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Editorial: Embracing the Future of Research in a Dynamic World

The landscape of research is evolving rapidly, driven by technological advancements, interdisciplinary collaborations, and the increasing emphasis on real-world impact. As we enter an era of knowledge acceleration, it is imperative for scholars, practitioners, and institutions to adapt to emerging trends that redefine how research is conducted, disseminated, and applied.

One of the most significant trends shaping modern research is the rise of Artificial Intelligence (AI) and Machine Learning (ML). These technologies are revolutionizing data analysis, enabling researchers to uncover complex patterns, automate repetitive tasks, and enhance predictive modelling across disciplines. In fields such as medicine, finance, and environmental science, AI-driven research is leading to groundbreaking discoveries and more efficient decision-making processes.

Another notable trend is the growing emphasis on Open Science and Open Access publishing. Researchers are increasingly advocating for transparency, reproducibility, and free access to knowledge. Open data repositories, preprint servers, and collaborative platforms are fostering a culture of shared learning, allowing scholars worldwide to build upon existing work without restrictions.

Interdisciplinary and trans-disciplinary research are also gaining prominence, breaking traditional academic silos. The integration of diverse fields such as behavioural science with technology, or sustainability studies with economics is leading to innovative solutions for complex global challenges. Addressing issues like climate change, public health, and digital ethics requires a holistic approach, where expertise from multiple domains converges to generate impactful insights.

Furthermore, ethical considerations in research are receiving increased attention. The rise of big data and biotechnology has prompted deeper discussions on data privacy, responsible AI, and ethical experimentation. Institutional review boards and ethical guidelines are evolving to ensure that scientific advancements are pursued with integrity and societal benefit in mind.

Finally, the future of research is being shaped by advancements in digital collaboration and remote research methodologies. The COVID-19 pandemic accelerated the adoption of virtual research conferences, digital fieldwork, and remote data collection techniques, proving that geographical boundaries need not limit scholarly engagement.

As we navigate these dynamic shifts, *Dharana: International Journal of Business* remains committed to publishing cutting-edge research that reflects these emerging trends. We encourage scholars to embrace innovation, uphold research integrity, and contribute to the ever-expanding universe of knowledge. The future of research is here, and together, we can shape it for the betterment of society.

A Commitment to Excellence and Ethical Scholarship

¹Er. N. Ramanuja

As we step into a new era of academic and professional excellence, it is heartening to witness the rapid evolution of research, innovation, and thought leadership across disciplines. At Dharana: International Journal of Business, we remain steadfast in our commitment to fostering a culture of intellectual rigor, ethical scholarship, and impactful discourse.

The role of research in shaping economies, industries, and societies has never been more critical. With advancements in digital technologies, artificial intelligence, and sustainability-driven initiatives, researchers today have an unprecedented opportunity to drive meaningful change. The integration of interdisciplinary approaches has further expanded the boundaries of knowledge, offering holistic solutions to complex global challenges.

Quality research is not just about generating new knowledge but also about making it accessible and actionable. Open-access publishing, collaborative research platforms, and digital repositories have democratized knowledge-sharing, ensuring that valuable insights reach stakeholders beyond academia. At our journal, we encourage contributions that reflect these evolving paradigms, highlighting research that has both academic depth and practical relevance.

Ethics and integrity remain the cornerstone of credible scholarship. As research methodologies evolve, so do the ethical considerations surrounding them. The onus is on academic institutions, journals, and scholars to uphold the highest standards of transparency, accountability, and ethical responsibility. Our editorial board remains committed to promoting ethical research practices, ensuring that every contribution aligns with global standards of integrity.

As we continue our journey at Dharana: International Journal of Business, I extend my heartfelt gratitude to our contributors, reviewers, and readers for their unwavering support. Your commitment to research excellence inspires us to maintain the highest standards of publication and intellectual engagement.

Together, let us shape a future where knowledge serves as a catalyst for positive transformation. I invite scholars, practitioners, and thought leaders to contribute to our journal, fostering an environment of learning, innovation, and progress.

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Trade Secret in India's Business Environment

M.G. Kodandaram

Trade Secret - An Intellectual Property

In today's highly competitive business landscape, proprietary knowledge holds tremendous significance. Companies depend on unique, value-added insights to solidify and sustain their strong market positions. This vital information, often developed over many years of experience and innovation, is commonly referred to as "Trade Secret". Such confidential information can encompass everything from formulas and processes to strategies and designs, providing a significant competitive advantage. Therefore, protecting this information from exposure and potential theft by competitors is essential.

'Trade Secret' refers to information not commonly known or easily accessible to individuals who typically handle such knowledge. Its value stems from the fact that it remains confidential, giving the holder a competitive advantage in the marketplace. The holder must take reasonable measures to protect the information from unauthorized access or disclosure. If the trade secret were to be exposed, it could cause significant harm to the holder, potentially undermining their business position or causing financial loss. The essence of a trade secret lies in its secrecy; by maintaining this confidentiality, companies can enhance their commercial prospects and secure their Intellectual Property Rights (IPRs) in a landscape where information is power.

Unlike traditional forms of Intellectual Property (IP), such as patents and copyrights, Trade Secret requires a distinct approach to protection due to several factors such as:

1. they may not fulfill the eligibility requirements specified by IP laws;

2. revealing such information could undermine the owner's market position; and
3. the cost of maintaining these types of IP may exceed their economic feasibility.

While Trade Secrets are not formally registered, they can be safeguarded through contracts and confidentiality agreements, ensuring that only authorized personnel have access.

Contents of 'Trade Secret'

A trade secret encompasses any confidential 'business-related information' such as - technical know-how, data compilations, business strategies, pricing information, marketing plans, customer lists, financial data, operational models research and development plans, product designs, formulas, manufacturing processes, software algorithms, proprietary databases, and any other valuable information. Trade Secrets are considered a form of IP and are critical to maintaining a business's competitive position. The definition provided in Black's Law Dictionary and endorsed by the Calcutta High Court in *Tata Motors v State of WB* [in *Tata Motors v State of WB*. (W.P. No 1773 of 2008)]¹ reinforces the idea that a Trade Secret must hold independent economic value and be actively protected through reasonable efforts to maintain its secrecy.

Trade secrets can involve both commercial and technical information. However, for information to qualify as a trade secret, it must meet specific conditions like:

1. it must have commercial value,

¹ 2010 LawSuit(Cal) 11

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2. it should be known only to a limited group of people, and
3. the owner must take reasonable steps to keep it confidential, often through confidentiality agreements with business partners and employees.

Article 39(2) of the Trade-Related Aspects of Intellectual Property Rights (TRIPs) Agreement allows member nations to create laws that prevent unauthorized disclosure and use of information that meets these criteria. As a signatory to the TRIPs Agreement, India has the flexibility to develop such laws, even though it currently lacks specific legislation on Trade Secrets. Indian courts and tribunals, however, have protected Trade Secrets under contract law, equity principles, and the common law action of breach of confidence, which addresses the violation of an obligation to maintain confidentiality.

