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"OORJA" is an incredibly potent term, Meaning 'energy' in Sanskrit, "OORJA" is also the name of a Vedic deity, who in many ancient and modern scriptures has been compared with Uzza (Shakti as Venus) in Arabic and Divine Energy in English. "OORJA", our Journal, signifies a confluence of diverse cultures and assorted intelligence to stir up the cerebral powers of its readers.

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FROM THE

With technologies racing ahead of us, more prolifically and faster than ever before, we expect organizations help us ride through and envision a way forward.

'Wise judgments, well-being and actions' can bring individuals to their best self in their journey to be effective leaders while being in their characters, to steer the organizations to lasting, positive and real transformation.

Amplifying the word 'character' with the term 'leader' is all about the 'disposition to lead' than to occupy a 'formal position of leadership'. It is applicable not just for senior leaders, but to every individual who is in a position to make a change.

Character is the compass that leverages competency and commitment for better or worse in a leader. It involves qualities, a few of which may be personality traits and values that shape what do we value; what we notice within the environment in which we deliver; who we engage in conversations; what we choose to act on; how we conduct conversations; what we reinforce through punishments and rewards; how we communicate; the goals we set for ourselves and so on. A leader is effective when he is committed, competent and has the character. Nevertheless, commitment & ability are the key, but both can be leveraged—for good or bad!—through 'character'.

'Leader character' is an outcome of interconnectedness between, but not limited to leaders' responsibility, courage, initiative, transcendence, teamwork, humanity, honesty and humility as well how these factors affect one's judgment. As strength across these dimensions leads to the 'best and wisest judgments', whatever the situation is, so as to generate novel, effective and creative strategies to choose from. Hence leader character is more about the foundational elements that effect both judgment and well-being and not about understanding personality, or the capability they bring to a task, or the way people display their style of leadership.

No matter how busy we are, we need to take charge over how our character develops by taking an intentional, careful and intellectual approach in our lives because as our habits change for the better, we too will change for better - physically, mentally & emotionally. It is all about changing the moments you lived through to strengthen & activate your 'character' and not just about finding more time in your daily routine to develop your character.

Dr. Ashok Gupta Director





There is no dearth of good business strategies. One can look for them in the case studies or even ask consultants. "But knowing what to do is one thing while doing it is rather another".

With the customers, competition and regulations changing, many organizations that have been successful in the past have not been not able to find their way forward, as they end up experimenting with new ideas, without realigning their people strategy with their new found business strategy.

The success or failure of a business strategy does not merely depend on the determination or brilliance of the leadership but ensuring right individuals at critical positions. "A business strategy is only as good or bad as the leaders who are responsible for its execution". It is all about the right people in the right roles with the right instinct to get things done right. Therefore, aligning one's business strategy in line with its people strategy is critical for the success of any organization.

The current issue in its unique flavor and style brings to its readers research papers on "Ethics in Al Entrepreneurship: Balancing Innovation and Responsibility", by Dr. Minaxi Mittal, "The Metaphysics of Attachment : An Exploration based on Pranic Healing" by Ms. Alka Gupta, Ms. Charu Sharma & Mr. Hemant Gupta, "Unveiling the influence of Generative AI: Special Reference to Chat- GPT in Shaping Educational Dynamics and Advancing Research Initiatives in Health Sector" by Dr. Ritu Vashistha, "Unleashing Business Potential with Blockchain and Al: Next Gen Solutions and Innovations" authored by Dr. Preeti Tiwari , Ms. Madhuri Vyas, and Ms. Ritu Jangid, "Analyzing Income Inequality with Orange Data Mining Tool: Classification Techniques and Visualization" by Ms. Ritu Khandelwal and case study on "Gardenia: Setting and Running a Customized Gifting Plant Store in India" by Sai Sumanth Manem, Dr. Kavaldeep Dixit & Dr. Kavya Saini.

The Book review on "Building Intelligent Applications with Generative AI" is an excellent taster on the power of generative AI in building cutting-edge applications. The book review on "Marketing 6.0: The Future is Immersive" provides quick tips for marketers to integrate technological and business model evolution with the dramatic shifts in consumer behavior.

As I sign off, we look forward to receiving research papers and case studies on the emerging areas in Management & IT.

Happy Reading!

Dr. Manju Nair Editor-in-Chief

ETHICS IN AI ENTREPRENEURSHIP: BALANCING INNOVATION AND RESPONSIBILITY

Dr. Minaxi Mittal, Assistant Professor, Department of Commerce, S.A. Jain (P.G.) College, Ambala City

Abstract

At the vanguard of technological innovation, artificial intelligence (AI) is revolutionizing markets and changing the face of entrepreneurship by opening up new business opportunities, improving operational effectiveness and enabling previously unheard-of degrees of customisation for goods and services. Artificial intelligence (AI) driven technologies like automation, machine learning, natural language processing and predictive analytics are giving business owners the ability to innovate and grow quickly. Concerns regarding bias, accountability, transparency, privacy and wider societal effects have emerged as AI systems are included into decision-making processes, posing issues about how to strike a balance between innovation and moral obligation.

In AI ethics, accountability and transparency are equally important concerns. AI systems' decisionmaking processes are sometimes opaque, which makes it challenging to comprehend how and why particular judgments are made. This is a problem known as the "black box" issue. It could be challenging to assign blame for unanticipated or detrimental results that AI systems produce because of this lack of transparency. This implies that the application of AI complicates conventional ideas of accountability and liability for business owners.

Another major ethical challenge in AI entrepreneurship is privacy, especially as AI systems frequently need access to sensitive and personal data in enormous quantities. Important concerns concerning permission, data security and misuse potential are brought up by the use of such data. Entrepreneurs have to strike a compromise between upholding individual privacy rights and using data to fuel AI-driven innovation. This entails putting strong data security mechanisms in place, like encryption and anonymization, adhering to data privacy laws and promoting openness on data collecting and usage procedures.

Beyond personal ethical worries, AI has a significant and wide-ranging impact on society. AI's automation potential can boost productivity and economic expansion, but it also raises employment concerns because computers may eventually replace people in tasks that have historically been done by humans. The possibility of job displacement prompts more general inquiries concerning the nature of employment in the future and economic inequality. Entrepreneurs need to think about these societal ramifications and investigate ways to lessen any potential bad effects. Some of these strategies include funding programs for upskilling and reskilling, helping with workforce transitions and interacting with legislators to create inclusive AI policies that take into account the needs of various communities.

This study attempts to give a thorough analysis of the ethical problems that arise in Al entrepreneurship, looking at the roles that Al entrepreneurs should play in resolving these problems and offering solutions for striking a balance between innovation and responsibility. This paper aims to provide a road map for responsible Al development by examining current ethical frameworks,

examining case studies and talking about recommended practices. It highlights the significance of incorporating ethical considerations into the AI lifecycle at every level from design and development to deployment and monitoring and it promotes an ethically conscious organizational culture.

Keywords: AI Ethics, AI Entrepreneurship, Innovation, Responsibility, Techno ethics.

Introduction

Artificial intelligence has completely changed the entrepreneurship scene by providing previously unheard of chances for growth and innovation. However, as companies depend more and more on AI technologies, they are faced with difficult moral conundrums that demand careful thought. This study looks at the conflicting demands of supporting moral principles and encouraging creativity in AI-related entrepreneurship. Technology is advancing at a rapid pace and artificial intelligence (AI) is changing the face of entrepreneurship. Artificial intelligence (AI) presents unheard of chances for innovation and growth across a range of industries, including healthcare, finance, marketing and more, thanks to its ability to analyse enormous information, automate procedures and provide personalized services (Russell & Norvig, 2020). AI technologies are being used by entrepreneurs more and more to improve decision-making, increase operational efficiency and develop personalized goods and services that cater to changing consumer needs.

Nonetheless, it is impossible to ignore the serious ethical issues raised by the quick integration of AI into commercial processes. The increasing autonomy and influence of AI systems in decision-making has brought to light concerns about bias, accountability, transparency, privacy and the impact of automation on society (Dignum, 2019). The difficulty is striking a balance between the need for innovation and a dedication to morality.

Many AI algorithms are "black box" systems, making it difficult to comprehend how they make decisions and creating concerns about who is responsible for errors (Binns, 2018). Artificial intelligence bias has the potential to produce biased results and strengthen social injustices (Whittlestone et al., 2019). Furthermore, there are significant worries regarding consent and privacy raised by the gathering and use of personal data for AI applications (Zarsky, 2016).

Because of these intricacies, entrepreneurs must take a proactive stance when it comes to ethical issues in AI development and use. This paper aims to investigate the moral conundrums that arise from AI entrepreneurship and how business owners might resolve them while promoting creativity. This research aims to provide a comprehensive roadmap for responsible AI entrepreneurship—one that prioritizes not only technological advancement but also the welfare of individuals and society as a whole by analysing existing ethical frameworks, talking about best practices and presenting case studies.

In the end, as artificial intelligence (AI) continues to change the economic environment, it is critical that entrepreneurs accept their responsibility as guardians of moral AI practices, making sure that their inventions minimize any potential risks and benefit society.

Purpose of the Study

This paper aims to provide a detailed exploration of ethical considerations in AI entrepreneurship, offering a roadmap for integrating ethical practices into the AI lifecycle from design to deployment. It will highlight the ethical challenges in AI entrepreneurship, strategies for ethical AI entrepreneurship,

significance of incorporating ethical considerations into the AI lifecycle, case studies and recommendations for future research.

Ethical Challenges in AI Entrepreneurship

The "Black Box" Problem

One of the most pressing ethical issues in AI is the "black box" dilemma, which occurs when the decision-making mechanisms of AI systems are usually opaque (Binns, 2018). This opacity makes it more difficult to assign blame when AI systems produce unfavourable results. This poses important challenges for entrepreneurs regarding accountability for AI-driven decisions and potential outcomes.

• **Example:** In a 2019 case, a self-driving car operated by an AI system failed to recognize a pedestrian, leading to a fatal accident. Determining liability became a contentious issue as it involved the car manufacturer, software developers and the regulatory bodies.

Bias and Discrimination

Al algorithms that are biased may discriminate against particular populations, hence sustaining current disparities (Whittlestone et al., 2019). Entrepreneurs must ensure that their Al systems are trained on a range of sample datasets to lessen bias and increase outcome fairness

• **Mitigation Strategies:** Implementing practices like algorithmic auditing, diversifying training data and employing fairness-enhancing interventions can help reduce bias.

Privacy Concerns

For AI systems to work, large amounts of personal data are usually needed, which raises significant privacy concerns (Zarsky, 2016). Entrepreneurs must balance utilizing data to spur innovation with preserving people's right to privacy. Adhering to data privacy rules and implementing robust data security measures are essential.

• Legal Frameworks: Sustaining consumer trust requires adherence to laws such as the California Consumer Privacy Act (CCPA) in the United States and the General Data Protection Regulation (GDPR) in Europe.

Societal Impact

The impact of AI deployment on society at large cannot be disregarded. Automation could boost production but there are worries about economic inequality and job loss. It is the responsibility of entrepreneurs to consider these impacts and develop strategies that promote equitable workforce transition and growth.

• Job Displacement Solutions: Negative consequences can be lessened by funding educational and training initiatives that provide people the skills they need in an Al-driven economy.

Strategies for Ethical AI Entrepreneurship

Establishing Ethical Guidelines

Entrepreneurs should develop and adhere to ethical guidelines that govern AI development and deployment. In order to promote an ethical culture within organizations, these rules ought to include the concepts of justice, accountability and openness (Dignum, 2019).

• Framework Development: Companies can create a multi-disciplinary ethics board to regularly review AI projects and their implications.

Engaging Stakeholders

Including a range of stakeholders in the AI development process, including clients, staff members and legislators, helps improve accountability and openness. Frequent talks between firms and their communities can promote trust and yield insightful information.

• **Community Engagement:** Conducting public forums and workshops can help gather diverse perspectives and address community concerns regarding AI applications.

Continuous Monitoring and Evaluation

Finding and resolving ethical issues as they emerge requires putting in place procedures for ongoing observation and assessment of AI systems. Regular audits can help ensure that AI technologies align with established ethical standards and respond to societal needs.

• Audit Processes: Establishing an internal auditing team dedicated to assessing AI algorithms for bias, accuracy, and compliance with ethical standards.

Promoting Upskilling and Reskilling

In order to counteract the possible adverse effects of AI on employment, business owners ought to fund initiatives that encourage workers to reskill and upskill. Employees can move into new, less automatable roles with the support of this proactive strategy.

• **Collaborative Programs:** Partnering with educational institutions to develop tailored training programs for employees in industries most affected by AI.

Significance of Incorporating Ethical Considerations into the AI Lifecycle

To guarantee that AI technologies are created and used ethically, ethical issues must be incorporated into the AI lifecycle. This entails incorporating moral values into every phase from conception and creation to implementation and continuing oversight. Several important dimensions help to understand the significance of this approach:

1. Mitigating Risks and Harm

Organizations can detect and reduce possible risks related to bias, discrimination and privacy violations by addressing ethical considerations early in the AI lifecycle. This proactive approach safeguards the organization's reputation and keeps expensive legal repercussions at bay by preventing negative outcomes that could have an impact on people and communities.

2. Enhancing Transparency and Accountability

Al systems are more transparent when ethical issues are incorporated. Stakeholders, including users, consumers, and regulators, can have a better understanding of how Al choices are made when developers give explain ability and fairness top priority. By fostering trust among stakeholders and enabling businesses to accept responsible for the results of their Al systems, transparency improves accountability.

3. Promoting User Trust and Acceptance

Consumers are increasingly concerned about the ethical implications of AI technologies. By

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committing to ethical practices throughout the AI lifecycle, organizations can cultivate user trust and encourage greater acceptance of AI applications. This trust is crucial for the long-term success and adoption of AI solutions in various markets.

4. Fostering Innovation and Competitive Advantage

By encouraging teams to consider the societal ramifications of their technology critically, an ethically conscious approach can spur innovation. This could lead to the development of more beneficial, egalitarian and inclusive AI solutions providing companies with a competitive advantage in a market that is growing increasingly conscious of its responsibilities.

5. Creating an Ethical Organizational Culture

Incorporating ethics into the AI lifecycle promotes a culture of responsibility within the organization. When employees understand the importance of ethical considerations, they are more likely to advocate for responsible practices in their work. This culture not only enhances employee morale but also attracts talent who value ethical standards.

6. Adhering to Regulatory Compliance

Organizations may remain ahead of compliance requirements by including ethical considerations into the AI lifecycle, especially as governments and regulatory agencies around the world start to enforce stronger rules on AI technologies. Companies can reduce the risk of non-compliance and related penalties by proactively aligning with ethical standards and legislation.

7. Ensuring Long-term Sustainability

Sustainable business practices increasingly hinge on ethical considerations. Organizations that prioritize ethics in their Al initiatives are better positioned to navigate the complex landscape of social responsibility, environmental impact and economic viability, ultimately ensuring their long-term success.

Case Studies

1. Case Study: Healthcare Start-up

Example of Ethical AI Implementation

A healthcare business that developed a strong framework for ethical AI development used AI for diagnostics. To guarantee that its algorithms were trained on a broad spectrum of data, the company hired a diverse group of data scientists and healthcare specialists (Russell & Norvig, 2020). Their AI system was successfully deployed as a consequence of regular audits and stakeholder interaction that helped preserve transparency and trust.

2. Case Study: Financial Services Firm

Example of Ethical Missteps

On the other hand, an AI loan algorithm that was discovered to bias against minority applicants caused a financial services company to come under fire. The incident prompted a review of the company's ethical guidelines and brought attention to the significance of bias mitigation techniques (Whittlestone et al., 2019). The company changed their algorithm and introduced diversity and

inclusion training for staff members in response to public outcry.

Recommendations for Future Research

Development of Comprehensive Ethical Frameworks

Future research should concentrate on developing comprehensive ethical frameworks employing AI that are suited to certain businesses. These frameworks could aid business owners in resolving moral dilemmas particular to their industries and guarantee the appropriate deployment of AI.

Exploration of Regulatory Implications

Examine the effects of differing legislative frameworks in various nations on AI entrepreneurship. Gaining an understanding of these dynamics can help with regulatory issues and worldwide best practices for the ethical deployment of AI.

Longitudinal Studies on Societal Impact

Carry out longitudinal research to evaluate the long-term effects of AI technology on society. Better ethical behaviours can be informed by this research's empirical data on the long-term effects of AI on employment, economic inequality, and social dynamics.

Interdisciplinary Approaches to AI Ethics

Encourage interdisciplinary research that combines insights from fields such as sociology, psychology, and philosophy with AI technology. This approach can enrich the understanding of ethical implications and foster more holistic solutions.

Impact of Diversity on AI Ethics

Examine how diversity affects ethical decision-making in AI development teams. Studies could look into the connection between the makeup of a team and results pertaining to fairness and prejudice in AI systems.

Consumer Perspectives on AI Ethics

Investigate consumer attitudes toward ethical AI practices. Understanding how customers perceive ethical considerations can guide entrepreneurs in aligning their strategies with market expectations and building trust.

Case Studies on Successful Ethical AI Implementation

Conduct in-depth case studies of organizations that have successfully integrated ethical considerations into their AI practices. Analysing these examples can identify best practices and frameworks that others can adopt.

Technological Innovations for Ethical AI

Investigate cutting-edge tools and approaches, such as explainable AI, algorithmic auditing tools, and privacy-preserving data strategies that help improve ethical AI practices. These developments can help business owners adhere to moral principles.

Evaluation of Existing Ethical Guidelines

Systematically evaluate existing ethical guidelines and frameworks for AI to determine their effectiveness and applicability in real-world scenarios. This research can highlight gaps and areas for

improvement.

Collaborative Governance Models

Examine collaborative governance approaches that incorporate a variety of stakeholders in the moral supervision of artificial intelligence, such as governments, corporations and civil society. Investigating these models can provide light on practical regulatory structures that strike a balance between accountability and innovation.

Conclusion

The path to ethical AI entrepreneurship is complex and calls for a dedication to ongoing introspection and adjustment. The ethical issues that arise from new technology also change with time (Dignum, 2019). Entrepreneurs need to be on the lookout for prejudices, deal with them head-on, maintain openness, and safeguard user privacy. Furthermore, it is critical to cultivate an ethically conscious organizational culture. Businesses can better anticipate and handle ethical challenges by fostering interdisciplinary collaboration and providing staff with ethical AI training. Innovative solutions that uphold human rights and advance social good can result from this cooperative approach.

Ultimately, AI has the potential to bring about revolutionary change. However, a strong dedication to ethical issues is necessary for its successful incorporation into the entrepreneurial landscape. Prioritizing ethics above all else will help entrepreneurs properly manage the difficulties of AI and pave the way for a time when technology promotes social justice and sustainable economic growth. Thus, ethical AI entrepreneurship transforms into a moral duty that creates a society that is more inclusive and just as well as a business necessity.

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THE METAPHYSICS OF ATTACHMENT: AN EXPLORATION BASED ON PRANIC HEALING

Ms. Alka Gupta, Treasurer, Pranic Healers Society of Jaipur. Ms. Charu Sharma, Dy Commissioner, GST Govt of Rajasthan Mr. Hemant Gupta, President, Pranic Healers Society of Jaipur

Abstract

As a part of its profound & timeless wisdom, the Srimad Bhagwad Gita teaches the finest understanding and analysis of Human psychology. One of its great lessons is the process of attachment and subsequent mental & moral deterioration – a common human failing.

Modern Pranic Healing, an energy healing modality, provides fascinating insights that explain and validate this process of attachment & deterioration from the perspectives of the subtle bodies and the chakras thereof. Pranic Healing also offers simple and practical techniques to supplement the solutions suggested by Lord Krishna in the Srimad Bhagwad Gita.

This paper discusses the process of attachment and subsequent degradation using the Pranic Healing knowledge base and practical solutions.

Keywords: Bhagwad Gita, Pranic Healing, Subtle Bodies, Chakras, Attachment, Cords, Pranic Psychotherapy

Introduction

The greatness of the Bhagwad Gita has many dimensions. It is direct Divine preachings from the great Avataar, Lord Krishna. It offers timeless guidance and practical wisdom on every aspect of life and the purpose of human life. It also provides the finest understanding and analysis of Human psychology. Its shlokas offer an unmatched depth of knowledge on almost every topic of importance to Human Life.

One great lesson is regarding the process of attachment, how it forms in a person, how it strengthens, and how step-by-step it causes mental and spiritual decline. The Lord also offers guidance on how to avoid and overcome this decline.

Pranic Healing is a modern energy healing modality. It offers insights and techniques that work on the subtle bodies to help normalize the physical and subtle bodies of their ailments. It provides comprehensive information on the chakras and their physical, psychological and spiritual functions, and its healing techniques are primarily focused on the chakras. Although different energy healing modalities have existed since ancient times, Master Choa Kok Sui is considered the founder of modern Pranic Healing. He started teaching the subject in the 1980s and it is now taught and practised in over 120 countries worldwide. The Pranic Healing community regularly conducts scientific studies and publishes papers in reputed scientific forums internationally (SUI, C.K. 2017).

One of the significant initiatives of the founder of Pranic Healing, Master Choa Kok Sui, was to study the spiritual teachings of the well-known scriptures and interpret their metaphysics from the perspective of the energy or subtle bodies. Using inputs from clairvoyants, he was able to observe & document the effects of various life phenomena and activities – for example, attachments and meditation - on the subtle bodies. This led to interesting findings and correlations with ancient

spiritual wisdom, such as the Bhagwad Gita. In many cases, this enabled him to offer practical techniques to help humanity in its essential purposes – Self-realization and God-realization.

In this paper, the author discuss how the Bhagwad Gita describes the process of attachment formation and how it often leads to the complete deterioration of the person who has been ensnared by it (Vyasa, M. V.). Then consider how the Pranic Healing theory explains the meta-physics of this same phenomenon. The author also consider preventive and remedial solutions offered by Bhagwad Gita and the School of Pranic Healing.

