. Individuals predominantly make purchases from those they favour, and social media plays a crucial role in establishing, nurturing, and enhancing these relationships. Simultaneously, traditional banking is coexisting with online banking to address the distinct requirements of various customers. The Indian banking system has been instrumental in fostering the socio-economic development of the nation. Financial institutions, including public sector banks, are actively embracing cutting-edge technology to enhance their product offerings, elevate customer service, optimize operational efficiency, and strengthen risk management systems. This represents not merely a source of competitive advantage; it is progressively evolving into a necessity for banks.In pursuit of new markets and customer demographics, alongside the directives issued by the Reserve Bank of India in this domain, financial institutions are now viewing the rural and unbanked populations as significant business prospects. As competition in urban markets intensifies and spreads come under

pressure, banks are innovating strategies to maintain their profitability. One approach involves income derived from fees and funds, which has prompted banks to develop a wide array of new products, thereby transforming them into comprehensive providers of financial solutions.

# Software and BPO Industry

Software and BPO industry in India has provided a major boost to the country's economy. It provides employment to millions of Indians. BPO industry in India is worth \$38 billion. Banking and financial services contribute to nearly 40% to India's outsourcing industry.

China has been a major competitor for the Indian outsourcing industry. But, India offers a cost advantage that is not easy to beat. But rising wage bill of IT professionals and global financial meltdown is challenging India's position as a preferred destination for outsourcing business processes. The contribution of the BPO sector to India's economic growth has been substantial, particularly in recent years, as there has been a marked increase in the demand from Western companies for outsourcing services to India. The contribution of BPOs to the enhancement of India's economy illustrates that the IT sector has significantly aided in the country's economic development. The increase in GDP has demonstrated a consistent upward trend, indicating that the BPO sector is significantly influencing the Indian economy. The contribution of Business Process Outsourcing (BPO) to India's economic development has been substantial, particularly in recent years, as there has been a marked increase in the demand for outsourcing services from Western nations.

# **Expansion of E-Commerce**

The significance of e-commerce in the global economy is underscored by the swift expansion and proliferation of internet usage over the past ten years. The surge in e-commerce has also led to a heightened utilization of various other media for commercial transactions, including the telephone, television, fax, and electronic payment systems. Ecommerce has emerged as a fundamental component of the global economy.

The influence of e-commerce on the global economy is extensive. One method to assess the influence of e-commerce on the global economy is to examine its effects on conventional physical retail establishments.

# Conclusion

One method to assess the influence of e-commerce on the global economy is to examine its effects on conventional physical retail establishments. The capacity for these businesses to operate outside of ecommerce is nonexistent; without an online presence, the business is unlikely to prosper. Digital marketing enables e-commerce to effectively engage a broader audience. Businesses are no longer limited to marketing solely to individuals who can physically visit their stores; instead, they can now reach anyone who matches their target demographic, regardless of location, through the use of effective online marketing strategies. The ongoing expansion of the economy its increasing global and inter connectedness has resulted in a significant influence of e-commerce on the international market. Countries that are geographically distant can now engage in trade and form business partnerships in

ways that were previously unattainable. The influence of e-commerce on global investment is set to emerge as a significant element as the world economy continues to grow and integrate. The influence of e-commerce has transformed various aspects, including the expenses associated with conducting business, the quality of service that companies can offer, and the methods employed in marketing. These changes are here to stay; rather, the real challenge will be to maintain a proactive stance.

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# EMPOWERING BUSINESS SUCCESS WITH ARTIFICIAL INTELLIGENCE

#### Dr. S. K.SUDHA

Head, Department of Commerce NPR Arts & Science College, Natham, Dindigul

#### Mrs. R. KALEESWARI

Assistant Professor of Commerce NPR Arts & Science College, Natham, Dindigul

#### Abstract

A revolutionary force that is changing the global corporate scene is artificial intelligence (AI). By enabling automation, enhancing decision-making, and improving operational efficiency, AI is driving innovation across industries. This paper explores the integration of AI in key business areas such as customer service, marketing, supply chain management, and financial analysis. AI-powered tools like chatbots, predictive analytics, and robotic process automation (RPA) are enhancing productivity while reducing costs. Furthermore, AI facilitates personalized customer experiences and real-time insights, enabling businesses to stay competitive in a dynamic market. This abstract underscores the potential and limitations of AI in business and highlights strategies for responsible implementation to maximize its benefits while mitigating risks. The corporate sector is undergoing a change thanks to artificial intelligence (AI), which is fostering innovation, efficiency, and expansion. Artificial Intelligence (AI) is revolutionizing the business world, driving efficiency, innovation, and growth. Businesses may improve decision-making, automate repetitive operations, and provide highly customized consumer experiences by incorporating AI technologies like machine learning, natural language processing, and predictive analytics. AI-powered solutions enhance financial forecasting, optimize operations, optimize supply chains, and identify fraud with unparalleled accuracy.

#### Introduction

The application of AI technologies, such as computer vision, machine learning, and natural language processing, to improve corporate operations, increase worker productivity, and create value is known as artificial intelligence in business. Numerous business operations are impacted by artificial intelligence, which is the creation of computer programs and machine learning that simulate human intelligence's capacity for problem-solving and judgments. Artificial intelligence (AI) is used by businesses to enhance data analysis and decision-making, enhance customer experiences, create content, optimise IT operations, and improve cybersecurity, sales, and marketing strategies, among other things. As AI technology advances and develops, new commercial uses appear.A human workforce can be assisted by artificial intelligence in streamlining processes and increasing the effectiveness of corporate operations.

These improvements are achieved in a number of ways, such as by employing AI to automate monotonous operations, produce information using machine learning algorithms, swiftly process enormous volumes of data sets and derive insightful information, and forecast future events using data analysis.

## **Objectives AI in Business Enhance Operational Efficiency**

Automate repetitive and time-consuming tasks to reduce errors and improve productivity. Simplify procedures like data input, supply chain management, and inventory control.

#### Improve Decision-Making

Make data-driven, real-time decisions by utilising analytics and insights generated by AI. To anticipate

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trends, control risks, and allocate resources as efficiently as possible, use predictive models.

#### **Personalize Customer Experiences**

Offer specialized goods, services, and advice according to the tastes and actions of your clients. To increase user satisfaction and engagement, deploy chat bots and AI-powered customer support solutions.

#### **Drive Innovation**

Create new goods, services, or company plans by spotting untapped market niches.Reduce time to market and innovate more quickly by implementing AI in research and development.

#### **Boost Sales and Marketing Efficiency**

Use campaign personalization, predictive analytics, and customer segmentation to maximize marketing efforts. Automate follow-ups, scoring, and lead production to increase the output of your sales staff.

#### **Enhance Risk Management**

AI can be used to identify fraud, evaluate credit risks, and guarantee legal compliance.Real-time risk monitoring and prediction can reduce losses and enhance crisis management.

#### **Reduce Costs**

Reduce operating costs by optimizing resource use and automating manual operations. Optimize workforce management, logistics, and energy use with AI tools.

#### **Support Strategic Planning**

By spotting trends, patterns, and possible disruptions, you can support long-term business planning. Analyse rival strategy and market data to improve competitive intelligence.

## **Facilitate Scalability**

By using AI-driven technologies and automating processes, you can help firms grow effectively.AIpowered localised marketing and decision-making can help expand into new regions.

#### **Promote Sustainability**

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Reduce waste and energy use by streamlining procedures. Use AI-driven insights in logistics and manufacturing to create sustainable practices.

# Importance of AI in Business Improved Efficiency

AI can automate monotonous jobs, allowing workers to concentrate on more intricate ones. AI is also capable of working around the clock and completing things more quickly than humans.

#### **Better Decision-Making**

AI can help businesses analyze data and make predictions, which can lead to better decisions.

#### **Reduced** Costs

AI can help businesses streamline processes, which can lead to cost reductions.

#### **Improved Customer Experience**

AI can provide personalized customer service, and can help businesses understand customer needs.

#### **Faster Innovation**

AI can help businesses identify opportunities in the market, and introduce new products and services more quickly.

#### **Better International Marketing**

AI can help businesses analyze multilingual sentiment, and create more effective marketing strategies for international audiences.

#### **Predictive Maintenance**

AI can predict maintenance needs, which can help businesses minimize downtime.

# Scope of AI in Business Enhanced Decision-Making

Machine learning algorithms and analytics backed by AI offer data-based insights that help organisations make timely and correct decisions. Supply chains can be optimised, trends may be predicted, and risk management can be enhanced via predictive analytics.

#### **Automation of Processes**

By using technologies like Robotic Process Automation (RPA), artificial intelligence (AI) makes it possible to automate time-consuming and repetitive processes. This increases output, lowers mistakes, and frees up staff members to work on more strategic tasks.

## **Personalized Customer Experiences**

Chatbots, recommendation engines, and sentiment analysis are examples of AI systems that assist companies in providing customers with individualized experiences. AI is used by businesses like Netflix and Amazon to customize content and raise user satisfaction.

### **Supply Chain Optimization**

Demand forecasting, inventory control, and logistics can all be improved by AI. Businesses may save expenses, speed up deliveries, and increase supply chain efficiency by doing real-time data analysis.

### **AI-Driven Innovation**

By spotting unmet consumer requirements and facilitating the development of new goods and services, artificial intelligence (AI) promotes innovation. For instance, the healthcare sector is changing as a result of AI-driven medication discovery.

#### **Marketing and Sales**

Businesses may target the correct audience, improve marketing efforts, and increase sales with the use of AI tools like dynamic pricing models, customer segmentation, and predictive analytics.

#### **Risk Management**

AI is used in insurance and finance for risk assessment, credit scoring, and fraud detection. AI is quicker than conventional techniques at spotting patterns and abnormalities.

#### Human Resource Management

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AI simplifies performance evaluation, staff engagement, and hiring. AI-powered solutions are able to create customized training plans, check resumes, and forecast staff attrition.

#### Sustainability and Energy Efficiency

By optimizing energy use and enhancing resource management, AI can assist companies in lessening their environmental impact. AI-powered energy solutions and smart grids are becoming more popular.

# Scalability and Cost Reduction

AI lowers overhead costs and automates jobs, enabling organisations to scale operations effectively. AI can be used by both startups and established businesses to reach a wider audience without incurring correspondingly higher costs.

#### Challenges of AI in Business Bias

AI algorithms can introduce bias, which can negatively impact employees and the business.

## **Security Risks**

Malicious actors can exploit AI systems to perform cyberattacks.

#### **Data Confidentiality**

Organizations must implement strict security mechanisms to ensure that private information remains secure.

#### **AI Integration**

Integrating AI into existing systems can be complicated and requires the support of experienced AI solutions providers.

## **Talent Deficit**

There may be limited access to talent with the skills needed to implement and run AI.

# Stakeholder Buy-In

Leaders may be hesitant to implement AI if they don't understand its benefits or are afraid of taking risks.

### **Implementation Strategy**

Unclear goals, choosing between in-house development or vendor solutions, and data infrastructure assessment can delay progress.

# **Data Quality**

Poor data quality can lead to dated insights, lost revenue, and operational setbacks.

# **Application of AI in Business**

**Real-time data analysis:**AI can analyze data in realtime to help businesses make quick decisions.

**Task automation:** AI can automate tasks, which can reduce manual labor and potentially lower operational costs.

**Predicting trends:**AI algorithms can analyze historical data to predict future trends or risks.

**Marketing:**AI can help identify promising leads, personalize marketing campaigns, and optimize pricing strategies.

**Customer behavior analysis:** AI is able to forecast future purchases and suggest pertinent goods and services by analyzing consumer behavior.

**Chatbots:** Chat bots use natural language processing (NLP) and machine learning (ML) algorithms to understand and answer customer inquiries in real-time.

**Healthcare:**AI can analyze patient data to identify patterns that may indicate a disease, and to develop new drugs and therapies.

**Route planning:**AI can analyze real-time traffic data, road conditions, and user preferences to recommend the most optimal routes.

**Strategic planning:** AI can help identify market trends in regards to competitors, customers, talent, and more.

**Energy efficiency optimization:**AI can study energy use and find ways to reduce waste.

# AI Technology Works in Business

# Analyzing Consumer Data

AI is capable of analyzing consumer data to comprehend the preferences and purchasing patterns of various client categories. This enables companies to provide tailored advice and focused advertising.

### **Predictive Maintenance**

AI is capable of analyzing sensor data and maintenance logs to detect any equipment problems early. Operators are able to make prompt judgments as a result.

### **Detecting Anomalies**

AI is able to identify outliers or irregularities in supply chain data. This aids decision-makers in taking remedial measures prior to the realization of risk.

# **Automating Routine Tasks**

Numerous standard support duties, including tracking orders or responding to frequently asked questions, can be automated with AI. This enables companies to accomplish more with fewer employees.

### **Providing Actionable Insights**

AI can deliver useful insights by analyzing and interpreting operational and customer data. Strategic choices on operations, market trends, and customer satisfaction can be influenced by these findings.

## Conclusion

From automating repetitive processes to enhancing decision-making and cutting expenses, artificial intelligence is revolutionizing company operations in numerous ways. Businesses that invest in AI technology can obtain a competitive edge and remain ahead of the curve, despite the difficulties associated with putting AI solutions into practice.

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# RISK MANAGEMENT IN INTERNATIONAL SUPPLY CHAINS: CHALLENGES AND STRATEGIES

#### S. SUGANYA

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

### Dr. A. DAYANA AMALA JOTHI

Head & Assistant Professor of Commerce Madonna College, Madurai

#### Abstract

In an increasingly globalized world, supply chains are more complex and vulnerable to risks such as geopolitical instability, economic fluctuations, natural disasters, and cyber threats. Effective risk management is crucial for maintaining resilience, efficiency, and competitive advantage. This paper examines the types of risks in international supply chains, risk assessment methodologies, and mitigation strategies. Case studies of recent supply chain disruptions provide insights into best practices for risk management.

*Keywords:* risk management, international supply chain, disruptions, globalization, resilience, supply chain risk, logistics, geopolitical risk, financial risk, sustainability

#### Introduction

International supply chains are essential for global trade but are increasingly exposed to various risks. Companies must develop effective risk management strategies to maintain operational continuity and competitiveness. This paper examines the major risks affecting international supply chains and the best practices to mitigate them.

# Types of Risks in International Supply Chains Geopolitical Risks

Political instability, trade wars, and sanctions affect global supply chains. For example, the US-China trade war led to increased tariffs, forcing companies to reevaluate their sourcing strategies (Johnson, 2021).

#### **Financial Risks**

Currency fluctuations, inflation, and economic downturns can impact supply chain costs. The COVID-19 pandemic highlighted the financial vulnerabilities of many companies relying on just-in-time inventory systems (Smith & Kumar, 2022).

#### **Operational Risks**

Delays, supplier failures, and disruptions in transportation can cause severe financial losses. The 2021 Suez Canal blockage demonstrated the impact of logistics failures on global trade (Brown & White, 2023).

## **Environmental and Natural Disasters**

Hurricanes, earthquakes, and climate change-related events disrupt supply chain operations. Companies like Tesla and Apple have been affected by supply chain disruptions due to extreme weather conditions (Davis, 2020).

# Risk Assessment and Mitigation Strategies Risk Identification and Assessment

Using risk assessment frameworks such as PESTLE and SWOT analysis, companies can proactively identify potential threats (Williams & Taylor, 2021).

#### **Diversification of Suppliers and Markets**

Companies should avoid dependency on a single supplier or market. The semiconductor shortage in 2021 underscored the risks of supplier concentration (Miller & Lee, 2023).

# Digital Transformation in Supply Chain Risk Management

Technologies such as blockchain, AI, and IoT improve supply chain transparency and reduce risks (Chen et al., 2022).

# **Resilient Logistics and Inventory Strategies**

Adopting buffer stock, dual sourcing, and nearshoring strategies can enhance supply chain resilience (Garcia & Roberts, 2021).

### **Case Studies of Effective Risk Management**

# Toyota's Lean Manufacturing and Risk Adaptation

Toyota's multi-supplier strategy helped the company recover quickly from disruptions such as the 2011 Japan earthquake (Singh, 2020).

# **Apple's Supply Chain Diversification**

Apple has reduced reliance on China by shifting some manufacturing to India and Vietnam, minimizing geopolitical risks (Hernandez & Park, 2022).

### Amazon's AI-Driven Supply Chain Management

Amazon uses predictive analytics to anticipate demand fluctuations and avoid inventory shortages (Wilson, 2023).

# Future Trends in Supply Chain Risk Management

• Adoption of AI-driven predictive analytics

- Increased focus on sustainability and ESG compliance
- Strengthening regional supply chains to reduce geopolitical risks

# Conclusion

Risk management in international supply chains is essential for business continuity. Companies must adopt proactive strategies, including diversification, digital transformation, and resilient logistics, to mitigate potential disruptions. Future research should focus on the integration of AI and sustainability in risk management frameworks.

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# CROSS-CULTURE MANAGEMENT IN THE DIGITAL WORLD

#### **B NAVEEN KUMAR**

BBA (Logistic & Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **R DHANUNSU**

BBA (Logistic & Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **B. VAIRAMUTHU**

Assistant Professor, Department of Business Administration Subbalakshmi Lakshmipathy College of Science, Madurai

#### Abstract

Cross-cultural management in the digital world is increasingly relevant as globalization has connected people, businesses, and organizations across continents. As businesses grow globally and technology accelerates the speed of communication, managing diverse teams that span different cultures has become both a challenge and an opportunity. This paper explores the intersection of cross-cultural management and digital communication, focusing on how digital platforms and technologies influence cross-cultural interactions. By analysing key concepts of culture, communication, and leadership in virtual environments, the paper aims to uncover best practices for managing multicultural teams in an increasingly digital world. Through an examination of challenges such as cultural misunderstandings, time zone differences, and lack of face-to-face interaction, the paper suggests strategies to foster collaboration and inclusion in global teams. This includes recommendations for leaders to leverage digital tools and cultural intelligence to enhance team performance. The objective is to offer insights into how cross-cultural management practices are evolving in the digital age and how leaders can effectively navigate these changes.

#### Introduction

With the growth of globalization, organizations today are increasingly managing diverse teams spanning multiple countries and cultures. At the same time, digital technology has created new ways to bridge geographic and cultural divides. As a result, managing cross-cultural teams in а digital environment has become both a challenge and a necessity. In the past, face-to-face communication and co-location played a central role in team management. However, digital communication tools now allow teams to collaborate across time zones. languages, and cultures. This evolution in workplace communication raises important questions: How do cultural differences manifest in digital spaces? What leadership strategies are effective in managing multicultural virtual teams?

This paper seeks to explore the intersection of cross-cultural management and digital communication, focusing on the challenges and opportunities that arise when managing diverse teams in the digital age. We will discuss how culture impacts digital communication, the role of leadership, best practices for managing digital teams, and the technological tools that can help bridge cultural divides.

# Understanding Culture and Its Impact on Digital Communication

Culture is an essential factor in any workplace interaction, shaping how individuals communicate, behave, and make decisions. Geert Hofstede's cultural dimensions theory (1980) is one of the most wellknown frameworks for understanding cultural differences. These dimensions include individualism vs. collectivism, power distance, uncertainty avoidance, and masculinity vs. femininity, among others. Digital communication, however, presents a unique challenge as the absence of face-to-face interaction can make cultural differences harder to discern.

For instance, direct communication, which is common in individualistic cultures like the United States, may clash with more indirect communication styles prevalent in collectivist cultures such as Japan. In a virtual setting, these differences can lead to misunderstandings or even conflict if not managed properly. Furthermore, the reliance on written forms of communication—emails, instant messages, and social media posts—can lack the nuances of tone and body language, making it more difficult to interpret meaning across cultures.

## **Challenges in Cross-Cultural Digital Management**

Managing a digital team that spans multiple cultures presents several challenges. First, language barriers are a significant issue. Even when all team members speak a common language, such as English, variations in fluency and regional dialects can create confusion and miscommunication.

Time zone differences are another challenge. As teams are spread across different parts of the world, coordinating meetings and deadlines becomes a logistical puzzle. This not only affects productivity but also team morale, as some members may feel excluded or overburdened by the need to accommodate others' schedules.

The lack of non-verbal communication is a further obstacle. In face-to-face settings, we rely heavily on body language, facial expressions, and gestures to gauge meaning. In digital environments, these cues are absent, making it harder to build rapport and trust. Consequently, relationships in virtual teams can take longer to develop, which can hinder collaboration and creativity.

# Leadership in a Digital and Cross-Cultural Environment

Leadership plays a crucial role in fostering an environment where cultural differences are understood and respected. In a cross-cultural digital setting, leaders need to adapt their communication style to ensure that they are effectively managing a diverse team. Transformational leadershipcharacterized by empathy, encouragement, and empowerment-can be particularly effective in digital cross-cultural environments. Leaders must be culturally intelligent (CQ), meaning they are aware of their own cultural biases and can adjust their behaviours to accommodate diverse cultural norms.

Effective cross-cultural digital leaders know how to build virtual teams that encourage innovation and foster inclusivity. They understand the importance of developing team cohesion, establishing clear communication protocols, and providing opportunities for team members to share their cultural perspectives. For example, scheduling regular checkins and providing a platform for open discussion can go a long way in mitigating misunderstandings and fostering trust.

# Best Practices for Cross-Cultural Management in the Digital Age

Effective cross-cultural management requires a combination of strategies that embrace both the opportunities and challenges presented by the digital world. Key best practices include:

- 1. Building cultural competence: Providing training on cultural differences and digital communication norms helps team members navigate their multicultural environment effectively.
- Promoting inclusivity: Ensuring that all team members have a voice, regardless of cultural background or geographical location, is vital for maintaining a positive and productive team dynamic.
- 3. Utilizing digital tools: Platforms such as Slack, Zoom, and Microsoft Teams enable effective communication and collaboration across cultures.

These tools should be leveraged to create transparent and inclusive communication channels.

4. Encouraging flexibility: Leaders should foster an environment that is open to flexible work schedules, allowing team members to work in a way that best suits their cultural norms and personal preferences.

# Technological Tools for Supporting Cross-Cultural Communication

Technological tools play a critical role in enhancing cross-cultural communication in global teams. Communication platforms such as Zoom and Microsoft Teams allow for real-time, virtual collaboration, bridging the gap between different time zones. Furthermore, project management tools such as Asana or Trello help streamline workflows, ensuring that all team members, regardless of location, can track progress and contribute to tasks in a timely manner.

AI tools, such as language translation software and real-time transcription services, can also aid in reducing language barriers, ensuring that team members are not limited by their linguistic abilities. As these technologies evolve, they will continue to offer new ways to enhance cross-cultural communication and collaboration.

#### Conclusion

In the digital age, managing cross-cultural teams requires leaders to embrace both the challenges and opportunities that come with working in a globalized, technologically connected world. By developing intelligence, adapting communication cultural strategies, and leveraging digital tools, leaders can create an environment where diverse teams can thrive. As technology continues to evolve, the future of cross-cultural management will likely involve even more sophisticated digital solutions that support collaboration and inclusion. The role of leadership in this digital and multicultural landscape is paramount. Leaders must not only be technologically adept but also culturally intelligent, understanding the nuances

of both digital communication and the cultural frameworks that shape their teams' interactions. In this regard, cultural intelligence (CQ) becomes a critical skill for leaders who must navigate the delicate balance between fostering inclusivity, enhancing team collaboration, and driving innovation in a virtual setting.

Moreover, digital tools and platforms have provided essential support in overcoming geographical and cultural barriers. Communication tools like Slack, Zoom, and Microsoft Teams have become lifelines for teams, allowing them to stay connected and collaborate in real-time despite differences in location and time zones. Project management platforms ensure that teams can coordinate efforts seamlessly, regardless of cultural backgrounds. Furthermore, technological advances in artificial intelligence, machine learning, and language translation software promise even greater opportunities for bridging cultural divides in the future.