The following types of information generally do not qualify as Trade Secrets:

1. Information that competitors can readily discover by examining or analyzing the product is commonly known as 'reverse engineering'. This information may remain confidential until the product is released, but it is not protected afterward. In these cases, it is advisable to plan for traditional IP protection.
2. General skills and knowledge acquired by employees during their employment, which they are free to use, though they cannot take proprietary secrets; and
3. Information that has entered the public domain, as it no longer retains trade secret protection.

Laws Relating to Trade Secret Protection

In India, legal remedies for the violation of Trade Secrets primarily stem from common law principles and contractual obligations, as there is no specific legislation solely governing trade secrets. When a Trade Secret is misappropriated, the owner can seek remedies through civil actions, including claims for breach of contract, breach of confidence, or misappropriation of trade

secrets. Courts may grant injunctions to prevent further disclosure or use of confidential information and award damages for economic losses suffered due to the violation. Additionally, remedies may involve specific performance orders, requiring the infringer to return any confidential information obtained unlawfully. However, this contractual protection is restricted to the parties who sign the agreement and does not extend to non-signatories, as long as they act in good faith. While criminal remedies for Trade Secret theft are less prevalent, certain provisions under the Indian Penal Code (now The Bharatiya Nyaya Sanhita, 2023) and the Information Technology Act, 2000 can be invoked in cases of corporate espionage or unauthorized access to trade secrets.

Examples of Trade Secrets in India

In India, the concept of trade secrets is not explicitly defined in legislation; however, various businesses utilize this strategy to protect their proprietary information, formulas, processes, and other business-related knowledge. Here are some notable examples of trade secrets in India:

1. Café Coffee Day, a leading coffeehouse chain in India, has successfully developed its unique coffee blend and preparation methods. The exact recipe and the process for making their signature drinks are closely guarded secrets. By keeping these recipes confidential, CCD maintains a distinct competitive edge over other coffee chains, and it is crucial in establishing their brand identity and customer loyalty.
2. Patanjali Ayurved has quickly risen to prominence in the Indian consumer goods market with its Ayurvedic products. The specific formulations and recipes for many of its products, including cosmetics and health supplements, are considered trade secrets. This confidentiality gives Patanjali a unique advantage in a crowded marketplace, as consumers increasingly seek natural and herbal alternatives to synthetic products.
3. Maruti Suzuki, India's largest automobile manufacturer, has a set of proprietary manufacturing processes that contribute to its production efficiency and product quality. The

specific techniques and technologies used in assembling vehicles are trade secrets that give Maruti Suzuki a competitive edge over other car manufacturers in India. This confidentiality helps the company maintain its position as a market leader in the automotive sector.

4. The Tata Group, one of India's largest conglomerates, has a wealth of confidential information regarding its business strategies across diverse industries, including steel, automobiles, and information technology. The specific strategies and operational know-how developed by the Tata Group are considered trade secrets. This knowledge enables the group to innovate and adapt to market changes while maintaining its competitive advantage.
5. Flipkart, one of India's largest e-commerce platforms, has developed a sophisticated supply chain management system that is key to its success. The specific algorithms and processes used to manage logistics, inventory, and customer delivery are considered trade secrets. By safeguarding this information, Flipkart can optimize its operations and ensure timely delivery of products, thus enhancing customer satisfaction.
6. Amul, one of the leading dairy brands in India, utilizes proprietary processing techniques for its dairy products. The methods for cheese production, milk processing, and flavour enhancement in their ice creams are closely guarded trade secrets. These unique processes allow Amul to maintain high-quality standards and deliver distinctive flavours to its consumers.
7. Ola, a major player in the Indian ride-hailing market, employs sophisticated algorithms for dynamic pricing, driver allocation, and route optimization. These proprietary algorithms are considered trade secrets, as they enable Ola to efficiently manage its operations and enhance the customer experience. Protecting this information is crucial for maintaining a competitive edge over rivals like Uber.
8. Zomato, a popular restaurant discovery platform, has developed a unique algorithm

for its restaurant review and rating system. The specifics of how ratings are calculated and how reviews are curated are closely guarded trade secrets. This confidentiality ensures that Zomato maintains the integrity and reliability of its platform while providing users with trustworthy recommendations.

9. Myntra, a leading fashion e-commerce platform in India, employs advanced algorithms for personalized recommendations and user experience optimization. The specifics of how these algorithms function and analyze user data are trade secrets. This confidentiality is essential for providing a tailored shopping experience that attracts and retains customers in a competitive online retail environment.

The above examples of trade secrets in India highlight the critical role that confidentiality plays in maintaining a competitive advantage across diverse industries. By safeguarding their proprietary information, businesses can foster innovation, enhance product quality, and build strong brand identities. As the Indian economy continues to grow and evolve, the significance of trade secrets will likely increase, making it imperative for businesses to implement robust strategies for identifying, protecting, and managing their Trade Secrets. A well-timed introduction of a 'sui generis' law for trade secret protection in India could greatly strengthen the competitiveness of Indian businesses.

Best Practices in Trade Secrets Protection

Trade secrets offer several key advantages for businesses, especially in industries where proprietary knowledge provides a competitive edge. They provide cost-effective protection, as they do not require registration or renewal fees, and can remain protected indefinitely as long as confidentiality is maintained. Their flexibility allows for the protection of a wide range of information, including technical and operational knowledge, without the limitations of other intellectual property (IP) protections. Additionally, trade secrets offer immediate protection, without the delays or disclosure requirements associated with patents. They also provide long-term security for

businesses that take steps to preserve confidentiality. For this purpose, the businesses that possess Trade Secrets must implement certain specific measures to safeguard this information from disclosure. Here are some of the best practices to ensure the effective protection of Trade Secrets in an organisation:

1. Compile a comprehensive list of trade secrets and review it regularly for accuracy.
2. Clearly label trade secret information (physical or digital) as "Trade Secret."
3. Limit access to Trade Secrets through physical, technological, contractual, and managerial controls.
4. Restrict remote access to Trade Secrets to minimize exposure risk.
5. Execute confidentiality agreements with employees and third parties, extending beyond termination.
6. Implement a robust Trade Secret Policy for managing confidential information.
7. Use technology to mitigate risks of reverse engineering and consider traditional IP protection wherever necessary.
8. Identify potential threats, including insiders, competitors, and hackers.
9. Assess and rank Trade Secret values to prioritize protection efforts.
10. Ensure approval and Non-Disclosure Agreement (NDA) before granting access to Trade Secrets.
11. Keep Trade Secrets concealed and restrict access to confidential information.
12. Avoid personal email use for sensitive information and safeguard documents with password protection and clear "confidential" markings.

These measures must be adhered to rigorously to protect valuable Trade Secrets. Moreover, there is anticipation for a sui generis law on trade secret protection in India, which could potentially resolve many of the existing challenges in this area.