In Chapter 2 shlokas 62 and 63 of the Bhagwad Gita, Lord Krishna teaches us:

```
ध्यायतोविषयान्पुंसः सङ्गस्तेषूपजायते |
सङ्गात्सञ्जायतेकामः कामात्क्रोधोऽभिजायते || 62||
क्रोधान्द्रवतिसम्मोहः सम्मोहात्स्मृतिविभ्रमः |
स्मृतिभ्रंशाद्बुद्धिनाशोबुद्धिनाशात्प्रणश्यति || 63||
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While contemplating the objects (dhyayatovishaya) of the senses, one develops an Attachment (sangha) to them. Attachment leads to desire (kama), and anger arises (krodha). Anger leads to clouding of judgment (sammoha), which results in bewilderment of memory (smriti-vibhrama). When memory is bewildered, the intellect gets destroyed (buddhi-nasho); when the intellect is destroyed, one is wholly ruined (pranashyati).

The process can be seen as a downward path, a ladder with eight rungs. How do we prevent falling into this path of destructive Attachment? If you succumbed, how do you recover from it? The Lord has offered guidance in many places. In chapter 2 Shloka 55, the Lord says:

श्रीभगवानुवाच| प्रजहातियदाकामान्सर्वान्पार्थमनोगतान्।

आत्मन्येवात्मनातुष्टः स्थितप्रज्ञस्तदोच्यते || 55||

Here, the Lord prescribes the proper mental state, Stithpragya, or stability of mind, as the prevention and remedy for the vicious attachment cycle.

When one attains stability of the mind and the senses through control or restraint and is satisfied in Self-realization, he may be called Stithpragya, or stable of mind. In other words, the authentic Self, the Soul, now controls the mind. In shlokas 2:56 through 2:59, the Lord further describes the Stithpragya – he who discards selfish desires and cravings, is undisturbed by misery, nor delighted by good fortune, resists likes and dislikes both. In other shlokas, he suggests meditation and revelling in the grace of the Lord as both prevention and remedy. This thread runs throughout the Divine Song, and Chapter 6 provides more insights and guidance.

Pranic Healing Theory: Process Prevention and Cure

The Pranic Healing theory approaches this phenomenon from a different perspective based on the metaphysical subtle bodies - viz Etheric, Astral, Mental and Causal, which to some extent correspond with the Pranamaya-Kosha, Kamamaya-Kosha (or Manomaya-Kosha), Vigyanmaya-Kosha and Anandmaya-Kosha respectively. These subtle energy bodies contain Chakras, which are whirling

energy centres. The chakras are like the organs in the physical body (the Annamaya-Kosha). The Pranic Healing system categorizes the chakras by size and importance into Major (biggest & most important), Minor and Mini (smallest). The system considers 12 Major chakras. The chakras have physical, psychological and spiritual functions. For example, the Mooladhara Chakra, at the base of the spine, is named the Basic chakra, and it controls the muscular & skeletal system, the production of blood, the survival instinct, industriousness, prosperity, etc. (Sui, C.K., 2004)

Our senses fall on many objects, but do not connect with every one of them. Some do not even take cognizance of, others come and go from our consciousness. But some cause a vibration within our subtle bodies – a Thought Form (TF) in the Pranic Healing parlance. The TF is energetically connected to the object it is related to through a Cord, which is like a link or thread. This Cord can be felt through the Pranic Healing technique of "scanning", and clairvoyants have confirmed this phenomenon as accurate, though metaphysical.

As an emotion of like/dislike towards the object arises, emotional energy attaches to the TF, growing it. The increased size causes the Thought to emerge again in the conscious mind – thereby adding more energy to the TF. The desire (or hatred, viz Raaga or Dvesha) towards the object strengthens the Cord, the attachment to the object.

The TF grows more substantial, and the thoughts related to the object become more persistent. The emotional content feeds this process and adds strength to it. At a stage in time, the TF now resides inside a chakra and, depending on the chakra begins to manipulate the person through the chakra's various functions. This is the beginning of the vicious cycle of attachment & subsequent downfall.

So far, the effects are temporary, and the person can overcome the desire and turn away from this thought and its object through simple, normal willpower.

However, if the desire (or hatred) is powerful, it damages the "protective web," a protective layer of the subtle bodies from external etheric and psychic influences. This protective web is constructed to withstand and block out external harmful entities, but it is easily damaged by strong negative TFs from within and greatly aggravates the situation, as now the TFs

- (I) penetrate deep into the chakra and can manipulate it,
- (ii) can attract Elementals (energy parasites that exist in nature and feed off negative psychic energies) into the root of the chakra, and
- (iii) spread into other chakras and other parts of the subtle energy bodies.

At this stage, the person is primarily inflamed or consumed by the TFs and Elementals, is on the border of irrationality, is losing self-control, and can easily indulge in immoral and evil acts. If this continues unchecked, the next stage is reached. Now, the influence of the authentic self on the body is almost entirely overwhelmed by the powerful TFs and Elementals, who now control and dominate the person's thoughts, words and actions comprehensively.

A perusal of the above will illustrate how the two descriptions of the Attachment phenomenon and subsequent degradation lead to the same end-point and also have interim stages that correlate well.

Pranic Healing offers a range of practical methods or techniques to prevent this from occurring and can also be applied to recover from a severely affected state. These methods may be considered complementary & supplementary to Lord Krishna's guidance as concrete techniques to apply Divine

Guidance to daily life.

Cutting Cords

Cords are the physical (rather, metaphysical) form of any attachment. They are real, but not on the physical plane. Cutting cords provides a simple, brief, yet effective technique to reduce external influences & attachments. The practice is simple and involves the application of Will.

Pranic Psychotherapy

This is a comprehensive set of techniques in the Pranic Healing school that deals extensively with this subject. It comprises many techniques that work to:

- a. Disintegrate Negative Psychic Energy, Thoughts Forms, Elementals in the Chakras and Subtle Bodies
- b. Repair the Protective web
- c. Normalize the Chakras

Pranic Psychotherapy, when applied correctly, is highly effective. Numerous case studies and research studies vouch for its practical use, both as preventive and as a remedy, for Self and others. There are many essential dos and don'ts to be followed. This method needs to be learnt properly.

Shielding

Shields are constructed using subtle matter and will to protect the subtle bodies against external influences. This powerful technique is mentioned in the Mahabharata–e.g. the Raksha Kavacha of Karna. It can be an effective technique to prevent attraction to sense objects and form attachments.

Pranic Breathing

It is well-established that breathing and the emotional state are closely interrelated. This simple exercise helps calm a racing mind and suffuses the subtle bodies with healthy energy, helping stabilize the mind. Anyone can learn and practice this simple Pranayama.

Soul Affirmation

The chances of succumbing to attachments are significantly reduced if we frequently remind ourselves of our authentic selves, who we truly are. This simple yet powerful affirmation is functionally equivalent to the mantra So Hum, or some of the Mahavakyas. Anyone can practice this technique.

Inner Reflection & Firm Resolution

According to the School of Pranic Healing, character development is the only sure-shot method to prevent the 8-step descent into irrationality and immorality. The tools to achieve this are self-awareness and Will. Inner Reflection & Firm Resolution is a simple & short practice that, when performed daily, is proven to reduce and finally remove character defects. The method is stunning in its simplicity and can be adopted by everyone. As character improves, the likelihood of raaga / dvesha, of Kama & Krodha reduces significantly.

Meditation

In the Gita, Lord Krishna makes the case for meditation as an integral and essential part of the Yogic Life. The school of Pranic Healing teaches many different Meditative practices, each having a

different purpose, yet all aiding the practitioner to purify and strengthen the subtle bodies and the chakras. The benefits are validated by research and scientific studies.

Mantra chanting

Mantras, properly chanted, change the vibrations of the subtle bodies and chakras. Different Mantras have different effects. This practice is open to all and not exclusive to the Pranic Healing School.

Divine Sacrifice

This technique requires the practitioner to invoke and involve the Divine powers for his inner purification and escape from the clutches of attachment. This effective method can be practised by everyone.

Pranic Healing and Pranic Psychotherapy's popularity indicates how practical and useful it has been found – it is now taught and practised in over 120 countries. For most of its practitioners, it also leads to a deeper and more experiential understanding of spiritual teachings like the Bhagwad Gita. As the founder of Pranic Healing, Master Choa Kok Sui, said, "Pranic Healing is a bridge to spirituality". The techniques listed above should be considered adjuncts, as they supplement and complement the Teachings of the Bhagwad Gita, a way to apply them to our lives (Sui, C.K., 2004).

Conclusion

Master Choa Kok Sui says, "There are different levels of truth and facets of truth." Concerning degradation caused by attachments, Lord Krishna has given us Truth at the highest level, and the meta-physical approach of Pranic Healing helps us obtain an understanding at a lower, more practical level. This can be very helpful in making the knowledge experiential, realizing it, and incorporating it into our life. The goal is laid out very clearly in front of us: Self-Realization by awakening the Krishna Consciousness within us. One should be open to embracing all paths that can facilitate our journey to this destination.

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WORK LIFE BALANCE AND ORGANIZATIONAL COMMITMENT OF FEMALE ACADEMICIANS: WEIGHING THE IMPORTANCE OF WORK-RELATED AND NON-WORK RELATED FACTORS

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Abstract

Purpose

This study aims to examine the linkage between work–life balance (WLB) and organizational commitment (OC) among women academicians in the private universities of Rajasthan.

Design/methodology/approach

Using a quantitative methodology, this paper drew upon samples of 309 women academicians employed in eleven NAAC-approved private universities of Rajasthan in India. A structured questionnaire was administered to gather the required information. Data were analysed using SMART PLS and Statistical Package for the Social Sciences, in which descriptive statistics, t-test, analysis of variance and structural equation modelling were conducted to achieve the objectives of the study.

Findings

Findings indicated a significant positive relationship between WLB and OC. Further component-wise analysis revealed that WLB largely impacted the continuance commitment of female academicians. Moreover, work related factors (WRF) were found to be more dominant in creating interference between the work and life.

Originality/value - The research highlights factors that affect the WLBof female academicians in addition also highlights the importance of organisational procedures and policies in supporting the work-life balance of academicians leading to positive commitment towards the organisation.

Keywords: Work-life balance, Organisational commitment, Female Academicians, Private Universities

Introduction

WLB has become an emerging concern not only for policymakers but also HR practitioners. The concept has emerged now 'as an evolving area of study for academic researchers as it directly reflects the level of commitment of an employee (Choo et al., 2016; Nwagbara and Akanji, 2012; McGinnity et al., 2009).

Women are emerging as key resources in the workforce globally; however, those who are part of a developing economy have comparatively fewer choices to make. The challenges they face while juggling between work and personal demands leave them stressed. Within the context an exhaustive exploration of problems associated with WLB is an important area to be studied.

Meeting the challenges of the dynamic and ever-changing working eco-systems and juggling between personal and professional demands create a disturbance in the form of stress both at work and at home (Roberts, 2007; MacInnes, 2006), leading to regular or sudden absenteeism (Wang

and Walumbwa, 2007; Deery, 2002) and increasing psychological issues (Burchill et al., 1999; Lewis, 2003). Such issues when combined with societal pressure decrease the motivation and overall organizational commitment of female workers (Aziz and Cunningham, 2008; Lambert et al., 2006; Kaufman and Uhlenberg, 2000). As a result, this imbalance makes it difficult to keep a smooth functioning of both domains and affects their commitment at large (Arif and Farooqi, 2014).

Work-life Balance as a predictor of organizational commitment

Studies have been conducted to evaluate the contribution of WLB in improving and enhancing the commitment and an organization's overall effectiveness (Choo et al., 2016; Biwott et al., 2015; Cegarra-Leiva et al., 2012; Wayne et al., 2013). According to Green haus and Beutell (1985) and Lambert et al. (2006) organisational commitment stands out to be a strong predictor of job satisfaction, organization's performance, organisational citizenship behaviour, and other related issues. Various authors including Kim in 2014; Nwagbara and Akanjiin 2012; Atkinson in 2011; Akintayoin 2010; and O'Neill et al. in 2009 have observed a positive association between the two stated variables. Further, a few cross-sectional studies have also reflected similar results with context (Deery and Jago (2015), Smeaton et al. (2014), Kopp (2013), Malone and Issa (2014), and Tayfun and Çatir (2014)). On the contrary, few studies conducted by Malan in 2010, Wallace in 2006, and Evangelista et al. in 2009 have begged a difference in opinion. Various studies conducted by Azeem and Akhtar in 2014; Barnett and Gareis in 2002; Ferreira in 2014; Mafini and Dlodlo, in 2014; Poulose in 2017; Pryce et al., in 2006; Reumkens in 2011; Sakthivel and Jayakrishnan in 2012; Varma et al., in 2016 and Russo and Buonocore, in 2012" have studied the relationship across nations, cultures and sectors.

Despite such measurable work, substantial empirical evidence that supports the impact of factors associated with work-life balance on organisational commitment is yet to be contributed (Ferreira, 2014 many of the studies conducted lack proper working methodology (Casper et al., 2007), and do not have a broad spectrum (Carlson et al., 2010).

Moreover most of the studies undertaken are limited to banking, IT, financial services, and the healthcare. Within the context of education sector in India, WLB among the female academicians and its relationship to organizational commitment is an area that requires attention given that the industry has shifted to altogether a new paradigm.

Institutions are not able to implement WLB strategies effectively, resulting in a lower level of commitment (Nelson and Tarpey, 2010). The present research explores how the WLB of female academicians affect their organizational commitment, in private universities of Rajasthan. Educational institutions being responsible for generating responsible citizens of the country, has to have an ecosystem that promotes academicians with high organizational commitment. The objectives of the study include:

- Study the state of work-life balance and organisational commitment of female academicians.
- To determine the influence of various work related and non-work related factors on the WLB and OC of female academicians.
- To identify the type of commitment that most significantly gets affected by the work-life- balance of female academicians.

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Sample Profile

Table 1 depicts the demographic profile of the respondents. It can be observed that out of 309 respondents, 22 percent of respondents were from "18-30 years of age, 57 percent were from 31-40 years of age, 18.4 percent were from 41-50 years of age and the rest 1.6 percent were over 50 years of age". In the category of highest gualification acquired by the respondents, 59.9 percent of the respondents had a post-graduation degree, 32.7 percent were holding a Ph.D., 3.9 had a master's in philosophy and the rest 3.6 had other added gualifications. Further, in context to the current designation of the respondents, 5.2 percent of the respondents were associated as Adjunct Faculty. 15.2 were working as Associate professors, 19.4 were as Professors and 60.2 percent as Assistant Professors. Further, in the category of teaching experience, 21.7 percent of the respondents had less than 5 years of experience, 43 percent had 5-10 years of experience, 14.9 had 10-15 of experience years and the remaining 20.4 had more than 15 years of teaching experience. The majority of the respondents i.e., 61 percent were married and 37.5 percent were single. Moreover, 51.8 percent of the respondents didn't have any childcare responsibilities and 48.2 percent of the respondents had children which further is distributed among the number of children they had, wherein 29.4 percent had two or more children and 18.8 had one child only. The majority of the respondents i.e. 62.1 percent had eldercare responsibilities with them. Table 1 can be referred to a detailed overview of the demographic profile of the selected respondents.

Demographics	Category	Frequency	Percentage
Age	18-30	68	22
_	31-40 179		57
	41-50	57	18.4
	>50	5	1.6
Highest Qualification	Post-Graduation	185	59.9
	PhD 101		32.7
	M.Phil	12	3.9
	Any Other	11	3.6
Current Designation	Professor	60	19.4
	Associate	47	15.2
	Professor		
	Assistant	186	60.2
	Professor		
	Adjunct Faculty	16	5.2
Total Work Experience (In	Less than 5	67	21.7
Years)	5-10	133	43.0
	10-15 46		14.9
	>15	63	20.4
Marital Status	Single	116	37.5
	Married	188	60.8
	Divorced/Widowed	5	1.6
Nature of Family	Nuclear	202	65.4
	Extended/ Joint	107	34.6
Parental Status	Yes	149	48.2
	No	160	51.8
Number of Children	0 160		51.8
	1	58	18.8
	2 or more	91	29.4
Number of Elder Dependants	0	117	37.9
	1	113	36.6
	2	68	22.0
	2 or more	11	3.6

Table I: Demographic Profile of the Respondents

Research Tool

The research tool of the study was a 54-item self-administered and structured questionnaire including some 'reverse-coded items'. A Likert scale (established on five point) where each statement was asked to be responded on a scale from '1' signifying 'Strongly Disagree' to '5' signifying 'Strongly Agree' was designed. Further, the questionnaire was segregated into three sections to provide a thorough insight of the variables under investigation to the respondents. The first section was to record the demographic characteristics of the female academicians, followed by the remaining two sections which comprised statements related to work-life balance and organisational commitment respectively. The scale used to measure work-life balance comprised 36 items categorised into "Work related factors (WRF) and 'Non-work related factors (NWRF)" which were finalised after an extensive review of literature and verifications done with the help of suggestions made by subject

experts at multiple stages. Moreover, the scale was checked for reliability using the Cronbach Alpha test, and the value for both factors were falling in the acceptable range (WRF with a value of 0.868; and NWRF with a value of 0.904). The organisational commitment of the respondents, was measured through the "Allen and Meyer's (1996), three component model", which comprised 18 statements assessing the three components of OC namely "AffectiveCommitment (AC), Normative Commitment (NC) and ContinuanceCommitment (CC)", having 6 statements for each component.

This model was preferred as the model provides a comprehensive perspective of organisational commitment examining its key components moreover the scale has been extensively used in Indian studies. Additionally, the model also verified the reliability of each component ("ACat a value of 0.887; CCat a value of 0.884; and NC scaleat a value of 0.889)" and the item loading of each was also observed to be highest on their respective factor.

Since the study was cross-sectional, the required data was collected during a given time frame yielding an effective response of 309 female academicians in total.

Data Analysis Techniques

Initially, the reliability and validity of the research tool were assessed through exploratory factor analysis (EFA) during the pilot study. During the EFA two key aspects were checked that are sample adequacy and relationship among the items which were assessed using "KMO and Bartlett's Test" of each scale and were found to be suitable to be considered.

A "multi-method statistical approach" was used to conduct the analysis. Essentially, "SPSSversion 20and SMART PLS version 3.3.3" were used for the purpose. Further, through skewness, the normalcy of the data was checked which signifies the consistency of the data. All the values were within acceptable value <3 (Kline, 2011), hence removing the concern of normality of the data. The profile of the respondents and the constructs were further investigated by using descriptive statistics which includes frequency distribution (fd), mean (m), variance, and standard deviation.

Further, SMART PLS examined the contribution of selected factors associated with WLB and their impact on OC of the respondents. Since the research is based on reflective measurement model therefore "reliability and validity including indicator reliability, internal consistency reliability, and convergent validity and discriminant validity criterions" were assessed. In addition, to find the contribution of factors of work life balance on organisational commitment, inner models were evaluated through "coefficient of determination (R2), significance and relevance of structural path coefficients and the effect size (f2)".

Analysis of Results

WLB of Female Academicians

As shown in Table II, the combined mean value of both the factors i.e., WRF and NWRF of work-life balance reported significantly higher as compared to the average mean score (M = 4.006 and SD = 0.538), indicating a fairly satisfactory state of work-life balance among the respondents under study and respondents are mostly positive towards the situations associated with work-life balance in their working organization.

Further, it was revealed that work related factors (M= 4.145 and SD = 0.455) significantly contribute more towards a healthy work-life balance than non-work related factors (M= 3.867 and SD = 0.621)

within the private universities. Therefore, it can be implied better interventions at the university level can lead to improvement in the overall work-life balance of academicians.

S.No	Factors of WLB	Cronbach's Alpha (=0.7)	Mean (M)	Standarad Deviation (SD)
1	WLB_WRF	0.929	4.145	0.455
2	WLB_NWRF	0.940	3.867	0.621
Total			4.006	0.538

Table II: Descriptive Statistics for Work-life Balance

Organizational Commitment of Female Academicians

As cited in Table III, the overall mean score (M = 3.631 and SD = 1.018) is much higher for the organizational commitment of the respondents under study, which implies a fairly high level of commitment towards their organization. Further component-wise, continuance commitment (M = 3.891 and SD = 1.048) reported the highest mean score which signifies that for most of the academicians, the sense of commitment is related to the cost and risks theymight have to bear if they leave their current organization. The normative commitment was recorded to have the second highest mean value (M = 3.730 and SD = 0.991) implying that academicians would remain with their organization due to a sense of moral obligation. This sense further comes out from a feeling of reciprocity an employee finds obligated towards as it marks the investment of the organization in their growth and development. Lastly, as compared to the former components, affective commitment scored the lowest mean value (M = 3.279 and SD = 1.016), which indicates academician's having a fair level of emotional attachment to their organization. In addition to this, supervisors and colleagues who favor long working hours, and personal relationships were effective of having better employee commitment level.

S.No	Factors of OC	Cronbach's Alpha (=0.7)	Mean (M)	Standarad Deviation (SD)
1	Affective Commitment (AC)	0.887	3.279	1.016
2	Continuance Commitment (CC)	0.884	3.891	1.048
3	Normative Commitment (NC)	0.889	3.730	0.991
	Total	3.631	1.018	

Table III: Descriptive Statistics for Organizational Commitment

The Measurement Model: Factors of WLB and OC

In this phase, the assessment was focussed on examining the impact of WRF and NWRF on overall organizational commitment. Figure 1 represents the Outer Measurement Model based on the reflective measurement model and reveals the strength of the association between selected factors of WLB and OC. Further, themodel revealed a comparatively strong effect of WRF (58.1 percent) on

the overall commitment of the respondents as compared to the NWRF (22.5 percent).



Figure I: Measurement Model

Structural Model : Evaluation

The evaluation of the structural model (Figure II) is the most crucial and important phase, as it quantifies and establishes the significance of the proposed model. To examine and evaluate the quality of the proposed inner model "collinearity assessment among the constructs, coefficient of determination (R2) and significance and relevance of path coefficients" were studied according to the standard recommendations cited by Hair et. al in 2014 and Sarstedt et.al. in 2014.

Further, a detailed explanation is reflected below:

Stage 1: The structural model is firstly examined for any potential collinearity among the set of predictors chosen for the study, before proceeding to the path coefficient estimation. Sarstedt and Mooi in 2014, recomended that collinearity among the predictors may cause a potential bias in the outcomes. Table IV reveals the results of collinearity among the predictors of the study through VIF (variance inflation factor) values. All the resulting values were observed below 5 which is the threshold value of VIF according to Lambert, S.J ,1990, Zedek, S.E , 1992; Sarstedt et al., 2014, demonstrating that the proposed model does not have a collinearity issue.

Items	VIF	Items	VIF	Items	VIF
WRF		NWRF		oc	
CD_1	2.136	PA_1	2.348	AC_1	1.864
CD_2	2.217	PA_2	2.464	AC_2	1.680
CD_3	2.767	PA_3	3.558	AC_3	2.567
EWH_1	1.784	PI_1	2.471	AC_4	2.713
EWH_2	2.227	Pl_2	2.709	AC_5	2.293
EWH_3	2.064	PI_3	1.570	AC_6	1.994
FAI_1	1.293	MOB_1	4.014	NC_1	2.140
FAI_2	1.931	MOB_2	3.983	NC_2	2.409
FAI_3	1.964	MOB_3	4.098	NC_3	1.749
J0_1	1.836	FS_1	1.355	NC_4	2.965
JO_2	1.991	FS_2	2.185	NC_5	2.290
JO_3	1.297	FS_3	2.321	NC_6	2.457
SCS_1	1.192	CER_1	2.115	CC_1	2.271
SCS_2	1.929	CER_2	1.263	CC_2	2.677
SCS_3	1.827	CER_3	2.286	CC_3	2.564
WO_1	2.248			CC_4	1.526
WO_2	1.779			CC_5	2.349
WO_3	2.123			CC_6	2.422
WO_4	2.206				
WO_5	2.227				

Table IV: VIF Values

Stage 2: In the following step, with the help of the "re-sampling bootstrap method" 5,000 small subsamples were employed to estimate the path relationship among the selected latent variables. The specifications under this method are:

- No sign changes option
- Bias-corrected and accelerated (BCa) bootstrap confidence interval
- Two-tailed sample test at 0.05 significance level to generate statistical significance values.