However, to truly harness the potential of these tools, organizations must invest in developing cultural competence within their teams. This involves not just offering training on digital tools but also educating team members on the importance of understanding cultural differences and adapting communication styles accordingly. As organizations place greater emphasis on diversity, equity, and inclusion (DEI), ensuring that all team members feel valued and respected becomes even more crucial in the digital realm.

Looking forward, the future of cross-cultural management in the digital age will likely involve more immersive technologies such as virtual reality (VR) and augmented reality (AR), which could help bridge the gaps created by distance and further humanize virtual interactions.

In conclusion, the digital world presents a unique opportunity to rethink and redefine cross-cultural management. By embracing technological solutions and cultivating cultural awareness, organizations can create environments where diversity is not just acknowledged but celebrated. Leaders who are able to navigate the complexities of digital communication and cross-cultural collaboration will set the stage for greater innovation, productivity, and success in the global marketplace.

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# A STUDY ON INVESTMENT PATTERN OF WOMEN EMPLOYEES IN MADURAI DISTRICT

#### S.HARUNNISHA

Assistant Professor of BBA Madonna Arts and Science College for Women, Madurai

#### Abstract

Since the few savings of today are used to cover the expenses of tomorrow, investing is one of each investor's top priorities. Based on their socioeconomic background, awareness and preferences, and financial literacy on the several investment avenues accessible in India, this article aims to investigate the investing patterns of female employees. Because they are members of the working class and are accustomed to traditional investment methods like secured deposits, the results indicated that the majority of female investors are younger. The survey also showed that stock market investing entails a great deal of risk and uncertainty. The findings also indicate that Indian women's psychological behaviour is influenced by their love of bullion and the low risk and attractiveness of investing in bullion metals. From the perspective of the study, it will be beneficial to investigate and broaden knowledge as well as determine the most effective way to invest and save money for a brighter future in the areas of personal finance and the pandemic recession. **Keywords:** investment, women investors, savings, financial market

Introduction

In India, women constitute around half of the total population. Though women population is almost equal to their male counterparts, the overall economic decisions are largely taken by men. In olden days, women were limited to household works and decisions only. But this scenario is changing with the increase in awareness among women due to being educated and employed. This has encouraged most women to gain knowledge about financial investments and take economic decisions and make investments in various avenues such as shares, mutual funds, debentures, Commodities market and bank deposits.

Women in India are a part of all sectors such as education, politics, media, science and technology etc., There are many women who govern many concerns and flourish in leading roles such as General managers, Chief Executive Officers, Directors, Managers, others such as in middle small classes, employed women are the ones who actually saves for their families. Employed women have the quality to manage their money in an effective and efficient manner. Their thinking and attitude towards financial investments are changing and improving with time. Hence it is necessary to study the attitude of employed women towards financial investments which in long run will help in the overall growth of Indian economy.

#### **Statement of the Problem**

Financial investments are important to gain stability and help the individuals, family as well as the industries during unfavorable situations. Saving the hard earned money has been a traditional practice from olden days. At present, the development in all sectors has led to varied financial investment options such as bank deposits, bonds, share markets, debentures, mutual funds, commodities markets etc.. The attitude of women employees in particular varies from that of salaried men due to various factors. Women employees take safe investment decisions avoiding risks and hence their attitude towards investment pattern has to be studied and analyzed .The present study attempts to know the level of awareness of women employees to take investment pattern and their attitude in taking these investment decisions.

# **Review of Literature**

N. Geetha, M. Ramesh (2011) This study Examines the factors responsible for investment behaviour of people and different investment options available. Equity are high risk and high return investment with liquidity, debts are low risk and fixed return instruments, Mutual funds and bonds are low risk with normal returns instruments, Company deposits and bank deposits has low risk and low returns, post office savings, PPF and insurance policies are no risk investment with low returns, Real estate and Gold has no returns on investment but has capital appreciation.

S. Prasanna Kumar (2014) Investment and savings are two different things. Investment means saving with a hop that some benefit will arise in future. Investment options are available like Bank deposits, NRO funds, Real Estate, Shares and Bonds etc. Respondent of the study reveals that majority of respondents selected deposit as a mode of investment.

#### Scope of the Study

- 1. The research involves the study of the attitude of women empolyees towards investment pattern.
- 2. The researcher has chosen the women employees within Madurai District in particular for the purpose of the study.
- 3. This research reveals the various factors influencing the attitude of women employees towards investment decisions both within and outside their family circle.
- 4. The study will also help the authorities of the financial institutions to frame their investment schemes so as to attract more number of women employees also and hence improve their performance.

### **Objectives of the Study**

- 1. To study the awareness of the women employees towards investment pattern.
- 2. To analysis the attitude of the women employees in Madurai District

- 3. To study how far the women employees have financial knowledge to help them to take investment decisions.
- 4. To measure the level of satisfaction of the women employees in Madurai District.
- 5. To examine the factor influencing the women employees towards investment pattern
- 6. To offer suggestions and conclusions for the study.

# Methodology

The study is based upon Primary data and Secondary data. Primary data has been collected from women employees in public in Madurai district. A sample of 580 respondents were chosen for the study. Secondary data have been collected from Journals, Magazines and textbooks.

### Sampling Design

Convenient sampling technique was adopted. The researcher decided the sample size in accordance with the population of women employees in public sector at the Madurai district level. The place and nature of employment were decided at random and sample respondents for the study.

## **Tools for Analysis**

The various statistical tools have been used such as Percentage Analysis, Trend Analysis, Chi-square test, ANOVA test, 'F' test, Factor Analysis and Garrett Ranking Technique.

### Findings

- Due to their strong investment-related financial expertise, it has been discovered that the majority of female investors are under 35 years old.
- It is evident that the majority of women feel at ease with conventional investment options like LIC, Post Office Schemes, and Secured Deposits.
- According to the report, investing in stocks, debentures, or any other commodity market is of the least interest to the respondents.

- It is discovered that the respondents are open to investing for a medium amount of time.
- According to this poll, the majority of respondents preferred low-risk and fixed-income assets.

# Suggestions

- It has been noted that working women's investment patterns need to be altered. Since there is a greater potential return in the future, they must shift from a mindset of safety and security to one of openness, which includes investing in high-risk securities.
- The majority of women are said to have their own decision-making styles but lack investment experience. To educate investors about emerging markets like cryptocurrencies, it is necessary to make investor education programs more widely known and to provide them with ongoing training.
- Although they lack investment experience, most women are thought to have their own decision-making methods. Increased awareness of investor education programs and continuous training are essential for educating investors about new markets, such as cryptocurrency.
- It has been shown that the majority of working women seek high returns but are unwilling to take risks.
- It is recommended that women investors in highrisk assets have their own investment channel. As a result, low-income women are not taking any of these into account; instead, they are concentrating on achieving their immediate objectives.

## Conclusion

Because many women lack a comprehensive understanding of all financial options and are risk

averse, women have only invested a very small portion of their income. Many women are unable to make judgements on their own and must rely on others to make investing decisions for them. Most women have invested when possibilities have arisen and have not prepared for their finances or other investment prospects. The majority of women grasp the fundamentals of investing, which is a good trend that will inspire more women to get involved in the market.

Since most women are not high-risk takers with declining portfolio values, they are unable to take risks and, as a result, cannot wait for improvements. Due to their low risk tolerance, the majority of women have made low-risk investments. Because they need advise from seasoned people, the majority of women base their decisions on the opinions of family members. The majority of women want to build assets that increase in value as their income does. It can be inferred that women are often conservative investors who place a high value on safeguarding their assets.

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# A STUDY ON WEB PERSONALIZATION USING WEB USAGE MINING

#### **G JESIMA**

UG Student, Department of Computer Science Madonna Arts and Science College for Women, Madurai

#### **A HARSHINI**

UG Student, Department of Computer Science Madonna Arts and Science College for Women, Madurai

#### **K.NISHA**

Head & Assistant Professor of Computer Science Madonna Arts and Science College for Women, Madurai

#### Abstract

The internet serves as a vast repository of information. Web Mining is an emerging trend designed to cater to user needs. It encompasses various types, one of which is Web Usage Mining, aimed at uncovering significant user navigation patterns. This technique can be applied to numerous real-world challenges, including enhancing websites and conducting further studies on customer behavior. Personalization represents a specific category of information filtering systems that aims to forecast the ratings or preferences a user might assign to an item they have yet to explore, utilizing a model derived from the item's characteristics. The proposed system leverages data such as user profile information, time spent on the site, and preferences extracted from log files. It then processes this selected information to refine user recommendations based on the outcomes.

Keywords: web mining, web usage mining, customization, web personalization

#### Introduction

Data mining is the process of extracting valuable insights or "mining" knowledge from extensive datasets. Knowledge Discovery in Data involves a complex procedure aimed at uncovering valid, novel, potentially useful, and ultimately comprehensible patterns within the data. Data mining encompasses not only the collection and management of data but also the analysis and forecasting of trends.

#### Web Mining

Web mining techniques are employed by various entities to extract valuable information regarding the interests and behaviors of users. The information obtained is utilized in business applications, online marketing promotions, advertisements, and more.

#### Web Usage Mining

Web Usage Mining involves the utilization of data mining methodologies to identify significant usage patterns from web data, aimed at comprehending and enhancing the requirements of web-based applications. This usage data encompasses the identity or source of web users, as well as their browsing activities on a website. Furthermore, web usage mining can be categorized based on the type of usage data analyzed.

Web Server Data: The Web server gathers user logs, which typically consist of the IP address, page reference, and access time.

Application Server Data: Commercial application servers possess essential features that facilitate the development of applications, particularly in the realm of e-commerce, with minimal effort. A crucial aspect of these servers is

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their capability to monitor different types of business events and record them in the application server logs.

Application Level Data: It is possible to define new types of events within an application, and logging can be activated for these events, thereby creating records of these specifically defined occurrences.

#### Personalization

Personalization refers to the process by which individuals receive products or outcomes tailored to their interests and expectations with minimal additional input. Users desire for the vastness of the internet to be condensed into a format that aligns with their specific requirements. Consequently, there is a need for a system that analyzes users' expectations and preferences derived from their log files. Such systems are built upon the principles of web mining, enabling the customization of websites according to individual user needs.

#### Literature Review

Pooja Mehta and colleagues (2012) define web mining as the utilization of data mining methodologies to derive insights from web-related data, which encompasses web documents, interdocument hyperlinks, and website usage logs, among other sources. The data involved may include various formats such as text, images, audio, video, or organized records like lists and tables.

A.J. Ratnakumar (2005) identifies three additional significant research domains within the field of Web mining: i) Web Content Mining, ii) Web Structure Mining, and iii) Web Usage Mining. Web Content Mining refers to the extraction of valuable information from the content of web documents. This content may include text, images, audio, video, or structured data such as lists and tables, all of which are intended to convey specific facts to users. W. Bin et al. (2003) explain that Web Structure Mining focuses on the hyperlink architecture of the web. This involves analyzing both the incoming and outgoing links of a webpage, which is often utilized for ranking search engine

results. Furthermore, A.J. Ratnakumar (2005) notes that Web Structure Mining can be understood as the process of uncovering structural information from the web. This type of mining can be conducted at either the document level (intra-page) or the hyperlink level (inter-page). Essentially, Web Structure Mining aims to derive insights from the organization of the World Wide Web and the connections between references and their referents.

A.J. Ratnakumar (2005) defines Web Usage Mining as the utilization of data mining methodologies to identify significant usage patterns from web data, aimed at comprehending and enhancing the services provided by web-based applications. This process is also referred to as Web log mining. Typical data collected from a website includes users' IP addresses, page references, and their access times. A notable aspect of usage or log mining is Personalization, which can also be referred to as Customization.

R. Girardi et al. (2007) have articulated that Web usage mining focuses on uncovering significant usage patterns through the analysis of Web usage data. This process involves the application of data mining techniques to identify usage patterns derived from Web data produced by user interactions with a Web server, which encompasses Web logs, click streams, and database transactions at a specific site or a collection of interconnected sites.

M. Eirinaki et al. (2005) articulated that the primary aim of a Web personalization system is to furnish users with the information they desire or require, without necessitating that they request it directly. Similarly, W. Bin et al. (2003) noted that personalization involves the implicit or explicit gathering of visitor data and utilizing that information within the content delivery framework to influence both the type of information presented to users and the manner of its presentation. A personalization mechanism relies on the explicit preferences expressed by the user, alongside a continuous process of tracking user navigation, collecting requests for ontological objects, and storing this data in the user's profile to provide tailored content.

A.J. Ratnakumar (2005) outlines the Web Personalization process as consisting of four distinct phases. The first phase involves the collection of Web data, which encompasses implicit data derived from previous activities and click streams documented in Web server logs, as well as through cookies or session tracking modules. In contrast, explicit data is typically obtained from registration forms and rating questionnaires.

Preprocessing of Web data- Data is often subjected to pre-processing to ensure it is formatted appropriately for the analysis method that will be employed in the subsequent phase. This preprocessing may involve rectifying inconsistencies within the data and eliminating irrelevant information in alignment with the objectives of the analysis.

Analysis of Web Data- This phase utilizes machine learning or data mining methodologies to identify noteworthy usage patterns and statistical relationships between web pages and user demographics. Often, this process leads to the automatic creation of user profiles and is generally conducted offline to prevent any additional load on the web server.

#### **Decision Making/Final Recommendation**

The findings from the preceding analysis phase are utilized to provide recommendations to the user. This process includes the real-time generation of dynamic web content, such as incorporating hyperlinks to the most recently accessed web page by the user. M. Aarti et al. (2015) emphasize the significance of analyzing web log files through web usage mining to identify users exhibiting similar behaviors on a specific website. This paper explores methods for extracting valuable insights from web log files using data mining techniques, including association rule mining and clustering. Initially, the web log file undergoes preprocessing, followed by the application of association rule mining and clustering algorithms to uncover usage patterns and identify users with comparable behaviors.

The findings from the preceding analysis phase are utilized to provide recommendations to the user. This process includes the real-time generation of dynamic web content, such as incorporating hyperlinks to the most recently accessed web page by the user. M. Aarti et al. (2015) emphasize the significance of analyzing web log files through web usage mining to identify users exhibiting similar behaviors on a specific website. This paper explores methods for extracting valuable insights from web log files using data mining techniques, including association rule mining and clustering. Initially, the web log file undergoes preprocessing, followed by the application of association rule mining and clustering algorithms to uncover usage patterns and identify users with comparable behaviors.

They introduce a semantically enhanced Web Usage Mining approach (SWUM), which integrates the domains of Web Usage Mining and the Semantic Web. In this approach, the undirected graph generated from usage data is augmented with comprehensive semantic information obtained from web pages and the structure of the website. The findings indicate that this method can achieve an accuracy improvement of 10-20% compared to a model based solely on usage data, and 5-8% better than a model based on ontology.

### Conclusion

This paper addresses the significant concept of Data Mining, specifically focusing on Web Mining. Additionally, it provides insights into the subfields of Web Content Mining, Web Usage Mining, and Web Structure Mining, all of which fall under the umbrella of Web Mining. Notably, Personalization within Web Usage Mining emerges as a promising area for future research. As the utilization of the World Wide Web continues to grow, so too do the applications of E-Commerce and their user base. Consequently, there is a need for a system that can capture current trends and preferences among users, which should be updated regularly. To achieve this,
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the concepts of Personalization and customization are employed.

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# FINTECH INNOVATION AND BLOCKCHAIN APPLICATIONS: TRANSFORMING FINANCIAL SERVICES

#### S. JEYA SURYA

UG Student, Department of Commerce Madonna Art's and Science College for Women, Madurai

#### M. KAMALI

UG Student, Department of Commerce Madonna Art's and Science College for Women, Madurai

#### Dr. A. DAYANA AMALA JOTHI

Head & Assistant Professor of Commerce Madonna College, Madurai

#### Abstract

The financial services sector has seen a radical transformation due to the swift development of financial technology, or fintech, which has improved accessibility, security, and efficiency. A subset of fintech advancements, blockchain technology has drawn a lot of interest because it offers the ability to solve persistent problems like cost-effectiveness, security, and transparency. The influence of fintech innovation is examined in this article, with particular attention to blockchain applications in asset management, lending, payments, and regulatory compliance. The paper addresses issues including regulatory compliance, scalability, and integration while highlighting the revolutionary potential of blockchain through a review of recent research and case stories. The results indicate that although blockchain has significant potential for the financial industry, its broad acceptance hinges on removing technological and legal obstacles. **Keywords:** fintech, blockchain, financial services, smart contracts, decentralized finance (defi), regulatory compliance

#### Introduction

By combining cutting-edge technologies like blockchain, artificial intelligence, and machine learning, financial technology, or fintech, has transformed conventional financial services.

Among these, blockchain has emerged as a critical innovation due to its decentralized and secure nature (Nakamoto, 2008). This paper investigates how blockchain technology drives innovation in the financial services sector, focusing on its applications in payments, lending, asset management, and regulatory compliance.

#### Literature Review Fintech Innovation

Fintech includes a broad range of applications, such as algorithmic trading and mobile banking.

The global fintech market has witnessed exponential growth, driven by consumer demand for

faster, secure, and more accessible financial services (Arner, Barberis, & Buckley, 2016).

#### **Blockchain Technology**

Blockchain is a distributed ledger technology that enables secure, transparent, and tamper-proof transactions without intermediaries (Tapscott & Tapscott, 2016). Its key features—immutability, decentralization, and consensus mechanisms—make it a promising solution for various financial applications.

## Blockchain Applications in Financial Services Payments and Settlements

Blockchain-based payment systems, such as Ripple and Stellar, offer faster and cost-effective crossborder transactions compared to traditional banking systems (Gupta & Gupta, 2020). The elimination of intermediaries reduces transaction costs and settlement times.

#### Lending and Credit Scoring

Blockchain technology is used by decentralised finance (DeFi) services to provide peer-to-peer financing without the need for middlemen. Smart contracts automate loan disbursement and repayment, enhancing transparency and efficiency (Schär, 2021).

#### Asset Management

Tokenization of assets on blockchain allows for fractional ownership, increased liquidity, and streamlined management of securities (Zohar, 2015). Security tokens and decentralized exchanges facilitate efficient trading and compliance with regulatory standards.

### **Regulatory Compliance and KYC**

Blockchain's immutability ensures transparent and auditable compliance records, simplifying Know Your Customer (KYC) and Anti-Money Laundering (AML) procedures (Fanning & Centers, 2016). Permissioned blockchains allow regulators real-time access to transaction data.

## Challenges in Blockchain Adoption Scalability Issues

Blockchain networks face challenges related to transaction throughput and latency, particularly in high-frequency trading scenarios (Croman et al., 2016).

### **Regulatory Uncertainty**

The lack of standardized regulations across jurisdictions hinders the adoption of blockchain in financial services (Zohar, 2015). A harmonized regulatory framework is essential for mitigating risks and fostering innovation.

### Integration with Legacy Systems

Integrating blockchain with existing financial infrastructure poses technical and operational challenges. Interoperability protocols are necessary to enable seamless data exchange between traditional systems and blockchain networks (Gupta & Gupta, 2020).

### **Case Studies**

#### **JPMorgan's Onyx Platform**

JPMorgan's Onyx platform utilizes blockchain for interbank information network and wholesale payments, achieving significant reductions in settlement times (JPMorgan, 2020).

#### **DeFi Platforms: Aave and Compound**

Aave and Compound exemplify the potential of DeFi by offering lending and borrowing services without intermediaries, using smart contracts to manage risk and compliance (Schär, 2021).

## **Future Directions**

The future of blockchain in financial services hinges on advancements in scalability solutions such as sharding and Layer 2 protocols. Additionally, regulatory clarity and enhanced interoperability will be critical for broader adoption.

#### Conclusion

With its improved security, transparency, and efficiency, blockchain is a game-changer in the financial services industry. To realise its full potential, though, issues like scalability, regulatory compliance, and integration with existing systems must be resolved.

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# INNOVATIVE DESIGN OF MULTIBAND AND MINIATURIZED SLOTTED MICROSTRIP PATCH ANTENNA FOR X AND KU-BAND APPLICATIONS

#### R. KAVIYA

UG Student, Department of Physics madonna Arts and Science College for Women, Madurai

#### **R. MUTHU IRULAI**

UG Student, Department of Physics madonna Arts and Science College for Women, Madurai

#### Dr. P. AROCKIA MICHAEL MERCY

Head & Assistant Professor of Physics Madonna College, Madurai

#### Abstract

A novel multiband slotted microstrip patch antenna design is examined in this work. A multi-ultra-wideband compressed and constructed antenna with four rectangular slots, two F-slots, and side corner cuts is visible on the patch using partial ground. The suggested multiband microstrip patch antenna can resonate at six different frequencies in the X and ku bands, ranging from 8 GHz to 19 GHz. At 8.6181 GHz, 12.3116 GHz, 14.1960 GHz, 15.6281 GHz, 18.1910 GHz, and 18.9447 GHz, among other frequencies, it may attain reflected powers of -23.8351 dB, -32.9380 dB, -14.6726 dB, -22.2810 dB, -19.0592 dB, and -18.8137 dB. The highest gain and directivity at the resonant bands are 6.3769 dB and 6.9104 dB, respectively. This antenna's modest size, weight, and cost make it appealing for a variety of uses, including satellite broadcast communication, spacecraft, police radars for detecting vehicle speed, military applications, navigation, and wireless computer networks.

*Keywords:* rectangular microstrip patch antenna, double f slots, rectangular slots, corner cuttings, return loss, vswr, gain, radiation efficiency, x and ku bands

#### Introduction

The development of the microstrip patch antenna, which is evolving to meet the exacting requirements of modern antenna design, is a noteworthy advancement in wireless communication technology. Antennas are widely used in contemporary wireless communication systems because their of advantageous features, which include a small profile, lightweight design, reliable performance, affordability, ease of production, and seamless integration with electronic circuits. The necessity for small, low-profile antennas that can operate in a variety of frequency bands is growing as wireless communication devices have become indispensable to our everyday interactions. The development of the microstrip patch antenna, which is evolving to meet the exacting requirements of modern antenna design, noteworthy advancement in wireless is а communication technology. Antennas are widely used in contemporary wireless communication systems because of their advantageous features, which include a small profile, lightweight design, reliable performance, affordability, ease of production, and seamless integration with electronic circuits. The necessity for small, low-profile antennas that can operate in a variety of frequency bands is growing as wireless communication devices have become indispensable to our everyday interactions.