Legislation for the Protection of Trade Secret

The increasing digitization of business operations has considerably heightened the risk of Trade Secret misappropriation, driving the need for stronger legal protections. Recognizing this vulnerability, both the Parliamentary Standing Committee on Commerce and the Law Commission of India have called for specific legislation to safeguard these crucial business assets. In response, the proposed 'Protection of Trade Secrets Bill, 2024'² aims to create a comprehensive legal framework that aligns India's Trade Secret laws with international standards. This initiative seeks to enhance clarity and provide stronger protections, ultimately promoting a more secure and competitive business environment in the country.

The bill comes at a time when India's legal infrastructure for protecting Trade Secrets is largely based on contractual obligations and common law principles. Although remedies exist through confidentiality agreements and tort claims, the lack of a specific law addressing Trade Secret misappropriation has left businesses exposed to potential risks, especially in a fast-evolving digital economy. The proposed legislation would address this gap by clearly defining Trade Secrets and outlining acts that constitute misappropriation. By establishing clear legal procedures, the bill will also ensure that courts maintain confidentiality during litigation, further safeguarding sensitive information.

A notable feature of the draft bill is its alignment with international standards, including the Agreement on TRIPS. Countries like the United States, the European Union, and South Korea have already implemented robust Trade Secret protection laws, enabling them to nurture innovation and attract foreign investment. By following suit, India is positioning itself as a competitive global player, offering businesses the legal certainty and protections they need to innovate and expand.

A dedicated law for the protection of Trade Secrets would not only strengthen the security of Indian enterprises but also position India as a more attractive destination

² <https://cdnbbsr.s3waas.gov.in/s3ca0daec69b5adc880fb464895726dbdf/uploads/2024/03/202403061982318841.pdf>

for global trade and investment. By establishing a legal framework that promotes innovation and safeguards proprietary knowledge, India is poised to develop a dynamic, innovation-driven economy capable of competing on the global stage. This framework would

empower Indian businesses to boost their competitiveness and contribute to increasing exports, further solidifying the country's leadership in technological and business advancements.

Employee Resilience and Employer Branding: The Mediating Role of Employee Engagement

Santosh Bommanavar¹ and M. D. Archana^{2*}

Abstract

Automation and other disruptive technologies are marking the new contemporary realities in a new industrial era. Due to this, organizations are demanding a workforce that is highly resilient, adaptable and responds positively to dynamic and stress-giving circumstances, and most engaged employees. Employees' resilience helps the organization recover quickly from setbacks and overcome adversity. Even though there is an eminent amount of literature revolving around employee resilience and employer branding in management discourse, the impact of employee resilience on employer branding has not been thoroughly studied in earlier studies. With this perception, the present research aimed to observe the mediating impact of employee engagement in the relationship between employee resilience and employer branding. This study used snowball sampling to survey 53 IT professionals in Bangalore City. The study hypotheses were experimentally tested using the linear regression approach. Furthermore, the study looked at the mediating role of employee engagement in the connection between employee resilience and employee branding using Preacher and Hayes's mediation analysis. The study's substantial relationships between its variables were shown through the results, which also demonstrated how employee resilience affects employee engagement and company branding. The results indicate that the impact of employee resilience on company branding is fully mediated by employee engagement. This study provides practical advice on how organizations can support employee resilience, which may then be crucial in creating a highly engaged workforce and enhancing the employer brand.

Keywords: Employer Branding, Employee Engagement, Employee Resilience, Mediation Effect

JEL Classification Code: J24, M12, M54, C12

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1. Introduction and Theoretical Background

1.1 Introduction

The relationship of organizations with their staff has garnered a great deal of attention in today's rapidly evolving work environment. Each organization faces a variety of factors and an ever more unpredictable

environment. Over the years, there has been an increasing number of high-risk events worldwide (Xiao & Cao, 2017). To be competitive in the 21st century, organizations must have a highly resilient and engaged workforce. This is because automation and structural transformation are the new digital realities (Malik & Garg, 2018). Support from the organization is crucial for this. Innovative and sustainable business concepts require a highly resilient and prospective human resource

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foundation. Employee resilience is essential for them to be able to swiftly adjust to the changing demands and work well even under demanding and emotionally taxing conditions (Fredrickson, Tugade, Waugh, & Larkin, 2003). For IT companies, the notion of staff resilience is important. Because IT workers operate in high-stress environments with mentally taxing and demanding roles, lengthy projects, and tight deadlines, as a result, job stress and turnover rates are higher in this industry (Bagga, 2013); (Messersmith, 2007); (Aguiar-Quintana, Nguyen, Cabrera, & Díaz, 2021).

Employees who possess resilience not only meet obstacles head-on but also maintain their drive and self-assurance, which helps them emotionally connect with their employer and raises employee engagement levels. An organization must help its resilient employees to withstand crises such as pandemics, mass layoffs, and the development of disruptive technology. Employees who exhibit high levels of vigour and mental toughness at work are considered to have high levels of employee morale. The components of work engagement are strength, dedication, and absorption (Ekhsan, Sudiro, Mugiono, & Hussein, 2022) (Ekhsan, Badrianti, & Aeni, 2021). Consequently, organizations can use employee resilience as a foundation from which to raise employee engagement levels. (Cooke, 2016), (Malik & Garg, 2018)

Strong employer brands are created by engaged employees who are more likely to maintain a positive attitude toward their companies (Hughes & Rog, 2008; Tiwari & Lenka, 2020). This aids a company in drawing in new employees and positioning itself as an “employer of choice” for those who adopt its basic principles, guidelines, and procedures. However, low staff engagement results in bad word-of-mouth, which damages the organization’s brand (Tiwari & Lenka, 2020). Because they show positive emotions toward the company, experience better health, have a higher level of trust in the company, and have a better relationship with their leaders, engaged employees perform better than uninvolved employees. Employees are also more likely to invest themselves in their work, which has an impact on employee performance and further productivity of the company. Even better, when employees promote their employer, it may help attract and retain the most talented candidates for the company. As a result, encouraging resilience and engagement

among employees is crucial to the organization’s ability to recruit and retain a larger pool of skilled workers.

1.2 Theoretical Background

The theoretical background for this research has been based on prior studies related to the resilience of employees, employer branding, and employee engagement. In addition, some literature has been presented that examines the relationship between any two of the three variables.

1.2.1 Employee Resilience

Organizations have recently had to deal with increasingly abrupt and tumultuous changes in an unpredictable environment. The Latin word resilience implies the ability to rise or jump back. The physics word “resilience” describes a material’s ability to revert to its initial condition following a disturbance. There isn’t yet a single, accepted definition of employee resilience. Numerous writers have defined terms from various angles. Beneficial psychology is used by the management discipline to analyze individuals, and research has shown that workers’ resilience has a beneficial impact on organizational commitments, job happiness, and commitment to change (Youssef & Luthans, 2007); (Shin, Taylor, & Gu Seo, 2012); (Aguiar-Quintana, Nguyen, Cabrera, & Díaz, 2021). Resilience in the organization has three successive states like anticipation, coping, and adaptation to successfully stand back. (Duchek, 2020). Skill adjustment is one of the crucial strategies to be resilient for organizations. (Edeh, Ugboego, & Adama, 2022)

Since the IT sector operates in a very dynamic and demanding environment where employees must deal with disruptive technologies like Artificial Intelligence (AI), machine learning, and cloud computing, the idea of employee resilience is crucial. Even in manufacturing sector the resilience has become vulnerable to relentless catastrophic events, thus it is gaining serious concern among many economic driven sectors (Shela, Ramayah, & Hazlina, 2023) Workers, to effectively handle and learn from unexpected events, procedures, and dynamics, developing or maintaining resources in a manner that is sufficiently flexible, storable, convertible, and flexible is necessary (Sutcliffe & Vogus, 2003). To be resilient, an

employee requires the organization's help to go through difficult times like pandemics, mass layoffs, and the development of disruptive technology.