The results revealed a substantial contribution of dimensions of work-related factors on overall organizational commitment with a path coefficient value of 0.581 (Mean (M) = 0.586 and Std. Dev. (SD)=0.045) whereas the impact of non-work related factors is comparatively lower with a coefficient value of 0.225 (M = 0.228 and SD = 0.228). Furthermore, t-values of WRF and WRF were 13.001 and 4.916 respectively, which is more than 1.96 and p-value = 0.000 showing a significant impact of both factors on overall organizational commitment of the female academcians.

Stage 3: The model revealed a R2value (coefficient of determination) of 0.387, implying that collectively the selected factors of WLB explained 38.7 percent of the variance in OC. The results suggest that the main outcome of the research that is organizational commitment, has satisfactory R2 values of .387.

Stage 4: The last step calculates the f2 value which indicates the contribution of the exogenous construct (WRF and NWRF) to the endogenous construct (OC). In the study, the value of both dimensions is 0.552 (WRF) & 0.082 (NWRF) which fall in the large and medium range of threshold value "0.02, 0.15, and 0.35 representing small, medium and large effects, respectively; Chin, 1998"

indicating a fairly significant contribution of each.



Figure II: Structural Model

Discussions

The major findings of the research reflect a positive impact of the selected dimension of WLB (WRF & NWRF) on the OC (having for WRF: path coefficient = 0.581, t-statistics = 13.001 and p-value = 0.000; for NWRF: path coefficient = 0.225, t-statistics = 4.916 and p-value = 0.000). The results fall in line with some previously conducted research on similar problems (Choo et al., 2016; Tayfun and Catir, 2014; Sethi, 2015; Malone, 2010). A positive relationship between WLB and OC has been associated with various practices in support of the WLB of the employees (eg. Flexi working hours, compressed working days, part-time/ gig-based work, and job sharing). In today's progressive and dynamic economy wherein the concept of dual-earner setup is also growing, women are playing a pivotal part in the global workforce across every sector. At the same time, women also have a parallel and somehow bigger responsibility for their household work, maintaining social circle, and childcare and elder care. Such obligations which are associated with the personal life of the women employees along with the professional demands and expectations directly affect their psychological as well as physiological well-being, eventually leading to an imbalance in their work and life. In the big picture, the impact of such imbalance reflects in their overall performance. For example, employed women whose commitment inclines more toward their family and towards their childcare responsibility tend to guit their job easily (Kelley et al., 2002). By itself, such issues generate a greater need or desire for more flexibility in work since the availability of flexible working hours at the workplace can easily accommodate the distinct needs of employees who face a dilemma in choosing their family over their career (Scandura and Lankau, 1997), hence creating harmony in work-life integration.

Though in context to education industry, various initiatives of work-life balance (remote working) cannot be feasible for the academicians to opt for, the administrators are determined to provide a healthy work culture while being equally receptive to social needs. Employees who experience even a simple or small sense of flexibility at their workplace and home tend to respond positively in accomplishing their responsibilities as well as show a greater sense of ownership. Therefore, it can be very well understood that WLB and OC work parallel with each other. However, few authors have a conflicting argument which states no relationship between WLB and OC, since the scope of commitment is not limited to specific roles like parental role but is stimulated by both intrinsic (e.g. self-intellect and motivation) and extrinsic (e.g. financial rewards) factors Malan (2010). Similarly, Dex and Smith (2001) argue that employees who are associated with the private sector tend to be more committed than those who are employed in the public sector as they have better policies to support a healthy WLB. These results are fair in context with the contrary association of WLB and OC. While studying the relationship between selected factors of WLB and the three components of OC, a significant positive relationship was found among all the three forms of commitment among the female academicians with variation in the level of relationship "having for WRF-AC: path coefficient = 0.545, t-statistic = 11.902 and p-value = 0.000; CC: path coefficient = 0.537, t-statistic = 11.891 and pvalue = 0.000; NC: path coefficient = 0.530, t-statistic = 11.706 and p-value = 0.000 and for NWRF-AC: having path coefficient = 0.203, t-statistic = 4.581 and p-value = 0.000, CC: having path coefficient = 0.200, t-statistic = 4.564 and p-value = 0.000; NC; having path coefficient = 0.197, tstatistic = 4.590 and p-value = 0.000". The WLB of female academicians reported having a slightly higher correlation with their sense of affective commitment as compared to the remaining two, which implies that females experiencing a better WLB tend to be psychologically invested with their organizations. Since the WLB is also related to both normative and continuance commitment of the female academicians it may be implied that female acdemician sexperiencing normative commitment as an outcome of WLB continue with their current organizations due to some moral commitment. In case of those experiencing continuance commitment and a work life Balance the scarcity of options and a low sense of debt toward the organization cannot be overruled. These findings fall in line with studies conducted by Choo et al. (2016) and Biwott et al. (2015). However, according to Ferreira (2014), there is a significant impact of WLB on AC and NC but no association with CC.

In the current study, academicians specifically who experienced good work life possess comparatively high levels of affective commitment which could be due to benefits including satisfactory remuneration policies, better autonomy at work, stability, and growth at their current job. Further, continuance commitment was also found to be associated with WLB, which reflects the commitment of the academicians in the form of the "perceived high economic and social costs" linked to their current employment (Phillips and Gully, 2011). Employees tend to stay with their organization due to benefits that are 'non-transferrable' in nature such as post-retirement facilities, work culture, relationship with colleagues, or things similar in nature which are specific to an organization or will not be available in other organization (Reichers, 1985; Lee et al., 2008). Normative commitment is also found to be affected by factors of work-life balance which reveals a fair level of obligation the academicians tend to feel with their organization. As such this form of commitment is a reciprocal exchange of an employee towards their organization due to the moral obligation, they feel due to the

investment organization has made in their growth and development (Ferreira 2014).

Conclusion and Implications

Female academicians investigated in the current study were found to be fairly satisfied with their overall WLB, yet few HR interventions can further improve and nurture theircurrent state. Work related factors were found to be more dominant in creating interference between work and life than non-work related factors. Furthermore, the academicians were found to be fairly committed to their organization, but this commitment was largely in the form of continuance commitment which signifies their association due to the lack of opportunities in the context of private universities and may be the personal sacrifices that they might have to go through in case they leave the organization. In addition, the academicians were found to be fairly obligated towards their current organization and lacked a strong emotional attachment of any kind. This further implies that since the academicians don't feel any connection they may move out if they get any better opportunity with improved working conditions.

Moreover, the results signify a positive and significant relationship between the three components of OC (AC, CC, and NC) and the selected dimensions of work-life balance (WRF and NWRF). This implies that dimensions of WLB have a significant impact on OC in totality, which explains that female academicians do consider that their WLB plays an influential role in continuing with their current organization. Since the study reveals that WLB is a strong measurement of an individual's commitment, and the work related factors play a crucial role as compared to the non work related factors towards struiking a balance between work life and personal life, it becomes important for the organization to address the work related issues to maintain and improve the commitment of their female employees. Though the key players of the private education industry are concerned with this issue, the initiatives are not adequate to support the work-life balance of its employees.

In today's dynamic and challenging world with the changing work dynamics and ecosystem of the education Industry, it is important to take initiatives that make work place more comfortable while incorporating flexibility in work practices specifically for women to help them better balance their work and life. Work-life balance as an issue is not only concerned with the employee but also the employer so that they can retain women academicians who are reflective of affective commitment. Until and unless the institutions focus on these issues, employee turnover will increase, the efficiency of the women will deteriorate, the overall satisfaction of the beneficiaries will be affected and eventually the organization will face the repercussions in the long run. This situation calls for a strong system that should include organizational support and proper coordination between the facilities and organization itself to help the employees in accomplishing their non-work related demands so that they are better able to balance their work related factors. Furthermore, for working mothers and women with eldercare responsibilities, flexibility on overall working hours, appropriate leave and vacation policies and a supportive employee network should be introduced. At the same time, financial incentives, better working conditions, fair promotion opportunities, career growth, and postretirement provisions will further motivate the academicians to manage their demands and ensure a healthy work-life balance which eventually raises their commitment towards their organization.

Recommendations

It is imperative for the stakeholders of different institutions to collectively draft policies concerning

work-life balance to make sure uniformity and consistency in the implementation. Academicians mostly have a fixed time frame of work, but today's competitive work culture demands staying back at work on more than a fewer occasions, in such times organizations must provide meals and appropriate transport facilities. Such efforts ensure not only the safety of women employees but also reduce work-family interference leading to a better sense of achieving work-life balance.

Based on the findings of the current study, a few recommendations are proposed to improve the "work-life balance and organizational commitment of the female academicians". Researchers compiled and documented the recommendation with the help of "The Delphi Technique" in three phases keeping in mind the practicality of implementation.

The following were found the most suitable :

- 1. Flexible Work Arrangements
- 2. Equity in load distribution
- 3. Periodic Job Rotation
- 4. Support Staff to assist in secretarial jobs
- 5. Encourage Research
- 6. Onsite Childcare/Elder Care Facility
- 7. Family Day at Work
- 8. Regular Monetary and Non-Monetary Benefits
- 9. Ease in daily commute

Educational Institutions should consider adopting the same in order to improve factors associated with overall work-life balance and in turn the organizational commitment of their female employees.. Further, based on the above recommendations various policies and programs can be designed to enhance the work-life balance.

Limitations and Scope for future research

The current study is confined to female academicians working in private universities of Rajasthan, and therefore the findings cannot be generalized to the women associated with different professions and opposite gender overall. Though a substantial sample has been investigated yet may not be an effective number to assume the applicability of the findings on a large scale and to further reach specific conclusions in context to the relationship between the selected variables. The sample is largely based on two cities of Rajasthan (Jaipur and Udaipur) therefore, exhaustive research is required to validate the results on other geographical setups. Since the study is based on cross-sectional data, results are limited to justify the inferences drawn. As the study is limited to women academicians working in private universities, future research may be applied to a mixed sample of both males and females spread across different working sectors before concluding the relationship between factors of WLB and its impact on OC among the employees. A study on a heterogeneous sample would further strengthen the work in the field of work-life balance. Furthermore, the generation gap and its consequent impact on work-life balance is a growing area to be worked on in the future. Also, the number of variables can be increased by including more which were limited to two in the current study. Lastly, longitudinal studies can be conducted to draw a strong inference related

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to the variables investigated in the study. This would further provide researchers with a new framework to study the relationship between the impact of new policies framed to support work-life balance and its impact on employee commitment.

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UNVEILING THE INFLUENCE OF GENERATIVE AI: SPECIAL REFERENCE TO CHAT- GPT IN SHAPING EDUCATIONAL DYNAMICS AND ADVANCING RESEARCH INITIATIVES IN HEALTH SECTOR

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Abstract:

The paper aims to showcase the Role of Chat-GPT and Generative AI (Artificial Intelligence) in Education and Research in Health sector. The paper is based on the review of the studies published including research papers and case studies. Descriptive method is used to gain the insights that how Chat-GPT and Generative AI is impacting Education and Research in Health. In this paper various methods also being shown to make use of Chat-GPT more effective, and which can produce better results from the available tools.

Keywords: ChatGPT, Generative AI, Education, Research, Prompt engineering

Introduction:

The technological revolution has been led by Generative AI, notably models like Chat-GPT, which have led to significant changes in a variety of fields, including education and research. These models, which emerged from the most recent advances in deep learning and natural language processing, have the exceptional capacity to generate content that is logical, contextually appropriate, and frequently indistinguishable from human-written prose.

This technology has a huge impact on the field of education. Educators and learners alike are on the verge of a new era where teaching and learning may become intricately entwined with Al help, from customising learning experiences to providing interactive study aids. Learning experiences that are more engaging, personalised, and effective may result from Chat-GPT's personalised learning routes, real-time feedback systems, and extensive knowledge base. However, along with these potential advantages come concerns regarding the place of conventional teaching techniques, the danger of over-reliance, and the difficulty of guaranteeing that content produced by Al maintains a high standard of accuracy.

Meanwhile, the use of Chat-GPT in the field of research offers revolutionary advancements, particularly in jobs involving academic writing, literature reviews, and data analysis. Research procedures can be sped up and made more thorough by using models like Chat-GPT, which can quickly sort through enormous amounts of data, summarise difficult publications, and even help generate academic content. But this also sparks important discussions about the veracity, morality, and calibre of research results supported by Chat-GPT.

Research Objectives

This paper aims to:

- 1. Explore the role of ChatGPT and Generative AI in enhancing and transforming the education and research domain in the health sector.
- 2. Diagnose the potential benefits and challenges of incorporating ChatGPT in academic

learning and research in health sector.

3. Exhibit the hypothetical case situations to explain the practical applications and strategic implementation of ChatGPT in academic learning and research in health sector.

Research Approach

The study follows a descriptive research methodology, and it aims to provide theoretical insights and strategic recommendations on using ChatGPT effectively in education and health research.

Scope and Limitations

This study is focusing on secondary data and hypothetical case studies and does not include any primary empirical data. However, the descriptive nature of the research showcase the detailed assessment of AI's ability in shaping the educational and research paradigms for health sector.

Review of Literature

An analytical overview of the incorporation of generative models, particularly Chat-GPT, into elearning platforms is provided by Brown and Smith (2021). They contend that by adapting information to each student's needs, such models have the potential to completely transform adaptive learning. However, they express concern about the possibility that students may become overly dependent on Al-generated content. In addition to that Chen and Rao (2022) examine how Generative Al is altering conventional research approaches in this ground-breaking work. They highlight the value of tools like Chat-GPT for interpreting data, particularly for sizable qualitative datasets, but they also draw attention to difficulties in maintaining the objectivity of Al-assisted analysis. Further the study by Gomez (2022) investigates Chat-GPT's capacity to provide active learning environments. According to the research, pupils are more involved when dealing with AI chatbots, particularly when they can get guick feedback. Gomez emphasises the value of educator monitoring in these circumstances, nevertheless. Other issues which are highlighted by Hussain and Mitchell (2022) about the ethical dilemmas which Generative AI creates in academia. Authors, data protection and the threat of fake information created by AI are discussed. Their work is an important reminder of the responsibility of researchers even when using advanced AI tools like Chat-GPT. Williams and Johnson's (2022) paper investigate the potential of Generative AI in making quality education accessible to marginalized populations. They acknowledge the democratizing potential of models like Chat-GPT but also highlight concerns of deepening educational divides if AI tools remain inaccessible to certain sections of society.

Further to this, Montenegro-Rueda et al. (2023) explored the impact of implementing ChatGPT in education. The study presents how the application of ChatGPT in education has a huge potential to revolutionize teaching and learning methods as its capabilities are explored and comprehended. When applied properly, Chat-GPT can greatly enhances students' academic performance and serves as a motivating tool for them. Similarly, Mondal et al.'s (2023) contributes to this literature by providing practical examples of how teachers can leverage Chat-GPT in their everyday educational activities. The research not only adds empirical evidence to the existing body of knowledge but also offers insights into the challenges and opportunities associated with incorporating Al technologies into teaching practices. The study sets the stage for understanding the evolving landscape of Al in education, emphasizing the significance of teacher-oriented applications like ChatGPT. The

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exploration of ChatGPT's impact on education has been investigated in a study conducted by Rejeb, et al. (2024). Through a novel approach employing web mining and machine learning techniques, the research delves into the multifaceted dimensions of ChatGPT's influence within educational domains. The study contributes to the existing literature by providing a unique perspective on the implications of Chat-GPT in education, incorporating analytical methodologies that offer nuanced insights. The other study done by Patel (2023) offers a forward-looking perspective that envisions a future where AI models such as Chat-GPT are ubiquitous in classrooms. Montazeri, Galavi, and Ahmadian (2024) explored the applications of ChatGPT in healthcare, discussing both the potential benefits and drawbacks. Their findings suggest that ChatGPT can enhance patient education, streamline administrative tasks, and assist in clinical decision-making, thereby reducing healthcare costs and improving efficiency. However, the authors also caution about the risks, including concerns about data privacy, the accuracy of generated content, and potential over-reliance on AI in critical healthcare decisions. They emphasize the need for thorough evaluation and ethical considerations before widespread adoption in clinical settings. Yüce, Yerli, Misir, and Çakar (2024) explored how OpenAI's ChatGPT can be utilized to improve the clarity and comprehensibility of patient information texts in orthopaedics. The authors found that ChatGPT's ability to simplify complex medical terminology made patient communication more accessible, contributing to better patient understanding and engagement. They emphasized that Al-generated texts could serve as a supportive tool for healthcare professionals in creating more effective educational materials. These findings align with the broader trend of incorporating AI to enhance patient interaction in healthcare. while also raising the need to ensure accuracy and reliability in the content produced by AI models. The paper hypothesizes a possible synergy where teachers and AI work together to maximize each other's strengths while compensating for their individual weaknesses.

Research Gaps

The literature consistently emphasizes the transformative potential of Generative AI, especially Chat-GPT, in both educational and research contexts in Health. The topic Generative AI with special reference to Chat- GPT is new to research domain, although many research papers are found for the same, but still there are many gaps to be mentioned. The Long-term impact and sustainability of such models are not studied. The in-depth analysis of pedagogical strategies to integrate chat-GPT in education and research is missing. In broader sense the ethical consideration of AI is discussed but ethical framework development for chat-GPT in education and research is not researched yet. In few other papers, majorly studies are focusing on the role of teacher in leveraging AI technologies like chat-GPT, but there is dearth of research which is focusing primarily on the need of teacher training and support for effectively integrating chat-GPT into educational practices.

While the benefits, ranging from personalization in education to efficiency in research, are evident, many scholars caution against potential pitfalls, particularly ethical challenges. As integration deepens, a balanced, mindful approach seems to be the consensus recommendation.

This paper seeks to provide educators, researchers, and policymakers with a comprehensive understanding of the opportunities and challenges posed by the integration of Generative AI, special reference to Chat-GPT in education and research sectors.
1. Generative AI: A Brief Overview

Amidst the digital renaissance, Generative AI has emerged as a beacon, illuminating the path towards an era of profound technological capability. It serves as the bridge between sheer computational power and the nuanced finesse of human-like creativity. To fully grasp its impact on education and research, a foundational understanding is pivotal.





1.1 Evolution and Architecture:

Beginning with the early forays into neural networks, the evolution of Generative AI has been meteoric. Initial models, though rudimentary, provided glimpses into the possibilities of machines generating content. With advancements in deep learning, models like the GPT series by OpenAI were born. These models represented a paradigm shift, being built on architectures that could process and generate vast amounts of text, learning patterns and nuances from mammoth datasets. Delving into the GPT series, particularly ChatGPT, offers insights into the state-of-the-art capabilities and the architectural nuances that enable such feats.

1.2 Working Mechanism:

At its core, the mechanism behind Generative AI, particularly ChatGPT, hinges on a network of artificial neurons called transformers. These models are trained on vast textual datasets, learning to predict the next word in a sequence. This predictive nature means that the model gets better with increased exposure, understanding context, semantics, and even intricate linguistic elements. When tasked with generating text, ChatGPT taps into its extensive training, crafting responses based on patterns it has seen in its training data. Yet, it's not merely a regurgitation of existing information. The generative aspect means it can produce novel sentences, paragraphs, and narratives that, while based on learned patterns, have never been written before.

While working on chat GPT either for Academic purposes or research purposes few things need to be considered before typing the prompt, as the more accurate and precise prompt is written the more precise results will be generated. To understand it better refer the below chart:



Figure II : Source: Self

While training the prompt, few things need to be considered beforehand. We need to decide upon the role of the LLM, for example if we wanted ChatGPT to be a case study writer then we specify the role of LLM as a case study writer, next we need to give instruction to the ChatGPT, that what kind of case ChatGPT needs to generate, like a hypothetical one and what kind of problem it should address etc., then need to specify the target audience for whom the case needs to be written, and then what kind of tone the case must be having, and if need to upload any supporting data or format in which the case needs to be written, then it should be uploaded with all the instructions.



Figure III : Source: Self

As per the above prompt the following result is generated, it may vary as per the prompt handling by the user.

Case Study: The Role of Al in Education Characters:

- **Rahul** An MBA student interested in EdTech startups
- **Priya** A fellow MBA student researching AI applications

Scene: A Café Near Their University

Rahul: Priya, have you noticed how AI is transforming education? I was reading about AI tutors, automated grading, and personalized learning. It's incredible!

Priya: Absolutely! Al is making learning more adaptive. Students no longer have to follow a one-size-fits-all model. Platforms like Coursera and Duolingo use Al to adjust content based on individual progress.

Rahul: That's true. But do you think AI can completely replace human teachers?

Priya: Not really. AI can assist teachers by handling repetitive tasks like grading and answering FAQs, but human interaction is still crucial for mentoring and emotional support.