Generally, X-band communication systems require different antennas for each frequency band. However, given the growing need for such integrated systems, it is prudent to develop a single antenna that can function across several frequencies to facilitate multitasking [1]. In its basic form, a microstrip patch antenna consists of a ground plane on one side of a dielectric substrate and a radiating patch on the other side. In terms of geometry, microstrip antenna patches can take on both conventional and unconventional forms. Rectangular, square, circular, elliptical, and triangular shapes are examples of common regular forms. Rectangular, square, circular, elliptical, and triangular shapes are examples of common regular forms. The design methods are clearly defined, and the shapes have been studied in great detail. These antennas are used in many different industries, such as security systems, automobile, missile technology, and aviation, among many others. Because they are easier to analyse and tend to produce symmetric radiation patterns, regularly shaped antennas are more frequently utilised. On the other hand, irregularly shaped patch antennas are designed with particular dimensions in order to attain desired features including multiresonant capabilities, wideband performance, and compactness [2]. The latest ultra-wideband (UWB) radio communication frequency allotment has rekindled interest in UWB antennas. Numerous UWB antenna designs have recently been put forth. Conventional UWB antennas, on the other hand, are typically "multi-narrowband," meaning that they are not designed to receive a single coherent signal across their whole operating bandwidth. Furthermore, in order to increase the signal-tointerference ratio (SIR), UWB systems must have better high-frequency cutoff performance. This is especially important given the growing need for higher frequencies in data communications in order to reduce interference from other indoor radio frequencies. Additionally, UWB antenna behaviour and performance must be consistent and reliable throughout the allotted spectrum. The reduction of pulse distortion, sufficient impedance matching,

steady gain, and linear phase throughout the bandwidth are all necessary for the efficient transmission and reception of UWB pulses. Maintaining a small antenna size without compromising performance is another important design factor. The UWB wireless communication band is designated by the Federal Communications Commission (FCC) to operate between 3.1 and 10.6 GHz with very low power emission levels. This can interfere with neighbouring communication systems, including the WiMax system operating between 3300 and 3600 MHz, the WLAN systems operating between 5150 and 5820 MHz and 5720 and 5870 MHz, the X-band operating between 7250 and 8400 MHz, the Wi-Fi system operating between 5470 and 5725 MHz, and the C-band operating between 3700 and 4200 MHz [4]. The main objective of this research is to increase radiation efficiency across a wide range of frequency bands while decreasing size to facilitate multitasking. Several methods, including double F shapes and the placement of four rectangular holes at the patch's base, are used in our innovative antenna design to minimise the patch's size. In order to facilitate multi-band operation, corner cuts are also integrated on both sides.

The simulated and enhanced outcomes are assessed using metrics like as gain, directivity, radiation efficiency, return loss, and Voltage Standing Wave Ratio (VSWR). This technology results in reduced return loss and enhanced radiation efficiency across many bands. Several antenna design characteristics have been thoroughly examined in order to maximise performance, particularly for satellite and radar applications.

#### **Antenna Design and Theory**

A double F-slotted patch, which has four rectangular slots in the lower portion of the patch and notches at the left and right corners, is a feature of the antenna design in question. In order to attain a 50-ohm impedance and guarantee efficient impedance matching, it is designed to be powered by a microstrip line. An FR4-epoxy substrate with a thickness of h = 1.43 mm and a dielectric constant of

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4.4 has been chosen for this setup. The partial ground plane has dimensions of 16.2 mm by 12.12 mm (Lg  $\times$  Wg), while the substrate is 40 mm long and 26 mm wide (Ls  $\times$  Ws). Table 1 provides detailed characteristics for this cutting-edge design. The antenna operates across a wide frequency range of 8-19 GHz and is designed with double F slots and a partial ground plane to meet the needs of radar and Ku-band applications. We show a rectangular microstrip patch antenna with a new distortion built into the patch through a partial ground plane. A microstrip patch antenna with a partial ground that maintains the original patch design is shown in Figure 1(a).







Fig 1. Antenna Geometry (a) Microstrip patch without modifications (b) Microstrip Patch with modifications (c) Final design with partial ground

The radiating patch, which has four rectangular slots at the bottom-two on the lower edge of the left side and two on the lower edge of the right sideincludes double F slots in Figure 1(b). These slots' measurements have been carefully considered in order to improve the antenna's performance and provide the intended outcomes. Two more incisions are also made at the left and right corners of the antenna to enhance its features even further. The front aspect of the suggested partial ground antenna, which aims for optimal return loss and increased radiation efficiency while satisfying X and Ku-band requirements, is depicted in Figure 1(c). According to Table 1, the precise measurements of every antenna parameter shown Figs. are in 1(a),1(b),and1(c).

Table 1. Measurements of depicted Microstrip Patch Antenna (MPA)

Antenna design	Designed Values				
parameters	(mm)				
Substrate material	FR4-epoxy				
Substrate Thickness (h)	1.43				
Length of the substrate	40				
Width	26				

Length of the patch	19.3		
Width of the patch	19.27		
Length of the ground	16.2		
Width of the ground	12.12		
Feed length, L	19.2		
Feed Width, W	3		
Vertical Right & Left Slot1	3.14		
length	5.14		
Vertical Right & Left Slot1	11		
width	1.1		
Vertical Right & Left Slot2	3 91		
length	5.71		
Vertical Right & Left Slot2	11		
width	1.1		

## Effects of Slots and Cuts to the Patch Shape









Fig 2. Antenna Modification (a)Simple patch with partial ground (b) Double F-Slots Interposed (c) Interposition of double F-Slots with Corner cuttings and Single slots at right and left side (d) Proposed antenna

Antenna performance is greatly impacted by different patch configurations in terms of return loss, Voltage Standing Wave Ratio (VSWR), gain, directivity, and radiation efficiency. Our goal is to improve the outcomes by adding slots to the patch. Figures 2(a), (b), and (c) illustrate and validate the design limits at various phases. The antenna structure, which is a straightforward patch with no

slots and a partial ground, is shown in Fig. 2(a).Resonating at 8.9 GHz, 13.175 GHz, and 17.75 GHz, this setup produces radiation efficiencies of 84%, 87%, and 94%, as well as return losses of -20.8362 dB, -29.8018 dB, and -13.9266 dB and gains of 2.9046 dB, 2.8959 dB, and 4.0926 dB, respectively. The addition of double F slots in Fig. 2(b) produces resonance in the same three frequency bands, but with enhanced radiation efficiencies of 81%, 88%, and 96%, as well as return losses of -20.5978 dB, -32.5549 dB, and -13.892 dB, and gains of 2.6291 dB, 2.628 dB, and 4.5043 dB, respectively. The antenna can resonate at five frequency bands-8.75 GHz, 12.05 GHz, 13.325 GHz, 15.275 GHz, and 17.975 GHz-with return losses of -20.6945 dB, -11.6413 dB, -32.518 dB, -21.2814 dB, and -18.8097 dB thanks to the addition of double F-shaped slots with corner cuts and small slots at the bottom of the patch, as shown in Fig. 2(c). With return losses of -23.8361 dB, -32.9380 dB, -14.6726 dB, and -22, the antenna can resonate at six frequency bands: 8.6181 GHz, 12.3116 GHz, 14.1960 GHz, 15.6281 GHz, 18.1910 GHz, and 18.9447 GHz. Finally, the addition of two slots at the left and right bottom of the patch improves the antenna characteristics in Fig. 2(c).

## Result and Discussion Parametric Analysis



The correlation plots of the simulated return loss curves against frequency for various patch configurations are shown in Fig. 3. The amount of power that is reflected back is indicated as return loss. The graphic shows how well the decreased patch with a partial ground works to increase the antenna's coverage of the X and Ku bands. F-shaped and rectangular slots are included into the patch to improve radiation efficiency by reducing the antenna's return loss. These slots target the X band (8-12 GHz) for radar applications and the Ku band (12–18 GHz) for satellite applications. The following describes in detail the features of the developed microstrip patch antenna.

### Gain Analysis of Proposed Antenna

The power radiated in a particular direction is indicated by the antenna gain. The three-dimensional depiction of the produced antenna's frequencydependent broadband gain is shown in Figures 4(a), 4(b), 4(c), 4(d), 4(e), and 4(f). At the resonant multiband frequencies of 8.6181 GHz, 12.3116 GHz, 14.1960 GHz, 15.6281 GHz, 18.1910 GHz, and 18.9447 GHz, the measured gains are 2.9757 dB, 3.8395 dB, 3.0622 dB, 5.3433 dB, 6.0244 dB, and 6.3769 dB, in that order.With a maximum gain of 6.3769 dB at 18.9447 GHz, the suggested antenna performs exceptionally well at this frequency. On the other hand, the lower gain of 2.9757 dB at the 8.6181 GHz resonance frequency indicates less efficacy at that frequency. At 18.9447 GHz, the antenna's maximal gain of 6.3769 dB demonstrates its potential for satellite communication applications. 3.4 The suggested antenna's directivity.



- (c) Gain of proposed antenna at 14.1960 GHz
- (d) Gain of proposed antenna at 15.6281 GHz
- (e) Gain of proposed antenna at 18.1910 GHz
- (f) Gain of proposed antenna at 18.9447 GHz



Fig. (5) Graph showing Directivity of the proposed microstrip patch antenna (a) at 8.6181 GHz, (b) at 12.3116 GHz, (c) at 14.1960 GHz, (d) at 15.6281 GHz, (e) at 18.1910 GHz and (f) at 18.9447 GH The directivity of the suggested microstrip patch antenna as a function of frequency is shown in Fig. 5. The antenna's ability to improve energy transmission in a particular direction while simultaneously improving energy receipt from that direction is indicated by its directivity. At the resonant multiband frequencies of 8.6181 GHz, 12.3116 GHz, 14.1960 GHz, 15.6281 GHz, 18.1910 GHz, and 18.9447 GHz, the observed directivity values are 3.3307 dB, 4.8116 dB, 3.6372 dB, 6.5220 dB, 6.3752 dB, and 6.9104 dB, respectively. According to the directivity plot, the resonance frequency of 18.9447 GHz is where the maximum radiation intensity, or 6.9104 dB, is reached. The suggested antenna's return loss, VSWR gain, directivity, and radiation efficiency are also shown in Table 4 below over a range of resonance frequencies.

Antenna Return Maximum Resonant Radiation Published Ground Height Gain size Loss Freq Efficiency Applications Antenna  $(\mathbf{mm})$  $(\mathbf{m}\mathbf{m})$ (mm)  $(\mathbf{dB})$ [GHz] (**dB**) % 21.7911 4.92 Ref.[5] 24x36 1.6 24x20 3.01 4.99 UWB band 33.6083 5.02 23.0760 -26.85 Ref.[6] 30x30 1.6 30x30 910.35 X band 6.27 \_ -16.13 -15.92 Ref.[7] 30x30 1.6 30x30 7.5 910.14 X band -14.84 -23 X and Ku 11.3 Ref.[8] 20x20 1.6 20x20 -14 5.13 89.2 12.6 12 bands -13 -38 -19 5.5, 8.5 X and ku Ref.[9] 38x35 1.57 34x34 6.4 93 12.5 20 -16 bands -12 -23.83 8.61 -32.93 12.31 X and ku Proposed 16.2x12. -14.67 14.19 40x26 1.43 6.37 94 Antenna -22.28 15.62 bands 12 -19.0518.19 -18.8118.94

Table. (2) Comparison of performance of the antenna introduced in previous literature's						
with the existing work						

According to the data in Table 2, the suggested antenna has properties that are similar to those of antennas that have already been proposed. Based on important microstrip antenna characteristics, such as size, resonant frequencies, return loss, and radiation efficiency, a thorough comparison with other antennas is carried out. The X and Ku frequency bands are where the antenna performs best. Our proposed antenna's main goal is to reduce size while maintaining multiband resonance frequencies so that it can be used in a variety of commercial applications. After thorough modelling and simulations utilising Ansoft HFSS 13.0 software, which made it easier to optimise parameters for improved overall performance, this antenna was successfully designed. The successful results from the measured and simulated parameters attest to the accomplishment of the design goals.

### Conclusions

According to this study, adding slots leads in a slight reduction in the effective patch size but greatly enhances the antenna's performance, producing a number of resonant frequencies, low return loss, and remarkable radiation efficiency. With its double F slots, four rectangular slots, side cuts, and partial ground plane, the suggested small rectangular microstrip patch antenna is perfect for X and Ku band applications. Its frequency range is 8 GHz to 19 GHz. The remarkable 96% efficiency achieved by this concept is amazing. The suggested antenna is very advantageous for applications in radar. microwave imaging, satellite wireless communication, and other fields because to its high radiation efficiency, ultra-wideband capabilities, fair gain, consistent radiation pattern, and low return loss.

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# OVERCOMING PROBLEMS IN E-BANKING TO ENHANCE CUSTOMER SATISFACTION

#### **R. MALATHY**

Assistant Professor of BBA Madonna College of Arts and Science for women, Madurai

#### Abstract

Technological development in E-banking sector have made communication and transactions esy for customers. Internet banking is the technology that is fastest growing banking practice now. Internet banking is a type of E-banking service which allow customers to do several financial and non-financial transactions through the internet. With the help of Internet Banking, customers can transfer funds to another bank account, check their account statement, pay utility bills and do a lot more. There are many different types of E-Banking services which customers can use for various bank transactions. The Problems of E-Banking are categorized as: Lack of Customer Awareness, Lack of Security, Difficult to Use, Not Reliable, Technology and Interruption, Marketing Calls and Phishing, Limited Scope of Service, Non Contactability. The E-SERVQUAL scale contains a core and recovery scale, represented by four and three dimensions respectively. Core scale is used to measure the customer's perceptions of service quality delivered by online retailers. Recovery scale refers to specific situations, when a customer has an issue or faces a problem. E-SERVQUAL Factors: Efficiency, Fulfillment, Communication, System Availability, Privacy, Assurance/ Trust, Site Aesthetics, Responsiveness. With the help of Internet Banking, customers can transfer funds to another bank account, check their account statement, pay utility bills and do lot more. It eliminates physical and geographic boundaries and time limitations of banking services. The convenience in using the E-Banking has increased the usage multifold.

Keywords: types of banking, problems of e-banking, customer satisfaction, e-servqual factors

#### Introduction

Technology is impacting the life of every human being both qualitatively and quantitatively in the present age. The quick expansion of information technology has imbibed into the lives of millions of people and introduced major changes in the world wide economic and business atmoshpere. Technological development in E-banking sector have made communication and transactions esy for customers. Internet banking is the technology that is fastest growing banking practice now. That means it provide information or service by a bank to its customer over the internet. It is viewed as a supplemental channel used in conjunction with other channels to provide the convenience of banking anytime from one's home or work, without having to incur some of the cost associated with a branch visit like going to the branch or waiting in queue. Internet banking is a type of E-banking service which allow customers to do several financial and non-financial

transactions through the internet.Customers can use their PC or laptop or Mobile phone and an internet connection to use this facility. With the help of Internet Banking, customers can transfer funds to another bank account, check their account statement, pay utility bills and do a lot more. It eliminates physical and geographic boundaries and time limitations of banking services. Also as compared with traditional banking, labor is replaced by machine very significantly, which is low in cost and is easily available all 365 days. E-Banking uses internet to help users get access their funds. It eliminates the bank visit for a customer to perform financial transactions. Most of the customers are using the internet for their day to day work, therefore the digital platform E-Banking is more reachable and convenient. There are many different types of E-Banking services which customers can use for various bank transactions.

## Types of E-Banking Mobile Banking

Most banks have online app for Mobile Banking. Customers can download and use the E-app for many different types of banking transactions. The apps can be used for transferring funds, checking account statements, locate the nearest ATM, and other banking services.

## ATM

ATM or Automated Teller Machine is most popular type of E-Banking. The ATM is also an electronic computerized telecommunication unit which enables the customers to deposit funds, withdraw cash, reset Debit Card PIN (Personal Identification Number) and many more banking services. Need to visit a bank and human teller is totally avoided.

## **Debit Card**

Debit card is connected to customer's bank account and they can use the funds from their account directly through this card. When customers use their Debit Card in ATM, the transaction amount is deducted from their bank account and cash is dispensed. The card can also be used to pay at POS outlets, shop online, and withdraw cash from ATMs.

### **Importance of E-Banking**

Electronic Banking is a crucial factor for society development that is necessary for the digitalization processes of the economy taking place in the world. E-banking is attractive to customers as it helps to reduce costs, control transactions, waiting times, etc. E-banking helps in automatic funding of accounts from long established bank accounts via electronic funds transfers. Its ease to monitor, transact and help in unlimited Service 24 by 7 and 365 days.

## **Problems of E-Banking**

While making online payments or transferring money from one account to another, the online Banking customers are always worried about the anti-social elements and hackers. Hacking enables the unethical hackers to trespass the accounts of online banking customers, and spend their savings. Availability of confidential information which is just secured by a user name and password makes it vulnerable to such threats. Most of the banks try to make their sites secured by implementing latest network security software. However, there have been plenty of cases in which web surfers were accidentally exposed to the financial details of online bankers. The present study aims at investigating the impact of both Problems of E-Banking and Customer satisfaction in using the E-Banking facility offered by the banks.

## The Problems of E-Banking are categorized as Lack of Customer Awareness

Customer awareness refers to how knowledgeable bank consumers are about E-Banking and services. Customers lacking in awareness on whom to get help while using E-Banking, Ways to generate Internet banking password, difficulty in processing an Online payment etc.

### Lack of Security

It means less of action of protecting the data and the information of a customer. It is a feeling that E-Banking is not a safe option for banking. Customers also feel that their personal data gets comprised and opens gate for unauthorized access, No clear explanations provided in the website.

### **Difficult to Use**

Banking customers who are not familiar with the E-Banking find it difficult to download and log in to the web page. They feel no sufficient guidance to transact online. They also feel inferior because they find It difficult to use E-Banking.

### Not Reliable

It is a feeling that the E-Banking is not reliable because the terms and conditions are not very transparent and facts are hidden. Further it is a felt that the personal data is not safe. Level of confident is much lower on keeping up the promise through online. It means that the data leakage is prone during online transaction. It is felt that the personal computers may undergo virus attack on downloading the online application. Confident levels are low to manage problems faced in online in remote.

### **Marketing Calls and Phishing**

Phishing is an electronic fraud tactic in which individuals are tricked over the phone into revealing critical financial or personal information to unauthorized entities. Banking customers have fear on Phishing and marketing calls that will affect their privacy. Phishing includes identity theft of the customer. Easy prey to fraudsters who collect the OTP of any transaction and rob money from bank account.

### Limited Scope of Service

It means only a few specific services are available for the customers. It is felt Banking customers cannot speak to any banking officers during the transaction to clarify their doubts. The services are limited in online and had to visit the branch for most of the services.

### Non Contactability

Internet connectivity is a major challenge in E-Banking. Unless a strong network connection is available, banking transaction cannot be performed. Unable to speak to a banking officer while in middle of a transaction. Software issue encountered cannot be addressed immediately.

The E-SERVQUAL scale contains a core and recovery scale, represented by four and three dimensions respectively. Core scale is used to measure the customer's perceptions of service quality delivered by online retailers. Recovery scale refers to specific situations, when a customer has an issue or faces a problem. In simpler terms, core scale refers to the quality of the website itself, while the recovery scale is more concerned with the actual performance of the bank, rather than with website performance. It is the need for businesses to focus on e-services in their e-business, and to understand the importance of e-service quality as a differentiating strategy.

## E-SERVQUAL Factors Efficiency

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It is the capability of delivering desired results without any wastage of time and energy. The website that is able to get accessed quickly. Ability to complete the banking transaction effectively without any extra efforts. Guidance provided in online to complete the process easily.

## Fulfillment

It is an act or process of delivering the product or service as committed. Service delivery is maintained as per the defined standard. All promises made in the online website are met to the expectation.

## Communication

It is the ability to deliver the message efficiently at shortest time possible. Banks are able to response to the customers queries immediately in email or phone call. It will be easy to reach a bank service person at any time.

### System Availability

It is a metric that measures the probability that the computer or website is not failed or undergoing a maintenance action.

## Privacy

Privacy is the right to be let alone, or freedom from interference or intrusion. Information privacy is the right to have some control over how your personal information is collected and maintained for future use.

### **Assurance/ Trust**

Process that provides sufficient guarantees about the existence of a sufficient level of trust to continue with a particular action. Trusted and Trustworthy E-Banking system. It creates a confidence in the system and helps to use the system.

## Site Aesthetics

It refers to the visual appearance of the website, web application, or mobile app developed using front-end technologies. It encompasses the overall layout with different components, menus, buttons, images, icons, colors, fonts, etc. that is very handy and convenient to operate.

## Responsiveness

It means quick response to customers who are in need. It is a process of being sensitive, open, aware, sharp towards customers. Challenges raised by the customers are attended on priority basis.

## Suggestions

- The Banks need to understand the needs of both the genders. The Banks need not follow and Gender specific designing of EBanking instead they can plan a generalized E-Banking designing.
- The study concludes that there is a similarity in male and female E-Banking behavior pattern, difference exist too. The male is more influenced by Lack of security; Banks should focus more on activities covering security on E-Banking platform to promote EBanking.Banks can focus on efficiency of E-Banking to cover female customers toward E-Banking
- The result of the present study indicates that the problems of EBanking factors are considered as most important factors for EBanking customers to continue with the existing facility with the positive Behavioural intention. When the problems persist the satisfaction of the customer reduces and therefore lead to losing a potential customer.
- More emphasis should be given to the Service of the Banks.To build more strong Behavioural intention of the customers, Banks should focus on Service quality as a constant and continuous process.
- To enhance the customer satisfaction, constants efforts to reduce problems faced by the customers during their transaction through E-Banking has to be taken.

## Conclusion

E-Banking service allow customers to perform several financial and nonfinancial transactions through the internet. Customers can use their PC or laptop or Mobile phone and an internet connection to use this facility. With the help of Internet Banking, customers can transfer funds to another bank account, check their account statement, pay utility bills and do lot more. It eliminates physical and geographic boundaries and time limitations of banking services. The convenience in using the EBanking has increased the usage multifold. Previous studies related to Problems of E-Banking have provided a foundation and base line to understand the Problems of E-Banking and to develop a comprehensive model.Researchers have developed models to explain the factors affecting the EBanking usage under many situations.

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## **EMPLOYMENT LAW AND HUMAN RESOURCE PRACTICE**

#### R. J. MERCY

UG Student, Department of B.Com CA Madonna Arts and Science College for Women, Madurai

S. NEGA SREE

UG Student, Department of B.Com CA Madonna Arts and Science College for Women, Madurai

#### **G.VASUKI**

Head & Assistant Professor of B.Com CA Madonna College, Madurai

#### Abstract

Employee law and human resource (HR) practices play a crucial role in shaping fair, ethical, and legally compliant workplaces Employee law encompasses regulations governing employment contracts, wages, workplace safety, discrimination, termination, and employee rights, ensuring both employers and employees operate within a structured legal framework. It protects workers from unfair treatment while providing businesses with guidelines to manage their workforce effectively. Human resource practices, on the other hand, focus on recruitment, training, performance management, compensation, and employee engagement. Effective HR management aligns organizational goals with labor laws, ensuring compliance while fostering a productive work environment.

Keywords: employee law and human resource, employment laws, employment contracts

#### Introduction to Employment Law

Employment law governs the relationship between employees and employers, ensuring fair treatment workplace safety, and compliance with legal standards. It covers various aspects, including hiring, wages, working conditions, discrimination, termination and benefits.

# Overview of Employment law Definition

Employment law refers to the set of legal rules and regulations that govern the relationship between employers and employees. It covers varies aspects, including hiring, wages, employment, working conditions, benefits, workplace safety, termination procedures.

#### **Importance of Employment Law**

Employment laws ensure fair treatment, create safe workplace, and promote economic stability by balancing employers and employees rights. Employers must stay informed about legal obligations to avoid disputes and penalties, while employees should understand their rights to seeks protection when necessary.

#### **Evolution of Employment Law**

Employment law has evolved over centuries, shaped by economic, social, and political changes. It has progressed from informal labor arrangements to a structured legal framework that protects workers rights and regulates employers – employees relationship.

#### **Employment and Contract and Agreement**

Employment contracts and agreements define the terms and conditions of a working relationship between an employers and an employee. These documents protect both parties by clarifying expectations, responsibility, and rights.

## Types of Employment Contracts Permanent Employment Contract

• Also known as a indefinite contract

• No fixed end data; continues until terminated by either party.

## **Fixed Term Employment Contract**

- Has a specified start and end date
- Used for temporary projects or seasonal work.
- Can be renewed.

## **Essential Clauses in Contracts**

### **Parties Clause**

Identifies all parities involves in the contracts including full legal names and contracts details.

## **Purpose/Recitals**

Explains the background and purpose of the contract, setting the context for the agreement.

## **Payment Terms**

Details the amounts, methods, and schedule of payments, including penalties for late payments if applicable.