1.2.2 Employer Branding

In modern marketing literature, branding is undoubtedly the most important concept. A brand represents "A name, term, sign, symbol or combination of these that identifies that maker or seller of the product and differentiates them from those of the competitor" – Philip Kotler and Gray Armstrong. (Kotler & Armstrong, 2011) Identifying the owner and creating a distinction, to gain benefits and competitive advantages is an important purpose of branding. Where the company and consumer brands are synonymous, the employer brand is also the same. Ambler and Barrow (1996) popularised this idea of employee branding, which is regarded as a synthesis of marketing and human resource management concepts. (Lengnick-Hall, 2011) (Itam & Swetha, 2022). They use brand marketing to enhance important HR outcomes like hiring, employee productivity, engagement, and improved performance. Employer branding is a collection of tactical measures to build a positive internal relationship with employees and a strong brand image in the external labour market. Several organizational elements support the organization in this way. Employer branding aids an organisation in identifying the crucial characteristics that are covered by potential and existing workers. (Samo, Talreja, & Bhatti, 2020). A positive work atmosphere, a work-life balance, competitive pay and benefits, chances for career progression, internal connections, etc., are all directly related to the development of an employer brand.

According to Ambler and Barrow (1996), Employer Branding is "The package of functional, economic, and psychological benefits provided by employment, and identified with employing company". Understanding the relationship between an employer and their employees requires an understanding of the concept of Brand as a person, which is apparent in corporate reputation, internal marketing, and company culture and identity (Ambler & Barrow, 1996). The organization uses employer branding as a long-term strategy to draw in new hires and inspire and retain existing staff members. Employee branding benefits workers in a practical, financial, and emotional sense. Employee behaviour must match the company's overarching beliefs and objectives for employer branding

to be successful (Eriksson *et al.*, 2023). This alignment can occur as part of the overall corporate culture. Employer brands are made up of two different kinds of values that are provided to workers: symbolic values like social identity and status, and instrumental values like career development chances and income. (Sarrica, Michelon, Bobbio, & Ligorio, 2014). When employees perceive their employer brand positively they shows more engagement toward the organisation, and to contrast to this when psychologically empowered, employees shows engagement regardless of their perception towards the employer brand (Drūteikienė, Savicke, & Skarupskienė, 2023)

1.2.3 Employee Engagement

William Kahn from Boston University initially used the term "Employee Engagement". He describes "the harnessing of organization members' selves to their work roles" as the process by which individuals use their bodies, minds, and emotions to express themselves in their positions. There are three phases to this idea. As the constructive opposite of burnout and an internal condition of the employee impacted by external circumstances, employee engagement is a multifaceted idea with behavioural, emotional, and cognitive components (Mazzei *et al.*, 2018).

Employees who are engaged do better on the job, burn out less frequently, and remain with the company longer. Employees that are engaged often display four behavioural traits: they feel motivated at work and devoted to the organization, feel content in their work and connect with a company (Stein *et al.*, 2021). In an article in Harvard Business Review, Stein *et al.* compiled the twenty most significant elements that drive employee engagement. They also identified the three most critical levers to increase employee engagement, which are:

1. Helping workers link their work with their values
2. Creating a more pleasurable and stress-free work environment
3. Providing workers with more paid time off and incentives.

Employee engagement increases the likelihood of displaying dedication to the organization. They become

inspired to actively participate in having a beneficial social influence. High levels of vigour and mental toughness at work are indicators of engaged employees' morale (Ekhsan *et al.*, 2021). Previous studies have demonstrated a clear correlation between employee engagement and significant results for the company and the workforce. Numerous studies have shown the beneficial correlation between employee engagement and other performance metrics, including productivity, profitability, task performance, job performance, and employee turnover rate.

2. Literature Review

2.1 Employee Resilience and Employee Engagement

According to Lupsa *et al.* (2020), employee resilience is "the workforce capability to endure and bounce back from issues, conflicts, lack of success, or situations that demand an increase in responsibility." However, in the workplace, it refers to the capacity to thrive in high-stress situations rather than only survive (Kumar & Das, 2022; Cleary *et al.*, 2018). The research paper "How Resilience Affects Employee Engagement?" by Md. Taufiq Amir & Wustari L. Mangundjaya advance theory and practice by managing engagement through observation of resilience's role and offer suggestions for better supervision of the staff-supervisor relationship as well as suitable design work to boost employee engagement. The resilience capacity of employees is unobserved as a forecaster of employee engagement. In the study titled "Investigative study on the role of employee resilience in employee engagement", the authors, Mr. P. Sai Kumar and Dr. V. Tulasi Das have conducted research and found that an IT employee's mentorship, career advancement, job autonomy, and teamwork are all significantly impacted by their commitment to progress. The authors concluded that employee engagement is significantly impacted by staff resilience.

2.2 Employee Engagement and Employer Branding

Many results have affirmed that employer branding can lead to employee engagement. However, only a few research literature conclude that good employee engagement can lead to better employer branding.

Employee engagement is all about employees identifying themselves in the work and organization by expressing themselves physically, emotionally, and cognitively in performing their role. Tanwar and Prasad (2016) have explained the employer brand in five dimensions and they are: healthy work environment, work-life balance, training and development, compensation benefits, ethics, and corporate social responsibility. Workplace also contributes to employee engagement. That further leads to internal branding of company. (Khairy, Agina, Aliane, & Hashad, 2023) These five factors are very crucial to enhancing the employee engagement level and these further lead to the enhancement of the productivity of the company and performance giving the organization psychological benefits of a positive brand. Employer branding also key to talent retention in the organizations (Ahmed, *et al.*, 2022) Brand of the company, psychological empowerment of employees and employee engagement reveals that these phenomena are all linked to disclosing employee's potential for the organization's success. The employer branding was measured in terms of four core values. Such as, economic value, social value, reputation value and Developmental value of organisation. (Anchu & Thampi, 2020). The employee's sense of pride and belongingness with their employer's brand/reputation, positively influence the employee's attitude of engagement and loyalty behaviour (Ilyas, Adeel, Said, & Alshuaibi, 2019) (Bhasin, Mushtaq, & Gupta, 2019). The successful employer branding still supersedes organisational commitment to equal opportunities and diversity management in organization's practice. (Kele & Cassell, 2023)

2.3 Employee Resilience and Employer Branding

A resilient employee can adapt himself to change effectively. In a dynamic environment, employees often need to implement change to be competitive. Employer branding benefits when the workforce is perceived as flexible and capable of navigating through challenges, creating a positive image of the organization. Resilient employees contribute to a positive work environment by maintaining a constructive attitude, even in the stage of adversity. This positivity can enhance the overall workplace atmosphere. A positive work environment is a crucial aspect of employer branding. It attracts top talent and fosters a culture that aligns with the

organization's values. A resilient workforce helps organizations attract and keep top talent and help them thrive. Further, employee resilience is a valuable asset that can significantly impact employer branding. It contributes to a positive work culture, enhances adaptability, and attracts top talent- which are essential in forming the public perception of the company as a top employer.