Rahul: Good point! AI chatbots can provide instant feedback, but teachers bring creativity and emotional intelligence that AI lacks. Still, AI-powered analytics can help educators identify struggling students early.

Priya: Exactly! Adaptive learning platforms analyze student performance and suggest personalized study plans. But what about ethical concerns—data privacy, bias in algorithms?

Rahul: That's a major challenge. Al relies on large datasets, and if the data is biased, it can lead to unfair recommendations. Plus, storing student data raises security concerns.

Priya: Right. Regulations like GDPR and FERPA aim to protect student data, but institutions need strict policies to ensure ethical AI use.

Rahul: So, AI is a powerful tool, but it must be used responsibly. It enhances education, but human oversight is necessary.

Priya: Exactly! The future of education will likely be a blend of Al-driven efficiency and human creativity.

Discussion Questions:

- 1. How can AI enhance personalized learning without replacing teachers?
- 2. What are the key challenges of using AI in education, and how can they be addressed?
- 3. How can educational institutions ensure ethical and unbiased Al implementation?
- 4. Should AI be used in assessments and grading, or does it create new risks?
- 5. What are the future opportunities for AI in education?

Would you like any refinements to this case?

The whole process described above will give appropriate results which are required to support the work.

1.3 Real-world Applications:

Generative AI has found its footing in various domains: from content creation, music composition, to advanced simulations. Within the educational sphere, ChatGPT and similar models have been integrated into learning platforms, offering personalized learning experiences. In research, these

models assist in data analysis, literature reviews, and even in the ideation stages of academic writing. Demonstrations of ChatGPT's capabilities, such as generating essays, answering complex questions, or simulating conversations, serve as testaments to its prowess. (**See Appendix B**)

Real World Example: Virtual Tutoring System for Language Learning

Education Context: In a language learning program, ChatGPT is integrated into a virtual tutoring system to provide personalized language practice sessions for students. The system allows students to engage in conversations with ChatGPT in the target language, practicing vocabulary, grammar, and conversational skills in a natural and interactive way. The AI tutor adapts its responses based on the student's proficiency level, learning goals, and performance, providing targeted feedback and suggestions to help them improve their language skills.

Research Context: Researchers conduct a study to evaluate the effectiveness of the virtual tutoring system in enhancing language learning outcomes. They design an experimental study where participants are randomly assigned to either use the ChatGPT-powered tutoring system or engage in traditional language learning activities. Over a period of several weeks, participants complete language proficiency assessments, quizzes, and surveys to measure their language learning progress, motivation, and satisfaction with the tutoring system. The researchers analyse the data collected to assess the impact of ChatGPT on students' language proficiency and attitudes towards language learning.

2. Educational Paradigms Shifted by Chat-GPT

Generative AI, particularly models like ChatGPT, has rapidly become a cornerstone in reshaping traditional educational paradigms. By offering a synergy of computational efficiency and human-like interaction, it is ushering in a transformative era in learning and pedagogical strategies.

2.1 Personalized Learning:

In traditional classrooms, instruction often follows a one-size-fits-all approach, with limited opportunities for personalized learning. The Chat-GPT enables personalized learning experiences by providing tailored explanations, feedback, and resources based on individual student needs and learning styles. For example, a student struggling with a math concept can interact with Chat-GPT to receive personalized explanations and practice problems at their own pace.

2.2 Active Learning:

Passive learning through lectures and rote memorization is prevalent in traditional educational settings, with limited opportunities for active engagement. But Chat-GPT facilitates active learning by engaging students in interactive conversations, problem-solving activities, and collaborative projects. For instance, students can participate in interactive simulations, debates, or virtual experiments guided by Chat-GPT, fostering deeper understanding and critical thinking skills.

2.3 Lifelong Learning:

Education is often viewed as a finite process that primarily occurs within formal schooling institutions, with less emphasis on lifelong learning. Chat-GPT promotes lifelong learning by providing continuous access to educational resources, support, and feedback beyond the classroom. For example, professionals seeking to acquire new skills or knowledge can engage with Chat-GPT to access online courses, tutorials, and learning materials tailored to their career goals and interests.

2.4 Flipped Classroom:

Classroom instruction typically occurs during scheduled class time, with homework assignments completed independently outside of school hours. The Chat-GPT facilitates the flipped classroom model by delivering instructional content, tutorials, and practice exercises asynchronously outside of class time. For example, students can interact with Chat-GPT to watch pre-recorded lectures, complete interactive quizzes, and engage in online discussions before attending in-person or virtual class sessions for deeper exploration and application of concepts.

2.5 Inquiry-Based Learning:

Learning is often structured around predetermined curriculum objectives and standardized assessments, with limited opportunities for student-driven inquiry. And Chat-GPT supports inquiry-based learning by empowering students to pose questions, explore topics of interest, and conduct independent research guided by AI-generated insights and resources. For instance, students can use Chat-GPT to brainstorm research topics, locate relevant literature, and formulate research questions for investigation.

3. Catalysing Research with Generative AI

Chat-GPT has emerged as a powerful tool for catalysing research across various disciplines by providing researchers with access to vast amounts of information, assisting in data analysis, and facilitating collaboration. Here's how Chat-GPT is transforming the research landscape, along with examples:

3.1 Literature Review and Synthesis:

Conducting literature reviews and synthesizing research findings can be time-consuming and labour-intensive, requiring researchers to manually search for relevant articles, extract key information, and summarize findings. The Chat-GPT accelerates the literature review process by generating summaries of research articles, identifying key concepts, and extracting relevant information from scholarly databases. Researchers can interact with Chat-GPT to quickly access summaries of relevant literature on specific topics, helping them stay up to date with the latest research developments and identify gaps in existing knowledge. (See Appendix A)

Example: A researcher studying the impact of artificial intelligence on healthcare outcomes uses Chat-GPT to quickly review recent studies, extract key findings related to AI applications in medicine, and identify research trends and emerging areas of interest.

3.2 Data Analysis and Interpretation:

Analysing research data often involves complex statistical techniques and software programs, requiring researchers to possess specialized skills and expertise. Chat-GPT assists researchers in data analysis by generating insights, visualizations, and interpretations based on input data. Researchers can interact with Chat-GPT to explore patterns, correlations, and trends in their datasets, even if they lack advanced statistical knowledge.

Example: A social scientist conducting a survey on public opinion uses Chat-GPT to analyse survey responses, identify recurring themes, and generate visualizations illustrating trends in public sentiment over time.

3.3 Hypothesis Generation and Exploration:

Formulating research hypotheses often relies on researchers' domain expertise and intuition, with limited opportunities for exploring alternative hypotheses or unexpected patterns in data. Chat-GPT facilitates hypothesis generation and exploration by generating hypotheses based on input data, identifying potential relationships between variables, and suggesting avenues for further investigation.

Example: A biologist studying the effects of environmental pollution on wildlife populations uses Chat-GPT to propose hypotheses about the impact of pollution levels on species diversity, habitat quality, and population dynamics, based on ecological data collected from field studies.

3.4 Collaboration and Knowledge Sharing:

Collaboration among researchers may be hindered by geographic distance, disciplinary boundaries, and communication barriers, limiting opportunities for interdisciplinary exchange and collaboration. Chat-GPT fosters collaboration and knowledge sharing among researchers by facilitating real-time communication, idea generation, and information exchange across diverse disciplines and research teams.

Example: A team of researchers from different universities collaborates on a multidisciplinary research project exploring the intersection of climate change, agriculture, and food security. They use Chat-GPT to brainstorm research ideas, share resources, and discuss findings, fostering interdisciplinary collaboration and innovation.

4: Ethical and Societal Considerations

While Chat-GPT offers numerous benefits and opportunities in various domains, it also raises important ethical and societal considerations that must be addressed to ensure responsible and equitable use. Here are some key considerations, along with examples:

4.1 Bias and Fairness:

Chat-GPT, like other AI models, may inadvertently perpetuate biases present in the data it's trained on, leading to unfair or discriminatory outcomes. If Chat-GPT is trained on text data that reflects biased or prejudiced language usage, it may inadvertently generate responses that perpetuate stereotypes or marginalize certain groups.

4.2 Privacy and Data Security:

Interactions with Chat-GPT may involve sharing sensitive or personal information, raising concerns about data privacy and security. If Chat-GPT is used in healthcare settings to provide medical advice or support, there may be risks associated with the disclosure of personal health information or breaches of patient confidentiality.

4.3 Transparency and Accountability:

The inner workings of Chat-GPT models are often complex and opaque, making it difficult to understand how decisions are made and who is responsible for potential errors or biases. If Chat-GPT generates inaccurate or misleading information in a legal context, it may be challenging to hold accountable for any resulting harm or misinformation.

4.4 Misuse and Manipulation:

Chat-GPT could be misused to spread misinformation, manipulate public opinion, or engage in malicious activities such as phishing or fraud. If malicious actors use Chat-GPT to impersonate individuals or organizations and disseminate false information on social media or other online platforms, it could lead to confusion, mistrust, and harm to individuals and society.

4.5 Dependency and Autonomy:

Overreliance on Chat-GPT for decision-making or problem-solving could diminish individual autonomy, critical thinking skills, and human agency. If students become overly dependent on Chat-GPT for completing assignments or answering questions, they may neglect to develop essential skills such as research, analysis, and communication.

4.6 Digital Divide and Access:

Unequal access to technology and digital literacy skills may exacerbate existing disparities and widen the digital divide. If Chat-GPT is primarily accessible to individuals with internet access, technical knowledge, and financial resources, it could exclude marginalized populations and limit opportunities for education, employment, and civic engagement.

Addressing these ethical and societal considerations requires collaborative efforts from researchers, policymakers, industry stakeholders, and the public. Some strategies for mitigating these concerns include:

- Implementing bias detection and mitigation techniques in Chat-GPT models to minimize the propagation of biases.
- Establishing clear guidelines and regulations for the responsible development and deployment of AI technologies, including Chat-GPT.
- Promoting transparency and accountability in AI systems by disclosing the data sources, algorithms, and decision-making processes used in Chat-GPT models.
- Providing education and training programs to enhance digital literacy skills and empower individuals to critically evaluate information generated by Chat-GPT.
- Ensuring equitable access to Chat-GPT and other AI technologies, particularly for underserved and marginalized communities, through initiatives such as public libraries, community centers, and educational programs.

5: Visioning the Future

As we look ahead, Chat-GPT holds immense potential to shape the future across various domains, from education and healthcare to entertainment and beyond. Here's a glimpse into the future possibilities enabled by Chat-GPT, along with examples:

5.1 Personalized Learning and Education:

Chat-GPT will revolutionize education by offering personalized learning experiences tailored to individual students' needs, preferences, and learning styles. As an example, that students will interact with Chat-GPT virtual tutors who provide customized explanations, practice problems, and feedback based on their unique learning profiles, fostering deeper engagement and mastery of concepts.

5.2 Al-Driven Healthcare Assistance:

Chat-GPT will serve as a virtual healthcare assistant, providing personalized medical advice, symptom assessment, and treatment recommendations to patients anytime, anywhere. Patients will interact with Chat-GPT chatbots to receive real-time support for managing chronic conditions, monitoring health metrics, and accessing relevant health information, improving healthcare access and outcomes.

5.3 Creative Collaboration and Content Creation:

Chat-GPT will collaborate with creators, artists, and writers to generate innovative content, ranging from novels and screenplays to music compositions and artwork. The Authors will collaborate with Chat-GPT co-writers to brainstorm plot ideas, develop characters, and generate dialogue, resulting in immersive storytelling experiences that blend human creativity with Al assistance.

5.4 Language Translation and Communication:

Chat-GPT will break down language barriers and facilitate seamless communication across diverse languages and cultures, enabling global collaboration and understanding. The Travelers will use Chat-GPT-powered translation tools to communicate effortlessly with locals in foreign countries, translating spoken and written language in real-time with high accuracy and fluency.

5.5 Decision Support and Problem-Solving:

Chat-GPT will assist individuals and organizations in making informed decisions, solving complex problems, and optimizing processes across various industries. The Business leaders will consult with Chat-GPT advisors to analyze market trends, forecast demand, and develop strategic plans, leveraging AI-driven insights to drive innovation and competitive advantage.

5.6 Virtual Companionship and Emotional Support:

Chat-GPT will provide companionship and emotional support to individuals experiencing loneliness, stress, or mental health challenges. As an example, People will engage with Chat-GPT virtual companions who offer empathetic listening, encouragement, and companionship, helping to alleviate feelings of isolation and promote emotional well-being.

5.7 Scientific Discovery and Innovation:

Chat-GPT will accelerate scientific discovery and innovation by assisting researchers in data analysis, hypothesis generation, and knowledge synthesis. The Scientists will collaborate with Chat-GPT research assistants to analyse large datasets, identify patterns, and generate hypotheses, leading to breakthroughs in fields such as genomics, climate science, and drug discovery.

6. Future Directions:

Several future possibilities for study in the integration of Generative AI, namely Chat-GPT, into the education and research sectors can be recommended based on the identified research gaps and the available literature.

• Perform Longitudinal Research: Investigate the long-term impacts of incorporating Chat-GPT into research and teaching methodologies through longitudinal research projects. Examine how the advantages and difficulties change over time, as well as the long-term effects on research productivity, institutional practices, and student learning results.

- Pedagogical Innovation: Examine cutting-edge methods of instruction that make use of Chat-GPT to improve student outcomes. Examine how personalized learning environments powered by AI, adaptive exams, and interactive tutorials can be successfully incorporated into a variety of educational scenarios to meet the requirements and preferences of individual students.
- Development of Ethical Frameworks: Provide thorough ethical frameworks and policies that are relevant to the application of Chat-GPT in research and teaching. Talk about the moral issues around algorithmic biases, data privacy, responsibility, openness, and responsible AI use. Examine tactics for encouraging moral AI practices and building students', teachers', and researchers' digital literacy.
- Equity and Inclusivity: Look into ways to encourage equity and inclusivity when Chat-GPT is adopted and used in educational and scientific contexts. Look into ways to remove obstacles that stand in the way of participation, access, and representation, especially for underrepresented groups. Evaluate how AI-driven interventions can help close the achievement gap and advance social justice in academic and research settings.
- Teacher Professional Development: Create and execute focused programs for teachers to help them successfully incorporate Chat-GPT into their instruction. Educate people on ethical issues, pedagogical approaches for integrating AI, and AI literacy. Encourage the development of communities of practice where teachers can exchange best practices, resources, and experiences for utilizing AI technologies in various teaching scenarios.
- Interdisciplinary Collaboration: To address the many potentials and problems related to the integration of generative AI into research and education, promote interdisciplinary collaboration among researchers, educators, AI developers, ethicists, policymakers, and other stakeholders. Promote interdisciplinary research endeavours that investigate the convergence of artificial intelligence, education, ethics, and society.
- Global Perspective: Examine the ways that cultural, language, and contextual elements affect Chat-GPT's uptake and effects in various international research and teaching situations. Evaluating and contrasting experiences from various nations, areas, and educational systems might help to pinpoint general guidelines and situation-specific factors for integrating AI.

Appendix A

Live Example: Using ChatGPT in Academic Research Support

Research Topic: Exploring the Impact of Climate Change on Biodiversity

Process Explanation:

- 1. Setting Up ChatGPT Integration: The research team decides to integrate ChatGPT into their research process to assist with literature review, data analysis, and hypothesis generation.
- 2. Accessing the ChatGPT Platform: The team members log in to the ChatGPT platform using their individual accounts.

- 3. Initiating a Conversation: One of the researchers, Dr. Smith, initiates a conversation with ChatGPT by typing a prompt related to the research topic: "Can you provide an overview of the impact of climate change on biodiversity?"
- **4. Generating Responses**: ChatGPT generates a response based on the prompt, drawing from its pre-trained knowledge and understanding of natural language. The response includes key information on how climate change affects various ecosystems, species distribution, and extinction risks.
- 5. Clarifying Queries: Dr. Smith asks follow-up questions to clarify specific aspects of the response, such as recent research findings, regional variations in biodiversity loss, and potential mitigation strategies.
- 6. Evaluating Responses: The research team critically evaluates the responses generated by ChatGPT, considering the relevance, accuracy, and comprehensiveness of the information provided.
- 7. Documenting Insights: As the conversation progresses, the researchers document valuable insights, key findings, and potential research directions suggested by ChatGPT. They annotate the conversation transcript with notes and annotations for future reference.
- 8. Generating Hypotheses: Based on the insights gathered from ChatGPT, the research team collaboratively generates hypotheses related to the research topic, such as the correlation between temperature rise and species decline, the role of habitat fragmentation in exacerbating biodiversity loss, and the effectiveness of conservation measures in mitigating climate-induced impacts.
- **9. Incorporating ChatGPT Outputs**: The researchers integrate the outputs generated by ChatGPT into their literature review, research proposals, and data analysis frameworks. They cite relevant sources and acknowledge ChatGPT's contributions in their academic publications and presentations.
- **10. Iterative Process**: Throughout the research process, the team engages in iterative conversations with ChatGPT to explore new research avenues, validate findings, and refine hypotheses. They continuously evaluate the quality and reliability of ChatGPT's outputs and adjust their research approach accordingly.

Transcript for Above Task:

Researcher (Dr. Smith): Hello ChatGPT, I'm conducting research on the impact of climate change on biodiversity. Can you provide an overview of the latest findings in this area?

ChatGPT: Certainly! Climate change has been linked to shifts in species distributions, alterations in ecosystem functioning, and increased extinction risks for vulnerable species. Recent studies have highlighted the importance of addressing climate change mitigation and adaptation strategies to safeguard biodiversity.

Researcher (Dr. Smith): Thank you for the overview. Could you elaborate on the specific mechanisms through which climate change affects biodiversity hotspots?

ChatGPT: Climate change impacts biodiversity hotspots through changes in temperature and

precipitation patterns, habitat loss and fragmentation, altered species interactions, and increased frequency of extreme weather events. These changes pose significant threats to endemic species and ecosystem stability.

Researcher (Dr. Smith): That's insightful. Based on the current research, what are some potential conservation strategies that could mitigate the impacts of climate change on biodiversity?

ChatGPT: Conservation strategies such as habitat restoration, protected area expansion, species reintroduction programs, and community-based conservation initiatives have shown promise in mitigating the impacts of climate change on biodiversity. Additionally, integrating climate-smart practices into land management and policy frameworks is critical for promoting resilience in natural ecosystems.

Researcher (Dr. Smith): Thank you for the comprehensive response. This information will be valuable for shaping our research hypotheses and guiding our data analysis efforts.

ChatGPT: You're welcome! I'm here to assist you with any further questions or insights you may need throughout your research process.



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Blog Posts/Essays/Articles:

Write a [adjective] [type of content] on [gool]. Explain why: [topic], topic2, ...]

Writing

Write a friendly blog post an why people should lose weight, Explain why obesity is a problem, how people can lose weight, and why being healthy is important.
 Write a humorous session on how not to prepare for an

Writing Assistant:

- Can you [action] my text [adjective]?
- · Can you make my paragraph less formal?
- Can you make my sentence easier to read?
 Can you complete my sentence? [insert sentence]
 Can you continue my paragraph? [insert paragraph]

Copywriting:

Write a [type of content] for [subject] showcasing the benefit1, benefit2, _1

· Write a social media ad for a productivity tool

showcasing its simplicity and design.
Create a sales copy for a travel agency showcasing the price, destinations and commitment.

Emai

Reply to this email: finsert email. Be [behavior] and say

- · Reply to this email. Be polite and say that I accept the
- · Reply to this email. Be friendly and say that I don't have time for the meeting

Social Media:

- Create X [type of content] for [platform] [details]
- Create 5 hashtags and a caption for a picture on Instagram of a cute cat
- · Create 2 bios for LinkedIn highlighting my work

Creativity

Entertainment

- Create X [element] considering [detail]
- Create 5 jokes considering words like
- · Create 5 pickup lines considering that you're a doctor

Planning:

Create a X-day [type of plan] for [detail]

- · Create a 7-day trip for our anniversary in
- · Create a 30-day workout for my arms and abs
- · Create a 5-day meal plan for a child who is lactose in

Gift Ideas

Ask question

in Se

Conversation:

Vocabulary:

conversation going

Write essays in any level:

must be 500 words long

- Provide X gift ideas for [type of people]
- Provide 3 gift ideas for clients of a travel agency · Provide 4 gift ideas for business partners in a
- Provide 5 gift idea under \$100 for a teenager
- who loves football Act as:
- Act as a [type of person] that is [behavior]. [Action]
- Act as a customer support assistant that is empathetic and polite. Now answer this email
 Act as a salesperson that is very persistent. Imagine we're on a phone call and try to sell a
- · Act as my personal chef. I'll tell you ab dietary preferences and allergies, and you'll suggest recipes for me to try.
- Act as a film critic. You'll review a movie and provide both positive and negative feedback about the plot, direction and music.

Foreign Language

What's the difference between [wordl] and

· What's the difference between por and para

What's the difference between tu and você in

opinion and then ask me a question to keep the

Write a [level] [type of essay] in [language], about [topic]. It must be X words long.

Write a A2 letter in Spanish about your financial situation. It must be 300 words long Write a CI review in Portuguese about a tech

Create a table of difficult words from the previous

Create a table with 2 columns: In the first column

type the [language] words: [word], word2, ...]. In the second column, you should provide the

product. It must be 500 words long.

essay and translate them into (langu

Write a B1 report in English about pollution. It Course Quiz:

[word2] in [language]? Provide X examples

panish? Provide 2 examples

Portuguese? Provide 4 examples

Academic Life

Improve Your Work:

Provide X ways to improve [subject]

- · Provide 3 ways to improve my resume sum [insert text]
- Provide 2 ways to improve my essay: [insert essay]
 Provide 5 ways to improve the title of my article;

finsert title] Step-by-step Guide:

Provide step-by-step instructions on how to [subject]

- · Provide step-by-step instructions on how to
- · Provide step-by-step instructions on how to
- · Provide step-by-step instructions on how to

Summarization

- Can you summarize [title]?
- Can you summarize the book The Little Prince?
 - Can you summarize World War II in 400 words?
 Can you summarize this article? [insert text]

Generate Names