## Legal Obligation of Employers and Employees Employers Obligations Employment Contracts

Employers must provide clear terms of employment, including roles, job, salary, benefits and termination conditions.

### **Fair Compenation**

Employers must pay wages agreed, ensuring, compliance with minimum wages laws.

## **Employees Obligations**

### **Honest & Ethical Conduct**

Employees must perform their duties with integrity and follow company policies.

## **Obey Employer's Lawful Instructions**

Employees must follow reasonable orders related to their job responsibilities.

### **Employee Rights and Responsibilities**

Understanding these rights and responsibilities is essential for both employees and employers, as it promotes a positive work culture, reduces conflicts, and ensures legal compliance. a well-balanced workplace where both parties fulfill their obligations leads to higher productivity and job satisfaction.

## **Employee Right**

Employee rights refers to the legal and ethical protections granted to workers in a workplace. These include fair wages, safe working conditions, protection from discrimination ,privacy rights ,and the right to leave and fair treatment .these rights ensure that employees are treated with respects and dignity.

## **Employee Responsibilities**

Employee responsibilities refers to the duties and obligation that an employee must fulfill as part of their job .this includes following company policies performing tasks efficiently, maintaining professionalism, respecting colleagues, ensuring workplace safety, and adhering to ethical standards.

## **Rights to Fair Wages and Benefits**

The right to fair wages is a fundamental labor rights recognized by international organizations, national laws, and labor unions. It ensures that workers receive compensation that is just equitable, and sufficient to provide a decent standard of living.

### **Workplace Privacy and Data Protection**

Workplace privacy data protection involve safeguarding employee's personal information and ensuring that workplace monitoring complies with legal and ethical standards.

# Equal Employment Oppounity (EEO) & Non-Discrimination

Equal employment opportunity (EEO) and nondiscrimination polices ensure that all employees and job applicants are treated fairly and are not subjected to bias or prejudice based on personal characteristics

# Human Resource Practices and Employment Law Compliance

Human resource (HR) practices focus on managing an organization's workforce effectively, while employment compliance ensure that businesses follow legal regulations related to employees. Together, they help create a structured, fair, and legally compliant workplace.

#### **Role of HR in Employment Law Compliance**

The human resources (HR) department plays a crucial role in ensuring that an organization follows employment laws preventing legal risks and maintaining a fair workplace. HR is responsible for implementing policies training employees, and handling legal complaint issues.

### Strategic HRM and Legal Framework

Strategic HRM (SHRM) aligns human resource practices with an organization's long-term goals to enhance performance, productivity, and competitive advantage. It moves beyond traditional HR functions to focus on workforce planning, leadership development, and organizational effectiveness.

#### **Recruitment and Hiring Practices**

Recruitment and hiring are critical HR functions that ensures organizations attract, select, and retain the best talent .a well-structured hiring process helps businesses build a skilled workforce while complying with labor laws and promoting diversity.

### Legal Aspects of Hiring Employees

Hiring employees involves several legal consideration to ensure fairness, transparency, and compliance with labor laws. Employers must follow regulation checks, wages, contracts, and data privacy to avoid legal risks.

#### **Equal Opporrtunits of Hiring Employees**

Equal opportunity in means ensuring that all candidates, regardless of their background, have a fair and unbiased chance to secure employment. This approach aims to eliminate discrimination based on race, gender, age, disability, religion, nationality, or other protected characteristics.

#### **Background Check and Employees Creening**

Background checks and employee screening are essential steps in the hiring process to verify a candidate's qualifications, work history, and overall suitability for a role. Employers use these screenings to mitigate risks, ensure workplace safety, and comply with legal regulations.

#### Conclusion

Employment law and human resource (HR) practices are fundamental in creating fair, ethical, and legally compliant workplaces. Employment law establishes the legal framework that governs employeremployee relationships, ensuring fair treatment, workplace safety, and protection of workers' rights. It has evolved over time to address changing economic, social, and political landscapes, emphasizing fairness, equity, and stability in the workforce. HR practices play a crucial role in aligning business objectives with employment laws by managing recruitment, training, performance evaluation, compensation, and employee engagement. Compliance with labor laws not only prevents legal risks but also fosters a positive and productive work well-balanced environment. А approach to employment law and HR management ensures that organizations can attract and retain top talent while maintaining ethical labor standards. By adhering to legal obligations and promoting employee rights, businesses can build a strong, sustainable workforce that contributes to long-term organizational success.

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## ANALYSIS AND RESEARCH OF THE MINING CONCEPTS

#### **R PARKAVI**

UG Student, Department of Computer Science Madonna Arts and Science College for Women, Madurai

#### M DHARANI

UG Student, Department of Computer Science Madonna Arts and Science College for Women, Madurai

#### **K. NISHA**

Head & Assistant Professor of Computer Science Madonna Arts and Science College for Women, Madurai

#### Abstract

Mining represents an emerging research domain that requires further discourse to precisely delineate its scope. Web Mining constitutes a significant area within the broader field of data mining. This paper aims to investigate the function of data mining in the extraction of information from web content, as well as the analysis of structure and usage patterns in contemporary web modules. It outlines the methodology for identifying patterns within data. Web mining involves the utilization of data mining techniques to derive knowledge from web-related data, which encompasses web documents, inter-document hyperlinks, and website usage logs, among other elements. Additionally, a comprehensive overview of the web data mining process is provided.

Keywords: data mining, web mining, web usage mining, web content mining, web structure mining

#### Introduction

The Internet serves as a global network for sharing computing resources, facilitating communication among all interconnected devices. It acts as a foundation for web services and the World Wide Web. The Web encompasses the entirety of web pages hosted on various servers. As the volume of content on the Web increases, it becomes increasingly challenging to search for and retrieve information, necessitating the use of automated tools by users to locate, extract, filter, and assess the information and resources they seek. Furthermore, the evolution of the Web has become a crucial mechanism through which numerous organizations and businesses disseminate information, including online shopping, distance learning, and news dissemination. While the Web provides access to a diverse array of information, it also presents several challenges, particularly in identifying relevant data and extracting valuable insights. Consequently, web

mining has emerged as a significant area of research aimed at addressing these issues.

#### **Data Mining**

Data mining refers to the technique of deriving insights from extensive datasets, such as databases, data warehouses, and data marts. This process encompasses the identification of user patterns that are deemed significant, with the overarching concept being the extraction of valuable information. The outcome of the data mining process is the generation of knowledge from the analyzed data.

# The fundamental elements of data mining consist of five main components

- 1. Extracting, transforming, and loading transaction data.
- 2. Storing and managing the data within a multidimensional database system.
- 3. Facilitating data access for business analysts and information technology specialists.
- 4. Analyzing the data using application software.

5. Presenting the data in a meaningful format, such as graphs or tables.

The data mining process encompasses several stages, with data processing being particularly challenging. This processing is carried out through various iterative steps, which are interactive and repetitive in nature.

### **Data Integration**

Integration refers to the method of amalgamating data from diverse sources. Data can be sourced from various locations, including databases such as merchant and store databases, data marts like departmental store databases, and external sources such as user questionnaires and training sets. Consequently, all these disparate data sources can be efficiently gathered and unified through the integration process.

#### **Data Selection**

In the preceding integration phase, all data sets are amalgamated. At this stage, the relevant data from the integrated sets are chosen. Selection entails identifying the necessary information from the combined data. For instance, when determining budget and significant users, the pertinent data includes user name, income level, and transaction history, rather than education level, phone number, and other extraneous details. Only the essential data is selected.

### **Data Cleaning**

In this phase, the chosen data undergoes a cleaning process to eliminate errors. Data obtained from various sources may contain inaccuracies, noise, and inconsistencies that must be addressed to achieve reliable outcomes. arise from Errors mav typographical mistakes or issues within questionnaires. Such errors can be identified and rectified manually. Noisy data is addressed through techniques such as binning and other methodologies. Inconsistencies, which refer to differing data formats

across sources, are also resolved during this data cleaning phase.

## **Data Transformation**

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Transformation refers to the procedure of converting data into a suitable format for the data mining process. This involves gathering data from various sources, each of which possesses its own specific format. The integration of these diverse data formats can pose significant challenges during the data mining process. For instance, date data in one data mart may be formatted as month, date, and year, while in other sources, it may appear in the order of date, month, and year. Such inconsistencies can be effectively addressed through techniques such as normalization and generalization.

### **Data Mining**

Data mining refers to the technique of extracting valuable insights and knowledge from various external data sources. This process involves uncovering information and patterns within the data, which is often termed Knowledge Discovery from Data.

#### **Pattern Evaluation**

The knowledge extracted from the previous step is assessed for its effectiveness. This evaluation process utilizes a knowledge base, which contains comprehensive information about user profiles, interests, and expectations. Such information is gathered through careful observation of user activities and click patterns. The insights derived from the knowledge base contribute significantly to the assessment of the mining results.

### **User Representation**

The assessed results are subsequently presented in accordance with the user's specified format. This representation may take the form of a bar chart or a pie chart, which facilitates the comparison of various data sets. Additionally, the results can be organized into a data table, resembling a report. User queries are then directed to a separate data mining process.

#### Web Mining

In recent years, there has been a notable rise in the graphs depicting computer usage and the World Wide Web. Users of these technologies often find it challenging to be held accountable for their actions. As the number of users continues to grow, so too do their demands. Individuals desire that the vastness of the World Wide Web be condensed into a more manageable format, tailored to their specific needs. Consequently, there is a pressing need for a system that can analyze user expectations and preferences, either explicitly through user profiles or implicitly through user log files. The primary challenge lies in the automatic extraction of valuable information. With countless web pages and sites being generated daily using HTML and various web applications, it is essential to develop a system that employs data mining concepts within web technology. This system is referred to as a web data mining system, which encompasses several subdivisions.



Figure 1: Categories of Web Mining

Web content mining extracts valuable information from online data, encompassing various types such as images, audio, video, and text.

Web structure mining offers insights into the structural information of documents and websites.

Web usage mining identifies access patterns associated with websites.

### **Proposed Approach**

The suggested approach comprises multiple stages, including file integration or merging, pre-processing, discovery, and pattern analysis. This paper specifically concentrates on the pre-processing phase related to Web Mining. Figure 2 illustrates the entire process of web data mining.



Fig 2: Web data Mining work

## Conclusion

As the internet and its utilization expand, there arises a significant opportunity to analyze web data and derive various forms of valuable insights from it. We examine the studies conducted in the fields of data mining and web mining. Generally, three distinct categories of web data mining are presented. Web mining is an increasingly prominent area of research. While web content mining is associated with data mining and text mining, it remains a distinct discipline. The data found on the web is predominantly semi-structured and/or unstructured.

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## TIME MANAGEMENT

#### **G. RAJALAKSHMI**

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

#### V. VANAKKODI

UG Student, Department of Commerce Madonna Arts and Science College for Women, Madurai

#### A. NIHILA

Assistant Professor of Commerce Madonna Arts and Science College for Women, Madurai

#### Abstract

In order to increase productivity and achieve desired results, time management is the process of organising and planning how to devote time to particular tasks and activities in an efficient manner. Effective time management is essential for both personal and professional success in the fast-paced world of today. Making the most of resources, minimising distractions, and prioritising critical tasks are all made possible by effective time management, which improves decision-making, focus, and stress levels. This paper explores key time management strategies, including goal setting, task prioritization, scheduling, and avoiding procrastination, while also examining the role of technology in supporting time management practices. Additionally, it discusses common barriers to effective time management, such as poor planning, lack of discipline, and the impact of multitasking, and provides practical solutions for overcoming these challenges. Ultimately, mastering time management skills can lead to a more balanced, productive, and fulfilling life, in the workplace and in personal endeavors.

Keywords: time allocation, productivity, goal setting, prioritization, scheduling

#### Introduction

In order to succeed both personally and professionally, time management is an essential ability. Effective time management can have a big impact on productivity, lower stress levels, and result in more satisfying life experiences in a society that is becoming more demanding and fast-paced.

Time, unlike other resources, is finite and irreplaceable, making how we use it essential in determining our effectiveness and overall well-being. Planning and organising work, establishing priorities, and choosing wisely how to spend time are all components of effective time management. It reduces inefficiencies and distractions while allowing people to concentrate on crucial tasks.

With proper time management, one can accomplish more in less time, leading to greater satisfaction and a better work-life balance. Conversely, poor time management can result in missed deadlines, increased stress, and feelings of being overwhelmed.

This concept encompasses various strategies, including goal setting, task prioritization, delegation, and time-blocking, each designed to help individuals to make most of their time. Technology, too, has introduced new tools to aid time management, such as apps and digital calendars, that help in organizing tasks and tracking progress.

As the demands of modern life continue to increase, mastering time management becomes more important than ever. By developing effective time management techniques, individuals can gain better control over their responsibilities, ultimately leading to increased productivity and more balanced life.

#### Literature Review

• Definition of Time Management: According to researchers, time management refers to the

conscious planning of time for specific activities to enhance productivity and reduce stress (Claessens et al., 2007).

 Benefits of Time Management: Studies have shown that individuals with effective time management skills experience less stress and have higher performance levels (Macan, 1994). This is linked to their ability to prioritize tasks and make intentional decisions about where their energy is directed (Lakein, 1973).

### **Strategies for Time Management**

- Prioritization: The Eisenhower Matrix is one popular method for prioritizing tasks based on urgency and importance (Covey, 1989).
- Goal Setting: Setting SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals helps focus efforts (Locke & Latham, 2002).
- Time Blocking: Allocating specific time slots for particular tasks can help prevent procrastination and multitasking (Cirillo, 2006).
- Barriers to Effective Time Management: Common barriers include procrastination, lack of discipline, poor planning, and distractions (Steel, 2007). Emotional factors such as fear of failure and perfectionism may also impact one's ability to manage time well (Flett et al., 2012).

## Time Management Strategies Effective Prioritization

Tasks are divided into four quadrants by the Eisenhower Matrix: neither urgent nor important, urgent but not important, important but not urgent, and urgent and urgent. This aids people in concentrating on important tasks.

### **Scheduling and Planning**

Time blocking and calendar management tools like Google Calendar or physical planners can ensure that tasks are given adequate time.

## Using Technology for Time Management

Productivity apps such as Todoist, Trello, and RescueTime assist with task management and tracking time spent on activities.

### **Overcoming Procrastination**

Techniques such as the Pomodoro Technique, encourages working in short bursts with breaks, help to overcome procrastination (Cirillo, 2006).

# The Role of Time Management in Personal and Professional Success

- Impact on Personal Life: Individuals who manage their time well experience greater life satisfaction. They are able to balance personal commitments and responsibilities effectively.
- Impact on Professional Life: In a professional setting, time management is critical for meeting deadlines, managing workloads, and maintaining a work-life balance. Time management can contribute to career progression and job satisfaction.
- Common Time Management Mistakes:
- Underestimating Time Required for Tasks: People often fail to account for the full time commitment of tasks, leading to underperformance and increased stress.
- Failure to Delegate: Delegating tasks is a key part of time management, especially in professional environments. Many individuals neglect this, leading to burnout.
- Multitasking: Multitasking is often counterproductive, as it divides attention and reduces overall efficiency (Rubinstein, Meyer, & Evans, 2001).

### **Improving Time Management Skills**

• Building Habits: Small, consistent improvements in how one manages time can lead to significant results. Building habits such as prioritizing tasks, using tools, and setting goals can contribute to long-term success.

• Seeking Feedback: Regularly assessing one's time management practices and seeking feedback from others can help refine strategies.

## Conclusion

To sum up, time management is an essential skill for both professional and personal development. By employing techniques like planning, prioritisation, and technology, people can increase their output, lower their stress levels, and improve their work-life balance. With constant work and introspection, time management is a talent that can be acquired and enhanced.

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## **PATTERN RECOGNITION**

#### **K KAMBAN**

BBA (Logistic & Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **S SRIRAM**

BBA (Logistic & Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **B. VAIRAMUTHU**

Assistant Professor, Department of Business Administration Subbalakshmi Lakshmipathy College of Science, Madurai

#### Abstract

Pattern recognition involves identifying patterns or regularities in data and is widely used in machine learning and artificial intelligence. While traditional methods have been effective, they often struggle with noisy, incomplete, or unstructured data. This paper explores how combining modern deep learning techniques—Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs)—can improve pattern recognition in noisy environments. The proposed hybrid model demonstrates enhanced accuracy over traditional methods, making it a valuable tool for real-world applications in fields like image processing and speech recognition. The paper concludes with a discussion of the results and potential directions for future research. This paper explores a hybrid deep learning model combining the strengths of CNNs and RNNs to improve pattern recognition performance, particularly in noisy environments. The proposed model leverages CNNs for spatial feature extraction and RNNs for sequential data processing, making it more resilient to noisy or incomplete data that is common in real-world applications. Through experimental analysis on a noisy version of the MNIST dataset, results show that the hybrid model significantly outperforms traditional CNN and SVM models in both accuracy and robustness. The hybrid model achieved an accuracy of 92%, compared to 85% with the CNN-only model and 80% with the SVM model. By presenting this hybrid approach, the paper provides insights into how combining spatial and temporal learning can address the challenges posed by noisy data in pattern recognition tasks. The findings contribute to the development of more reliable and efficient machine learning models capable of operating in unpredictable, noisy environments. Future directions will involve extending the model to more complex datasets and exploring additional techniques for improving noise robustness, ultimately advancing pattern recognition for real-world applications in industries such as healthcare, autonomous systems, and security.

Keywords: pattern recognition, machine learning, convolution neural networks

#### Introduction

Pattern recognition is the task of identifying and classifying patterns or regularities in data. It's an important field in machine learning, where algorithms are trained to recognize patterns in images, speech, text, and more. For example, recognizing handwritten digits, classifying emails as spam or not, and detecting fraud in financial transactions are all tasks that rely on pattern recognition. While early methods in pattern recognition worked well, they had limitations, especially when data was noisy or incomplete. Noisy data refers to errors or irrelevant information that can distort the correct patterns, leading to poor model performance.

With the rise of deep learning, particularly Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), the ability to handle complex and noisy data has greatly improved. CNNs are commonly used for image-related tasks, while RNNs are effective for sequence-based tasks like speech and text.

This paper will present how combining CNNs and RNNs can enhance pattern recognition, especially in noisy environments. The proposed hybrid model aims to automatically learn features from data while maintaining robustness against noise, which is crucial in real-world applications such as medical diagnosis, autonomous driving, and security systems.

#### **Background and Literature Review**

Pattern recognition has evolved significantly over the years. Traditional methods, such as Support Vector Machines (SVM), k-Nearest Neighbours (k-NN), and Decision Trees, relied on manually engineered features, which could be tedious and error-prone. These methods often struggled with large and noisy datasets, which led to the exploration of more powerful techniques like deep learning.

#### **Convolutional Neural Networks (CNNs)**

CNNs are widely used in computer vision tasks such as image classification and object detection. Unlike traditional methods, CNNs can automatically learn relevant features from raw data without needing manual feature extraction. They are composed of layers that perform convolutions and pooling operations, which help the network focus on important aspects of the input data, like edges or textures in images.

### **Recurrent Neural Networks (RNNs)**

RNNs are designed to handle sequential data. In applications like speech recognition or text generation, RNNs process data one step at a time, using previous steps' information to make predictions. However, RNNs can struggle with longterm dependencies due to issues like vanishing gradients, which has been addressed with variants like Long Short-Term Memory (LSTM) networks.

#### **Hybrid Models**

While CNNs excel at feature extraction for spatial data (e.g., images), and RNNs are great for sequential data, combining them can provide a more robust solution, especially for tasks that involve both spatial and sequential information. For example, in speech recognition, you may need CNNs to extract features from audio and RNNs to understand the sequence of sounds.

Despite their success, deep learning models, including CNNs and RNNs, are still vulnerable to noisy data. To address this, researchers have explored methods like data augmentation, noise injection, and regularization techniques to improve robustness. However, there is still room for improvement, especially in environments with high levels of noise or incomplete data.

#### **Research Problem and Objectives**

The problem this paper addresses is how to improve the performance of pattern recognition models when dealing with noisy data. In many real-world scenarios, data is not perfectly clean or structured, and noise can significantly reduce the accuracy of models. For example, in medical imaging, noise might arise from equipment limitations, while in speech recognition, background sounds could interfere with the clarity of speech.

The primary objective is to propose a hybrid deep learning model that combines the strengths of both CNNs and RNNs to handle noisy datasets more effectively. The key research questions this paper addresses include:

- 1. How can a hybrid CNN-RNN model improve pattern recognition in noisy environments?
- 2. How does the performance of this model compare to traditional methods, such as CNNonly or SVM models, when dealing with noisy data?
- 3. What impact does different levels of noise have on the accuracy of the model?

By answering these questions, the paper aims to demonstrate that hybrid models can not only improve

accuracy but also offer better generalization in noisy real-world settings.

#### Methodology

#### **Dataset and Preprocessing**

To evaluate the proposed hybrid model, we use the MNIST dataset, which contains handwritten digits from 0 to 9. This dataset is commonly used for testing pattern recognition algorithms. We introduce noise to the dataset by randomly altering pixel values in some images to simulate real-world noise.

- Training and Test Split: The dataset is divided into 70% for training and 30% for testing.
- Normalization: All pixel values are scaled to a range of 0 to 1 to help the model converge faster during training.

### **Proposed Hybrid Model**

Convolutional Neural Network (CNN): The CNN component is responsible for extracting features from the noisy images. It consists of multiple convolutional layers followed by max-pooling layers, which help reduce the dimensionality of the data and focus on important spatial patterns (e.g., edges, corners, textures).

Recurrent Neural Network (RNN): After feature extraction, the model feeds the output from the CNN into an RNN to capture sequential patterns. Since MNIST images are not inherently sequential, this step is more about experimenting with how a hybrid architecture might perform in sequential data or data that has dependencies between individual data points. The RNN is implemented using Long Short-Term Memory (LSTM) units, which help mitigate the vanishing gradient problem and maintain longterm dependencies in the data.

Model Training: The hybrid model is trained using categorical cross-entropy as the loss function, since it's a classification problem. The Adam optimizer is used for training, as it adapts the learning rate during the process.

#### Evaluation

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The performance of the hybrid model is evaluated using standard metrics like:

- Accuracy: The percentage of correctly classified images.
- Precision and Recall: To assess how well the model identifies the correct classes and avoids false positives/negatives.
- F1-Score: The harmonic means of precision and recall, useful when balancing both is important.

### Results

#### **Performance Comparison**

The hybrid CNN-RNN model is compared to the following baseline models:

- CNN-only model: A standard CNN trained on the MNIST dataset.
- SVM-based model: A support vector machine classifier applied to the MNIST dataset with handcrafted features.

The hybrid CNN-RNN model outperforms the CNN-only and SVM models in terms of accuracy, particularly in noisy environments. Here are the results:

- Hybrid CNN-RNN: Achieved an accuracy of 92%.
- CNN-only: Achieved an accuracy of 85%.
- SVM: Achieved an accuracy of 80%.

The hybrid model also demonstrated higher precision and recall, especially in detecting digits that were severely corrupted by noise. The F1-score for the hybrid model was 0.91, indicating a good balance between precision and recall.

## Discussion

#### **Key Findings**

The results confirm that the hybrid CNN-RNN model is more robust to noisy data compared to traditional methods. The CNN efficiently extracts features from the noisy images, while the RNN helps capture sequential dependencies, making the model more resilient to noise.

## **Challenges and Limitations**

While the hybrid model shows promise, it still faces challenges, such as:

- Overfitting: The model could potentially overfit to the noisy data if not properly regularized.
- Computational Complexity: Hybrid models can be computationally expensive, especially in larger datasets or real-time applications.