3. Research Design

3.1 Research Gap

The link between employee engagement and resilience has, however, received very little attention in the literature. Earlier studies have looked at and examined these concepts as separate entities, and minimal research has been conducted by taking only two terms together like, employee resilience and employee engagement or employee engagement and employer branding. However, no studies have tried to establish the relationship between these three terms together. To date, no studies have been conducted to know the impact of employee resilience on building employer branding.

3.2 Objectives

The key objective of the current study is to examine the relationship between employee resilience, employee engagement, and employer branding. In particular, employee resilience appears to be one of the hypotheses proposed for this study. The ability to adapt to new circumstances with the support of the organization and increased employee engagement towards the organization may lead to this. For a good employer's brand to be created, it also takes organizational effort. To create good employer branding, employee engagement acts as the mediating role. This objective is achieved by using primary data gathered through an online survey of selected information technology staff in order to describe the theoretical features of all core elements of each key concept. A survey has been carried out to assess these proposed relationships and the results have been presented in this paper. The key objectives are:

1. To study the relationship between employee resilience and employer branding.

2. To inspect the relationship between employee engagement and employer branding
3. To examine the correlation between employee resilience and employer engagement.
4. To investigate the mediating relationship of employee engagement between employee resilience and employer branding.

3.3 Hypotheses of the Study

H1: There is a significant and positive relationship between employee resilience and employer branding.

H2: There is a significant and positive relationship between employee engagement and employer branding

H3: There is a significant and positive relationship between employee resilience and employer engagement.

H4: Employee engagement mediates the relationship between employee resilience and employer branding.

3.4 Hypothetical Framework

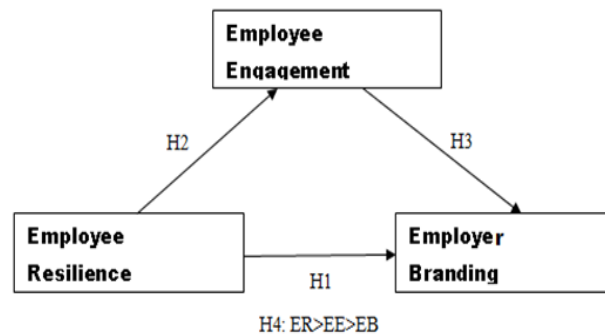


Figure 1. Hypothetical Framework of relationship between Employee Resilience and Employer Branding and Employee Engagement.

3.5 Research Methodology

The method used for this research is a quantitative research method. The study aimed to inspect the relationship between Employee Resilience (ER) employee engagement and Employer Branding (EB) among the employees of IT organizations in Bangalore City. For the research Employee Resilience is considered as an Independent Variable, the Employee Branding is considered as a

dependent Variable, and the Employee Engagement (EE) is considered as a mediating factor between employee resilience and employee branding.

1. Survey Instrument

Structured questionnaires are used for data collection, the questionnaire has four parts, the first part contains questions about demographic profile, the second part contains questions about the employee's resilience construct, the third part contains questions about employee engagement construct and the fourth part contains questions about employer branding.

2. Data Collection

The study has adopted the online survey method to collect the data from the IT professionals in Bangalore. Different IT professionals from different IT companies were approached using the snowball sampling method. This is because it was difficult to get access to the IT organization. The researcher approached many HRs of IT organizations to participate in this study through mail and formal channels, but responses from them were negative. Therefore the researchers decided to use a snowball sampling method to select the respondents. Questionnaires were distributed among a few known friends who work in the IT industry and they were asked to refer some of their friends and colleagues and circulate the questionnaire to them. This approach is called the 'Wasta Snowball Sampling Method' (WSSM). Respondents from senior to junior levels were also contacted to assess their resilience, engagement level, and impact on employee branding. Questionnaires were distributed to 100 employees of the IT sector and 60 responses were received back among 60, 7 responses were almost blank, and only 53 responses were considered for the further study.

3. Measurement

All the scales of this research study explored the attributes of ER, EE, and EB in IT companies based on the previous studies' literature review. The study uses the Likert scale with five levels from 1 which denotes strongly disagree to 5 which denotes strongly agree. The data was tested and analysed by using descriptive statistics, ANOVA, t-test, mediating factor analysis by traditional linear regression analysis, and Process procedure by Andrew F. Hayes (Hayes, 2022) used in the Statistical Software program SPSS version-26.

4. Data Analysis and Interpretation

The data was assessed and analysed by using the statistical SPSS (Statistical Package for Social Sciences) version 26. To begin with, the study data examination procedure was conducted starting with descriptive statistics to summarise and examine the respondents' demographic profile. As denoted in Table 1, the demographics of fifty-three participants are as follows: Respondents By age: 10 employees (18.9%) were 25 years and under 25 years age group, majority of the employees i.e., 31 (58.5%) were in the 26-35 age group, and 12 employees (22.6%) were in 36-45 age group. By gender 22 employees were female (41.5%) and 31 employees were male employees (58.5%). In terms of work experience in the IT industry,

Table 1. Respondents Demographic Characteristics.

Age		
	Frequency	Percent
25 and under 25	10	18.9
26-35	31	58.5
36-45	12	22.6
Total	53	100.0
Gender		
	Frequency	Per cent
Female	22	41.5
Male	31	58.5
Total	53	100.0
Years of experience in the IT Industry		
	Frequency	Per cent
less than 1 year	4	7.5
1-5 years	11	20.8
6-10 years	15	28.3
11-15 years	19	35.8
more than 15 years	4	7.5
Total	53	100.0

(Source: Primary data)

4 employees had less than one year of experience i.e. (7.5%), 11 employees (20.8%) had experience of 1-5 years, and 15 employees (28.3%) had 6-10 years of experience. 19 employees (35.8%) had 11-15 years of experience, and 4 employees (7.5%) had more than 15 years of experience. (Source: Primary Data)

4.1 Scale Reliability Assessment

The reliability of the items was estimated using the Cronbach Alpha method of internal consistency analysis, which also looked at the questionnaire's usability. Table 2 shows the Cronbach alpha values for employee engagement (0.934), employer branding (0.931), and employee resilience (0.741). All variable factors value is above typical threshold values of 0.7 which indicates a high level of reliability of the variable factors. The result shows that the study can utilize the questionnaire as these results are statistically significant.