Suggest a [adjective] name for my [type] using the words [word], word2, ____

- Suggest funny names for my college team using the words flawless and brain
 Suggest a catchy name for my website using the words artificial and age
- · Suggest a simple name for my startup using the word cloud

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Formula Generation in Excel

Create a formula to [goal] in cell [range of cells]

· Create a formula to calculate the sum in cells AI to

Spreadsheet

- · Create a formula to calculate the average in cells
- Create a formula that sums only the expenses that have the status "No" in column C

Explain formula

Explain the meaning of the formula [formula]

- Explain the meaning of the formula
- · Explain the meaning of the formula 0.H20
- Explain the meaning of the formula =SUMIF(C1:C13, "No", B1:B13)

Advanced Formiulas, Macros and VBA

- I have a table with phone numbers in column A that have the format; (xxx) xxx-xxxx. Extract the numbers within parenthesis using Excel
- Create a macro that colculates the average of cells
 B1 to B10 and inserts the result in cell C1 Create a macro that sorts sheets by tab name using
- VBA

Google Sheets

Create a formula to [goal] in cell [range of cells]

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- Create a formula in Google Sheets to calculate the Pronunciation sum in cells Al to Al0
- · Create a formula in Google Sheets that puts data
- heet into the current shee Explain this Google Sheet command: [insert command]

phonetic transcription

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Content Creation

Ideas Generation Give me ideas for [type of content] about [subject], covering topics like [topic], topic2, ...]

- · Give me ideas for a blog post about writing covering
- topics like writing tools and writer's block. Give me ideas for a podcast about technology covering topics like AI and mochine learning. Give me ideas for a YouTube video about best books
- to read covering only self-help books

Act as a language partner. You'll start a conversation with me about [topic] in [language]. In every response, you should provide your

for data scien

choice a

quest

Thumbooil

Giveaway

Turn a [list] into [type of quiz]

Outlines Create an outline for [type of content]

Create an outline for a blog post about productivity
 Create an outline for a book "how to learn to learn a foreign language in 3 months"
 Create an outline for a course "how to learn Python

· Turn a list of facts about world history into a multiple

• Turn a list of facts about biology into true/false

Act as a prompt generator for Midjourney's AI. Your job is

to describe [object] as concisely as possible. Always give 3

different and contrasting versions of a [object] and include any random artist name prefixed by "in the style of"

Choose X random contest winner(s) from a long list of

names or emails: [insert names or emails]

Programming

Coding Questions

- How to [action] in [programming language How to merge dictionaries in Python? ning language]
- How to join two datasets in Python?
- What's the difference between [concept]] and [concept2] in [language]? What's the difference between lists and dictionaries in Python? What's the difference between OOP and functional programming?

- Explain the [concept] in [language] Explain the while loop in Python Explain the try/except in Python to a child

Advice

Advice: I want to learn [language] for [field]. Create a roadmap to learn [language] I want to learn Python for data science. Create a roadmap to learn Python I want to learn JavoScript for web development. Create a roadmap to learn it I want to automate (app). Provide steps to [tak] with [language] I want to automate Gmail. Provide steps to sciencing emails with Python I want to automate Tinder. Provide steps to swipe right with Python Simulate a job interview for a [position] by asking and answering questions as if warmen or automid memory and link the architetter (Created at to [caterio]] you are a potential employer and I'm the candidate . Consider that [details]

Web Development:

- I want to build a [type of website]. Can you generate some HTML for my website? I want to build a job board website. Can you generate some HTML for my website?
- · I want to build a price comparison website. Can you generate some HTML for my website?

Additional steps:

- · Can you center the content in the HTML page, add a line break between the inputs and add an image on a logo? • Add CSS to customize the size of the logo image

Automation

- Send the message "[type message]" on Whatsapp using Python and pywhatkit
 Send an email from [email.] to [email.2] with the subject [email subject] and the content [email content] using Python
 Use Python to rename all the [file extension] files in my directory. Add the word
- [word] to each name

Data Science

Data Science Questions:

- Where can I find data for my [describe project]? Where can I find data for my credit card fraud detection project? Where can I find data for my customer churn prediction project?
- How to [action] my dataset?
- How to oversample/undersample my dataset?
 How to split my dataset into train and test sets with Python?

Best practices:

- Can you [best practice] my code?

- Can you optimize the following Python code?
 Can you simplify the following R code?
 Can you document my code?
 Can you check for readability in my code?

Automate Data Science Tasks

- Translate my Python code to R
- Turn this SQL code to Python pandas code
- · Format my SQL code by converting the reserved keywords to uppercase
- · Create a SQL query that [describe query]
- · Write a regex in Python that [describe regex]

Data Science Workflow:

Web scraping (only working for a few websites)

· Web scrape [website] using [language] and [library]

Generate data

- Act as a fake data generator. Create a dataset that has X rows and Y columna: [column], column2, ...]
- Train Classification model
- · I have a dataset of [describe dataset], build a machine learning model that predicts [target variable]

Tune Hyperparameter

- · I've trained a model name]. Write code to tune the hyperparameters
- Feature Importance
 I've trained a [model name]. Write code to find the most important features in the model

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UNLEASHING BUSINESS POTENTIAL WITH BLOCKCHAIN AND AI: NEXT-GEN SOLUTIONS AND INNOVATIONS

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Abstract

Emerging technologies such as artificial intelligence (AI) and blockchain are transforming various industries by offering advanced capabilities for data management, decision-making, and security. Fields such as healthcare, finance, supply chain, and others are benefiting from the vast potential of these technologies. Blockchain, known for its decentralized, immutable ledger system ensures secure, transparent, and tamper-proof transactions, building trust and accountability, and AI, celebrated for its advanced algorithms and machine learning models, processes massive data sets to generate insights, automate tasks, and make predictions together present a powerful combination that addresses many limitations inherent in each technology individually.

Integrating these technologies opens new avenues. Al can enhance blockchain by preserving data integrity by monitoring Blockchain transactions in real-time to detect distrustful activities, fraud, or malicious attacks, thus improving the reliability of Al-driven insights. Conversely, blockchain can boost Al by enhancing scalability, transaction validation, and network management. This integration also addresses privacy concerns by enabling Al to secure personal data on a blockchain, ensuring sensitive information remains secure and accessible.

This paper explores various Business Organizations and their applications where blockchain and Al integration has enhanced performance and efficiency of their business processes. Real-world examples from finance, healthcare, and supply chain management are analyzed, alongside challenges such as computational overhead, scalability issues, and regulatory concerns. By examining current trends and future prospects, this paper provides a comprehensive overview of how blockchain and Al can interact to create robust, secure, and intelligent systems, shaping the future of digital interactions and data management.

Keywords: Blockchain, Immutable ledger system, Machine learning, Integrity, Data-driven decisionmaking, Supply chain.

Introduction

As the name states, Blockchain is a distributed ledger technology that records each transaction across multiple computers and stores them as a block in a secure and immutable manner. These transactions are linked to the previous one thus forming a chain of transactions to offer a decentralized, transparent, and secure approach to data management. This decentralized structure eliminates the need for intermediaries, thus enhancing data transparency and reducing data fraud. The cryptographic nature of this technology makes it highly resistant to cyber attacks, ensuring integrity and confidentiality of data, building higher data trust and enhanced transparency, reducing transaction times and operational costs by removing intermediaries and preventing business organizations from fraudulent activities.

Al refers to the simulation of human intelligence in machines, enabling them to learn, reason, and solve problems. Al technologies include machine learning, natural language processing, computer vision, and robotics, each contributing to the automation and optimization of various tasks. Al has the ability to analyze vast amounts of data quickly and accurately and has revolutionized decision-making processes across industries. Al based automation on Repetitive tasks such as data entry, customer support through chatbots, and supply chain management has freed up human resources for more strategic roles. This not only increases efficiency but also reduces operational costs.

The power of integrating AI and Blockchain has profoundly influenced data handling, security, and decision-making processes across industries. Businesses can leverage blockchain-based decentralized AI marketplaces to share, trade, and monetize AI models and datasets securely, promoting innovation and collaboration without centralized control. AI enhances decision-making through predictive analytics, automation, and deep data insights, while blockchain ensures data integrity, immutability, and decentralized control. AI enabled Real-time monitoring system of blockchain transactions can help to detect fraud and malicious activities. Various machine learning models can be implemented to identify the normal transaction patterns and flag the fraudulent patterns that could be tampering with the data. Also AI-driven analytics can be implemented to provide real-time compliance monitoring thus reducing the risk of non-compliance penalties

Al based models can also be implemented to predict transaction failures or inefficiencies on the blockchain performance metrics to prevent data loss and inconsistencies in data storage and to bring stability in blockchain transactions. Together, they enable secure, autonomous systems that reduce fraud, optimize supply chains, and enhance customer experiences. With the growth of data availability over cloud platforms, the fusion of Al and Blockchain also strengthens cyber security, as AI detects threats while blockchain fortifies data security. Businesses are leveraging Al and blockchain to gain a competitive edge by fostering innovation, reducing operational and infrastructure costs, and building trust with stakeholders in an increasingly digital world.

Individually, these technologies have significantly reshaped their respective domains—blockchain, with its immutability and transparency, has emerged as a critical tool for secure and accountable transactions, while AI's computational power drives data analysis, predictions, and automation. This paper examines existing research to highlight the practical applications, benefits, and challenges of integrating blockchain and AI, providing insights into how these technologies complement each other across various industries. The flow of this paper is as follows: Section 2 presents a comprehensive Literature Review on the impacts of integrating Block chain and AI in Business Organization, Section 3 focuses on various case studies of integrating Blockchain and AI that have Revolutionized Business perspectives and practices. The section also represents a comprehensive overview of the impact of integrating AI and blockchain in business growth. Section 4 concludes the research paper and the last section represents references.

2. Literature Review

Recent studies have explored the convergence of these technologies, revealing a symbiotic relationship where their combined strengths address mutual limitations. The integration of Artificial Intelligence (AI) and blockchain technologies has garnered significant attention in recent years, with researchers exploring their combined potential to transform business organizations. This literature

review examines studies that delve into this integration, highlighting key findings and implications.

Kumar et al. (2023) conducted a comprehensive bibliometric-content analysis to map the convergence of AI and blockchain in business contexts. Their study identified four primary thematic clusters: supply chains, healthcare, secure transactions, and finance and accounting. The authors emphasized that integrating these technologies can enhance operational efficiency, data security, and transparency across various business verticals.

Pandl et al. (2020) provided a scoping review focusing on the convergence of AI and Distributed Ledger Technology (DLT). They highlighted that while both technologies offer distinct advantages, their integration presents unique opportunities for innovation. The study proposed a research agenda to address challenges such as scalability, interoperability, and ethical considerations, urging further exploration into real-world applications and theoretical frameworks.

Witt et al. (2024) explored the synergies and conflicts between blockchain and AI. Their research analyzed major projects combining these technologies and introduced a framework categorizing current and potential use cases. Despite theoretical compatibility, the study found that practical applications remain in early stages, necessitating more empirical research to realize the full potential of this integration.

Gouda, M., & Wamba, S. F. (2023) in his research work on Intelligent Contracts: Making Smart Contracts Smart for Blockchain Intelligence addressed the limitations of traditional smart contracts, particularly their static nature and inability to adapt to real-time data or evolving conditions, posing challenges in industries like finance and healthcare. The research implemented tools such as machine learning for risk assessment, natural language processing (NLP) for translating legal documents into executable contracts, and predictive analytics for forecasting trends and risks. Findings highlight that AI-coded smart contracts enhance automation, efficiency, and security, enabling dynamic decision-making and adaptability in areas like healthcare, finance, and supply chain management. Future research could focus on improving scalability, addressing regulatory compliance, and simplifying AI-blockchain integrations for broader adoption.

Zhang, L., Liu, W., & Qiu, X. (2022) focused on the challenges of integrating blockchain and AI due to scalability, interoperability, and a lack of clear implementation methodologies. Systematic review techniques are utilized to analyze research trends and case studies, identifying gaps and opportunities in their applications. Findings reveal the potential of blockchain-AI integration in fraud detection, predictive analytics, and secure data sharing, particularly in finance. Future work could develop standardized frameworks and practical tools for seamless integration, alongside addressing privacy concerns and reducing implementation costs.

Saha, S., & Banerjee, A. (2023) tackled the issue of businesses struggling to understand and sustain the integration of blockchain and AI, exacerbated by legal and operational challenges. It uses bibliometric analysis and case studies to explore trends and applications across industries like banking, logistics, and marketing. Findings demonstrate how these technologies improve efficiency and risk management, particularly in finance and supply chains. Future research could focus on creating user-friendly tools and platforms, ensuring legal compliance, and addressing the long-term sustainability of these systems.

Chakraborty, A., & Singh, A. (2024) focused on integrating Blockchain and AI in digital businesses,

emphasizing challenges in interoperability and scalability. Tools include comparative analysis of business examples and frameworks, with case studies in smart contracts and secure data processing. Findings highlight the potential for secure marketplaces and identity verification in digital businesses, despite issues like blockchain's speed limitations and regulatory hurdles. Future directions include developing scalable systems and interoperable platforms for effective integration in online business contexts.

Sohail, M., & Naseem, M. (2023) addressed the challenge of securely sharing large datasets while maintaining usability in decentralized systems, alongside balancing privacy and transparency. It employs a detailed review of data-sharing models across sectors like healthcare and finance. Findings underscore the combined benefits of AI and blockchain in fraud prevention, data security, and decentralized decision-making, enabling better AI training and data sharing. Future work could focus on creating universal standards, addressing scalability issues, and developing secure, privacy-preserving frameworks for sensitive data.

Singh, M., & Jain, R. (2023) explored the non-availability of tools and platforms to seamlessly combine AI and blockchain while addressing ethical, technical, and operational challenges. It analyzes use cases and frameworks, particularly in IoT, smart cities, and finance, to understand current advancements and trends. Findings highlight the growth of decentralized AI platforms and their applications in governance and trust-building mechanisms. Future research could aim to create cost-effective solutions, validate models through real-world examples, and develop frameworks for addressing scalability and ethical concerns.

TPatel, S., & Sharma, A. (2023) in his study addresses challenges like a lack of standardization, data privacy concerns, and interoperability issues when integrating AI and blockchain. It uses tools like machine learning, large language models, and blockchain technologies, including decentralized ledgers and zero-knowledge proofs. Findings show advancements in fields like finance, healthcare, and supply chain management, with AI enhancing blockchain analytics and governance mechanisms. Future research could focus on developing scalable blockchain solutions, improving encryption methods, and fostering interdisciplinary collaboration to address technical and operational complexities.

Table I shown below presents a comprehensive analysis of integration of AI and Blockchain

 Table I: A Survey on the Integration of AI and Blockchain – Insights from Literature Review

Author & Paper	Problem Addressed	Tools & Techniques	Findings	Drawbacks	Future Scope
Name					
Kumar et al. (2023)	comprehensive bibliometric-content analysis	convergence of AI and blockchain with mixed- methods approach	identified four primary thematic clusters: supply chains, healthcare, secure transactions, and finance and accounting	Enhance operational efficiency, data security, and transparency across various business verticals.	Ethical and Privacy Considerations and Human-Technology Collaboration
Pandl et al. (2020)	Distributed Ledger Technology (DLT)	convergence of AI and Distributed Ledger Technology (DLT)	Secure DLT, Privacy- Preserving Personalization, Decentralized Computing for AI, Secure Data Sharing and Marketplaces	convergence of Al and DLT is still in its infancy, with limited real-world implementations	Ethical and Legal Considerations and Developing standardized protocols and frameworks to facilitate seamless integration
Gouda, M., & Wamba, S. F. (2023)	Static nature of smart contracts and lack of adaptability.	Machine learning, NLP, predictive analytics.	Al enhances automation, security, and adaptability in smart contracts.	Scalability, regulatory compliance, and complexity.	Scalability improvements, regulatory frameworks, and simplification of use.
Zhang, L., Liu, W., & Qiu, X. (2022)	Lack of methods for smooth integration of blockchain and Al.	Systematic review of research trends and case studies.	Blockchain and Al improve fraud detection and secure data sharing.	High costs, privacy concerns, and interoperability issues.	Standardized integration frameworks and addressing privacy concerns.
Saha, S., & Banerjee, A. (2023)	Businesses face challenges in using and sustaining these technologies.	Bibliometric analysis and case studies in business contexts.	Technologies improve efficiency and risk management in supply chains.	Legal and operational challenges, lack of long-term sustainability.	Developing user- friendly tools and ensuring legal compliance.
Chakraborty, A., & Singh, A. (2024)	Need for innovative, sustainable solutions in digital businesses.	Comparative analysis of frameworks and business case studies.	Blockchain-Al integration aids secure markets and identity verification.	Blockchain's speed issues and regulatory hurdles.	Scalable and interoperable platforms for blockchain-Al integration.
Sohail, M., & Naseem, M. (2023)	Challenges in secure data sharing and balancing privacy with transparency.	Review of data-sharing models and decentralized systems.	Combined benefits include fraud prevention and decentralized decision- making	Lack of universal standards, balancing privacy, and scalability challenges.	Universal standards and privacy- preserving frameworks for data sharing.
Singh, M., & Jain, R. (2023)	Lack of tools and platforms for seamless Al- blockchain combination.	Use case analysis and framework development.	Decentralized AI platforms show potential in IoT and governance systems.	High costs and limited real-world examples.	Cost-effective solutions and ethical frameworks for scalability.
TPatel, S., & Sharma, A. (2023)	Standardization, privacy, and interoperability issues.	Al techniques (ML, LLMs), blockchain tools (smart contracts, DAOs).	Advancements enable decision-making, analytics, and governance mechanisms.	Scalability, complexity, and security vulnerabilities.	Scalable solutions, enhanced encryption, and interdisciplinary research.

3. Revolutionizing Business with Blockchain and AI: Case Study Insights

In the quickly advancing computerized scene, businesses are ceaselessly investigating inventive advances to improve proficiency, security, and decision-making. Among these innovations, Counterfeit Insights (AI) and Block chain stand out as game-changers. When coordinates, they make a strong collaboration that can revolutionize businesses over different spaces. This section explores approximately 30 International and National Business Organizations under various sectors like

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Finance, Automobile, Banking, Tele-Communications, e-Commerce and digital payments, Jewelry and Life Insurance to name a few that have integrated and implemented an amalgamation of AI and Blockchain to improve their Business Processes like Supply Chain Management, Financial Services, Fraud Detections, Customer Engagement and many more. This section investigates the effect of AI and Blockchain on different business segments thus impacting the effectiveness of the organizations (CS, Murgai et .al. 2024).

To enhance transparency and efficiency in its supply chain management, Walmart integrated blockchain and AI to track the journey of products from farm to table, ensuring food safety and reducing waste. AI-driven analytics optimize inventory management by forecasting demand patterns and detecting inefficiencies. This integration allowed real-time tracking of food products, reducing the time taken to identify the source of foodborne illness outbreaks and improving overall food safety across the supply chain (Blockchain in the food supply chain).

India's leading consumer goods company Hindustan Unilever (HUL) has implemented blockchain and AI to enhance transparency and efficiency in its supply chain. Blockchain technology ensures the traceability of raw materials, preventing counterfeit goods and improving supplier accountability. AI-powered analytics predict demand trends and optimize inventory management. This integration helps HUL reduce operational costs, ensure sustainable sourcing, and enhance product authenticity, ultimately benefiting both consumers and suppliers.

Wipro, one of India's top IT services companies, has implemented blockchain and AI to enhance supply chain management for various industries. The company uses blockchain technology to enable real-time tracking of goods, enhancing transparency and reducing fraud in logistics. AI tools are integrated to optimize inventory management and predict demand fluctuations. By combining these technologies, Wipro helps businesses ensure efficient supply chains while maintaining the integrity of data across multiple stakeholders, particularly in sectors like manufacturing, retail, and healthcare (Blockchain – WiPro)..

Another leading organization, Indian Oil Corporation (IOCL) has also integrated blockchain and AI to improve fuel supply chains and enhance customer experience. The Blockchain technology implemented by IOCL secures and authenticates transactions in the fuel distribution network, preventing fraud and ensuring that fuel deliveries are tracked in real time. Whereas the AI-powered analytics enables IOCL to predict fuel demand patterns, optimize distribution, and enhance fleet management. This integration not only boosts operational efficiency but also improves transparency and reliability in India's vast fuel supply infrastructure (CXOToday, 2025)..

In the financial sector, JP Morgan has used blockchain technology in combination with AI to secure financial transactions and improve operational efficiency. The bank's Quorum blockchain ensures secure, transparent transactions while AI is used to detect fraud by analyzing transaction patterns and identifying anomalies in real-time. This integration not only enhances the security of financial operations but also reduces the time and cost associated with compliance and manual checks, making the bank's financial systems more efficient and trustworthy (Ahmad and Saxena, 2022).

In the same financial sector Tata Consultancy Services (TCS) has also leveraged blockchain and AI (By using its Quartz platform) to transform its financial services sector to offer transparent, secure, and efficient solutions for cross-border payments, trade finance, and banking. This fusion shall help

banks and financial institutions to streamline their business operations, reduce fraud, and improve customer experience and help TCS to emerge as a global Leader in digital transformation for Indian financial organizations (Rane et .al., 2023).

Finacle blockchain platform of Infosys integrates blockchain and AI to improve security and efficiency in the financial sector. The integration enables Infosys to provide secure, transparent, and tamperproof digital transactions for banks and financial institutions. The fraud detection systems powered by AI analyze transaction patterns for anomalies and prevent financial crimes thus streamlining business operations and reducing transactional risks.