## Future research could explore

- Applying the model to more complex datasets (e.g., medical images or real-time video).
- Improving generalization through advanced regularization techniques or data augmentation.
- Integrating attention mechanisms to allow the model to focus on the most relevant parts of noisy data.

## Conclusion

In conclusion, the paper proposes a hybrid deep learning model that combines CNNs and RNNs to improve pattern recognition performance in noisy environments. Experimental results demonstrate that this hybrid model outperforms traditional methods, particularly when noise is present in the data. By combining the spatial feature extraction capabilities of CNNs with the sequential learning abilities of RNNs, the model is better equipped to handle realworld noise in pattern recognition tasks. The findings suggest that hybrid models can provide more accurate and robust solutions, and future work should focus on improving these models for more complex and dynamic datasets. In this paper, we explored the use of a hybrid deep learning model combining Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) to enhance pattern recognition, especially in noisv environments. The hybrid model addresses a critical challenge in machine learning: the performance degradation of traditional models when confronted with noisy, incomplete, or corrupted data. By integrating CNNs for spatial feature extraction and RNNs for capturing temporal dependencies, the proposed model significantly improves the accuracy

and robustness of pattern recognition tasks. The experimental results presented in this study demonstrate that the hybrid CNN-RNN model outperforms traditional methods such as CNN-only and SVM models, particularly when noise is introduced into the dataset. With an accuracy of 92%, the hybrid model showed a clear advantage, showcasing its ability to not only extract meaningful patterns from noisy data but also to generalize well to unseen examples. One of the major strengths of this approach is its flexibility and ability to handle different types of data. For instance, CNNs are wellsuited for visual recognition tasks like image classification, while RNNs can be extended to sequence-based problems, such as time-series forecasting and speech recognition. This hybrid architecture, therefore, holds the potential for a wide range of applications, from medical image analysis to autonomous driving and real-time speech recognition. However, this study also highlights several areas for future work. Although the hybrid model performs well in controlled environments. real-world datasets are often much more complex. In conclusion, the hybrid CNN-RNN model represents a significant step forward in pattern recognition, offering a more reliable and scalable solution for handling noisy data. This work lays the foundation for future advancements in the field of machine learning, with applications in diverse industries where data is often imperfect and unpredictable. By continuing to refine and extend this approach, researchers can contribute to the development of even more robust models capable of solving some of the most pressing challenges in pattern recognition and artificial intelligence.

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## AN OVERVIEW OF CLOUD COMPUTING

#### **K M URMILA**

UG Student, Department of Computer Science Madonna Arts and Science College for Women, Madurai

#### K. NISHA

Head & Assistant Professor of Computer Science Madonna Arts and Science College for Women, Madurai

#### Abstract

The number of internet users is growing at an unprecedented rate. A significant challenge faced by these individuals and numerous organizations is the lack of adequate storage capacity, leading to a constant transition from one storage medium to another. For instance, users have moved from hard drives to floppy disks, and subsequently from floppy disks to compact disks. To address this issue, we are entering a new phase of computing known as cloud computing. When we upload our photographs to online platforms instead of storing them on personal computers, or when we utilize webmail or social networking services, we are engaging with cloud computing solutions. While cloud computing offers substantial advantages for medium to large enterprises, it also presents certain drawbacks, particularly for small businesses. This paper aims to provide a comprehensive overview of cloud computing, including its definition, models, characteristics, service models, deployment models, as well as its benefits and limitations, to assist organizations in fully grasping and implementing the concept of cloud computing.

#### Introduction

Information Technology has long been regarded as a significant challenge for enterprise organizations, particularly in terms of cost and management. However, the last decade has witnessed a substantial transformation within the information technology sector. Factors such as the commoditization of hardware, the rise of open-source software, virtualization, the globalization of the workforce, and the adoption of agile IT methodologies have facilitated the emergence of innovative technologies and business models. Cloud computing now provides organizations with a variety of options for managing infrastructures, reducing expenses, their and transferring responsibilities to third-party providers. Consequently, the increasing demand for cloud computing has spurred the creation of new market offerings that encompass diverse cloud service and delivery models. Essentially, cloud computing consists of clusters of multiple dedicated servers interconnected within a network, emphasizing the sharing of computational resources.

#### What is Cloud Computing?

Cloud computing is often perceived as an ambiguous concept, much like a cloud in the sky that eludes precise definition. To comprehend why cloud computing can be challenging to grasp, it is essential to consider a few factors. Firstly, cloud computing encompasses a vast range of services and applications. Secondly, it is intangible, meaning it cannot be physically touched. Lastly, the term has been muddied by excessive marketing jargon. Essentially, cloud computing denotes the use of the Internet for computing tasks, as opposed to relying solely on a desktop computer. This technology enables users to perform all computing activities online, serving as a practical alternative to the traditional methods of purchasing, installing, upgrading, and managing physical hardware, operating systems, and software. It eliminates the need for significant initial investments, allowing users to "rent" only the resources they require, in the quantities they need. This innovation impacts individuals across various age groups, from business professionals to school-aged children.

## **Characteristics of Cloud Computing**

The subsequent points outline the fundamental attributes of cloud computing.

On demand self services: Computer services, including email, applications, and network or server services, can be delivered without necessitating human interaction with each service provider. Cloud service providers that offer on-demand self-services encompass Amazon Web Services (AWS), Microsoft, Google, IBM, and Salesforce.com. Notable examples of organizations utilizing AWS include The New York Times and NASDAQ (NIST).

Broad network access: Cloud capabilities are accessible via the network and can be utilized through standard methods that facilitate usage across various thin or thick client platforms, including mobile phones, laptops, and personal digital assistants (PDAs).

Resource pooling: The computing resources of the provider are consolidated to cater to various consumers through a multi-tenant model. This approach allows for the dynamic allocation and reallocation of diverse physical and virtual resources based on consumer demand. These resources encompass storage, processing power, memory, network bandwidth, virtual machines, and email services, among others. The aggregation of these resources fosters economies of scale.

Rapid elasticity: Cloud services can be provisioned swiftly and flexibly, with some instances allowing for automatic scaling to accommodate increased demand and rapid release to reduce capacity as needed. For consumers, the available provisioning capabilities often seem boundless, enabling them to acquire resources in any quantity at any time.

Measured service: The utilization of cloud computing resources can be quantified, regulated, and documented, ensuring transparency for both service providers and consumers. These services incorporate a metering function that facilitates the management and optimization of resource consumption. This means that, similar to charges for airtime, electricity, or municipal water, IT services are billed based on usage metrics, adhering to a payper-use model. Increased utilization results in higher costs. Just as utility companies provide electricity to their customers and telecommunications firms offer voice and data services, IT services—including network security management, data center hosting, and departmental billing—can now be conveniently offered as contractual services.

### Service Models of Cloud Computing

The various service models of cloud computing include:

Software as a Service (SaaS): In a Software as a Service (SaaS) model, a ready-to-use application is supplied along with all necessary software, operating systems, hardware, and network infrastructure. Currently, SaaS solutions are provided by companies including Google, Salesforce, Microsoft, and Zoho, among others.

Platform as a Service (Paas): In a Platform as a Service (PaaS) model, the provider supplies the operating system, hardware, and network infrastructure, while the customer is responsible for installing or developing their own software and applications. To address the needs for manageability and scalability of these applications, PaaS providers present a set of predefined combinations of operating systems and application servers, including platforms like LAMP (Linux, Apache, MySQL, and PHP), restricted J2EE, and Ruby, among others. Notable examples of PaaS offerings include Google App Engine and Force.com.

Infrastructure as a Service (laas): The IaaS model offers only the hardware and networking components, while the customer is responsible for installing or developing their own operating systems, software, and applications. Notable examples include Amazon, Go Grid, and 3 Tera.

## **Deployment Models of Cloud Computing**

Cloud services are generally offered through various models, including private clouds, community clouds, public clouds, or hybrid clouds. Public cloud: The offerings available through the public cloud are accessible to all individuals globally. Examples of such services include online photo storage, email services, and social networking platforms. Additionally, services tailored for businesses can also be provided within a public cloud environment.

Private cloud: The services offered via the private cloud are exclusive to a specific organization. Management of these services is conducted either by the organization itself or by a third-party provider.

Community cloud. This service is utilized by multiple organizations and is accessible exclusively to those entities. The infrastructure may be owned and managed by the organizations themselves or by a cloud service provider.

Hybrid cloud: A Hybrid Cloud represents an integration of various resource pooling techniques, such as the amalgamation of public and community clouds. This model enables service providers to leverage third-party Cloud Providers either fully or partially, thereby enhancing the flexibility and capacity of computing resources.

### **Advantages of Cloud Computing**

The subsequent points outline several key benefits of cloud computing.

Quick Deployment: Cloud computing offers the benefit of rapid deployment. Upon selecting this operational approach, the entire system can become fully operational within just a few minutes. Naturally, the duration required will vary based on the specific technology required for the business.

Easier scale of services: It facilitates the ability of businesses to adjust their services in alignment with client demand.

Deliver new services: The potential for new categories of applications and the provision of innovative services that are inherently interactive is created.

Easy Access to Information: Upon registering in the cloud, users gain the ability to access information from any location with an Internet connection.

Almost Unlimited Storage: Utilizing cloud storage provides nearly limitless capacity for information storage.

Backup and Recovery: The storage of all data in the cloud facilitates a significantly simpler process for both backing up and restoring information compared to the challenges associated with physical device storage.

## **Disadvantages of Cloud Computing**

The subsequent points outline several significant drawbacks associated with cloud computing.

Security in the Cloud: One significant concern associated with cloud technology is security. Prior to embracing this technology, organizations must understand that they will be entrusting their sensitive data to an external cloud service provider. This action could pose considerable risks to the organization. Therefore, it is imperative for businesses to select a highly reputable service provider that can ensure the complete security of their information.

Prone to attack: Storing information in the cloud may expose companies to external hacking attempts and various threats; consequently, there remains a persistent risk of sensitive data being compromised.

Technical Issues: While it is accurate that information and data stored in the Cloud can be accessed at any time and from any location, there are instances when the system may experience significant malfunctions. Organizations must recognize that this technology is inherently susceptible to outages and various technical difficulties. Even the most reputable Cloud service providers encounter such challenges, despite their commitment to maintaining high standards of service.

#### Conclusion

Cloud computing provides numerous advantages for both organizations and individuals. It shifts the focus to the interface that connects service providers with various groups of service users. However, there are significant concerns regarding security and privacy. When evaluating a cloud service, it is essential to consider the protection of personal information to ensure the safety of our customers. To address security challenges in cloud computing, a new technology known as "fog computing" is currently being developed. If successfully implemented, this

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# RECENT TRENDS IN LEATHER INDUSTRY WITH SPECIAL REFERENCE TO DINDIGUL DISTRICT, TAMILNADU

#### Ms. DEVISHREE.A

(Research Scholar – MKU23PFOC11111), Department of Commerce Madurai Kamaraj University, Madurai

#### Dr. P. PONRAMU

Associate Professor, Department of Commerce Sri Meenakshi Government Arts College for Women, Madurai

#### Abstract

This paper deals with the evolution and export Carrying-out of the leather industry in Tamilnadu, which is facing social and economic Complications especially in leather Supply. All over the world, leather and leather Supply are used by inventors of footwear. Until the late 1960s, the major meat-producing countries also had facilities for processing and refining hides and skins into a variety of leather Supply, either domestically or for export to growth countries. The evolution of the leather industry was favored by the country's large livestock population, which occupies a unique position in the world; all of these Supply consume about 60 percent of total leather production. The production and export of leather Supply are systematically promoted, as they represent a four to five times increase in value compared to grist. The restriction on the export of finished leather with a 5% tariff rate and ISI standards have been introduced. Liberalization of imports of grist, leather machinery, chemicals and auxiliary materials are the main points of the new Course of action. The leather industry is one of the most important industries with a Sturdy impact on the ambiance, both in terms of consumption of grist and disposal of waste Supply. The Conversion of leather grist requires a large amount of water energy.

Keywords: evolution carrying-out; export; leather supply

#### Introduction

All over the world, leather and leather Supply are widely used in the manufacture of footwear. Leather clothing and other finished leather goods, such as handbags and travel bags, came into use as the world changed. By the late 1960s, the major meatproducing countries also had facilities for processing hides and skins into a variety of leather Supply, either domestically or for export to growth countries. They even imported hides from developing countries to meet their growing needs. In Asia, the five tigers of the leather industry are Japan, Taiwan, South Korea, Hong Kong, and Singapore; Brazil, Argentina, Spain, Greece, and Portugal have effectively exploited the opportunities of the global market.1 In addition to countries such as India, Pakistan. Indonesia, Turkey, Thailand, and Bangladesh have also growth active plans to expand and modernize their tanning industries and have begun exporting semi-tanned and finished leather. Over the past two decades, emerging economies such as South Korea, Taiwan, Brazil, Spain and Portugal have successfully penetrated the global footwear, apparel and leather markets of growth countries and secured a significant share. However, it is difficult for countries like India with inadequate product quality and marketing structures to compete, especially in the finished goods sector. According to a recent ILO report, "A trend toward globalization and increased competition is emerging in the leather and footwear industry, particularly in the laborintensive manufacturing sectors of the developing world." "Europe, led by Italy, continues to be the center for technological design innovation," he said. "Leather continues to be highly valued by consumers, with most leather production now used for footwear and increasingly for upholstered furniture and leather garments."2
#### **Evolution of the Leather Industry**

The evolution of the leather industry has been driven over an extended period by the country's large livestock population, which occupies a unique position in the world with an estimated 435 million cattle, buffalo, sheep and goats (57% buffalo, 16% cattle, 20% goats, 4% sheep). The affordability of hides and skins has remained almost unchanged. According to the CLRT (Chennai), sheep hides worth over 3.3 million rupees are lost annually because carcasses are not removed. Therefore, procurement of grist will be one of the major constraints for the improvement of the leather sector in the future. Kanpur, one of India's major centers for leather and leather Supply, is limited to buffalo tanning and finishing and the production of harness and shoe leather. In Calcutta, this type of activity is considered primary, while in Tamilnadu finished leather of various kinds is specialized.3

#### **Statement of the Problem**

The Indian leather industry occupies an important place in the Indian economy. This sector is known for its consistently high export earnings and is one of the top ten foreign exchange earners in the country. The leather industry is an employment sector that provides jobs to about 4.42 million people, mainly from the weaker sections of society. Women predominate in employment in the leather goods sector, accounting for 30% of the total.

Despite these prospects, the Indian leather industry faces some technical, economic, and social obstacles, as well as specific Complications related to small and medium leather enterprises. If these Complications are solved, the leather industry will have a prosperous future.

In Tamil Nadu, most of the leather industries are located in Dindigul district. An in-depth micro-level study of the Complications and prospects of the leather industry in a small district will provide crystal clear results that will be useful to all stakeholders, such as the leather traders, the public, and the Course of action makers, i.e., the central and state governments.

# Recent Trends in the Leather Industry in Tamilnadu

The following is a description of recent changes in the Indian leather industry:

Production is tiny, and the cottage industry is in sharp decline due to a shift from traditional production methods to factory production. Ninety percent of hides and 50 percent of skins are obtained from slaughter, resulting in improved quality of finished leather.

Due to the liberalization of import policies, the level of technology in the leather goods industry is commendable. The percentage of female labour in the footwear and leather goods industry has increased. The image of Indian leather Supply in the international market has improved. Demand for technical personnel and skilled labour to meet export needs has increased. Dependence on imported hides and skins is increasing significantly. Awareness of wastewater treatment has increased.4

# **Complications in the Leather Industry**

The leather industry is one of the most important industries that has a Sturdy impact on the ambiance, both in terms of consumption of grist and disposal of waste Supply. A large amount of water energy is required to convert the raw material leather, and there is an acute shortage of design and product evolution as there are no facilities for treating tannery effluents in India, and tanneries and leather goods inventors have an extremely limited supply of trained personnel.

India's newly growth footwear sector lacks sufficient capacity for product evolution, design and marketing, while the leather industry occupies an important place in the Indian economy due to its huge employment and export potential. There is increasing emphasis on planned evolution aimed at optimizing the use of available grist to maximize returns, especially from exports. The leather industry is one of India's traditional industries and is essentially located in certain states, but is also scattered as a cottage industry in rural areas. The Indian leather industry is present in both organized and unorganized sectors. The prevailing decentralized nature and small size make it difficult to change this industry. Global competition was the main reason for the leather industry to export tanned hides and skins. In the early 1970s, it set a goal to become a major player in the leather Supply segment.8

# Suggestions of the Study

- The industry should develop factor size by increasing capital rather than the number of industries.
- The industry should improve its technology by developing capital efficiency, not labour efficiency.
- Capital should be used efficiently to increase gross value added through efficient management.
- The central government cares about upgrading the joint wastewater treatment plans.
- The factors affecting productivity in the leather industry.
- The government needs to help increase the capital requirements of the leather industry in TamilNadu.

# Conclusion

The improvement in the overall productivity factors is obviously due to the increasing labor productivity. The capital invested in the leather industry has been used inefficiently, with the systematic use of labour and capital coming to the fore after liberalization. The downward productivity trend is due to the sharp decline in gross value added in the leather industry, especially after 1995-96. There is a need to develop the leather industry by taking advantage of the rising gross value added. The research and evolution sector needs to be strengthened and made efficient to increase the gross value added of the leather industry in TamilNadu.

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# A STUDY ON GREEN MARKETING TOWARDS ORGANIC FOOD PRODUCTS WITH REFERENCE TO MADURAI

#### J. PUNITHA MARTINA NESAMANI

Research Scholar, PG & Research Department of Commerce Mannar Thirumalai Naicker College (Autonomous), Madurai

#### Dr. B. KOTHAI NACHIAR

Assistant Professor, PG & Research Department of Commerce Mannar Thirumalai Naicker College (Autonomous), Madurai

#### Abstract

The recent marketing concept depends towards the customer is different. Marketing is the adaption of the commercial activities and to induce behavioural change amoung organizations. Now a day, green marketing is focusing on customer products. It depends naturally to ecological processing and biodiversity. Green Marketing involves advertisement, sales promotions and marketing strategies which influence green purchasing amoung consumer. It is essential for eco-friendly behaviour to consumer. Marketing is wide to describe the communication between the company and the consumer. The marketing strategies creates the planning place for advertising to the consumer.

#### Introduction

Green is an important word of the decade in the international market and term like Green Marketing, Sustainable Marketing, Environmental Marketing and Social Marketing are getting popular. Green Marketing refers to the production, promotion and distribution of goods and services which are ecofriendly in nature and do not increase the rate of pollution in the society and these products are concerned with the environmental protection.

Green marketing is the marketing of products that are presumed to be environmentally preferable to others. Thus green marketing incorporates a broad range of activities, including product modification, changes to the production process, sustainable packaging, as well as modifying advertising.

#### **Objectives of the Study**

- To study the consumer opinion on organic food products.
- To analyze the impact of green marketing on purchasing behaviour of organic food products.

#### **Review of Literature**

Babita Saini (2013) proposes that the challenges both for marketing specialists and for consumers, raised by the concept of green marketing, are due to several issues, such as the lack of an acceptable definition for green marketing, the absence of a clear understanding of cause-and-effect relationships in matters affecting the environment, and the overt and covert reasons for concern about such issues.

Saxena & Khandelwal (2010) explored that Green Marketing covers more than a firm's marketing claims has pointed out that Green Marketing should not neglect the economic aspect of marketing. Marketers need to understand the implications of Green Marketing. Thus Green Marketing is a golden goose, and can be a very powerful marketing strategy though when it is done right.

Jeevarathnam P. Govender and Tushay L. Govender, South Africa(2016): Green marketing has gained attention from businesses and society at large. The ultimate goal of this research is to market environmentally safe products while also aggressively urging consumers to support and preserve the environment (Stern and Ander, 2018).

An additional goal is for businesses to alter their operations and offer environmentally friendly products. Finding the relationship between respondents' age and how the cost of eco-friendly products influences their shopping decisions is one way to analyse secondary data.

Aysel Bozetepe(2012): The purpose of this research project is to determine how consumers respond to green marketing. Consumers are growing worried the increasingly about effects of globalisation on the environment. Reasonably priced products that cause the least amount of harm to the environment are necessary to create things that will appeal to consumers. This study's primary goal was to find out how consumers responded to green products compared to conventional ones. Participants in the study included married and single men and women, married and childbearing individuals, and persons of various ages, educational backgrounds, and economic levels. In conclusion, green items had an impact on single consumers' purchases, while only green prices had an impact on married consumers' purchases and married consumers with children.

#### **Statement of the Problem**

The study aims to understand the issues associated with employing non-organic products that contain chemical pesticides and fertilisers. In order to build a green marketing environment and to generate new marketing conditions for potential buyers, the world today needs fresh decisions and ideas. When pesticides are used, consumers suffer consequences. After learning about organic products, customers have begun purchasing and using them on a daily basis. The researcher is interested in how the green marketing concept benefits society. Consequently, this specific study has been conducted.

# Methodology

Source of data and methods of data collection

This study is based on primary and secondary data. Primary data were collected with the support of structure questionnaire and the secondary data were collected from various books and journals.

#### Population and sample size

Hence the population size is infinite, 175 samples were collected and the samples were selected using purposive sampling technique.

#### **Analysis and Interpretation**

Demographic	Catagory	Total	Percentage	
variables	Category	respondent	1 er centage	
Age	20 - 30	19	19%	
	30 - 40	39	39%	
	40 - 50	69	69%	
	Above 50	23	23%	
Gender	Male	72	72%	
	Female	78	78%	
Marital status	Married	103	103%	
	Unmarried	47	47%	
Occupation	Business	17	17%	
	Professional	28	28%	
	Private	37	37%	
	Government	43	43%	
	Others	25	25%	
Annual income	10,000 – 20,000	27	27%	
	20,000 – 30,000	38	38%	
	30,000 – 40,000	64	64%	
	Above 40,000	23	23%	
Aware of green marketing	Aware of green marketing Yes		121%	
	No	29	29%	

Interpretation: The result is derived from 150 respondents, 69% of the respondent belongs to the age group of 40 - 50. Most of the female respondents are category in 78%. The marital status of the respondent is 103 they belong to married category. The respondents who belongs to occupation is 43% for Government and 37% to Private both are giving importance to green products. The income level of the respondents belongs to 30,000 - 40,000 (64%). Many (121%) of the respondents are aware of green product marketing.

# **Reason for Buying Green Products**

Garret's Ranking Technique

Factors	Ranks
Product features	III
Packaging	V
Health based	Ι
Environment friendly	IV
Reasonable price	II

# Interpretation

The following factors are ranked by using garret ranking which shows that every respondent buy the products due to health consciousness, second rank is reasonable price for the product, the product features are different from other products which satisfy the customer, the next factor is package of the products and the final one is environmental friendly.

# Finding

- Majority of the respondents 69% belongs to 40-50 age group.
- Most of the respondents are female with 78%, and male with 72% are also having a little more interest green product marketing.
- The respondents are in the category of government occupation with 40%.
- 64% of the respondents belong to the income level of Rs. 30,000 40,000.
- Majority of 121% the respondents are aware of green products marketing.
- Majority of the respondent are more health conscious

#### Conclusion

These days, the consumption of non-organic food items increasingly shortens our lifespan. Future natural disasters will have a significant impact on the planet if it fulfils its mission. Therefore, this is the ideal moment to choose "green marketing" on a global scale. If all countries implement strike regulations, the business world will undergo a significant transformation because green marketing is crucial to preventing global pollution. One strategy for preserving the environment for next generations is green marketing. The notion will not be simple. To determine how likely it is to flourish in the market, the company must first plan and then do research.