Table 2. Reliability Test

Reliability Statistics		
	Cronbach's Alpha	No. of Items
Employee Resilience	0.741	10
Employee Engagement	0.934	18
Employer's Branding	0.931	10

(Source: Primary data)

4.2 Normality Assessment

To determine if the data were normally distributed, the Shapiro-Wilk and Kolmogorov-Smirnov tests were used. From table 3, it was found that for the employee, the resilience variable showed a significance of more than (p) 0.05, and employee engagement and employer branding variables showed a significance of less than (p) 0.05. That means only employee resilience-related data are normally distributed.

Two distinct methods of analysis were applied to evaluate this notion. Initially, the Baron and Kenny's mediation process (Baron & Kenny, 1986). Secondly, Andrew F. Hayes' Macro-Process approach for SPSS version 4.2 was employed. This process tool is a modelling tool for logistic regression route analysis. To calculate the impact of mediation models, it is mostly utilized in social and professional contexts (Hayes, 2022).

Employee resilience elements were converted into a new variable in the first phase in the manner shown below: ER1 to ER10 was transformed into "Mean_ER", employee engagement items were transformed into a new variable like EE1 to EE18 was transformed into "Mean_EE", Employee engagement items are transformed into a new variable like EB1 to EB19 was transformed into "Mean_EB". The researcher must estimate each path in the model according to Baron and Kennys' (Baron & Kenny, 1986) method before determining if a variable functions as a mediator by determining whether certain conditions are satisfied (Hayes A. F., 2009). Hayes wrote the explanation that follows: "For instance, is considered a mediator of the relationship between X and Y if both

Table 3. Normality Test of the data.

Tests of Normality						
Construct	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ER	0.083	53	0.200*	0.974	53	0.306
EE	0.130	53	0.027	0.954	53	0.041
EB	0.165	53	0.001	0.954	53	0.042

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

(Source: Primary data)

a and b paths in a model like the one below figure are statistically significant and c' is closer to zero than c .” (Hayes A. F., 2022)

H1: There is a positive relationship between employee resilience and employer branding.

Employee resilience impact on Employer’s branding

The correlation coefficient between employee resilience and employer branding, from table 4, $R = 0.437$ shows that although there is a link between the two, it is not very strong. Only 19.1% of the variability in the dependent component EB is explained by the independent factor ER, according to the coefficient of variance R^2 . The model’s generalizability is demonstrated by the modified R^2 listed in the table above. The corrected $R^2 = 0.175$ value in the table above is seen to be around the $R^2 = 0.191$ value. If the adjusted R^2 is deducted from the R^2 , the value will be $(0.191 - 0.175 = 0.016)$. This significant drop indicates that there will be a 1.6% decline in the result if the sample universe takes part in the study and the model is fitted.

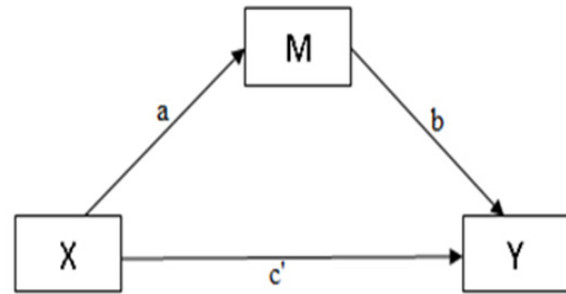


Figure 2. Example Relation between variables (Hayes A. F., 2009).

Researchers are able to statistically test the null hypothesis using the Analysis of Variance (ANOVA). The ANOVA test result is displayed in the above Table 5 with an F ratio of 12.065 and p value less than 0.05. This result suggests that there is less than a 5% chance that an F ratio this high would just occur by coincidence. The alternative hypothesis is accepted and employee resilience has

Table 4. Regression table showing the relationship between employee resilience and employer branding

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.437 ^a	0.191	0.175	0.60465
a. Predictors: (Constant), Mean_ER				

(Source: Primary data)

Table 5. ANOVA Table for the Relationship between Mean Employee Resilience and Mean Employer Branding

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.411	1	4.411	12.065	0.001 ^b
	Residual	18.646	51	0.366		
	Total	23.057	52			
a. Dependent Variable: Mean_EB						
b. Predictors: (Constant), Mean_ER						

(Source: Primary data)

Table 6. Regression Coefficients for Predicting Mean Mean Employer Branding

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.642	0.653		2.514	0.015	0.331	2.953
	Mean_ER	0.583	0.168	0.437	3.473	0.001	0.246	0.920
a. Dependent Variable: Mean_EB								

(Source: Primary data)

Table 7. Regression table showing the relationship between Employee Resilience and Employee Engagement

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.533 ^a	0.284	0.270	0.51867
a. Predictors: (Constant), Mean_ER				

(Source: Primary data)

Table 8. ANOVA Table for the Relationship between Employee Resilience and Employee Engagement

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.444	1	5.444	20.238	0.000 ^b
	Residual	13.720	51	0.269		
	Total	19.165	52			
a. Dependent Variable: Mean_EE						
b. Predictors: (Constant), Mean_ER						

(Source: Primary data)

a positive impact on IT company branding since the p-value is smaller than the significant level (0.05).

The above coefficient table's (table 6) result showed that employee resilience has a somewhat beneficial impact on IT employer branding. Organizational support to

employees to be resilient helps to build employer brand image among the employees and industry.

H2: There is a positive relationship between employee resilience and employee engagement.

Employee resilience has an impact on Employee Engagement

The correlation coefficient between ER and EE, $R = 0.533$, in the preceding table 7 shows that employee resilience and employee engagement have a relatively significant link, albeit they do not follow the same route. Only 28.4% of the variability in the dependent component EE is explained by the independent factor ER, according to the coefficient of variance R^2 . The model's generalizability is demonstrated by the modified R^2 listed in the table above. As can be seen in the above Table 7, the corrected $R^2 = 0.270$ value is quite similar to the $R^2 = 0.284$ value. The result will be $(0.284 - 0.270 = 0.014)$ if the modified R^2 is removed from the R^2 . This degree of decrease indicates that there will be a 1.4% decrease in outcome variation if the sample universe engages in the study and the model is fitted.

Researchers are able to statistically test the null hypothesis using the Analysis of Variance (ANOVA). The ANOVA test result is displayed in the above Table 8, with an F ratio of 20.238 and P value of less than 0.05.000, this result suggests that the likelihood of an F ratio of this magnitude occurring purely by coincidence is less than 5%. Employee resilience influences IT employees' engagement, and as the p-value is smaller than the significant level (0.05), the alternative hypothesis is accepted and the null hypothesis is rejected.

According to the results in the above coefficient Table 9, employee resilience has a moderately good impact on IT employees' engagement. Organizational support to adjust to the change of environment, training and development, and psychological support will enhance the morale of the employees and they feel connected to the organization.