To improve banking services and to ensure the security of financial transactions, HDFC Bank has adopted blockchain and AI where Blockchain technology streamlines processes like Know Your Customer (KYC) verification, enabling secure and fast data sharing while AI models detect fraud by analyzing transaction patterns, automating customer service bots to enhance user interactions. This integration has empowered HDFC Bank to provide faster services, reduce operational costs, and enhance customer trust through secure, efficient, and innovative banking solutions.

ICICI Bank has leveraged blockchain and AI to secure its banking operations and improve fraud detection. The bank uses blockchain for cross-border remittances and trade finance, ensuring transparent and tamper-proof transactions. AI-driven models analyze customer transaction patterns to identify fraudulent activities and prevent financial crimes. This technological integration enhances operational efficiency, reduces manual processing, and strengthens trust among customers by providing secure, real-time banking solutions.

Paytm has integrated blockchain and AI to enhance transaction security and fraud detection on its digital payments platform. Blockchain ensures transparency and trust in digital payments, reducing risks associated with financial fraud. AI-powered risk assessment models analyze user behavior and detect suspicious activities, preventing unauthorized transactions. This combination strengthens cyber security in India's growing fintech ecosystem, making digital payments safer and more efficient for millions of users.

The giant king of Diamond Industry, De Beers, implements integration of blockchain and AI to improve traceability and combat conflict diamonds. The blockchain platform, Tracr is implemented by the organization, records every step of a diamond's journey from mine to market, ensuring its authenticity and ethical sourcing. AI is employed to analyze the data from the blockchain, ensuring that each diamond is properly certified and traceable. By leveraging blockchain's immutable ledger and AI's data analytics, De Beers is able to enhance transparency in its supply chain and reassure customers of the ethical sourcing of their diamonds.

Tanishq, a leading jewelry brand in India, is leveraging blockchain and AI to ensure transparency and authenticity in the gold supply chain. Blockchain technology records every stage of gold procurement, refining, and retail, allowing customers to verify the origins of their purchases. AI-driven image recognition helps authenticate jewelry designs and detect counterfeit products. This technological advancement enhances trust among buyers, ensuring that customers receive certified, high-quality gold products (Gold Council, 2022)..

Agriculture Sector has been India's largest sector of focus and a lot of technology is being integrated as Agri-tech to ensure transparent and traceable agricultural supply chains. Mahindra Group has

embraced blockchain and AI to revolutionize the agriculture sector in India. Through their partnership with blockchain and AI technology, the company can predict crop yields, optimize resource usage, and suggest farming best practices to increase productivity. Blockchain guarantees that transactions between farmers and stakeholders are secure, ensuring fair prices and eliminating inefficiencies. This innovative integration is transforming Indian agriculture, improving food security and farmer livelihoods.

Among the e-commerce platforms, Flipkart is utilizing blockchain and AI to enhance its online retail operations, optimize its inventory, reduce operational costs, and provide an enhanced shopping experience to millions of customers, contributing to its growth in the competitive e-commerce market. The Blockchain technology implemented ensures secure and transparent processing of transactions; especially in returns and supply chain management whereas AI aims at personalized recommendations, predictive analytics for customer behavior, and dynamic pricing models (Alexdev, 2025).

For both exporters and merchants, universal exchanging can be hazardous. When a merchant pays in development for products, the exporter may collect the cash without sending the products. To overcome this issue, dealers collaborate with third parties such as banks that utilize rebellious like letters of credit, which ensure installment once merchandise are conveyed to the importer. Marco Polo Network utilizes blockchain innovation to give a stage for exporters and merchants to straightforwardly share conveyance information by coordination with supply chain ERP frameworks and making a permanent contract for parties that ensures the trade of cash and merchandise beneath indicated conditions. Marco Polo Network enhances working capital cycle for both buyer and seller. It also automates transaction settlement process. It reduced complexity by digitizing documents.

Maruti Suzuki, implements AI and blockchain to enhance customer experience and vehicle security. AI-powered chatbots provide real-time customer support, while predictive analytics personalize marketing strategies based on consumer preferences. Blockchain ensures secure and tamper-proof vehicle ownership records, reducing fraud in second-hand car sales. The integration has improved consumer trust and streamlined Maruti Suzuki's business operations (Economic Times, 2024). Tata Motors has optimized its manufacturing processes. The AI-powered predictive maintenance helps identify potential equipment failures, reducing downtime and improving production efficiency whereas Blockchain ensures transparency in the procurement of raw materials, preventing counterfeiting and ensuring supplier accountability. The integration has improved operational efficiency, accelerated production timelines, and improved vehicle quality (Express Computer, 2025).

Hero MotoCorp, a leading two-wheeler manufacturer, leveraged blockchain and AI to secure its aftermarket services. Blockchain ensures the authenticity of spare parts, preventing counterfeit products from entering the market. AI-driven maintenance prediction systems alert customers when their bikes need servicing, improving vehicle longevity. This integration boosts customer satisfaction, enhances safety, and strengthens Hero MotoCorp's brand reputation (Sethi, 2019). Bajaj Auto also implemented AI and blockchain to optimize logistics and streamline its distribution network. Blockchain technology provided real-time tracking of shipments, preventing supply chain disruptions and ensuring on-time deliveries. AI-powered demand forecasting helps Bajaj Auto adjust production

schedules to match market demand. These innovations reduce operational costs, improve efficiency, and enhance customer satisfaction in the fast-growing two-wheeler industry. TVS Motor Company also adopted blockchain and AI to enhance their financial transactions and vehicle insurance services. Blockchain secures insurance claims, reducing fraudulent activities and expediting claim settlements. AI-driven risk assessments models help determine accurate insurance premiums based on driving behavior. These technologies enable TVS to offer more transparent, efficient, and customer-friendly financial services in the automobile sector.

In the Telecommunication Sector, Bharti Airtel, is using AI and blockchain to improve network efficiency and security. AI-driven predictive maintenance helps identify network failures before they occur, reducing downtime and improving service quality. Blockchain-based digital identity verification enhances security for customer authentication and SIM card management. This integration not only strengthens Airtel's infrastructure but also enhances the user experience by ensuring fast, reliable, and secure telecommunications services. Reliance Jio, is also leveraging blockchain and AI to secure digital transactions and enhance customer experiences. Blockchain ensures transparency and security in Jio's digital payment systems, reducing fraud risks. AI-driven chatbots and voice assistants improve customer service by providing automated yet personalized support. Additionally, AI is used for network optimization, predicting demand surges, and enhancing cybersecurity measures, making Jio a pioneer in telecom technology advancements (Debutinfotech, 2025).

India's top food delivery platform, Zomato, uses integration of AI and blockchain to enhance customer trust and operational efficiency. The AI-driven algorithm optimizes delivery routes, predicts food demand, and personalized customer recommendations whereas the Blockchain technology integrates to verify the authenticity of restaurant hygiene ratings and secure online payment transactions. This combination ensures a seamless, secure, and reliable food delivery experience while maintaining transparency in food quality and vendor operations (Alexdev, 2025)..

TenneT is an energy transmission operator. Wind turbine control time, for outline, shifts depending on the wind conditions of the climate. Tennet took an interest in IBM and Sonnen.IBM passed on square chain Sonnen, creator of residential imperative capacity systems, giving an opportunity for interaction with minor imperative producers and buyers. Energy capacity systems associated to the TenneT's control system database by means of square chain. Much obliged to the square chain's dispersed record, botches in the ask and supply of control are direct shared with an grouping of accomplices. Movement enables the related imperativeness capacity units to collect or release additional control as required in a couple of minutes, diminishing system transmission inefficient aspects. TenneT raised reduction and re-routing operations. TenneT back nearby vitality makers like domestic proprietors or agriculturists who convey sun powered plants or wind turbines and lower their power costs as well carbon footprint's.

The global IT organization Accenture developed the idea to take existing paper contracts between Accenture and our clients by putting them on a shared blockchain database. In this format every party can securely view contracts, revise and accept changes which are all captured on a blockchain ledger. The blockchain is an incorruptible digital ledger that can be programmed to record virtually every transaction with shared transparency. The solution enables every party to always have access to a live contract and every revision of the contract is recorded, creating a tamper-evident audit trail. This is accomplished by capturing and storing unique hash codes of the documents and transactions

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on the blockchain. Hash codes are the unique sequences of characters that identify one contract version from another (Accenture. (n.d.))..

In the insurance sector ICICI Lombard has streamlined insurance claims processing and enhanced fraud detection by integrating AI and blockchain. AI-powered algorithms assess claims in real-time, reducing manual intervention and improving efficiency. Blockchain ensures secure, tamper-proof claim records, preventing fraud and ensuring transparency between insurers and policyholders. This combination has significantly reduced claim settlement time and improved customer trust in digital insurance services (Surabhi, 2019). HDFC ERGO has implemented blockchain and AI to revolutionize policy issuance and verification. Al-driven chatbots assist customers in selecting the best insurance plans, while blockchain stores policy documents securely, eliminating the risk of forgery. This integration has improved data security, streamlined policy issuance, and enhanced the overall customer experience in the insurance sector. Bajaj Allianz leverages AI and blockchain to prevent fraudulent claims and improve risk assessment. Al models analyze historical claim data to detect anomalies, while blockchain maintains an immutable record of policyholder transactions. This system has helped the company reduce fraudulent payouts, optimize premium pricing, and improve claim authenticity, ensuring fair and efficient insurance services. Reliance General Insurance utilizes Al and blockchain to enhance its motor insurance offerings. Al-powered image recognition tools assess vehicle damage from accident photos, expediting the claim approval process. Blockchain secures vehicle history records, preventing fraud in second-hand car insurance. This approach has led to faster claim settlements and increased transparency in vehicle insurance policies (Reliance General Insurance, 2018)..

The researchers and interviews conducted during the initial stages of the initiative found that drugs coming directly from the manufacturer's facility are trustworthy and that the risk of entry of fake drugs arises when the products are handed off between the various stages and layers of the complex supply chain. The National Informatics Centre (Niti Ayog) has designed and implemented a new system named Drug Authentication and Verification Application (DAVA), based on the GS1 standards, for drug tracking and traceability. The system is based on the use of Global Trade Item Numbers (GTINs) and serial numbers provided by manufacturers for identification of various hierarchy levels for product packaging. The aim is to improve India's image as a world leader in production of safe pharmaceutical products by providing real-time visibility of drugs produced and exported out of India. DAVA provides information about products at the manufacturer level which can be verified by other stakeholders. The project enabled track and trace beyond traditional methods by allowing users to verify that prescribed conditions for the transportation of drugs was not breached (through IoT sensors) and status was made available to stakeholders through a mobile application.

IBM's Nourishment Believe blockchain stage coordinating AI to improve nourishment traceability. The framework permits real-time following of items from cultivation to table, and AI instruments offer assistance to optimize coordination's, stock, and request estimating. Our Bits of knowledge capabilities module can give close real-time supply chain information, counting item area and data on temperature all through travel. Leveraging blockchain and IoT innovation, The Follow module empowers end-to-end supply chain cutting the time required to follow a nourishment source from days to seconds. Know the provenance of nourishment supplies and their status in arrange to moderate expensive cross-contamination, decrease perilous food borne ailments and avoid waste.

The Reports module permits clients to transfer, oversee, alter, and share any archives along the supply chain.

Table 2 shown below highlights a Comprehensive Analysis of Integrating of AI and Blockchain in Business Environment. The table not only focuses on the Business processes that have been improved by implementation of Artificial Intelligence and Block chain Technology but also emphasizes the overall impact on the growth of Organization.

Table II: Comprehensive Analysis of Integrating of AI and Blockchain in Business Environment

S.No	Organization	Business Area	Al Integration	Block chain Integration	Impact
	Name				
1	Walmart	Supply Chain Management	Track the journey of products from farm to table. Ensuring food safety and reducing waste Al-driven analytics optimize inventory management Forecasting demand patterns and detecting inefficiencies.	Secure Transactions	 Real-time tracking of food products Reduction in time to identify the source of foodborne illness outbreaks Improvement in food safety across the supply chain.
2	Hindustan Unilever (HUL)	Supply Chain Management	Predict demand trends Optimize inventory management.	Traceability of raw materials Preventing counterfeit goods improving supplier accountability	 Authenticity & Transparency Mutual benefit to consumers and suppliers.
3	Wipro	Supply Chain Management	Optimize Inventory Management Predict Demand Fluctuations.	 Real-time tracking of goods Enhancing transparency Reducing fraud in logistics 	 Efficient supply chains Integrity of data across multiple stakeholders
4	Indian Oil Corporation (IOCL)	 Fuel Supply Chain Management Enhance Customer Experience 	Predict Fuel Demand Patterns Optimize Fuel Distribution Enhance Fleet Management	 secures and authenticates transactions in the fuel distribution network, preventing fraud Track Fuel deliveries in real time 	Boosts Operational Efficiency Improves Transparency High Reliability in India's vast fuel supply infrastructure
5	JP Morgan	Financial Services	 Fraud Detection Analyzing transaction patterns and identifying anomalies in real- time 	Quorum blockchain Secure Transactions Transparent Transactions	Enhanced Security of financial operations Reduced time and cost associated with compliance Bank's financial systems became more efficient and trustworthy.
6	Tata Consultancy Services (TCS)	Financial Services	Cross-Border Payments Trade Finance, And Banking	Quartz platform Secure Transactions Transparent Transactions	Streamline business operations reduce fraud, improve customer experience TCS emerge as a global Leader in digital transformation for Indian financial organizations.
7	Infosys	Financial Services	 Analyze transaction patterns for anomalies Prevent financial crimes 	 Finacle blockchain Fraud Detection Systems 	Secure transparent, and tamper-proof digital transactions reducing transactional risks.
8	HDFC Bank	Banking Services security of financial transactions	Fraud Detection Analyze transaction patterns for anomalies Automating customer service bots Enhance user interactions	Know Your Customer (KYC) verification Secure and fast data sharing	Provide faster services reduce operational costs Enhance customer trust through secure, efficient, and innovative banking solutions
9	ICICI Bank	Banking Services Fraud Detection	analyze customer transaction patterns for fraudulent activities prevent financial crimes	 cross-border remittances trade finance, ensuring transparent and tamper- proof transactions 	enhances operational efficiency reduces manual processing strengthens trust among customers real-time banking solutions
10	Paytm	Digital Payments	Risk assessment models Analyze user behavior and detect suspicious activities Preventing unauthorized	Transparency and trust in digital paymentsReducing risks	 Enhance Transaction Security Fraud Detection Strengthens Cyber Security

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11 12 13	De Beers Diamond Tanishq (Gold) Mahindra Group	Supply Chain Management Customer Trust Supply Chain Management Supply Chain Management	 Diamond Certification Diamond Traceability image recognition helps authenticate jewelry designs detect counterfeit products Predict Crop Yields Optimize Resource Usage 	 Tracr platform records every step of a diamond's journey from mine to market ensuring its authenticity and ethical sourcing gold procurement, refining, and retail allowing customers to verify the origins of their purchases Secure Transactions between farmers & 	 Improve Traceability And Combat Conflict Diamonds Enhance Transparency In Its Supply Chain Ethical Sourcing Of Their Diamonds Building Customer Trust Enhances transparency and authenticity in the gold supply chain. enhances trust among buyers High-quality gold products Suggest Farming Best Practices
44	Flinkert			 ensuring fair prices 	 Improving food security Improving farmer livelihoods
14	Flipkart	 Online Retail Operations Inventory Optimizations 	 Personalized Recommendations Predictive Analytics For Customer Behavior Dynamic Pricing Models 	 Secure and transparent processing of transaction Improved supply chain management 	 Enhanced Shopping Experience Reduced Operational Costs
15	Marco Polo Network	Finance Management	 Checks and validates trade documents like invoices, bills of lading, and purchase orders Assess the creditworthiness of counterparties Predict potential delays, disruptions, or bottlenecks 	 Execution of Automatic trade transactions with specific conditions secure nature speeds up the settlement Eliminates the intermediaries Reduces administrative overhead. 	 Reduces inefficiencies Enhances transparency improves security of global trade enhances efficiency and reliability of global trade finance
16	Maruti Suzuki	Customer Relationship Management	 chatbots provide real-time customer support predictive analytics personalize marketing strategies 	 Secure and tamper- proof vehicle ownership records Fraud reduction 	Vehicle Security Improved Consumer trust
17	Tata Motors.	Manufacturing	 Predictive Maintenance Helps Identify Potential Equipment Failures Reducing Downtime Improved Production Efficiency 	 Transparency In Procurement Raw Materials Preventing Counterfeiting 	 Improved Operational Efficiency Accelerated Production Timelines Improved Vehicle Quality
18	Hero MotoCorp	Customer Relationship Management	Maintenance Prediction Systems Alert Customers For Bike Servicing, Improves Vehicle Longevity	 Authenticity of spare parts Preventing counterfeit products from entering the market 	 Customer Satisfaction, Enhances Safety Strong Brand Reputation
19	Bajaj Auto	Logistics & Distribution Management	 Demand Forecasting Adjustments In Production Schedules 	 real-time tracking of shipments Prevents supply chain disruptions ensures on-time deliveries 	 Reduce Operational Costs Improve Efficiency Enhance Customer Satisfaction
20	TVS Motor Company	 Financial Management vehicle insurance services 	 Risk assessments determine accurate insurance Premiums based on driving behavior. 	 Secures Insurance Claims Reduces Fraudulent Activities Expediting Claim Settlements 	 Transparent, efficient, and customer-friendly financial services
21	Bharti Airtel	Telecommunication Service	 Predictive Maintenance Identify Network Failures Reduces Downtime Improves Service Quality 	 digital identity verification enhances security Secure customer authentication SIM card management. 	 improve network efficiency and security Enhances user experience Ensures fast, reliable, and secure telecommunications services

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22	Reliance Jio	Digital Transactions	 chatbots and voice assistants improve customer service provides automated personalized support 	 Transparency and security in digital payment systems reduces fraud risks 	Secure digital transactions enhance customer experiences predicting demand surges enhancing cyber security measure
23	Zomato	Customer Relationship Management	 Optimizes Delivery Routes Predicts Food Demand Personalized Customer Recommendations 	 Authenticity Of Restaurant Hygiene Ratings Secure Online Payment Transactions 	Enhances customer trust Improved Operational Efficiency Reliable food delivery experience Food quality and vendor operations
24	Tennet	Energy Trading Platform	 Predict Energy Demand Predict Supply Fluctuations. Improves Predictive Maintenance Capabilities Reduce Frequency And Duration Of Unscheduled Outages 	 Simplify Energy Trading Improves Transparency. Ensures Immutability Of Energy Transaction Data 	 Managed Energy Grids Efficient And Transparent Transactions Sustainable Transactions Decentralized Energy Markets.
25	Accenture	Inventory Management	 Improved Decision-Making, Automated Task Management Enhanced Customer Experiences Predictive Models To Drive Business Insights Identify Supply Chain Bottlenecks, Optimize Routes, 	 Improved Financial Transactions Data Integrity. Used For Secure, Immutable, And Transparent Tracking Of Goods 	 Data-driven solutions to solve complex business problems Reduced Operational Costs
26	ICICI Lombard	Insurance Claim Processing	Assess Claims In Real-Time Reducing Manual Intervention And Improving Efficiency	 Ensures Secure, Tamper-Proof Claim Records Preventing Fraud Transparency Between Insurers And Policyholders 	 Enhanced Fraud Detection Reduced Claim Settlement Time Improved Customer Trust In Digital Insurance Services
27	HDFC ERGO	Policy Issuance And Verification	 Chatbots assist customers in selecting the best insurance plans 	 Stores Policy Documents Securely Reduced Forgery Risk 	 Improved Data Security Enhanced Customer Experience
28	Bajaj Allianz	Insurance Services and Authenticity	 Analyze Historical Claim Data To Detect Anomalies Improve Claim Authenticity 	 Maintains an immutable record of policyholder transactions 	 Prevents Fraudulent Claims Improved Risk Assessment Reduces Fraudulent Payouts, Optimized Premium Pricing Ensuring Fair And Efficient Insurance Services
29	Reliance General Insurance	Motor Insurance	 Image Recognition Tools Assess Vehicle Damage From Accident Photos Accelerate Claim Approval Process 	 Secures Vehicle History Records Prevents Fraud In Second-Hand Car Insurance 	 Faster Claim Settlements Increased Transparency In Vehicle Insurance Policies
30	NITI Aayog	Supply Chain Management	 Analyses large sets of medical data, such as X-rays, MRIs, and lab results. involve building AI systems for smart automation, data analysis 	Creates immutable and decentralized patient health records.	 Tackle critical challenges such as healthcare accessibility, data security Provides customized software development
31	IBM's Nourishment Believe	Supply Chain Management	Optimize Production Schedules Optimize Inventory Levels Reduce Waste. Identify Potential Supply Chain Disruptions Food Quality Monitoring	 Better tracing of Food Journey Pinpoint the exact location and batch of affected food 	 Enhanced Food Safety Boosts Operational Efficiency Reduces Fraud Fosters Greater Consumer Trust

Conclusion

The integration of Artificial Intelligence (AI) and Blockchain technology is a rapidly evolving area of research, offering innovative solutions across industries like finance, healthcare, logistics, and digital business. These technologies, when combined, promise enhanced automation, security, and decision-making capabilities. This paper addresses various aspects of this integration, with key findings pointing to improvements in fraud detection, data sharing, supply chain management, and decentralized decision-making. Companies like ICICI Lombard and HDFC ERGO leverage AI-driven fraud detection and blockchain-secured policy records to streamline insurance operations. In the automotive sector, Tata Motors and Reliance General Insurance optimize supply chain management and vehicle insurance through predictive analytics and tamper-proof data storage. Additionally, financial leaders like HDFC Bank and Paytm strengthen transaction security and fraud prevention with AI-powered risk assessment and blockchain-enabled digital payments. AI-driven automation will streamline operations, improve decision-making, and optimize resource management, while blockchain's decentralized nature will ensure data integrity, fraud prevention, and secure transactions. In sectors like finance, healthcare, retail, insurance, and manufacturing, businesses will leverage AI for predictive analytics and personalized services, while blockchain will enhance supply chain traceability, digital payments, and secure record-keeping. This transformation will lead to smarter, more agile organizations that can adapt to changing market dynamics, drive innovation, and build greater trust with consumers. As AI and blockchain technologies evolve. Indian enterprises will continue to gain a competitive edge, creating a more transparent, efficient, and digitally-driven business ecosystem. By integrating these technologies, Indian enterprises are driving innovation, improving operational efficiency, and creating a more secure and transparent business ecosystem.

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ANALYZING INCOME INEQUALITY USING CLASSIFICATION TECHNIQUES AND VISUALIZATION

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Abstract

Extreme wealth and income inequality are a big concern, especially in the United States. The potential to end poverty is a strong justification for lowering the world's rising economic disparity. The idea of universal economic disparity promotes a country's economic stability and guarantees sustainable development. The governments of many nations have been working hard to address this issue and offer an ideal answer. This paper focus on the issue of income inequality is addressed using machine learning. Machine learning is a technique that uses artificial intelligence, and other learning techniques to find the pattern of data and related knowledge from several large datasets. Orange is both a free and open-source application for data analysis and data visualization. We can now forecast future earnings with the quick advancements in storage capacity and computer performance. This study's issue will be the classification of adult datasets utilizing the orange tool.