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# A SOCIO ECONOMIC ANALYSIS OF HOTELIERS UTILITY TOWARDS ONLINE FOOD DELIVERY APPLICATIONS IN MADURAI CITY

#### Mrs. G. SHARMILA DEVI

Research Scholar (Part Time) MKU23PFOC10796 Department of Commerce Madurai Kamaraj University Madurai

#### Dr. V. SUGANYA

Assistant Professor, The Research Centre of Commerce Fatima College (Autonomous), Madurai

#### Abstract

Online food delivery system is a very well known theme (system) in current time. With the fast development of modern civilization many hotels have popped up which are providing food delivery on time to the customers. The delivery service given by companies have separate wings for food delivery. There have been several issues regarding this matter and rapid changes are occurring regularly to rectify the problems. Online food delivery has seen a huge growth in recent years. Technology plays a big role in satisfying the changing demands of consumers and improving its way. Hoteliers will get opportunities that are considered as a new source of revenue from a business perspective. Hoteliers are the main business system, who to satisfy the demands and needs of customers engage in online delivery services. Online food delivery is recommended in developing countries as consumer preferences and technology is used for it. **Keywords:** online food delivery applications, hoteliers, growth, technology, hotels

#### Introduction

Computers now become part of life for accessing almost any kind of information. Life in the twenty first century is filled with technology and it is very difficult for any organization to survive without utilizing technology. In the current scenario, the hotels makes online food delivery with the help of third- party apps like Zomato that enables to enlarge their business and provide a platform for the further improvement. This method creates massive growth of the economy by contributing massive employment opportunities to the young people and creates a large variety of services to the consumers and helps to reach the consumers extremely rapidly. The rise of the online food delivery platform has provided job opportunities for several people across the world in the form of chefs and administrative staff in hotels, delivery people or as programmers behind the online platforms. An immense change is found in the hotel and food delivery market over the last few years with

fast urbanization and continuous entry of people from nearest rural regions to cities. As the steps essential to make an order is as simple as few clicks on mobile devices like smart phones, tablets, or laptops.

#### **Statement of the Problem**

In the current situation after the covid period, online food delivery application became very popular. Hoteliers utility is the one of the factor that determine online food delivery application to change to digitalization. Almost all the hoteliers adopt the new technology eagerly. In other words, new and young consumers may be labeled as 'lazy' for depending on technology and expediency. Moreover the time taken for the food to be delivered serves as a fine reason for consumers when they do not have plans on where and what to eat. The purpose of the study is to analyze the socio economic conditions of the hoteliers using the online food delivery applications.

# **Review of Literature**

(Gupta, (2019))1 in" A Study on Impact of Online Food delivery app on Restaurant Business special reference to zomato and swiggy" The new development of the net has boost the extension of online food services by facultative individuals to go looking, compare costs and handily access these services.

(Chetan Panse, (2019).)2 in "Understanding consumer behaviour towards utilization of online food delivery platforms."In the food manufacturing, online food delivery applications such as

Gupta, M. ((2019)). A Study on Impact of Online Food delivery app on Restaurant Business special reference to zomato and swiggy. . International Journal of Research and Analytical Reviews, , 6(1), 889-893.

Chetan Panse, D. S. ((2019).). Understanding consumer behaviour towards utilization of online food delivery platforms. Journal of theoretical and applied information technology, , 97, 16.

Swiggy, Zomato and Foodpanda have established themselves. They give a complete food ordering and delivering explanation system. It provides a single window for ordering from a wide range of hotels.

(Gupta V. &., (2021))3 in "How the consumer's attitude and behavioural intentions are influenced: A case of online food delivery applications in India" To the greatest of the authors' knowledge, this is one of the first studies that explored the risk/benefit perception related to the use and selection of OFDAs in the context of India.

# **Objectives of the Study**

- To Analyse the Socio economic analysis of online food delivery applications used bu the hoteliers.
- To find the most preferred online food delivery applications among hotels.

• To study the usage of online food delivery applications to the hoteliers.

# **Research Design**

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A descriptive research design is adopted by the researcher in the entire work.

# **Sources of Data Collection**

Primary and secondary sources are used for the data collection. The data is collected mainly from two sources:-

- Primary data through visiting and observing the site, interviewing the residents
- Secondary data from sources like articles, newspapers and websites.

# Sample Size

60 Respondents are chosen as a sample size in this study.

# **Techniques of Sampling**

Simple random sampling method is used for the primary data collection

# **Tools for Analysis**

- Simple Percentage Analysis
- Rank

Gupta, V. &. ((2021)). How the consumer's attitude and behavioural intentions are influenced: A case of online food delivery applications in India. International Journal of Culture, Tourism and Hospitality Research, 15(1), 77-93.

# **One Way Anova**

# Data Analysis and Interpretation Socio Economic Profile of the Respondents

The socio – economic background such as gender, age, marital status,education qualification, reason for selecting the occupation and size of hotel. Hence the variables of the respondents were collected and tabulated in Table 1.

		· · · · · · · · ·	
	Socio Economic	Number of	Percentage
	variables	Respondents	to Total
Condon	Male	54	90
Gender –	Female	6	10
	Below 35	11	18
A go(in yoong)	35-45	30	50
Age(III years)	45-50	14	23
	Above 50	5	9
MARITAL	Married	45	75
STATUS	Unmarried	15	25
	Upto school	16	27
Educational	Ug/diploma	32	53
qualification	Pg& More	7	11
quanneation	Others	5	9
	Family business	20	33
<b>Reason for selecting</b>	Friends	8	13
the Occupation	Own interest	28	47
the Occupation	Others	4	7
	Small	22	37
Hotel Size	Medium	24	40
	Big	14	23

# Table 1 Socio Economic Profile of the Respondents

Source: Primary data

Table 1 shows that majority 90% of the respondents are male, 50% of the respondents are 35-45 years, 75% of the respondents are married, 53% of the respondents are Ug/Diploma, 28% of the respondents are medium size hotel.

# Preferred apps for online food delivery applications

Rating the app has been attempted in table 2 based on usage frequently.

Table 2	App	Preferring	in	Hotels
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Preferred Apps	No. of the respondents	Percentage (%)	Rank
Swiggy	16	27	Π
Domino's	14	23	III

Zomato	18	30	Ι
Pizza Hut & others	12	20	IV
Total	60	100	

Source: Primary data

Table 2 shows that majority (30 %) of the respondents has used Zomato followed by 27% used Swiggy and 23% used Domino's and remaining 20% used Pizza others. Therefore majority of the respondents used Zomato app.

# **ANOVA test Hypothesis Testing**

Ho= There is no significant difference in relationship between gender and apps helped to the hoteliers

Ha= There is a significant difference in relationship between gender and apps helped to the hoteliers

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		ANOV	Ά			
		Sum of Squares	df	Mean Square	F	Sig.
OFDA helped	Between Groups	19.267	1	19.267	34.208	.000
in growing the	Within Groups	32.667	58	.563		
businee	Total	51.933	59			
OFDA helped	Between Groups	53.519	1	53.519	80.664	.000
attracting new	Within Groups	38.481	58	.663		
customer	Total	92.000	59			
OFDA helped	Between Groups	41.667	1	41.667	58.000	.000
retain existing	Within Groups	41.667	58	.718		
customer	Total	83.333	59			
OFDA helped	Between Groups	46.230	1	46.230	64.294	.000
retain new	Within Groups	41.704	58	.719		
customer	Total	87.933	59			
overall	Between Groups	22.002	1	22.002	72.308	.000
	Within Groups	17.648	58	.304		
responsionity	Total	39.650	59			

Table 3 show the null hypothesis is accepted. Therefore gender and usage of applications are not related.

# Findings

- 90% of the respondents are male.
- 50% of the respondents are 35-45 years.
- 75% of the respondents are married.
- 53% of the respondents are UG/Diploma.
- 47% of the respondents are Own interest.
- 40% of the respondents are preferred medium size hotel.
- Gender and usage of applications are not related.

# Conclusion

Presently online business are penetrating through a wider range market at all levels, i.e., from small hotels to big hotels. Varying standards of living have brought a harsh shift in the food habits of the public in varrying forms like ready to cook , heat and eat and much more. Thus the concept of old traditional cooking is gradually replaced by most recent convenience based kitchen concepts. Gone are those times, when people used to go to hotels for eating. The system also has some deficiency like late delivery of the food products, limitations in getting high orders. But even then in today's fast pacing world and an increasing smartphone using population, one can analyze a secure hike in the digital literacy leading to improved access to network services. In hotels, the hoteliers has no interior cost, waiter cost, electricity cost and other expenses. Even people who can't afford to go to the big hotels can get rich hotel food at their doorstep with these online food delivery applications using technology. Also we are thinking of visiting some hotels that have delicious food as it is too far to go there. Now customers can easily get food through online food delivery application without that worry and without spending much time on transportation. Even hoteliers have Small spaces are enough to run the hotels through the online food delivery applications. Many of the hotels has began the

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delivery of food through their own apps and also utilize third-party apps like Zomato and Swiggy.

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# **RISING OF NEW ERA IN INDIAN BANKING**

#### **SRI HARINI TV**

BBA (Logistics and Shipping Management) Subbalakshmi Lakshmipathy College of Science, Madurai

#### **B. VAIRAMUTHU**

Assistant Professor, Department of Business Administration Subbalakshmi Lakshmipathy College of Science, Madurai

#### Abstract

This paper examines the evolution of banking services has introduced a diverse range of choices and alternatives for users, resulting in intense competition among financial institutions. A bank's profitability and success are significantly influenced by its ability to retain loyal customers, which is contingent on providing services that meet customer expectations and deliver a high level of satisfaction. Traditional banking has given way to electronic banking in the current period due to technological improvements. Because of this shift, banks must now assess consumer satisfaction with digital services in order to stay competitive and relevant in the market. This study focuses on assessing customer satisfaction levels with electronic banking services, considering factors like internet banking, point-of-sale services, and website design. To achieve this, primary data were collected using a structured questionnaire distributed to users. A total of 220 responses were obtained through convenient sampling. The data were analyzed using multiple regression analysis to determine the relationship between dependent variables, such as customer satisfaction, and independent variables, including the quality of electronic services offered. The findings of the analysis revealed that electronic banking services play a pivotal role. In influencing customer satisfaction. Specifically, internet banking, point-of-sale services, and well-designed websites significantly and positively impact how satisfied customers are with their banking experience. These findings highlight how crucial it is to keep enhancing digital banking platforms in order to satisfy client demands and maintain loyalty in a banking landscape that is becoming more end more competitive.

Keywords: banking services, customer satisfaction, electronic banking, traditional banking

#### Introduction

This essay explores how the introduction of digital banking has transformed the Indian banking industry into a smooth, technologically advanced environment.

Mobile banking services have become the cornerstone of the fintech revolution, making it possible for consumers to manage nearly all aspects of their finances from a mobile device. Digital banking in India began gaining momentum in the early 2000s with the introduction of internet banking. Digital banking eliminates the constraints of physical branches, offering customers 24/7 access to services like fund transfers, bill payments, loan applications, and more. Initiatives like the Unified Payments Interface (UPI), mobile banking apps, With the rapid adoption of smartphones, internet penetration, and innovative technologies of artificial intelligence (AI),

blockchain, and cloud computing, the traditional banking model has shifted towards a more customercentric and efficient approach.

#### **Objectives of the Study**

- To analyze the adoption and growth of digital banking services.
- To study the benefits and challenges of digital banking.
- To examine customer satisfaction with digital banking solutions.
- To explore the role of technology in shaping modern banking practices.
- To identify trends and innovations in digital banking.

#### Special Issue 5

#### March 2025

#### **Evaluation of Indian Banking**

The Indian banking sector has undergone a significant transformation, driven by technological advancements and government initiatives promoting digitalization. From traditional branch-based operations, the sector has shifted toward digital and electronic banking models, improving accessibility, efficiency. and customer convenience. The implementation of programs like the Unified Payments Interface (UPI) and Pradhan Mantri Jan Dhan Yojana (PMJDY) has improved financial inclusion by guaranteeing millions of people, particularly in rural regions, access to banking. Mobile banking, internet banking, and fintech innovations blockchain like AI and have revolutionized traditional banking processes, enabling faster transactions and customer-centric services. Challenges such as cybersecurity threats, digital illiteracy, and technological gaps have hindered complete financial inclusion. Despite these obstacles, Indian banks are investing in infrastructure, improved cybersecurity, and digital literacy campaigns to strengthen trust and operational efficiency. The evolving banking model indicates promising prospects as India embraces digitalization while addressing these challenges.

#### **Traditional Banking**

Traditional banking refers to the conventional system of financial services provided through physical branches, focusing on in-person transactions such as deposits, withdrawals, loan applications, and account management. It relies on face-to-face customer interactions and established banking processes, emphasizing trust, personalized service, and local community relationships.

# **Digital Banking**

Customers can access banking transactions online or through mobile devices thanks to digital banking, which is the use of technology to deliver financial services. Online fund transfers, bill payment, loan applications, and account management are among the services it offers. Convenience, round-the-clock accessibility, and effective, client-focused financial solutions are all provided by digital banking.

# The Harshad Mehta Scam: Lessons for Digital Banking Security and Risk Management Case Study

The Harshad Mehta scam of the early 1990s is one of India's most notorious financial frauds, highlighting serious vulnerabilities in banking systems and financial markets. Harshad Mehta, a stockbroker, exploited loopholes in the banking system to manipulate stock prices, defrauding banks and investors of an estimated  $\Box$  5,000 crore.

### **Key Events**

Mehta used a technique called bridge financing, where he exploited the time gap between the actual transfer of funds and the issuance of bank receipts.

He misappropriated money from public sector banks (PSBs) by creating fake receipts, moving funds into the stock market, and inflating share prices, particularly in blue-chip stocks.

The fraud went unnoticed for years due to weak oversight and manual processes in banking and stock exchange operations.

# **Implications for Digital Banking**

Need for Robust Digital Security: The reliance on physical documents, manual checks, and paper receipts created significant loopholes. In today's digital age, secure, real-time transaction monitoring and encryption are vital to prevent similar fraudulent activities.

Automation and Transparency: The scam underscores the need for automated systems that ensure transparency, with built-in checks and balances to track every transaction. This can help identify anomalies early, reducing the risk of fraud.

Regulatory oversight: Digital banking platforms must be subjected to continuous regulatory oversight, with real-time reporting and audit trails to enhance accountability.

### **Technological Advancements in Banking**

Technological advancements in banking include innovations like digital payments, AI, block chain, mobile banking, cloud computing, and cybersecurity tools. These technologies have streamlined transactions, enhanced customer experience. improved security, and enabled real-time financial services. They have transformed traditional banking into a more efficient, customer-focused, and digitalfirst financial ecosystem.

# **Digital Banking Platforms and Mobile Apps**

Digital banking platforms and mobile apps have made managing finances easier and more convenient. They allow me to check balances, transfer funds, pay bills, and monitor transactions anytime, anywhere. The user-friendly interfaces and security features like biometric logins ensure a smooth, efficient, and secure banking experience.

# **Digital Payments Revolution**

The digital payment revolution has transformed financial transactions by offering faster, secure, and convenient alternatives to cash. Mobile wallets like Google Pay, Apple Pay, and mobile banking apps enable seamless payments, bill settlements, and online purchases. Innovations like AI, block chain, and cryptocurrency further enhance accessibility and financial inclusion globally.

# Growth of UPI (Unified Payments Interface)

The growth of UPI (Unified Payments Interface) in India has been remarkable, revolutionizing digital payments. With its instant money transfer capabilities, user-friendly interface, and integration with multiple banks and apps, UPI has seen widespread adoption. It has driven financial inclusion, reduced cash dependency, and empowered millions to make secure, real-time payments seamlessly.

# **Finacial Inclusion and Rural Banking**

All people, especially those who are underserved and underbanked, have access to banking and financial services thanks to financial inclusion. By providing banking services to isolated locations and tackling issues such a lack of infrastructure and awareness, rural banking is essential to accomplishing this. Financial inclusion in rural areas has greatly improved thanks to digital technologies, mobile banking, and government programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY). Rural communities now have easier access to credit, insurance, and savings accounts thanks to mobile banking and fintech solutions. By bridging the financial divide, these initiatives support equitable growth and provide rural populations economic power.

# **Microfinance and Small-Scale Credit Facilities**

Small-scale loan facilities and microfinance are essential for empowering marginalised groups and promoting economic growth. These financial tools give people and small businesses who are frequently shut out of traditional banking systems access to credit, savings, and insurance services.

By providing small loans, usually without collateral, microfinance institutions (MFIs) help lowincome people launch or grow small companies, enhance their standard of living, and become financially independent. These loans frequently help small retail stores, farming, tailoring, and other entrepreneurial endeavours that boost the local economy and combat poverty.

Small-scale credit facilities are tailored to address the unique needs of micro-entrepreneurs, offering flexibility in repayment schedules and lower interest rates compared to informal lending sources. Group lending models, commonly used in microfinance, foster accountability and mutual support among borrowers, further enhancing repayment rates.

Beyond credit, many MFIs offer financial literacy training, helping borrowers manage their finances effectively. This holistic approach not only improves individual well-being but also strengthens community resilience. Microfinance has shown significant impact in rural and developing regions, where access to traditional financial services is limited. It empowers women, who constitute a significant portion of borrowers, promoting gender equity and household welfare.

However, challenges such as over-indebtedness, high operational costs, and limited regulatory oversight persist. To maximize their potential, microfinance initiatives must prioritize sustainable practices, integrate technology for greater efficiency, and ensure ethical lending practices.

Ultimately, microfinance and small-scale credit facilities are vital tools for building inclusive financial systems and driving socioeconomic progress.

#### **Role of RBI and Government Policies**

Government policies and the Reserve Bank of India (RBI) are essential for promoting financial inclusion and improving banking services. Through programs like priority sector lending, payment bank licensing, and digital payment development, the RBI oversees banking operations, maintains financial stability, and fosters inclusive growth. The goal of government initiatives like Digital India, the Pradhan Mantri Jan Dhan Yojana (PMJDY), and Direct Benefit Transfer (DBT) is to increase underserved groups' access to banking and financial services. In disadvantaged communities, these initiatives, along with technical advancements. have increased economic participation, promoted savings, and broadened financial access.

#### **Banking Reforms and Guidelines**

Goods and Services Tax (GST): Simplified tax structure, impacting banking operations.

Insolvency and Bankruptcy Code (IBC): Provides a legal framework for resolving insolvencies and improving credit recovery.

RBI Regulatory Measures: Strengthening supervision and governance to ensure financial system stability.

Credit Access & Financial Inclusion: Guidelines aimed at improving credit access, especially for underserved populations.

Digital Banking & KYC Norms: Promoting digital banking while ensuring secure customer identification through enhanced KYC procedures.

NPA Management: Measures to address nonperforming assets (NPAs) and ensure healthier bank balance sheets.

### **Promoting Digital Transformation in Banking**

Mobile Banking & Apps: Offering 24/7 access to account management, fund transfers, bill payments, and more.

AI & Automation: Implementing chatbots, AIdriven customer service, and automated processes to enhance user experience and efficiency.

Block chain & Cryptocurrencies: Ensuring secure, fast, and transparent transactions with blockchain technology and enabling cryptocurrency services.

Open Banking: Encouraging third-party integrations to offer innovative services like personalized financial advice and alternative lending options

Cybersecurity: Strengthening digital security measures, including encryption and biometrics, to protect customer data and transactions.

Digital Lending & FinTech: Expanding access to credit through digital platforms and partnerships with fintechs.

# **Policies Supporting Financial Inclusion**

Pradhan Mantri Jan Dhan Yojana (PMJDY): Launched in 2014 to provide universal access to banking services. Focuses on opening zero-balance bank accounts, issuing debit cards, and offering overdraft facilities.

Direct Benefit Transfer (DBT): Ensures subsidies and welfare payments reach beneficiaries directly through bank accounts, reducing leakages.

Small Finance and Payment Banks: Established to serve underserved sectors like small businesses, low-income groups, and rural areas. Microfinance Institutions (MFIs): Provides small loans to rural and low-income populations without collateral.

Rural Infrastructure Development Fund (RIDF): Funds rural projects to enhance accessibility and financial services in remote areas.

Financial Literacy Programs: Educates individuals about banking, savings, and digital payments to promote informed financial decisions.

Aadhaar-Enabled Payment System (AEPS): Facilitates easy banking access using biometric authentication linked to Aadhaar.

Kisan Credit Card (KCC): Provides affordable credit to farmers for agricultural and allied activities.

# Challenge in the New Era

- The Indian banking sector faces several challenges in the new era, shaped by technological advancements, regulatory shifts, and evolving consumer expectations. One of the primary concerns is digitization. While digital banking offers convenience and efficiency, it also brings challenges such as cybersecurity risks and data privacy concerns, particularly with the increasing adoption of mobile banking and digital payment systems. The rise in online fraud and the need for robust cyber infrastructure is critical.
- Another challenge is financial inclusion. Despite advancements, a significant portion of India's population, particularly in rural areas, remains unbanked or under banked. Reaching these individuals with the right services, while ensuring affordability and accessibility, continues to be a struggle for both public and private sector banks.
- The banking sector is also grappling with nonperforming assets (NPAs), especially among public sector banks. The rise in NPAs due to defaults from corporate borrowers puts a strain on the financial system, hampering growth and profitability. To address this, the government has implemented reforms like the Insolvency and Bankruptcy Code, but the issue persists.

• Moreover, competition from fintech companies and digital wallets has intensified, requiring banks to innovate constantly. Traditional banks are under pressure to modernize their services and offer more customer-centric solutions to remain competitive.

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• Finally, regulatory compliance remains a dynamic challenge as the Reserve Bank of India (RBI) introduces new policies and frameworks to ensure transparency, financial stability, and consumer protection in the rapidly evolving landscape. Balancing these demands will define the future of Indian banking.

# **Cyber Security and Fraud Prevention**

- Cybersecurity and fraud prevention are critical components of safeguarding digital assets, systems, and personal information in today's increasingly interconnected world.
- Cybersecurity focuses on protecting computer systems, networks, and data from unauthorized access, attacks, and damage. It involves a variety of practices, including encryption, firewalls, and multi-factor authentication, to ensure the integrity, confidentiality, and availability of digital resources.
- Fraud prevention, on the other hand, addresses the detection, deterrence, and response to. fraudulent activities, such as identity theft, financial scams, and unauthorized transactions. fraud prevention relies Effective on а combination of advanced technologies, such as algorithms, machine learning real-time monitoring, and behavioral analysis, to identify suspicious activities and mitigate risks before they result in significant harm.
- A layered approach is essential for both cybersecurity and fraud prevention. For example, businesses should implement secure authentication processes, train employees on phishing and social engineering threats, and regularly audit systems for vulnerabilities. Additionally, organizations should work with cybersecurity experts to stay ahead of emerging

threats and use threat intelligence to identify potential risks before they escalate.

• As digital threats continue to evolve, a proactive strategy that combines strong cybersecurity defenses with continuous fraud detection and prevention mechanisms is necessary to minimize the impact of cybercrime and protect sensitive data.

# **Future in Indian Banking**

- The future of Indian banking is set to be shaped by digital transformation, financial inclusion, and technological innovation. Digital banking will continue to grow with the rise of neo banks and fin tech platforms, offering personalized services and improving accessibility. The adoption of artificial intelligence (AI) and machine learning will enhance customer experience, streamline operations, and enable better risk management. Block chain technology could revolutionize security and transparency in transactions.
- Additionally, the expansion of UPI (Unified Payments Interface) and digital wallets will drive cashless transactions, promoting a more inclusive economy. Green banking initiatives focusing on sustainable finance will also gain momentum, aligning with global environmental goals. The rise of data-driven banking will lead to tailored financial products for underserved

populations, further promoting financial inclusion. With an evolving regulatory landscape, Indian banks are poised to become more agile, secure, and customer-centric in the coming years.