Table 9. Regression Coefficients for Predicting Mean Employee Engagement

Coefficients								
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		
	B	Std. Error				Beta	Lower Bound	Upper Bound
1	(Constant)	1.438	0.560		2.567	0.013	0.313	2.563
	Mean_ER	0.648	0.144	0.533	4.499	0.000	0.359	0.937
a. Dependent Variable: Mean_EE								

(Source: Primary data)

Table 10. Regression table showing the relationship between employee engagement and employer branding

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.770 ^a	0.593	0.585	0.42921
a. Predictors: (Constant), Mean_EE				

(Source: Primary data)

H3: There is a positive relationship between employee engagement and employer branding

Employee engagement has an impact on employer branding

It is evident from the above Table 10 that there is a relatively significant association between employer branding and employee engagement, with the correlation coefficient between the two variables being $R = 0.770$. Only 59.3% of the variability in the dependent component EB is explained by the independent factor EE, according to the coefficient of variance R^2 . The model's generalizability is demonstrated by the modified R^2 listed in the table above. As can be seen in the above Table 10 the corrected $R^2 = 0.585$ value is rather similar to the $R^2 = 0.593$ value.

Should the modified R^2 be removed from the R^2 , the result will be $(0.593 - 0.585 = 0.008)$ This significant reduction indicates that there will be a 0.8% decrease in outcome variation if the sample universe engages in the study and the model is fitted.

The null hypothesis may be quantitatively tested by researchers using the Analysis of Variance (ANOVA). The ANOVA test result is displayed in the above Table 11, with an F ratio of 74.158 and a p-value of 0.000 is less than 0.05, this result suggests that the likelihood of an F ratio of this magnitude occurring purely by coincidence is less than 5%. Employee engagement influences IT employer branding since the p-value is less than the significant level (0.05), rejecting the null hypothesis and accepting the alternative.

Table 11. ANOVA Table for the Relationship between Employee Engagement and Employer Branding

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.662	1	13.662	74.158	0.000 ^b
	Residual	9.395	51	0.184		
	Total	23.057	52			
a. Dependent Variable: Mean_EB						
b. Predictors: (Constant), Mean_EE						

(Source: Primary data)

Table 12. Regression Coefficients for Predicting Mean Employer Branding

Coefficients								
Model	Unstandardized Coefficients			Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.567	0.391		1.453	0.152	-0.217	1.352
	Mean_EE	0.844	0.098	0.770	8.612	0.000	0.647	1.041
a. Dependent Variable: Mean_EB								

(Source: Primary data)

Table 13. Regression table showing the relationship between employee resilience and employee branding with employee engagement as a mediating factor

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.770 ^a	0.594	0.577	0.43294
a. Predictors: (Constant), Mean_ER, Mean_EE				

(Source: Primary data)

Table 14. ANOVA Table for the Relationship between Mean Employee Resilience and Employee Branding with Employee Engagement as a mediating factor

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.685	2	6.843	36.507	0.000 ^b
	Residual	9.372	50	0.187		
	Total	23.057	52			
a. Dependent Variable: Mean_EB						
b. Predictors: (Constant), Mean_ER, Mean_EE						

(Source: Primary data)

The above coefficient Table 12 result showed that employee engagement has an impact on the branding of IT Companies. Most engaged employees dedicate themselves to the organization's betterment, even further they voluntarily give good words about their employers in their network. Employee productivity also helps to contribute to creating employer brands in the industry.

H4: Employee engagement mediates the relationship between employee resilience and employer branding.

Hence, there is an impact of employee resilience with mediating variable employee engagement on employer branding.

Table 13 demonstrates a strong positive correlation ($R = 0.770$) between the predictors, ER and EE, and the dependent variable EB. It explains 59.4% of the variance in the dependent variable ER, as indicated by the R^2 value, while the adjusted R^2 (0.577) confirms that the model remains robust even after accounting for the

number of predictors. The standard error of the estimate (0.43294) suggests that the model's predictions are fairly accurate, with a relatively small average deviation from the observed values.

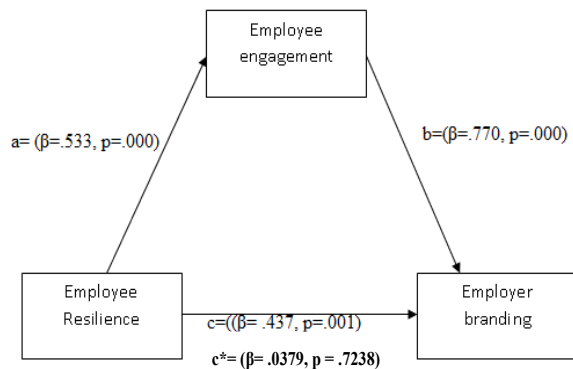
The null hypothesis may be quantitatively tested by researchers using the Analysis of Variance (ANOVA). The ANOVA test result is displayed in the above Table 14, with an F ratio of 36.507 and a p-value of 0.000 is less than 0.05, this result suggests that the likelihood of an F ratio of this magnitude occurring purely by coincidence is less than 5%. Employee engagement mediates between IT employee resilience and IT employer branding since the p-value is less than the significant level (0.05), rejecting the null hypothesis and accepting the alternative.

Hayes (Hayes A. F., 2009) claims that all procedures are accurate. As per Table 15, the current dataset shows a strong correlation between employer branding and employee resilience. ($\beta = 0.437$, $p = 0.001$). Employer engagement as a mediator has a substantial connection associated with employer branding ($\beta = 0.770$, $p = 0.000$),

Table 15. Regression Coefficients for Predicting Mean Employer Branding

Coefficients								
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		
	B	Std. Error				Beta	Lower Bound	Upper Bound
1	(Constant)	0.460	0.497		0.925	0.359	-0.538	1.458
	Mean_EE	0.822	0.117	0.750	7.034	0.000	0.587	1.057
	Mean_ER	0.050	0.142	0.038	0.355	0.724	-0.235	0.336

a. Dependent Variable: Mean_EB

**Figure 3.** Process Macro by Hayden (2022) shows the relationship between Employee Resilience and Employer Branding and Employee Engagement.

and there is a positive significant relationship between employee resilience and employee engagement ($\beta = 0.533$, $p = 0.000$). When employee engagement is taken into account as a mediator, the link between employee resilience and employee branding becomes less significant in the final phase ($\beta = 0.0379$, $p = 0.7238$).

When employee engagement is controlled for and employee resilience has no discernible impact on company branding, there is a full mediation role. This is the situation in the model under analysis; the full mediation hypothesis is supported if the association would diminish and would not be substantial. The degree of reduction on c , in general, characterizes the mediation

effect. This implies that the mediation effect is greater if c gets smaller (Hayes A. F., 2009)

Andrew F Hayes created the bootstrapping statistical computer program known as Process Macro for SPSS, which is useful for analyzing the impact of moderating or mediating factors on independent and dependent roles. With the software, the overall, direct, and indirect effects may be analyzed. The analytical process of the macro also includes standard error, regression coefficients, both standardized and unstandardized, and additional statistical variables like p -values (Hayes A. F., 2022).

All of the mediation role results are included in Table 16. The bootstrapping approach is used to present the 95% confidence interval along with the indirect, direct, and total impacts of all dependent and independent variables in the following table no.16.