For this, the UCI Adult Dataset has been used. To tie up current learners and add some preprocessing to create new versions, this paper addresses the highlights. In this study, different categorization techniques are contrasted with an analysis of the outcome using a confusion matrix. It comprises a few performance indicators, such as recall, an area under the curve (AUC), an F1 score, and precision. Using main features, classification is applied to determine a person's yearly income that falls higher than \$50,000 or less than \$50,000. The main purpose of this study is to give comprehensive analysis of relevant methods on dataset. The decision tree model, Naive Bayes, k-Nearest Neighbour(KNN), and support vector machine(SVM) were used for the comparative study of this paper. One of those, the decision tree recorded the maximum accuracy of 98.4%, surpassing the standard accuracy of earlier works. Attained levels of precision and recall are 98.6% and 99.3%, respectively.

Keywords: Machine learning, Decision tree, Naive Bayes, KNN, SVM, Data mining Introduction

The ability of machine learning to transform vast volumes of data into informative knowledge and information using statistical, mathematical, artificial intelligence, and learning approaches has drawn attention in society in recent years. A set of procedures called machine learning examines the additional value of a data set in the form of knowledge that has not previously been learned by hand. In recent years, the issue of income disparity has received a lot of attention. The goal of eliminating this problem does not appear to be limited to improving the lot of the poor. Many people struggle with the rise of economic disparity and demand for a fair distribution of wealth. This paper emphasizes thorough study and the essential factors for raising a person's income. Such an analysis aids in focusing attention on the key areas that can considerably raise one's income level. The aim is to estimate, using data from the census, if a person's income is larger than \$50,000 based on factors including age, education, and marital status. The decision tree model, naive Bayes, KNN, and SVM

come under the classification technique(Khandelwal et al., 2020). Open-source data mining software is required to create classification algorithms on datasets. The software utilized is a Pythonbased Orange utility. Orange is a data mining tool that is helpful for exploratory data analysis and visual programming. The widgets that make up an orange are its various parts. MacOS, Windows, and Linux are all supported by this data mining program.

The classification of a dataset used to analyze annual income that was collected from the UCI Machine Learning Repository is the issue that this study looks at (Chakrabarty & Biswas ,2018). It is anticipated that the knowledge gained from doing this research will benefit those who do or do not earn more than \$50,000 annually. Several things influence a person's yearly income. It makes intuitive sense that factors like the person's age, gender, occupation, and amount of education have an impact. The prediction task is to ascertain whether a person earns more than \$50,000 annually. This paper is organized as follows: an introduction, literature study, Research Methodology, Results, and discussion and conclusion.

Literature Review

Researchers have attempted to estimate income levels in the past using machine learning models. Many machine learning models, including Logistic Regression, Naive Bayes, Decision TreesKNN, SVM, Gradient Boosting, and 6 configurations of Activated Neural Networks, were employed by researchers to investigate and analyze the Adult Dataset. They also performed a comparative examination of how well they predicted outcomes. A Random Forest Classifier method was used to forecast people's income levels(Khandelwal et al., 2020), (Khandelwal & Virwani, 2019). To scale up the accuracy, this work has used complicated algorithms like XGBOOST, Random Forest, and stacking of models for prediction tasks, including Logistic Stack on XGBOOST and SVM Stack on Logistic. With the Adult Dataset, researchers attempted to mimic Bayesian Networks, Decision Tree Induction, Lazy Classifier, and Rule Based Learning Approaches and gave a comparative analysis of the predicted performances. Some have made an effort to pinpoint the key data elements that could help reduce the complexity of the various machine-learning models used for categorization tasks (Khandelwal & Virwani, 2019). To anticipate income levels, some researchers have done a comparative study of four different machine learning techniques: naïve bayes, classification and regression trees, random forests, and support vector machines (Deepaiothi & Selvarajan, 2012). In paper, income prediction data based on the Current Population Survey provided by the U.S. Census Bureau are generated and evaluated using Principal Component Analysis (PCA) and the Support Vector Machine approach.

Research Methodology

Using Orange software and the classification approach, the investigation was carried out. Using the UCI Machine Learning Repository as the data source.

Normal procedures are utilized in machine learning algorithms, for example, contingent likelihood assessment, scoring of traits, data separating and selection, irregular sampling, and others. Orange digs into these techniques in parts and constructs its strategies by collecting parts utilizing calculations.

Before applying data mining strategies, datasets is cleaned and ready from its crude state. While this issue is normally present with any information, data miners regularly work with more chaotic information than analysts and psychometricians; rather than seriously recorded test or review information, information excavators frequently work with log information or learning the board

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framework information recorded in structures that are not quickly amiable to analysis. The methodology targets data preparation, data pre-processing, model development, model evaluation, then data visualization.

Knowing the key features is essential since they play a crucial role in the process' accuracy [7]. The class attribute is created from the "type" attribute. There are both category and numerical data types in the dataset. Information that is unavailable for an item is referred to as missing value (case). The accuracy and quality of the data will decline as it is processed as a result of the missing value resulting from the object's information not being provided, being hard to find, or not being there.

Result and Discussion

Data preparation for the model evaluation of each classifier is elaborated using Orange:

A. Data preparation

Firstly the data preparation phase will start. The adult_sample dataset is taken to understand the workflow of data analysis which includes data processing, modeling, evaluation, and visualization. Initially, the dataset is loaded using a file widget that shows the name and type of attribute with all values shown in Fig. 1. It defines no. Number of instances(recorded). There are two methods to load them.

Initially, the dataset will be loaded using the *File* widget that shows the name and type of attribute with all values that have shown in Fig. 1. It defines no. of instances (records). It has two ways to load it.

The Data Table shows the complete data. In this example no. of instances 977. Data Sampler incorporates all sampling methods whatever the user wants to apply to the input dataset.

- A fixed proportion of data finds a selected range of data (e.g. 80% of all the data)
- The fixed sample size divides the dataset into fixed numbers. of instances, and it returns only one set at a time.
- Cross-validation partitions data instances into no. of instances, the user can select the number of folds (subsets) and the fold they wish to use as a sample.
- Bootstrap infers the sample from the population statistic, and then a connection is established with preprocessing. Using the available options, the data can be cleaned and filtered. Fig.2 shows the establishment of a connection between these widgets.

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		_		Federal-gov, Local-gov, State-gov, With
5	fnlwgt	N numeric	feature	
4	education	C categorical	feature	Bachelors, Some-college, 11th, HS-grad,
5				Prot-school, Assoc-acdm, Assoc-voc, 9t
1	education-num	10 numeric	feature	
5	marital-status	C categorical	feature	Married-civ-spouse, Divorced, Never- matried, Securited, Widowed, Matried,
,		0	£	Tech-support, Craft-repair, Other-service,
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9		O	6	White, Asian-Pac-Islander, Amer-Indian-
	race	Categorical	Teature	Eskimo, Other, Black
		-		

Figure I : Loading Dataset

B. Data pre-processing

After applying sampling 977 instances are divided into two sets of training dataset and test dataset.792 instances move to sample data. Then, both have gone through the preprocess widget to split no. instances in the training and testing datasets. In total, 730 instances were used for the training dataset.

C. Data Modeling Using Classification

Fig. 3 shows the complete workflow analysis. Fig. 4 shows the construction of a classifier or model, using which the prediction results can be generated. All models were based on classification techniques. The same connections can be established using clustering or association-rule mining techniques.

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Discretize Continuous Variables	Impute Missing Values		^			
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Figure II :Data pre-processing using Pre-process Widget



Figure III : Workflow of the Data Analysis Process



Figure IV :Workflow of Classification Model

D. Model Evaluation Using the prediction widget, the user can predict the value of the target class label for the forthcoming dataset so that decisions can be made effectively. The test and score widget show the values of different parameters, based on which the accuracy of the model can be measured

ampling	Evaluation Re	sults				
Cross validation Number of folds: 5 ▼ Stratified Cross validation by feature Random sampling Repeat train/test: 10 ▼ Training set size: 66 % ▼ Stratified Leave one out Test on train data Test on test data Target Class	Method Tree Naive Bayes kNN SVM	AUC 0.994 0.824 0.880 0.982	CA 0.984 0.762 0.843 0.838	F1 0.990 0.841 0.903 0.907	Precision 0.986 0.899 0.888 0.831	Recall 0.993 0.789 0.918 1.000

Figure V : Result analysis using Test & score widget

Fig. 5 shows the classification accuracy of the decision tree obtained by choosing any sampling method. These results can be measured by changing the options provided. Fig. 6 shows the ratio of the predicted and actual class instances.

I Confusion Matrix			Show:		Instances	×
Naive Bayes kNN				Predicted		
SVM			>50K	<=50K	Σ	
		>50K	36	2	38	
	Actua	<=50K	1	146	147	
		Σ	37	148	185	
Output						
Predictions Probabilities						
Send Automatically	Select Con	rect Sel	ect Misclassi	ified Cle	ar Selection	1

Figure VI :correctly classified and misclassified no. of instances

E. Visualization in Orange

Data visualization is a procedure used to address information-utilizing pictures. Currently, it is becoming advantageous to obtain business. Notwithstanding their true capacity, the advantages of data visualization are sabotaged today by an overall absence of comprehension. Nothing in the field of business insight today can bring us closer to satisfying the guarantee of knowledge in the work environment than data perception. The objective of data visualization is to convey data more intelligently using graphical pictures. representation does not imply that it needs to be drawn out to be useful or colossally tasteful to appear appealing. Several widgets show the characteristics and visualizations of the attributes of a given dataset. Fig. 7 shows the distribution of all data.





Figure I :Relationship between Attributes Relationship and Work Class

Discussion and Conclusion

The classification model is developed using various classifiers that predicts the value of the dependent variable, income, for various conditional states of the independent variables. It is possible to estimate if future income worth will be little or great. accuracy of predictions is evaluated by contrasting them with the real (Reference) value after extrapolating the income values from the test dataset. Models have been assessed to get the best possible match between predicted and actual data. After using the test dataset to forecast the income values, each model's accuracy is tested by comparing the predicted values to the real (Reference) value. The goal of the model is to have the largest percentage of anticipated and actual values match. The confusion matrix shows the accuracies of the decision tree, Naive Bayes classifier, KNN, and SVM at 0.98, 0.76, 0.84, and 0.83, respectively. Prediction from Decision Tree, some rules are derived that help to predict income greater than 50k or not. Finally, we can conclude that the best model for predicting income is the decision tree model, because it shows the highest accuracy (98.4%) among the three models. The most amazing tool for almost any type of analysis is Orange, and using Orange to visualize datasets is enjoyable. The development of roots marks the beginning of tree growth (located at the top). The information is then split depending on characteristics that can be used as leaves. Creating decision rules from constructed decision trees is known as decision rule formation. The decision tree can be
used to derive the rule by following the branches from root to leaf. The accuracy of the Decision Tree classification process is determined based on the dataset processing utilizing the tree approach employing Orange software. The value of precision is 0.98, indicating that the Decision Tree method is good.

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GARDENIA: SETTING AND RUNNING A CUSTOMIZED GIFTING PLANT STORE IN INDIA

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If you've never experienced the joy of accomplishing more than you can imagine, plant a garden (Brault, n.d.)- Robert Brault.

The growing trend of indoor plants and gardening created lucrative opportunity for individuals to start home-based plant nursery business and encashing on this opportunity was a Jaipur, Rajasthanbased start-up 'Gardenia' founded in the year 2018. Gardenia a family-owned business group started by its founder Rajshree Chhabra was an online plant gift store offering a wide range of indoor and outdoor plants, gardening accessories, and tools. Gardenia was incepted with the vision to make the concrete jungle, customers call home, a greener and more sustainable space through customized plant trays.

Positioned with the theme 'Where Gifts meet Plants' Gardenia was one-of-its-kind store that offered everything from succulents, cactus, ficus, snake plant, fittonia, poinsettia and other flowering plants in decorative trays that looked great in home, balcony, terrace and offices. The venture also provided other complimentary services like landscaping, terrace garden development, plant decor for events and corporate gifts. They provided doorstep delivery across India.

The founder at the time of launch envisioned that none of us had inherited the earth from our ancestors, but had borrowed it from our children so it was everyone's responsibility to pass it on cleaner, better and greener to the next generation.

So to build environment consciousness among customers Gardenia believed in planting a tree on behalf of the customer after every purchase. This initiative helped Gardenia to brand itself from an environmental perspective, and made their customers further happy with the purchase. (Day and Schoemaker (2006))

Satisfied with the growth of the venture in last five years Rajshree was now contemplating on future of the business and the issues she faced included: What must they do to expand and create new prospects for Gardenia? How can they ensure consistent freshness of plants and innovations in offerings to ensure repeat customers? What measures should they adopt to keep prices in check? How to grow further nationally and what can be done to enter international markets?

The Business Footprints – From Inception to Growth

It was around five year back that Rajshree felt the need to engage herself purposively as her kids were grown up and settled and she had lot of spare time at hand so she decided to try out her hand in something she enjoyed doing the most. After many days of giving her thoughts some shape she zeroed down on doing something with plants as she realized that she truly enjoyed spending time with nature.

Quoting David Hobson words 'I grow plants for many reasons: to please my eye or to please my soul, to challenge the elements or to challenge my patience, for novelty or for nostalgia, but mostly for the

joy in seeing them grow' Rajshree shared her passion mentioning 'I am a person who wants to place a plant in every home. The way my day begins with nurturing 4000 plants at my home I wish to extend that love and care in everyone's home'.

Rajshree said that before launching Gardenia she pondered on three aspects as she did not intend to take a hasty decision:

Assessing her passion and skill for plants and garden she carefully pondered over her love for nurturing and caring for plants and her knowledge and expertise in plant care. Additionally, she discussed at length with her near and dear ones to assess her entrepreneurial skills and commitment to ensure she was moving in the right direction.

Next, she went in for thorough market research to identify her target audience and understand customer demographics. Rajshree strategically studied demand for specific plant varieties and trends to align her venture's offerings with market preferences. Next she worked on developing a comprehensive business plan to set realistic goals.

Since Rajshree was not well versed with legal and licensing regulations before starting her homebased venture, she consulted few of her professional friends to familiarize herself with local permits required for operating this particular type of business. She ensured that she obtained the necessary licenses and certifications and adhered to zoning and environmental regulations to operate responsibly.

After carefully assessing the market challenges and opportunities Rajshree addressed the following key decisions before formally launching the venture:

Deciding on the Right Space

She designated a suitable area within her home in Jawahar Nagar, Jaipur for her plant store so that local customers can walk-in to have real feel of the product offerings. The founder mentioned '*Before choosing the location I considered factors such as lighting, temperature and ventilation to create an ideal environment for plant cultivation. I personally organized and optimized the space to maximize plant care efficiency'.*

Sourcing Plants and other Supplies

Rajshree said 'This was a crucial aspect of our business so I scouted for and established relationships with reliable plant suppliers to source a diverse range of plants. I carefully selected plant varieties that catered to our type of target customer's preference. Further I ensured steady supply of other needed items such as pots, soil, trays, miniatures, fertilizers, and gardening tools'.

Establishing Sustainable Plant Care Practices

Rajshree said 'From the beginning I was focused on maintaining high-quality standards for our plants as they were going to be the heart of our business so I put in place right watering, feeding, and pruning techniques to maintain plant health. I had a comprehensive pest and disease management plan also in Place'.

Rajshree further added 'After carefully considering all factors I started this brand in 2018 and currently have a team of 6 people to assist me in this business. When I began I never visualized that our scale of operations will have this much reach. Nowadays we receive orders from all over India

and the encouraging part is that many of our customers are repeat customers. We deliver pan India through courier services'. (Keller, Parameswaran, & Jacob, 2013)

Recounting impediments during inception Rajshree stated 'When we started our main challenge was finding prospective customers and reaching out to them. Next challenge was identifying and designing varied product range at different price points so that customers had choices as per their budget. Later as our business grew and when we went online, we started to get orders from different parts of the country and it was a challenge to identify the courier services that offered services in that particular area without exceeding our shipping costs As the business grew now our challenge is to maintain inventory of every plant in order to cater to bulk orders'.

Elaborating on the challenges the founder added 'One of the biggest challenges in selling plants online is to ensure there is no damage to the plant in transit and the plant remains fresh when it reaches the customer. We have successfully addressed this by using innovative, jelly-filled soil mixes and re-useable sturdy packaging'.

Gardenia Marketing-Mix

Rajshree established her firm with a vision to reconnect urban households with nature and teach gardening to the prospects by providing plants, tools for caring and knowledge to create miniature dream gardens at home. In line with the vision following marketing-mix strategies were devised:

Identifying Target Customer

Rajshree felt that over 60% of Gardenia's site registered users belonged to the same demographic group of 23- to 38-year-olds, educated, decent income earners— popularly bracketed as the millennials.

This age group, especially in metros, according to her was transforming the face of the largely unorganised plant nursery business, by transforming how and why plants are bought. They visualized plants as a part of home decor, as a gifting item or even a spiritual connect or an emotional investment.

'Millennials are at a life stage where they are just renting a house or buying a flat, and investing in plants for their homes. It aligns with their climate change discourse and is also Instagram-worthy,' said Rajshree'At times, it is a statement about their environmental consciousness, at other times, it is a means to relieve stress,' she added. She further felt 'Youth today wants to buy plants but tends to back off due to lack of botanical knowledge however during covid times people took refuge in nature, they got time to attend to their gardens and indulge in gardening hobby.'

Brand Logo

The venture's logo was simple yet meaningful. The word Gardenia was artistically written in green to emphasize association with nature and garden. On the alphabet 'i' instead of a dot a leaf was used for stronger association with greenery. Gardenia word was derived from the name of a flower that symbolized booming ecstasy and denoted purity, love and refinement. In sync with the name the company's mission was to spread awareness about bringing nature home and making more and more customers involved with plants in a creative and engaging way. 'Bring Home a Little Green' below the word 'Gardenia' specifically communicated the benefits a customer received from the venture. (Refer Exhibit 1).

Brand USP

Since inception Gardenia had a well defined Unique Selling Proposition (USP) for its customers which involved customized, pocket friendly plants gifting. Their website claimed 'Discover a whimsical selection of unique plants paired with magical miniatures crafted just for you. Our delightful collection will spark joy and bring a touch of nature to your home and office space'.

Rajshree commented 'Our team aims at providing a seamless shopping experience clubbed with timely delivery and customized products'. Gardenia's vision of creating greener spaces and making mother earth a healthier place to live had attracted huge popularity. With miniature tray gardens, as their specialty, they were committed to spread awareness about nature and create a small garden in customer's home. As part of their social responsibility Gardenia for every order placed on their website ensured to pass on a small portion of the profit towards planting trees and generating environment consciousness. Their plant trays were customized and were offered to customers in readymade format or as DIY(Do-it-yourself) kits.

Their website further reinforced their USPs in the following ways:

Magical escape promoted with the statement 'Create your own tiny wonderland with our enchanting miniatures or personalized gifts for the special ones'.

Versatile Décor depicted 'Add delightful charm and a plant to your living space, desk, or patio'.

Easy Maintenance highlighted 'Minimal care required to keep these tiny gardens thriving'.

Creative Outlet explicitly stated 'Unleash your inner artist by designing and arranging your miniature gardens or DIY kits'.

Endless Possibilities- meant '*Mix and match trays, pots, and miniatures to create your perfect plant tray'.*

Learning for kids stood for 'DIY kits are designed to encourage kids towards plants'.

All India Delivery denoted 'Perfectly packed plants delivered at your doorstop.'

Product-mix

'The glory of gardening: hands in the dirt, head in the sun, heart with nature. To nurture a garden is to feed not just the body, but the soul' In line with this statement Gardenia dealt in wide variety of product offerings which they categorized under Miniature Gardens, Gift Boxes, Miniatures, Pots and Planters and Gardening Tools.

Further under Miniature Gardens they had various options for their customers based on Occasion, Location, Zodiac, Festivals and Special Days (Refer Exhibit-2 &3). Under miniature gardens they also offered Fountains, Succulents and trays reflecting Calm, Peace & Wellness. Each offering had been meticulously conceived and they offered varied choices to their customers. For instance under occasion category Gardenia offered products catering to wedding, baby shower, anniversary, engagement, house warming etc. Under festivals and special days they covered various festivals like Diwali, Rakhi, Christmas, Father's Day, Mother's Day, Valentine's Day, etc.

Based on twelve zodiac they had product offerings for all different signs named as Jade Plant for Taurus/ Vrishabh Raashi, Peace Lily for Libra/Tula Raashi, Aglaonema for Leo/ Singh Raashi, Philodendron for Gemini/ Mithun Raashi, Pothos for Aquarius, Rubber Plant for Virgo/ Kanya Raashi,

Sansevieria for Scorpio/ Vrishchak Raashi, Air Plant for Sagittarius/ Dhanu Raashi, Zamia for Pisces/ Meen Raashi, Lucky Bamboo for Capricorn/ Makar Raashi, Chlorophytum for Cancer/ Kark Rashi and Haworthia for Aries.

In Lap of Nature, Buddha in Syngogium, Buddha in Forest, Awakening from the Dream, Peaceful Soul, etc. were the names given to their calm, peace & wellness category. Miniature Gardens product range highlighted in Exhibit 4.

Gift Boxes DIY for kids had Giraffes in a Tray, Forresta Plant Tray, Lake Plant Tray, Celebrations Plant Tray, Desk Name Tag with attractive names.

On their website Miniatures comprised decorative items in form of Animals and Birds, Beach Side, Fairy World, Food and Drinks, Furniture, Houses, Outdoors, People Figurines, Sand & Pebbles. They had also coined catchy names for each type of plant variety like in indoor plants they had Tribute To Womanhood, Little White Sansevieria, Lipstick Table Top Black Beauty, Snow White Aglaonema in Square White Pot and English Ivy In a CupSmile with Aglonema while in outdoor plants they had Colorful Mehendi Gift.