# Summation

In conclusion, the digital banking in India has transformed the financial sector by enhancing accessibility. convenience, and inclusivity. Innovations like UPI, AI, and mobile banking, along with initiatives such as PMJDY and Direct Benefit Transfers, have advanced financial inclusion, especially in rural areas. Regulatory support from the RBI and government policies has ensured stability and equitable access. Continued digital transformation through solutions like digital lending and open banking promises sustained financial inclusion and economic growth.

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# A STUDY ON THE IMPACT OF AI IN E-COMMERCE

#### Mrs. S. MEENAROSHINI

Research Scholar, PG Research Department of Commerce Mannar Thirumalai Naicker College (Autonomous), Madurai

#### Dr. D. KOTHAI NACHIAR

Assistant Professor, PG Research Department of Commerce Mannar Thirumalai Naicker College (Autonomous), Madurai

#### Abstract

Artificial intelligence in e-commerce pertains to the incorporation of AI technologies and methodologies within the realm of online retail. This encompasses the application of machine learning techniques, natural language processing, and computer vision to enhance various dimensions of the e-commerce experience. The objective of AI in this sector is to bolster customer engagement, personalization, recommendation systems, fraud detection, inventory management, and the optimization of supply chains. By utilizing AI, companies can offer more customized and efficient services, resulting in greater customer satisfaction and overall advancement in the e-commerce landscape. This paper centers on elucidating the nature of e-commerce and artificial intelligence, along with their advantages. It also seeks to assess the significance of artificial intelligence and its application in the e-commerce sphere. Keywords: Artificial intelligence, Machine learning, E-commerce.

#### Introduction

Numerous businesses aim to embrace e-commerce to boost sales and services while enhancing customer satisfaction. Successful strategies and tools in ecommerce can significantly enhance the revenues and profits of small and medium-sized enterprises (SMEs) Nonetheless, the effectiveness of these electronic platforms for businesses can be influenced by their level of commitment to and utilization of smart technologies and tools that help deliver optimal technical services to customers (Mishra et al., 2023). The growth of e-commerce has been driven by technological advancements, changes in consumer behavior, and improvements in logistics and payment systems. Electronic commerce, or ecommerce, is a paradigm shift that affects consumers and marketers alike. Instead, e-commerce is more than just an additional means of improving current company procedures. It is spearheading a radical transformation of conventional corporate practices. India is not an exception to the remarkable development that this important shift in business strategy is experiencing globally. E-commerce has grown as a result of widespread internet use, and

start-ups in particular have been utilizing it more and more as a unique business strategy. The goal of the current study is to describe the state of e-commerce and examine its tendencies. The study also looks at the important factors that are necessary for ecommerce business models to succeed.

# Objectives

- To find out the major role of artificial intelligence in e-commerce
- To find out the major application of artificial intelligence in e-commerce

#### **Revolution of Artificial Intelligence**

AI has undeniably revolutionized the e-commerce landscape, helping to transform it from what was a nascent industry into a highly sophisticated and customer-centric ecosystem. By seamlessly integrating into e-commerce platforms, AI has empowered businesses to understand and cater to consumer preferences with unprecedented accuracy. Personalized recommendations, efficient logistics, and data-driven decision-making have become the cornerstones of successful online retail operations. However, the journey is far from over. As AI technology continues to evolve, we can anticipate even more groundbreaking applications in ecommerce. The potential for augmented reality shopping experiences, bettered predictive analytics for anticipating consumer trends, and AI-driven supply chain optimization is immense. While challenges such as data privacy and ethical considerations must be addressed, the future of e-commerce is undoubtedly bright, driven by the innovative power of artificial intelligence.

#### **Role of Artificial Intelligence in E-Commerce**

AI is essential to transforming the e-commerce sector. It improves many facets of online commerce and has many advantages. These are some of the main functions of AI in online shopping.

Client service: Chat bots and virtual assistants driven by AI allow companies to offer round-theclock client assistance. According to T India 2.0: Vision for India 2047, these AI assistants are able to respond to consumer inquiries.

Personalization: To offer individualized product recommendations and customized shopping experiences, AI algorithms examine consumer data, such as browsing history, purchasing behavior, and preferences. Businesses benefit from higher conversion rates and consumer engagement as a result.

Fraud Detection: AI systems are able to recognize and stop fraudulent actions like account hacking and payment fraud by identifying trends and anomalies in real time. This increases security and fosters consumer trust.

Inventory management: By analyzing market trends, sales data, and other data, AI algorithms can optimize inventory levels and guarantee that goods are available when and where they are needed. This prevents stock outs and overstocking, resulting to cost savings and greater customer satisfaction.

Voice Commerce: AI-powered voice assistants like Alexa and Google Assistant offer hands-free shopping. The Voice search is becoming a major feature of e-commerce systems. With the rise of smart speakers and voice assistants, voice commerce is gaining traction. Consumers are increasingly adopting voice commands to search for products, make purchases, and track orders, delivering a hands-free and convenient shopping experience.

# Advantages of Implementing Artificial Intelligence in Online Retail

Technology breakthroughs like virtual reality, software as a service, artificial intelligence, and digital transformation are opening up new avenues for e-commerce. E-commerce businesses are aware of the benefits of AI and related technologies. Machine intelligence is being used by major ecommerce firms to improve customer service, select better products, and expedite delivery.

A recent report by the Retail Industry Leaders Association and McKinsey & Company suggests that AI-informed technology may help achieve each of the seven imperatives for reimagining retail in 2021.

# More Specialized Advertising and Marketing

Personalization was a top goal, however only 15% of the merchants who responded to the survey claimed to have fully implemented it across all channels. Direct communication with each of your clients will help you stand out from the competition. Deep personalization approaches are now practical thanks to developments in artificial intelligence (AI) and machine learning. By examining a substantial quantity of data from prior purchases and other customer interactions, you may determine what your customers genuinely want and deliver the most persuasive message

#### **Seamless Automation**

The goal of automation is to accomplish a task with as little human intervention as possible. That can mean anything from scheduling emails in a CRM or marketing tool, using Zapier to automate tasks or leveraging advanced technology to help with hiring. In the context of future ecommerce trends, however, some of the most commonly talked about today are robotics and machine learning. AI can play a big role in helping you automate the repetitive tasks that keep your online store functioning. With AI, you can automate things like product recommendations, loyalty discounts, low-level support, and more.

# Other benefits

Data processing and collecting for online customer purchases are now easier than before. Artificial intelligence is used to generate personalized product recommendations that are based on past consumer behavior and lookalike customers. Websites that suggest things you might like based on prior purchases employ machine learning to look at your buy history. In order to create a tailored experience, implement a marketing plan, optimize pricing, and provide customer insights, retailers rely on machine learning to collect, analyze, and apply data.

# AI'S Advantages in E-Commerce Sector

Online shopping has completely transformed as a result of the development of artificial intelligence (AI) and machine learning (ML), which have made it more responsive and personalized than ever. With the goal of enhancing the client experience, Eighty percent of retail CEOs wish to employ intelligent automation driven by AI in their businesses.

Artificial Intelligence (AI) has become a driving force in the e-commerce industry, revolutionizing the way businesses operate and interact with customers. One of the biggest advantages AI offers is personalized shopping experiences, where machine learning algorithms analyze customer behavior, past purchases, and browsing patterns to provide tailored product recommendations. This not only enhances customer satisfaction but also increases conversion rates. AI also plays a crucial role in customer support, with AI-powered chatbots and virtual assistants offering 24/7 assistance, handling common inquiries, and guiding users through the buying process, significantly reducing the need for human intervention.AI-driven dynamic pricing strategies allow e-commerce companies to stay competitive by adjusting prices based on real-time market trends, competitor pricing, and customer demand. This helps

maximize revenue while offering customers the best possible deals. AI is also transforming the way consumers search for products, with smart search and visual recognition enabling more accurate search results through natural language processing (NLP) and image-based search. Customers can now upload photos to find similar products, making shopping more intuitive and efficient.

Moreover, AI enhances voice commerce by enabling hands-free shopping experiences through smart assistants like Alexa and Google Assistant. Customers can search for products, place orders, and track shipments using voice commands, making online shopping more convenient. AI also automates content creation and marketing, generating SEOfriendly product descriptions, personalized email campaigns, and targeted advertisements that improve customer engagement and drive sales.AI-powered augmented reality (AR) shopping experiences allow customers to virtually try on clothes, glasses, and makeup or visualize how furniture would look in their homes before making a purchase. This reduces return rates and increases customer confidence in their buying decisions.AI is a game-changer for the e-commerce industry, providing businesses with powerful tools to enhance customer engagement, streamline operations, and increase sales. Companies that adopt AI-driven solutions will gain a competitive edge and improve customer satisfaction in the evolving digital marketplace

#### The Future of E-Commerce

E-commerce is expected to grow even further with advancements in AI, automation, and logistics. Innovations such as drone deliveries, AI-driven customer experiences, and block chain-based transactions will continue to redefine online shopping. Additionally, emerging markets and rural areas will see increased e-commerce penetration, expanding the global customer base.

### Conclusion

This article highlights how artificial intelligence is fostering innovative thinking and bettering e-

commerce customer experiences. Among the most common uses of AI in e-commerce are personalized shopping. inventorv control. and product recommendations. This study has demonstrated how AI is fostering innovation and improving user experiences in e-commerce. Personalized shopping, product recommendations. and inventorv management are some of the most common applications of artificial intelligence in e-commerce. Artificial intelligence is essential for all enterprises nowadays. Artificial intelligence has made ecommerce considerably more consumer-friendly. Furthermore, artificial intelligence will eventually create jobs in the e-commerce sector in addition to helping businesses.

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# **DIGITAL MARKETING - AN EMERGING SCENARIO**

#### **B. VARSHINI**

UG Student, Department of BBA Madonna Arts and Science College for Women, Madurai

S. INIYA

UG Student, Department of BBA Madonna Arts and Science College for Women, Madurai

#### M. DURGA

Head & Assistant Professor of BBA Madonna Arts and Science College for Women, Madurai

#### Abstract

The digital age has brought about unprecedented changes in the way businesses operate and connect with their audiences. Digital marketing, a dynamic and multidimensional field that uses technology and digital media to promote goods, services, and brands, is at the centre of this change. This subject delves into the complexities of digital marketing, following its development, evaluating its effects on companies, and looking at the opportunities and problems it poses in the modern world. Over the years, digital marketing has undergone substantial change to become what it is now. Its origins can be found in the late 20th century, when the internet first appeared. ARPANET, the forerunner of the internet, was created in the latter part of the 1960s. However, the public did not have access to the World Wide Web until the 1990s. The groundwork for modern digital marketing was established by this advancement. The 1990s saw the birth of the World Wide Web: Tim Berners-Lee established the World Wide Web in 1990 as a means of exchanging information. This innovation transformed trade and communication. The 1990s saw the rise of banner ads. On HotWired.com (now Wired.com), the first clickable banner ad debuted in 1994. Online display advertising got its start as a result, giving companies a new means of connecting with consumers online.

Keywords: digital marketing, search engine optimization, email marketing

### **Introduction to Specific Channels**

Digital marketing initiatives and internet businesses exploded in the late 1990s. But in 2000, the dot-com bubble crashed, and numerous online companies went out of business. The rise of search engines such as Google and Yahoo gained popularity.

Marketers realized the importance of optimizing websites to appear prominently in search results, giving rise to Search Engine Optimization (SEO). Digital marketing comprises a spectrum of strategies and tools, each tailored to engage audiences in distinct ways. To successfully navigate the world of digital marketing, one must comprehend these elements. Optimising a website's visibility in search engine results is the main goal of SEO. It uses both off-page and on-page strategies to raise rankings naturally. In the digital world, content reigns supreme. In order to draw in, inform, and involve their target audience, businesses produce and disseminate valuable content, including blog posts, articles, videos, and infographics. Social media sites like Facebook, Instagram, Twitter, and LinkedIn provide effective avenues for increasing brand recognition, customer interaction, and conversion rates.

#### **Technical Aspects**

Email marketing is still a powerful technique for communicating directly with consumers. It entails nurturing leads, sending subscribers relevant emails, and upholding client relationships. Businesses can display adverts on search engines and other platforms by implementing Pay-Per-Click (PPC) advertising campaigns. It's an economical method of increasing traffic and conversions because advertisers only pay when consumers click on their adverts.

Influencer marketing taps into niche and interested audiences by using the social media popularity of individuals or content producers to market goods and services. Digital marketing relies heavily on data-driven decision-making. Marketers may optimise their strategy by tracking and analysing user behaviour with tools like Google Analytics. Businesses have been forever changed by digital marketing, which has ushered in a new era of options and possibilities. Even tiny firms can compete globally thanks to the internet's ability to transcend national borders.

#### **Focused Campaigns**

Digital marketing enables companies to reach diverse audiences worldwide. Digital marketing often proves more cost-effective than traditional advertising methods. With precise targeting in PPC advertising, businesses can allocate their budget effectively to reach potential customers. Social media platforms and email marketing facilitate direct, realtime interaction with customers. Using these channels to interact with consumers builds trust and brand loyalty.

Through advanced targeting and personalization techniques, digital marketing enables businesses to tailor content and offers to individual customer preferences, enhancing the likelihood of conversion. Digital marketing campaigns are highly measurable. Real-time tracking of ROI and key performance indicators (KPIs) allows marketers to make quick strategy adjustments and optimisations. Even while digital marketing has many benefits, there are drawbacks as well. Regulations like the CCPA and GDPR were introduced in response to growing concerns about data privacy, and they have an impact on how companies gather and use consumer data for marketing.

#### **Analysis of Data**

Platforms like Google and Facebook, which often adjust their algorithms, are crucial to digital marketing. The exposure and reach of a firm can be greatly impacted by these developments. Because there is so much stuff on the internet, it can be difficult to stand out. Making valuable, high-quality content that stands out from the crowd is a neverending task. Ad blockers are used by users, which lessens the impact of display adverts. Instead of depending only on conventional advertisements, marketers need to come up with creative strategies to engage viewers. Competencies Needed for A broad skill set is necessary for success in digital marketing. To analyse campaign outcomes and make datadriven decisions, one must be proficient in data analysis. The key to successful content marketing is having the ability to produce valuable, interesting, and relevant material. Effective campaign execution requires familiarity with a variety of digital marketing tools and platforms. Gaining organic traffic requires knowing how search engines operate and optimising content for search. To produce captivating content and campaigns that stand out in a congested digital landscape, creative thinking is needed.

#### Social Media Marketing-Trending Scenario

Digital marketing's future is defined by ongoing innovation and adaption. Marketers will be able to deliver personalised content at scale and streamline operations with the help of marketing automation tools and artificial intelligence. It will be necessary for marketers to optimise content for voice-based queries as voice search and virtual assistants grow more common. Technologies like AR and VR will open up new possibilities for dynamic and engaging marketing campaigns. We must manage the moral dilemmas of data privacy and the prudent application of technology in marketing.

### Conclusion

Digital marketing is the backbone of modern business strategies in the digital age. The way

businesses interact with their clients has changed as a result of its development from the early days of the internet to its current status as a data-driven, customised, and highly quantifiable discipline. Digital marketing provides firms previously unheardof possibilities for global reach, cost-effective advertising, real-time interaction, and customised customer experiences, despite its drawbacks, which include content saturation and data privacy issues. Aspiring digital marketers need to have a wide range of skills in order to succeed in this changing environment.

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# INTUITIONISTIC FUZZY GENERALIZED B CONTINUOUS MAPPINGS

#### A. GEETHA LAKSHMI

Assistant Professor, Department of Mathematics Madonna Arts & Science College for Women, Madurai

#### **B. SUGUNA SELVARANI**

Assistant Professor, PG& Research Department of Mathematics Cardamom Planters Association College, Bodinayakanur

#### Abstract

In this paper we have introduced intuitionistic fuzzy generalized b continuous mappings and some of their basic properties are studied.

*Keywords:* Intuitionistic fuzzy topology, intuitionistic fuzzy generalized b closed sets, intuitionistic fuzzy generalized b continuous mappings, intuitionistic fuzzy  ${}_{b}T_{1/2}$  (IF ${}_{b}T_{1/2}$ ) space and intuitionistic fuzzy  ${}_{b}gT_{1/2}$  (IF  ${}_{b}gT_{1/2}$ ) space.

#### Introduction

The concept of fuzzy sets was introduced by Zadeh [13] and later Atanassov [1] generalized this idea to intuitionistic fuzzy sets using the notion of fuzzy sets. On the other hand Coker [4] introduced intuitionistic fuzzy topological spaces using the notion of intuitionistic fuzzy sets. In this paper, we introduce intuitionistic fuzzy generalized b continuous mappings and studied some of their basic properties. We arrive at some characterizations of intuitionistic fuzzy generalized b continuous mappings

#### Preliminaries

**Definition 2.1:** [1] Let X be a non-empty fixed set. An *intuitionistic fuzzy set* (IFS in short) A in X is an object having the form A = { $\langle x, \mu_A(x), \nu_A(x) \rangle / x \in$  X where the functions  $\mu_A(x)$ : X  $\rightarrow$  [0, 1] and  $\nu_A(x)$ : X  $\rightarrow$  [0, 1] denote the degree of membership (namely  $\mu_A(x)$ ) and the degree of non -membership (namely  $\nu_A(x)$ ) of each element x  $\in$ 

X to the set A, respectively, and  $0 \le \mu_A(x) + \nu_A(x) \le 1$  for each  $x \in X$ . Denote the set of all intuitionistic fuzzy sets in X by IFS (X).

**Definition 2.2:** [1] Let A and B be IFSs of the form A = { $\langle x, \mu_A(x), \nu_A(x) \rangle / x \in X$ } and B = { $\langle x, \mu_B(x), \nu_B(x) \rangle / x \in X$ }. Then

- (a)  $A \subseteq B$  if and only if  $\mu_A(x) \le \mu_B(x)$  and  $\nu_A(x) \ge \nu_B(x)$  for all  $x \in X$
- (b) A = B if and only if  $A \subseteq B$  and  $B \subseteq A$
- (c)  $A^c = \{ \langle x, v_A(x), \mu_A(x) \rangle / x \in X \}$
- (d)  $A \cap B = \{ \langle x, \mu_A(x) \land \mu_B(x), \nu_A(x) \lor \nu_B(x) \rangle / x \in X \}$
- (e)  $A \cup B = \{ \langle x, \mu_A(x) \lor \mu_B(x), \nu_A(x) \land \nu_B(x) \rangle / x \in X \}$

For the sake of simplicity, we shall use the notation  $A = \langle x, \mu_A, \nu_A \rangle$  instead of  $A = \{ \langle x, \mu_A(x), \nu_A(x) \rangle / x \in X \}$ . Also for the sake of simplicity, we shall use the notation  $A = \{ \langle x, (\mu_A, \mu_B), (\nu_A, \nu_B) \rangle \}$  instead of  $A = \langle x, (A/\mu_A, B/\mu_B), (A/\nu_A, B/\nu_B) \rangle$ .

The intuitionistic fuzzy sets  $0_{\sim} = \{\langle x, 0, 1 \rangle / x \in X\}$  and  $1_{\sim} = \{\langle x, 1, 0 \rangle / x \in X\}$  are respectively the empty set and the whole set of X.

**Definition 2.3:** [3] An *intuitionistic fuzzy* topology (IFT in short) on X is a family  $\tau$  of IFSs in X satisfying the following axioms.

- (i)  $0_{\gamma}, 1_{\gamma} \in \tau$
- (ii)  $G_1 \cap G_2 \in \tau$  for any  $G_1, G_2 \in \tau$

(iii)  $\cup$  G<sub>i</sub>  $\in \tau$  for any family {G<sub>i</sub> / i  $\in$  J }  $\subseteq \tau$ .

In this case the pair  $(X, \tau)$  is called an *intuitionistic fuzzy topological space* (IFTS in short) and any IFS in  $\tau$  is known as an intuitionistic fuzzy open set (IFOS in short) in X.

The complement  $A^c$  of an IFOS A in IFTS (X,  $\tau$ ) is called an intuitionistic fuzzy closed set (IFCS in short) in X.

**Definition 2.4:** [3] Let  $(X, \tau)$  be an IFTS and A =  $\langle x, \mu_A, \nu_A \rangle$  be an IFS in X. Then the intuitionistic fuzzy interior and intuitionistic fuzzy closure are defined by  $int(A) = \bigcup \{ G / G \text{ is an IFOS in X and} G \subseteq A \}$ ,  $cl(A) = \bigcap \{ K / K \text{ is an IFCS in X and A} \subseteq K \}$ .

Note that for any IFS A in (X,  $\tau$ ), we have cl(A<sup>c</sup>) = [int(A)]<sup>c</sup> and int(A<sup>c</sup>) = [cl(A)]<sup>c</sup>.

**Definition 2.5:** [7] An IFS A = {  $\langle x, \mu_A, \nu_A \rangle$  } in an IFTS (X,  $\tau$ ) is said to be an

- *intuitionistic fuzzy semi open set* (IFSOS in short) if A ⊆ cl(int(A)),
- *intuitionistic fuzzy α-open set* (IFαOS in short) if A ⊆ int(cl(int(A))),
- *intuitionistic fuzzy regular open set* (IFROS in short) if A = int(cl(A)).

The family of all IFOS (respectively IFSOS, IF $\alpha$ OS, IFROS) of an IFTS (X,  $\tau$ ) is denoted by IFO(X) (respectively IFSO(X), IF $\alpha$ O(X), IFRO(X)).

**Definition 2.6:** [7] An IFS  $A = \langle x, \mu_A, \nu_A \rangle$  in an IFTS  $(X, \tau)$  is said to be an

- 1. *intuitionistic fuzzy semi closed set* (IFSCS in short) if  $int(cl(A)) \subseteq A$ ,
- *intuitionistic fuzzy* α-closed set (IFαCS in short) if cl(int(cl(A)) ⊆ A,
- intuitionistic fuzzy regular closed set (IFRCS in short) if A = cl(int((A).

The family of all IFCS (respectively IFSCS, IF $\alpha$ CS, IFRCS) of an IFTS (X,  $\tau$ ) is denoted by IFC(X) (respectively IFSC(X), IF $\alpha$ C(X), IFRC(X)).

**Definition 2.7:** [8] Let A be an IFS in an IFTS  $(X, \tau)$ . Then bint(A) =  $\cup \{ G / G \text{ is an IFbOS in } X \text{ and } G \subseteq A \}$ , bcl(A) =  $\cap \{ K / K \text{ is an IFbCS in } X \text{ and } A \subseteq K \}$ .

Note that for any IFS A in (X,  $\tau$ ), we have  $scl(A^c)=(sint(A))^c$  and  $sint(A^c)=(scl(A))^c$ .

**Definition 2.8:** [11] An IFS A in an IFTS (X,  $\tau$ ) is an

- intuitionistic fuzzy generalized closed set (IFGCS in short) if cl(A) ⊆ U whenever A ⊆ U and U is an IFOS in X.
- intuitionistic fuzzy regular generalized closed set (IFRGCS in short) if cl(A) ⊆ U whenever A ⊆ U and U is an IFROS in X.

**Definition 2.9:** [10] An IFS A in an IFTS  $(X, \tau)$  is said to be an *intuitionistic fuzzy generalized semi closed* set (IFGSCS in short) if scl(A)  $\Box$  U whenever A  $\subseteq$  U and U is an IFOS in  $(X, \tau)$ .

**Definition 2.10:** [10] An IFS A is said to be an *intuitionistic fuzzy generalized semi open set* (IFGSOS in short) in X if the complement A<sup>c</sup> is an IFGSCS in X.

The family of all IFGSCSs (IFGSOSs) of an IFTS  $(X, \tau)$  is denoted by IFGSC(X) (IFGSO(X)).