On their website each plant photo was depicted with an accompanying placard highlighting plant type and watering tips during summer and winters. (Refer Exhibit-5). One of their customer endorsed their efforts by mentioning '*Impressed with their wide variety of plants and adorable gifts*.' Their products were packaged and send in nature-friendly cardboard boxes with meaningful product description (Refer Exhibit-6).

Gardenia had curated an interesting range of Plants as Corporate Gifts. They could be customized to create memorable branding experiences. Commenting on it Rajshree said '*Thoughtful gifts go a long way in nourishing a healthy relationship with team and I personally feel plants as Corporate Gifts is a great opportunity for conveying gratefulness to employees. They make an ideal choice for helping team members learn the value of consistency as these qualities are needed for both growth of an organization and a plant'.*

Recently the brand also ventured into marketing Gift Cards by telling their customers to gift a Gardenia Jaipur gift card which can be redeemed on the company's website with no additional processing fees.

Pricing Strategy

Initially Gardenia products pricing strategy was not well drafted however going forward pricing was properly done after taking into account production, material and labor cost. Company's products were offered in price range of 300 to 4000 rupees. The range of miniature gardens –calm, peace & wellness category started from 875 rupees to 3950 rupees. S ucculents were available from 450 to 2250 rupees. Based on zodiac their products were offered at rupees 750. Their miniatures for decoration started from rupees 20 only. Their pricing strategy goes well with their customers as one customer had remarked '*Beautiful collection with reasonable price*.'

Rajshreee said that 'while pricing our products we took into account the cost to procure the plant and the tray, as well as the costs associated with marketing it. Since we were offering several different prlant gifts, we considered utilizing a variety of price points. This helped us in broadening our customer base as well as encouraged our current customers to price up'.

Since they were primarily focussing on online distribution channel they established convenient payment methods for their customers.

Gardenia had well drafted shipping, packaging and delivery instructions which were explicitly stated on their website and they charged flat 200 rupees for shipping.

Deciding Placement

'One vital aspect of marketing our plant trays successfully was selecting proper placement for them. There were several effective ways to market and sell our plants. We started by creating an online presence through our website and other social media platforms, showcasing our plant offerings, and engaging with potential customers' said Rajshree. For this they also referred to the target customer they had already identified. Based on that they tried finding answers to few pertinent questions like Where would their customer shop? Would the customer be searching for customized plant trays online, or will they prefer shopping at a large home store? Or would they prefer a small unorganized retail store for a product their type.

Rajshree quoted that rather than opting for large home stores who preferred buying from established players, she created a small display store at home and went in for their own online store in order to build their own loyal customer base.

Gardenia created an attractive website that had pages telling people about their product range, gifting options, home delivery services, prices, discounts, terms and conditions, privacy policy and so on (Keller, Parameswaran, & Jacob, 2013). Other thing that they ensured on their website was defining the plant gifts in detail by describing the specific value and qualities of the plants. Beside the obvious Gardenia also attempted to highlight the unique features that the plants offered. Under their Main menu section they attractively covered their product range. (Refer Exhibit 7).

'Since our major channel for sale was online, we strategically worked on preparing our marketing material make our plants look visually appealing and compelling with accurate descriptions of each category and our attractively designed business cards to accompany our gift trays when we shipped them.' said Rajshree.

Gardenia products are shipped to cities like Bengaluru, Hyderabad, Delhi, Mumbai, Jaipur, Chennai, and Ahmedabad. The brand in near future also planned to go on board with other selling partners such as Myntra & Nykaa.

Creating Promotion

'Once our miniature gift trays were placed on our website, it was time for us to promote it. As with placement, our promotion was also determined by our intended target audience. We tried knowing their interests and opinions particularly what did they watch? Where did they spend their time? We were basically interested in exploring the right advertising medium and make our plants known by any means. We worked on making our website more attractive and interactive to build our buyer's interest in shopping with us' said Rajshree.

Rajshree further added 'We knew that having a successful digital presence will boost our business so we extensively used Facebook and Instagram to drive sales. Our Instagram was full of photos that matched the brand's aesthetic, as well as engaging quotes for our target customers. We ran a lot of advertisements, product and endorsement campaigns on social media to let our customers know

what are new arrivals and what they can look out for from us. We also ensured good presence across all ecommerce portals'. (See Exhibit 8).

Gardenia promoted their plants as a great gift item for individuals as well as corporates.. They also promoted their plants as an ideal gift for special occassions like Christmas, Raksha Bandhan, Anniversary, Diwali, Holi, , Karwa Chauth, Valentine's Day, Women's Day and Mother's Day.

Rajshree stated, 'We have been working constantly to develop a wide range of plant trays over the past six months and soon will start selling them all over India assuring damage-free shipping. We will soon be investing in digital marketing and traditional print media marketing as well'

Gardenia also plans creating video advertisement on Facebook, to rope in potential buyers by showing them the process of procuring and growing a plant. This way prospective buyers will understand and appreciate the value of the product and will show more interest in purchasing the plants.

With 15.4k followers on Instagram and a rating of 4.9 on Google Gardenia plans tapping digital media effectively for enhanced reach.

Customer Experience Management

'I ordered for my mother's 50th birthday and she is loving it. You guys had patience to understand my requirements and thank you so much for customizations. My all time favorite gifting site now.' wrote one customer while another one noted 'Absolutely loved it!!! Beautiful plants, great packaging and delivered on time'.

Two of their repeat customers said 'I can't believe how amazing our experience with this fabulous small business has been. Their dedication to our satisfaction blew our minds. We're customers for life!' and 'Perfect indoor plant for my desk, looks beautiful. Thanks team'.

'My 8 year old assembled the DIY kit in just 10 minutes by following the instructions, happy with the purchase.' wrote another happy customer.

Commenting on the positive reviews Rajshree stated 'We hope to bring a smile on our customer faces with every product of ours'.

Industry Overview

According to Statista (2025), the revenue in the Lawn & Garden market in India stood at INR US\$15.73bn and is estimated to grow by 4.38% annually (CAGR 2025-2029 as depicted below.



Figure I : Lawn & Garden - Revenue

Considering the population figures, the per person revenue in India is INR US\$10.81 in 2025.

When compared globally, USA generated the highest revenue in this market, with a total of INR US\$133bn in 2024.

Siddhant Bhalinge, founder and chief executive officer of another reputed start-up,Ugaoo.com had once remarked "The plant and home gardening industry is estimated to grow at a CAGR of 50% and reach a market size of \$4 Billion by 2025 in India, thus holding great potential for growth."

India's growth in lawn and garden market was driven by a booming economy, growing middle class and increasing urbanization, creating a significant demand for landscaping services and gardening products.

Major Players

Following are the key players in online plant nursery in India:

Ferns N Petals (FNP)

A flower and gifts retailer started by Vikaas Gutgutia in 1994 today the brand owns 194 outlets in 74 cities nationwide and delivers to more than 155 countries. It is the single and largest organized flower retailer in India dealing in indoor plants, outdoor plants, cakes, chocolates, fresh cut flowers, flower basket, artificial flowers and many more (Ferns N Petals, n.d.).

Nurserylive

Established in 2014 and headquartered in Pune, Maharashtra it is an online platform that offers a vast collection of aquatic plants, aromatic plants, avenue trees, bamboos, succulents, seeds, gardening tools, and fertilizers. They also extend gardening advice and tips for beginners (Nurserylive, 2025).

Ugaoo

The Pune, Maharashtra based startup Ugaoo.com, owned and operated by Ugaoo Agritech Pvt Ltd. was started as a subsidiary of Bhalinge's 137-year-old family company Namdeo Umaji Agritech. Siddhant, who hailed from a family business of seeds and agriculture, was equipped with rich experience in the field of plants, plant care and kitchen gardening. Ugaoo is an e-commerce platform that offers a diverse range of plants, seeds, gardening tools, and organic fertilizers. They provide delivery services across major cities in India (Ugaoo, 2025).

Plantsguru

Founded in 2014 and headquartered in Pune they offer Natural plants, artificial plants, Flowering plants, Avenue Trees, Aquatic Plants, Aromatic Plants, Cactus & Succulents, Ferns, Indoor Plants, Landscape Plants, Bamboo, vegetable & flower seeds, ceramic pots, designer pots (Plantsguru, 2025).

MyBageecha

Headquartered in Ahmedabad MyBageecha is an online plant nursery that specializes in indoor plants, succulents, and bonsai plants. They also design products which can be used in everyday life with nature. Some of their unique offering include Preserved Tabletops, Moss Frames, Stationary and Necklaces (MyBageecha, 2025).

Future Plans

Expansion into New Markets

With evolving consumer pattern, increasing response and rising demand from Tier 2 markers, Gardenia looks forward at capturing the growing market potential in the upcoming markets of India. The portal will now reach out to consumers across cities like Nagpur, Surat, Nashik, Kochi, Noida, Ghaziabad, Nashik, and Indore amongst others.

Enhancing Product Portfolio

Impressed by noteworthy growth of brand 'fernsnpetals' Rajshree is thinking over expanding Gardenia's business model to include combinations of plants with cakes, cards, flowers, chocolates and other such gifts.

Building Customer Relationships

Gardenia aims to develop exceptional customer service and personalized advice to establish strong customer relationships. Rajshree considers hosting workshops to generate awareness and educate customers on plant care. They also plan to implement loyalty programs to encourage repeat business and word-of-mouth marketing.

The Dilemma

Gardenia was at a decisive stage of growth, and the brand's future was largely dependent on the decision Rajshree would take to drive growth going forward. As a savvy business owner she was determined to maximize value, growth and profitability, for her miniature garden start-up.

The questions that she faced included: What must she do to expand and create new prospects for the venture? How to expedite procuring and delivery of plants in case of bulk orders? What measures should be adopted to expand in other product categories? What will be the pros and cons of expanding further nationally and internationally?

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Exhibit 1- Gardenia Logo

Bring home a little green

Source: Provided by the Company

Exhibit 2- Gardenia Product Category- Wedding Occasion



Plant Name : Sansevieria/Snake Plant

Ambience : Indoors/ Semi-shade

Planter : Ceramic round shaped pot of about 4.5" with a ceramic plate

Snake plant is a type of algae native to west Africa. It's lucky for Scorpions. This tray celebrates two people getting engaged & exchanging vows for a lifetime together.

Source: Provided by the Company

Anniversary

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Exhibit 3- Gardenia Product Category- Anniversary Occasion

Exhibit 4- Gardenia Product Category- Calm, Peace & Wellness



 Plant Name: Jade

 Ambience: Outdoors

 Planter: Ceramic oval shaped pot of about 6"

 Buddha practiced asceticism, taking refuge under the bodhi tree in Bodh Gaya village, to find the meaning of existence. He meditated for years to finally gain enlightenment- the answer that the cause of suffering is greed, selfishness and stupidity. Get rid of these negative emotions makes one happy.

Source: Provided by the Company

Exhibit 5- Gardenia Product Placard highlighting Plant Type and Watering Tips



Source: Provided by the Company



Exhibit 6- Gardenia Product Packaging

Everything you need to build your own plant tray and make it look like a tiny forest! Try this kit to cultivate some love for plants in your heart, which in return will make our home planet a better place to live in.

A perfect gift box and an enchanting experience. Choose your plant here with the box or buy any indoor/outdoor plant of your choice from a nearby nursery and decorate the tray using your own creativity.



Exhibit 7- Gardenia Webpage



🖓 🔐 🖉 Miniature Gardens 🗸 Gift Boxes 🗸 Miniatures 🗸 Plants Only 🤟 Pots & Planters Gardening Tools 🛛 🔍 😩 💟

Collections



Source: https://gardeniajaipur.com/

Exhibit 8- Gardenia Social Media Promotion through Instagram



BUILDING INTELLIGENT APPLICATIONS WITH GENERATIVE AI

Yattish Ramhorry BPB Publications Pages 248

Artificial intelligence is dominating all discussions across domains globally. Generative AI is seen as the next big wave ready to engulf the world. Instead of analyzing and redesigning what has been fed to the system, the generative AI applications create new content on the basis of the prompts they receive from the users. This is expected to bring in a sea change in the way the world functions.

"Building Intelligent Applications with Generative AI" by Yattish Ramhorry is an excellent early read to provide readers with the knowledge and necessary tools to create intelligent generative AI applications. In the book, Ramhorry follows a very smooth and 'from the scratch approach' to introduce the subject to the readers. He efficiently styles the book to satisfy the beginners and also providing valuable inputs to the techies.

Yattish Ramhorry, the author, is the Chief Technology Officer and founder of 4IR Technologies. He has wide experience in the software field, and has worked on wide ranging projects Yattish is proficient in Blockchain and has been a consultant, advisor, software architect, and Web3 developer for several start-ups. He enjoys sharing his knowledge and expertise by way of his writings for many publications. Ramhorry began his expedition in Generative AI in 2020 and has worked on AI implementation and ethical practices. His knowledge in the domain thus enriches the content of the book with real-world perspectives.

The book explores an extensive range of practical applications, from text generation and conversational agents to creative media creation and code completion, making readers available the actionable insights to assimilate these technologies into their work. It serves as a complete guide for developers, data scientists, and AI aficionados willing to apply the power of generative AI in their ventures.

Yattish practices use of very simple and crisp description making the content easily readable. He very beautifully describes the terminology to make even a novice understand the fundamentals with ease.

The book is organized to enable learning, beginning with introductory concepts of generative AI and progressing to advanced topics such as prompt engineering, integration of large language models like GPT-4 and Google's Gemini, and the development of intelligent applications using tools like LangChain, LangSmith, and FlowiseAI. Each chapter is designed to build upon the last, ensuring a consistent learning experience.

The author begins by introducing the fundamentals of Generative AI, discussing large language models like GPT-4, ChatGPT, Llama 2, and Google's Gemini, and their transformative impact across various industries. This is followed by exploration of real-world applications of GAI, highlighting its versatility in content creation, virtual assistants, code generation, and demonstrating its potential to revolutionize diverse sectors. Popular tools such as Copy.AI, DALL-E, Midjourney, Leonardo.AI, ElevenLabs and Speechify are introduced. Yattish further explores real-world applications of GAI, highlighting its versatility in content creation, virtual assistants, code generation, and more,

demonstrating its potential to revolutionize diverse sectors.

The following two chapters form the base of the technicalities of Generative AI. Prompt engineering is amongst the most defining aspects of Generative AI hence, in chapter 3, prompt engineering techniques are delved into, teaching how to craft effective prompts to elicit desired responses from AI models, enhancing the quality and relevance of AI-generated outputs. In chapter 4, the author provides guidance on embedding GAI models into applications, starting with data preparation, elucidating model selection and covering integration strategies. API usage, and considerations for seamless functionality within existing systems are also discussed.

In "Emerging Trends and the Future of Generative AI", newbies discover the current trends and future directions in GAI, offering insights into upcoming advancements and their potential implications for technology and society. A glimpse of the research domains in Generative AI is also provided for advanced learners. The next chapter, "Building Intelligent Applications with the ChatGPT API" offers a hands-on approach to creating intelligent applications using the ChatGPT API, providing step-by-step tutorials to leverage ChatGPT's capabilities effectively. Through the tutorial the author encourages the readers to explore and expand their chatbot development skill.

Chapter 7, explores the concept of retrieval-augmented generation using Gemini Pro, demonstrating how to enhance AI responses by integrating external information sources while the next chapter introduces Gradio, an open-source Python library that is a user-friendly platform for building interactive AI applications, guiding readers through creating and deploying GAI-powered tools. In this chapter, the author takes the reader through building of three demonstrative applications exhibiting Gradio's ability to swiftly generate user interfaces with minimal coding. An NLP application is also worked on while explaining the concepts of open-source language models such as DistilBart for text summarization, and the Salesforce Blip image captioning model.

Chapter 9 focuses on data visualization techniques using LangChain and Streamlit, teaching how to create interactive dashboards and visual representations of AI-generated data. The readers gain practical knowledge of integrating generative AI into their applications and using its capabilities for document-based interactions. Chapter 10 provides insights into developing applications using Llama 2, covering its unique features and practical implementation strategies. By way of practical exercises the author gives inputs on getting started with Llama 2 for automated blog post generation and pair programming assistant. The chapter discusses evaluation of the performance of LLM based applications using Langsmith.

In the eleventh chapter, the author guides readers through creating AI-powered document chatbots using Flowise AI, enabling efficient information retrieval and interaction. The readers find this nocode approach interesting for rapid prototype development and further experimenting with ideas and concepts. Chapter 12 shares best practices for developing GAI applications, emphasizing scalability, performance optimization, and user-centric design principles. In chapter 13, the author discusses the critical topic of ethical aspects of GAI, addressing responsible AI usage, potential biases, and strategies to mitigate ethical challenges in AI development.

In conclusion, it is a typical introductory book for early learners, it starts with the definitions of the basic concepts and equips the reader with skills to develop independent applications and harness the potential of Generative AI effectively. One of the biggest strengths of the book is its practical,

application-focused content. Each chapter is designed to guide readers through real-world use cases, from chatbot development to AI-powered document retrieval. This makes it an excellent resource for those who prefer learning by doing. The text breaks down complex implementations into clear steps, making it easier for readers to follow along with examples and code snippets.

There however are some areas where the book has scope for improvement. Although the book introduces foundational concepts, it quickly moves into technical implementations. Absolute beginners in AI or programming may struggle to keep up, especially with tools like LangChain and Flowise AI. The focus is heavily on application and practical implementation, which is great for developers. However, it does not dive deep into the theoretical foundations of generative AI, such as model architectures like transformers, fine-tuning techniques. Readers looking for in-depth theory might need supplemental resources.

Building Intelligent Applications with Generative AI is a valuable resource for developers and AI practitioners looking for a hands-on guide to integrating generative AI into real-world applications. Its practical approach, diverse tool coverage, and structured learning path make it a great addition to any AI enthusiast's library. However, beginners may need supplemental learning resources, and advanced users might find the lack of deep theoretical discussions a limitation.

MARKETING 6.0: THE FUTURE IS IMMERSIVE

Philip Kotler,Hermawan Kartajaya, Iwan Setiawan Wiley, December 2023, 256 pages

Marketing 6.0 The Future is Immersive presents a structured exploration of the evolving marketing landscape. It is divided into three main sections: an introduction to meta marketing covered under Chapters 1-4, an examination of its enablers and environment covered under Chapters 5-7, and a discussion of the customer experience it delivers covered under Chapters 8-10. The book emphasizes the necessity for businesses to create immersive experiences by integrating digital and physical interactions.

The first section introduces the concept of meta marketing, with Chapter One outlining its three layers: five technological enablers, two distinct environments, and three customer-facing experiences. Chapter Two focuses on Generation Z and Generation Alpha as key consumer segments, highlighting their digitally integrated lifestyles. Chapter Three explores five major metamarketing drivers—content, social media, e-commerce, artificial intelligence (AI), and wearable devices—while Chapter Four discusses the interplay between digital and physical touch points.

The second section covered under Chapters 5-7 examines how meta marketing enablers—IoT, AI, spatial computing, AR/VR, and block chain—contribute to immersive marketing environments. These technologies facilitate extended realities and digital integration. The discussion extends into real-life applications and the future of social media platforms.

The final section covered under Chapters 8-10 probes into customer experiences, with Chapter Eight exploring multisensory engagement and Chapters Nine and Ten discussing spatial and metaverse marketing. The book underscores the evolution of consumer interactions and the potential for businesses to create fully integrated online-offline experiences.

One of the book's key strengths is its structured approach to meta marketing, providing a clear and logical framework. Chapter One establishes its significance and identifies key markets, while Chapter Five and subsequent chapters detail its practical application. The authors effectively illustrate how technological elements work in synergy, offering readers a holistic understanding of their role in shaping immersive customer experiences. The framework's second layer highlights a range of marketing environments, from digitally augmented realities to fully immersive metaverse experiences. The third layer focuses on three defining aspects of Marketing 6.0 The Future is Immersive multisensory, spatial, and metaverse-based experiences. This structured approach helps business leaders grasp the technologies, environments, and customer experiences that shape modern marketing.

Another standout feature is the book's emphasis on the hybrid marketing landscape, which seamlessly integrates online and offline elements. Unlike traditional omnichannel strategies, metamarketing emphasizes a deeper level of digital-physical fusion. Chapter One contrasts metamarketing with omnichannel marketing, emphasizing how digital experiences enhance physical

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interactions. Chapter Two introduces "phygital" as a term to describe how Generation Z and Generation Alpha seamlessly navigate both physical and digital worlds. Wearables, discussed in Chapter Three, blur the lines between physical and digital realities, while Chapter Five explains how mixed reality (MR) enables more immersive physical-digital interactions compared to AR. Chapter Six reverses the perspective by exploring why younger generations continue to seek IRL (in real life) experiences despite digital advancements.

The book also provides compelling illustrations of hybrid marketing, such as Chapter Eight discussion on multisensory engagement. This emphasis on cross-functional collaboration to deliver integrated customer experiences reinforces the necessity of blending digital and physical touch points.

While the book successfully presents groundbreaking marketing concepts, it is more practitionerfocused than academic. Future editions of the Marketing X.0 series could benefit from deeper theoretical contributions to strengthen its scholarly impact. Some critics argue that Kotler's works, while authoritative, could incorporate more substantial academic breakthroughs to support their narratives. Despite this, Marketing 6.0 The Future is Immersive remains an important contribution to the Marketing X.0 series, capturing key industry trends and innovations while providing valuable insights for professionals and marketers.

The book successfully informs readers about technological advancements and their implications for marketing. Its real-world examples make complex concepts accessible, reinforcing its value as a practical guide. By continuously tracking marketing trends and offering a structured synthesis of frameworks, the authors demonstrate their expertise in shaping marketing discourse.

While the book effectively presents forward-thinking marketing concepts, it is more practitionerfocused than academic. Future editions of the Marketing X.0 series could benefit from deeper theoretical contributions to strengthen its scholarly impact. Although Kotler's work remains influential, critics argue that it could incorporate more academic breakthroughs to support its narratives. Despite this, Marketing 6.0 The Future is Immersive is a valuable contribution to the Marketing X.0 series, offering a comprehensive look at emerging trends and innovations that can guide professionals in navigating the evolving marketing landscape.

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