**Definition 2.11:** [8] An IFS A in an IFTS  $(X, \tau)$  is said to be an *intuitionistic fuzzy*  $\pi$  - *generalized semi closed set* (IF $\pi$ GSCS in short) if scl(A)  $\subseteq$  U whenever A  $\subseteq$  U and U is an IF $\pi$ OS in (X,  $\tau$ ).

**Result 2.12**: [8] Every IFCS, IFGCS, IFRCS, IF $\alpha$ CS, IFGSCS is an IF $\pi$ GSCS but the converses may not be true in general. Every IF $\alpha$ GCS is IFGSCS but the converse is need not be true.

**Definition 2.13:** [9] An IFS A is said to be an *intuitionistic fuzzy alpha generalized open set* (IF $\alpha$ GOS in short) in X if the complement A<sup>c</sup> is an IF $\alpha$ GCS in X.

The family of all IF $\alpha$ GCSs (IF $\alpha$ GOSs) of an IFTS (X,  $\tau$ ) is denoted by IF $\alpha$ GC(X) (IF $\alpha$ GO(X)).

**Definition 2.14:** [5] Let f be a mapping from an IFTS  $(X, \tau)$  into an IFTS  $(Y, \sigma)$ . Then f is said to be *intuitionistic fuzzy continuous* (IF continuous in short) if  $f^{-1}(B) \in IFO(X)$  for every  $B \in \sigma$ .

**Definition 2.15:** [7] Let f be a mapping from an IFTS (X,  $\tau$ ) into an IFTS (Y,  $\sigma$ ). Then f is said to be

1. *intuitionistic fuzzy semi continuous* (IFS continuous in short) if  $f^{-1}(B) \in IFSO(X)$  for every  $B \in \sigma$ .

- 2. *intuitionistic fuzzy*  $\alpha$  *continuous* (IF $\alpha$  continuous in short) if f<sup>-1</sup>(B)  $\in$  IF $\alpha$ O(X) for every B  $\in \sigma$ .
- 3. *intuitionistic fuzzy pre continuous* (IFP continuous in short) if  $f^{-1}(B) \in IFPO(X)$  for every  $B \in \sigma$ .

**Result 2.16:** [7] Every IF continuous mapping is an IF $\alpha$ -continuous mapping and every IF $\alpha$ -continuous mapping is an IFS continuous mapping.

**Definition 2.17:** [6] A mapping f:  $(X, \tau) \rightarrow$ (Y, $\sigma$ ) is called an *intuitionistic fuzzy*  $\gamma$  *continuous* (IF $\gamma$  continuous in short) if f<sup>-1</sup>(B) is an IF $\gamma$ OS in (X,  $\tau$ ) for every B  $\in \sigma$ .

**Definition 2.18:** [10] Let f be a mapping from an IFTS (X,  $\tau$ ) into an IFTS (Y,  $\sigma$ ). Then f is said to be an *intuitionistic fuzzy generalized continuous* (IFG continuous in short) if f<sup>-1</sup>(B)  $\in$  IFGCS(X) for every IFCS B in Y.

**Result 2.19:** [10] Every IF continuous mapping is an IFG continuous mapping.

**Definition 2.20:** [9] A mapping f:  $(X, \tau) \rightarrow$ (Y, $\sigma$ ) is called an *intuitionistic fuzzy generalized semi continuous* (IFGS continuous in short) if f<sup>-1</sup>(B) is an IFGSCS in (X,  $\tau$ ) for every IFCSB of (Y,  $\sigma$ ).

**Definition 2.21:** [8] An IFTS  $(X, \tau)$  is said to be an intuitionistic fuzzy  ${}_{b}T_{1/2}$  (IF<sub>b</sub>T<sub>1/2</sub> in short) space if every IFGbCS in X is an IFCS in X.

**Definition 2.22:** [8] An IFTS  $(X, \tau)$  is said to be an intuitionistic fuzzy<sub>b</sub>gT<sub>1/2</sub> (IF <sub>b</sub>gT<sub>1/2</sub> in short) space if every IFGbCS in X is an IFGCS in X.

# Intuitionistic fuzzy generalized b continuous mappings

In this section we have introduced intuitionistic fuzzy generalized b continuous mapping and studied some of its properties.

**Definition 3.1:** A mapping f:  $(X, \tau) \rightarrow (Y, \sigma)$  is called an *intuitionistic fuzzy generalized semi continuous* 

(IFGb continuous in short) if f  $^{-1}(B)$  is an IFGbCS in  $(X, \tau)$  for every IFCS B of  $(Y, \sigma)$ .

**Example 3.2:** Let  $X = \{a, b\}$ ,  $Y = \{u, v\}$  and  $T_1 = \langle x, (0.2, 0.3), (0.4, 0.7) \rangle$ ,  $T_2 = \langle y, (0.3, 0.4), (0.7, 0.6) \rangle$ . Then  $\tau = \{0_{-}, T_1, 1_{-}\}$  and  $\sigma = \{0_{-}, T_2, 1_{-}\}$ 

are IFTs on X and Y respectively. Define a mapping f:  $(X, \tau) \rightarrow (Y, \sigma)$  by f(a) = u and f(b) = v. Then f is an IFGb continuous mapping.

**Theorem 3.3:** Every IF continuous mapping is an IFGb continuous mapping but not conversely.

**Proof:** Let f:  $(X, \tau) \rightarrow (Y, \sigma)$  be an IF continuous mapping. Let A be an IFCS in Y. Since f is IF continuous mapping, f<sup>-1</sup>(A) is an IFCS in X. Since every IFCS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.4:** Let  $X = \{a, b\}$ ,  $Y = \{u, v\}$  and  $T_1 = \langle x, (0.3, 0.2), (0.6, 0.7) \rangle$ ,  $T_2 = \langle y, (0.4, 0.3), (0.5, 0.6) \rangle$ . Then  $\tau = \{0_{-}, T_1, 1_{-}\}$  and  $\sigma = \{0_{-}, T_2, 1_{-}\}$  are IFTs on X and Y respectively. Define a mapping f:  $(X, \tau) \rightarrow (Y, \sigma)$  by f(a) = u and f(b) = v. The IFS A =  $\langle y, (0.5, 0.6), (0.4, 0.3) \square$  is IFCS in Y. Then f<sup>-1</sup>(A) is IFGbCS in X but not IFCS in X. Therefore f is an IFGb continuous mapping but not an IF continuous mapping.

**Theorem 3.5:** Every IF $\alpha$  continuous mapping is an IFGb continuous mapping but not conversely. **Proof:** Let f:  $(X, \tau) \rightarrow (Y, \sigma)$  be an IF $\alpha$  continuous mapping. Let A be an IFCS in Y. Then f<sup>-1</sup>(A) is an IF $\alpha$ CS in X. Since every IF $\Box$ CS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.6:** Let  $X = \{a, b\}$ ,  $Y = \{u, v\}$ and  $T_1 = \langle x, (0.3, 0.2), (0.6, 0.8) \rangle$ ,  $T_2 = \langle y, (0.3, 0.3), (0.5, 0.6) \rangle$ . Then  $\tau = \{0^{\circ}, T_1, 1^{\circ}\}$  and  $\sigma = \{0^{\circ}, T_2, 1^{\circ}\}$  are IFTs on X and Y respectively. Define a mapping f:  $(X, \tau) \rightarrow (Y, \sigma)$  by f(a) = u and f(b) = v. The IFS A =  $\langle y, (0.5, 0.6), (0.3, 0.3) \rangle$  is IFCS in

Y. Then f  $^{-1}(A)$  is IFGbCS in X but not IF $\alpha$ CS in X. Then f is IFGb continuous mapping but not an IF $\alpha$  continuous mapping.

**Theorem 3.7:** Every IFR continuous mapping is an IFGb continuous mapping but not conversely. **Proof:** Let f:  $(X, \tau) \Box$   $(Y,\sigma)$  be an IFR continuous mapping. Let A be an IFCS in Y. Then by hypothesis f<sup>-1</sup>(A) is an IFRCS in X. Since every IFRCS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.8:** Let X = { a, b }, Y = { u, v } and T<sub>1</sub> =  $\langle x, (0.2, 0.4), (0.8, 0.6) \rangle$ , T<sub>2</sub> =  $\langle y, (0.3, 0.5), (0.7, 0.5) \rangle$ . Then  $\tau = \{0_{\sim}, T_{1,1_{\sim}}\}$  and  $\sigma = \{0_{\sim}, T_{2,1_{\sim}}\}$  are IFTs on X and Y respectively. Define a mapping f: (X,  $\tau$ )  $\rightarrow$  (Y,  $\sigma$ ) by f(a) = u and f(b) = v. The IFS A =  $\langle y, (0.7, 0.5), (0.3, 0.5) \rangle$  is IFCS in

Y. Then f<sup>-1</sup>(A) is IFGbCS in X but not IFRCS in X. Then f is IFGb continuous mapping but not an IFR continuous mapping

**Theorem 3.9:** Every IFGS continuous mapping is an IFGb continuous mapping but not conversely. **Proof:** Let f:  $(X, \tau) \rightarrow (Y,\sigma)$  be an IFG continuous mapping. Let A be an IFCS in Y. Then by hypothesis f<sup>-1</sup>(A) is an IFGCS in X. Since every IFGCS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.10:** Let X = { a, b }, Y = { u, v } and T<sub>1</sub> =  $\langle x, (0.5, 0.6), (0.2, 0.2) \rangle$ , T<sub>2</sub> =  $\langle y, (0.6, 0.6), (0.3, 0.2) \rangle$ . Then  $\tau = \{0_{-}, T_{1,1_{-}}\}$  and  $\sigma = \{0_{-}, T_{2,1_{-}}\}$  are IFTs on X and Y respectively. Define a mapping f: (X,  $\tau$ )  $\rightarrow$  (Y,  $\sigma$ ) by f(a) = u and f(b) = v. The IFS A =  $\langle y, (0.3, 0.2), (0.6, 0.6) \rangle$  is IFCS in

Y. Then f  $^{-1}(A)$  is IFGbCS in X but not IFGSCS in X. Then f is IFGb continuous mapping but not an IFGS continuous mapping

**Theorem 3.11**: Every IF $\alpha$ G continuous mapping is an IFGb continuous mapping but not conversely. **Proof:** Let f:  $(X, \tau) \rightarrow (Y,\sigma)$  be an IF $\alpha$ G continuous mapping. Let A be an IFCS in Y. Then by hypothesis f<sup>-1</sup>(A) is an IF $\alpha$ GCS in X. Since every IF $\alpha$ GCS is an IFGSCS and every IFGSCS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.12:** Let X = { a, b }, Y = { u, v } and T<sub>1</sub> =  $\langle x, (0.5, 0.5), (0.4, 0.5) \rangle$ , T<sub>2</sub> =  $\langle y, (0.5, 0.7), (0.5, 3) \rangle$ . Then  $\tau = \{0_{\sim}, T_1, 1_{\sim}\}$  and  $\sigma = \{0_{\sim}, T_2, 1_{\sim}\}$  are IFTs on X and Y respectively. Define a mapping f: (X,  $\tau$ )  $\rightarrow$  (Y,  $\sigma$ ) by f(a) = u and f(b) = v. The IFS A =  $\langle$  y, (0.5, 0.3), (0.5, 0.7)  $\rangle$  is IFCS in

Y. Then f<sup>-1</sup>(A) is IFGbCS in X but not IF $\alpha$ GCS in X. Then f is IFGb continuous mapping but not an IF $\alpha$ G continuous mapping.

**Theorem 3.13**: Every IFGP continuous mapping is an IFGb continuous mapping but not conversely. **Proof:** Let f:  $(X, \tau) \rightarrow (Y,\sigma)$  be an IFWG continuous mapping. Let A be an IFCS in Y. Then by hypothesis f<sup>-1</sup>(A) is an IFWGCS in X. Since every IFWGCS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.14:** Let X = {a, b}, Y = { u, v } and T<sub>1</sub> =  $\langle x, (0.4, 0.3), (0.6, 0.7) \rangle$ , T<sub>2</sub> =  $\langle x, (0.6, 0.7), (0.4, 0.3) \rangle$ . Then  $\tau = \{0_{-}, T_1, 1_{-}\}$  and  $\sigma = \{0_{-}, T_2, 1_{-}\}$  are IFTs on X and Y respectively. Define a mapping f: (X,  $\tau$ )  $\rightarrow$  (Y,  $\sigma$ ) by f(a) = u and f(b) = v. The IFS A =  $\langle y, (0.4, 0.3), (0.6, 0.7) \rangle$  is IFCS in

Y. Then  $f^{-1}(A)$  is IFGbCS in X but not IFGPCS in X. Then f is IFGb continuous mapping but not an IFGP continuous mapping.

**Theorem 3.15**: Every IFWG continuous mapping is an IFGb continuous mapping but not conversely.

**Proof:** Let f:  $(X, \tau) \rightarrow (Y,\sigma)$  be an IFGP continuous mapping. Let A be an IFCS in Y. Then by hypothesis f<sup>-1</sup>(A) is an IFGPCS in X. Since every IFGPCS is an IFGbCS, f<sup>-1</sup>(A) is an IFGbCS in X. Hence f is an IFGb continuous mapping.

**Example 3.16:** Let X = { a, b }, Y = { u, v } and T<sub>1</sub> =  $\langle x, (0.2, 0.3), (0.8, 0.7) \rangle$ , T<sub>2</sub> =  $\langle x, (0.4, 0.5), (0.6, 0.5) \rangle$ , T<sub>3</sub> =  $\langle y, (0.6, 0.5), (0.4, 0.5) \rangle$ .. Then  $\tau = \{0_{-}, T_1, T_2, 1_{-}\}$  and  $\sigma = \{0_{-}, T_3, 1_{-}\}$  are IFTs on X and Y respectively. Define a mapping f: (X,  $\tau$ )  $\rightarrow$  (Y,  $\sigma$ ) by f(a) = u and f(b) = v. The IFS A =  $\langle y, (0.4, 0.5), (0.6, 0.5) \rangle$  is IFCS in Y. Then f <sup>-1</sup>(A) is IFGbCS in X but not IFWGCS in X. Then f is IFGb continuous mapping but not an IFWG continuous mapping.

The relations between various types of intuitionistic fuzzy continuity are given in the

following diagram. In this diagram 'cts' means continuous.



# Fig.1 Relation between intuitionistic fuzzy generalized b continuous mappings and other existing intuitionistic fuzzy mappings None of them is reversible

**Theorem 3.17:** A mapping f:  $X \rightarrow Y$  is IFGb continuous then the inverse image of each IFOS in Y is an IF $\alpha$ GOS in X.

**Proof:** Let A be an IFOS in Y. This implies  $A^c$  is IFCS in Y. Since f is IFGb continuous, f  ${}^{-1}(A^c)$  is IFGbCS in X. Since f  ${}^{-1}(A^c) = (f {}^{-1}(A))^c$ , f  ${}^{-1}(A)$  is an IFGbOS in X.

**Theorem 3.18:** Let f:  $(X, \tau) \rightarrow (Y, \sigma)$  be an IFGb continuous mapping, then f is an IF continuous mapping if X is an IF  ${}_{b}T_{1/2}$  space.

**Proof:** Let A be an IFCS in Y. Then  $f^{-1}(A)$  is an IFGbCS in X, since f is an IFGb Continuous. Since X is an IF  ${}_{b}T_{1/2}$  space,  $f^{-1}(A)$  is an IFCS in X. Hence f is an IF continuous mapping.

**Theorem 3.19:** Let f:  $(X, \tau) \rightarrow (Y, \sigma)$  be an IFGb continuous function, then f is an IFG continuous mapping if X is an IF gbT<sub>1/2</sub> space

**Proof:** Let A be an IFCS in Y. Then  $f^{-1}(A)$  is an IFGbCS in X, by hypothesis. Since X is an IF  $gbT_{1/2}space$ ,  $f^{-1}(A)$  is an IFGCS in X. Hence f is an IFG continuous mapping.

**Theorem 3.20:** Let  $f : (X, \tau) \to (Y, \sigma)$  be an IFGb continuous mapping and  $g : (Y, \sigma) \to (Z, \delta)$  is IF continuous, then g o  $f : (X, \tau) \to (Z, \delta)$  is an IFGb continuous.

**Proof:** Let A be an IFCS in Z. Then  $g^{-1}(A)$  is an IFCS in Y, by hypothesis. Since f is an IFGb continuous mapping,  $f^{-1}(g^{-1}(A))$  is an IFGbCS in X. Hence g o f is an IFGb continuous mapping.

#### Conclusion

In this paper we have introduced intuitionistic fuzzy generalized b continuous mappings and studied some of its basic properties. Also we have studied the relationship between intuitionistic fuzzy generalized continuous mappings and some of the intuitionistic fuzzy continuous mappings already exist.

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# ENVIRONMENTAL IMPACT OF GLOBAL BUSINESS OPERATIONS

#### K. POONGODI

UG Student, Department of B.Com CA Madonna Arts and Science College for Women, Madurai

### **C. RIHANA PARVEEN**

UG Student, Department of B.Com CA Madonna Arts and Science College for Women, Madurai

#### G.VASUKI

Head & Assistant Professor of B.Com CA Madonna Arts and Science College for Women, Madurai

#### Abstract

Global business operations have significant environmental impacts, ranging from resource depletion and pollution to greenhouse gas emissions and biodiversity loss. As companies expand internationally, their supply chains, manufacturing processes, and transportation networks contribute to climate change, deforestation, and water scarcity. Industries such as manufacturing, energy, and agriculture are major contributes to carbon footprints and ecological degradation. However, growing awareness of sustainability has led to the adoption of corporate social responsibility (CSR) initiatives, green technologies, and regulatory frameworks aimed at minimizing environmental harm. This paper explores the environmental consequence of global business activities, the challenges in implementing sustainable practices, and the role of governments, businesses, and consumers in fostering an eco-friendly global economy.

#### Introduction

The environmental impact of global business operations is multifaceted and far-reaching. Greenhouse gas emissions from transportation, energy consumption, and industrial processes contribute to climate change. The extraction, processing, and disposal of natural resources result in pollution, habitat destruction, and resource depletion. Furthermore, the global supply chains complexity and opacity often obscure environmental and social injustices.

#### Meaning

The environmental impact of global business operations refers to the effects that international trade, production, and corporate activities have on the natural environment. This includes issues such as:

• Resource Depletion: Overuse of natural resources like water, forests, and minerals.

- Pollution: Air, water, and soil contamination from industrial processes and waste disposal.
- Greenhouse Gas Emissions: Carbon dioxide (CO<sub>2</sub>) and other emissions from manufacturing, transportation, and energy consumption contribute to climate change.
- Deforestation: Clearing forests for agriculture, infrastructure, and urban expansion.
- Biodiversity Loss: Habitat destruction leading to the decline of plant and animal species.

Global businesses influence these impacts through supply chains, production methods, and corporate policies. However, many companies are adopting sustainable practices to reduce environmental harm and comply with regulations.

# The key aspects of the environmental impact of global business operations include

Carbon Emissions & Climate Change: Businesses contribute to greenhouse gas emissions through manufacturing, transportation, and energy use, leading to global warming.

Resource Depletion: Overconsumption of natural resources such as water, fossil fuels, minerals, and forests due to industrial activities and supply chain demands.

Pollution (Air, Water, and Soil): Waste disposal, chemical spills, and emissions from factories and transportation cause environmental contamination and health hazards.

Deforestation & Land Degradation: Expansion of agriculture, infrastructure, and industries leads to forest loss, habitat destruction, and reduced biodiversity.

Waste Generation & Management: Improper disposal of industrial waste, plastic pollution, and ewaste affect ecosystems and human health.

Biodiversity Loss: Business activities disrupt ecosystems, endanger species, and reduce biodiversity through habitat destruction and pollution.

Supply Chain & Logistics Impact: Global trade and transportation (shipping, air freight, trucking) contribute to emissions and ecological damage.

Regulatory Compliance & Sustainability Efforts: Governments and organizations enforce environmental laws. while companies adopt responsibility corporate social (CSR) and sustainability initiatives to mitigate harm.

Businesses are increasingly adopting ecofriendly practices such as renewable energy use, circular economy models, and carbon offset programs to reduce their environmental footprint.

# Important of environmental impact of global business operations

The environmental impact of global business operations is crucial because it affects ecosystems, human health, and long-term economic sustainability. Here are key reasons why it matters:

#### **Climate Change Mitigation**

Businesses contribute significantly to carbon emissions through manufacturing, transportation, and

energy use. Sustainable practices help reduce greenhouse gas emissions.

# **Resource Conservation**

Global businesses consume large amounts of natural resources (water, minerals, forests). Sustainable operations prevent resource depletion and promote efficiency.

# **Biodiversity Protection**

Deforestation, pollution, and habitat destruction caused by industries threaten wildlife. Environmentally responsible businesses help preserve biodiversity.

# Waste Management & Pollution Control

Industrial activities generate waste, including plastics and hazardous chemicals. Proper waste management reduces pollution and promotes recycling.

# **Regulatory Compliance & Reputation**

Many governments enforce environmental laws. Companies that comply avoid fines and improve their public image, attracting eco-conscious customers.

# Health & Well-being

Pollution from industries affects air, water, and soil quality, leading to health issues like respiratory diseases. Sustainable operations improve public health.

# Long-term Economic Sustainability

Environmental degradation leads to higher costs in the future (e.g., disaster recovery, raw material shortages). Green business strategies ensure longterm profitability.

# Corporate Social Responsibility (CSR)

Consumers prefer businesses that prioritize sustainability. Eco-friendly practices enhance brand loyalty and investor confidence.

# The Environmental Impact of Business Operations

# **Resource Consumption and Depletion**

Resource consumption and depletion refer to the use and exhaustion of natural resources due to human

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activities. These resources can be renewable (such as water, forests, and fish) or non-renewable (such as fossil fuels, minerals, and metals). Overconsumption and unsustainable use lead to depletion, environmental degradation, and long-term consequences for ecosystems and human societies.

### **Emissions and Pollution**

Emissions and pollution are major environmental concerns that impact air, water, and soil quality. They mainly come from industrial activities, transportation, agriculture, and household waste.

### Waste Generation and Disposal

Waste generation and disposal refer to the production of waste materials and the methods used to manage and dispose of them. This process is crucial for environmental sustainability and public health.

# **Supply Chain Impact**

The global supply chain is a critical component of international business operations, encompassing the production, sourcing, and logistics of goods and services. However, the complexity and opacity of global supply chains often conceal significant environmental and social impacts.

# **Biodiversity Loss**

Biodiversity loss refers to the decline or disappearance of biological diversity in ecosystems, including the loss of species, habitats, and genetic diversity. It is driven by factors such as habitat destruction, climate change, pollution, over exploitation of resources, and invasive species.

# **Corporate Social Responsibility**

Corporate Social Responsibility (CSR) refers to a company's commitment to ethical business practices, environmental sustainability, and social well-being.

It goes beyond profit-making to include initiatives that benefit society, employees, and the environment.

#### **Circular Economy and Innovation**

The circular economy is an economic model designed to minimize waste and maximize resource efficiency by keeping materials, products, and services in circulation for as long as possible. It contrasts with the traditional linear economy (take-make-dispose) by focusing on reducing, reusing, recycling, and regenerating resources.

### Conclusion

To mitigate these impacts, businesses must adopt sustainable practices, such as reducing carbon footprints, improving energy efficiency, embracing circular economy principles, and ensuring ethical supply chain management. Governments. corporations, and consumers all play a crucial role in driving environmental responsibility through regulations, green technologies, and conscious consumption. In conclusion, the long-term success of global business operations depends on balancing economic growth with environmental stewardship. Sustainable business models are not only essential for protecting the planet but also for ensuring future profitability and resilience in an increasingly ecosystem.

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