The table's direct impact looks at whether there is a direct link between the variables and whether there isn't a mediating variable. Table 16 displays the results, which indicate that employee resilience has a direct impact on employer branding of 0.0505 with a t -value of 0.3554 and a p -value of 0.7238, which is more than 0.05. Therefore, it is impossible to reject or accept the null hypothesis that there is no direct association between employee resilience and corporate branding. To put it another way, since "Zero" is included within the 95% confidence interval, the coefficient " c " is not significant. (-0.2349 to 0.3359).

Table 16. Mediation Analysis of Mean_EB, Mean_ER, and Mean_EE

***** PROCESS Procedure for SPSS Version 4.2 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com (Hayes A. F., 2022)

Documentation is available in Hayes (Hayes A. F., 2022). www.guilford.com/p/hayes3

Model: 4

Y: Mean_EB

X: Mean_ER

M: Mean_EE

Sample

Size: 53

*****TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y*****

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_cs
0.5832	0.1679	3.4735	0.0011	0.2461	0.9203	0.4374

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_cs
0.0505	0.1421	0.3554	0.7238	-0.2349	0.3359	0.0379

Indirect effect(s) of X on Y

	Effect	BootSE	BootLLCI	BootULCI
Mean_EE	0.5327	0.1077	0.3089	0.7371

Completely standardized indirect effect(s) of X on Y

	Effect	BootSE	BootLLCI	BootULCI
Mean_EE	0.3995	0.0772	0.226	0.5353

Whether there is no indirect association at all between company branding and employee resilience, is the indirect result of the investigation. The 95% bootstrap confidence interval for the indirect effect's value, which ranges from

0.3089 to 0.7371, is 0.5327. The alternative hypothesis can be accepted and the null hypothesis rejected because "Zero is not included in the 95% coefficient interval." This indicates that the connection between employee

resilience and employer branding is mediated by employer involvement. Additionally, this approach uses full mediation for the connection.

5. Key Findings

This hypothesis strengthens the importance of employee resilience in today's dynamic environment. Data Analysis affirms the positive relationship between employee resilience and employer branding. Employees with resilient abilities are therefore aware of what is going on in and around the sector and are better equipped to handle unforeseen circumstances. According to some writers, resilience is a quality in a person that helps them defend against the bad effects of their environment and encourages adoption. Resilience is a dynamic process that may be improved over time by fortifying organizational capacities. (Tasic *et al.*, 2019). Enhanced capabilities of the organization present it as a great employer brand in the industries with great results. It will further attract great talents to be associated with the organization. Analysis shows that there is a moderated association or correlation between employee resilience and employer branding. Along with the resilient workforce, other factors also may foster employee branding.

Resilient employees show the highest adaptability towards change. If an organisation supports this adoption process it will boost the morale of the employees and enhance the engagement level of employees. Organizations support employees to be resilient by providing training and development, psychological, and moral support in times of crisis, and this can enhance the engagement level of the employees. A higher level of resilience leads to a higher level of engagement of employees only with the backup by the company.

Employee engagement can be measured by the level of involvement, and dedication absorption by the employees towards the organization. Factors that influence employee engagement are comfortable working conditions, good remunerations, and perks, work-life balance, job security, recognition, career growth opportunities, relationship between employee and superior, and peer group. According to the survey, highly engaged workers help to shape the industry's perception and brand image of their employers. The study also shows that Employee Engagement is closely correlated positively with employer

branding. Highly engaged employees themselves feel the organization is a great place to work and promote their organization with their performance and productivity.

Conclusion

The focus of the study was to find out the association between the variables of employee resilience, employee engagement, and employer branding. From the data analysis results, the study concludes that all variables have a positive association among the variables. When we consider only ER, EE, and EB, employer resilience has a significant impact on employee engagement and employee branding individually with a moderate correlation. When we consider the employee engagement variable as the mediating factor, the relationship between Employee resilience and employer branding is not significant. That means employee engagement has a major mediating role in deciding the relationship between employee resilience ability and employer branding. When an organization supports employees to be ready for the changes and to give crisis support, it can expect employees to be engaged with the organization for the betterment of the organization. Most engaged employees give 360° contributions to create a good image of the company as an employer and as a good place to work. Any organization, before thinking of building the brand image as an employer, should plan for developing employee resilient ability and enhancing the employee engagement level. Because a resilient and engaged workforce itself will become an instrument or medium in the creation of the brand image of the company.

Limitations and Scope for Future Research

Despite all the positive outcomes and findings, this research study has some boundaries. As the study samples are considered only from IT organizations which are located in Bangalore city and the number of samples is only 53 employees, the result may differ in the large sample data analysis. And in the study, we have not considered the demographic factors' impact on employee resilience, employee engagement, and employer branding. Future research should incorporate the demographic factors to better understand the

influence of these variables. Further research can be conducted by collecting large samples from throughout India to affirm the findings. At present, the study focuses only on IT professionals and future research can be done on other professionals and other industry employees also.

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Sustaining Equality: Investigating the Persistent Economic Effects of Gender Pay Disparities in the IT Industry

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Abstract

Despite significant technological developments, the Information Technology (IT) sector - a crucial driver of global development- continues to struggle with a gender pay gap. The gender wage disparity in the IT business is unjust, which undermines diversity efforts and puts the long-term viability of the sector at risk. The comprehensive literature review addresses other factors that contribute to compensation discrepancies, such as differences in experience, higher education, negotiation dynamics, possibilities for professional progression, and instances of discrimination. By carefully analyzing the underlying causes, assessing the implications on career advancement and job happiness, and putting forth practical tactics for promoting inclusivity and equity, this study seeks to close the research gap. The study approach utilizes a meticulous cross-sectional design, merging secondary data from published studies, publications, and reports with primary data gathered via an online poll. The study used non-probability sampling techniques to collect data from 54 IT professionals, thereby facilitating a thorough comprehension of the difference in earnings between genders in the industry. The findings of the research indicate that in spite of a balanced gender representation and appropriate workplace attitude, women continue to confront substantial pay disparities, being underrepresented in senior roles due to “glass ceiling” and significant micro inequalities. In conclusion, the study recommends the development of a more equitable and inclusive sector that is in line with sustainability principles for a resilient and just future.

Keywords: Disparity, Economic Growth, Gender Pay Gap, IT Industry, Sustaining Equality

JEL Classification Code: J31, J16, O15, M54, C83

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1. Introduction and Theoretical Background

1.1 Introduction

In an era of rapid technological advancement and digital transformation, the Information Technology (IT) sector is a major influence on global economic growth. Gender

pay disparity in the IT business remains a worrying issue, notwithstanding the remarkable progress and innovative achievements. Research on these disparities is vital to identify the various levels of inequality, including the social, economic, and physiological effects of unequal access to employment opportunities that affect people in this dynamic industry (Jaffee, 1989; Wright *et al.*, 1995; Smith, 2002; Huffman & Cohen, 2004). Hence, this study

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emphasizes the incorporation of sustainability concepts that transcend economic considerations. Despite its reputation for fostering innovation and advancing the economy, the IT industry is unfortunately hampered by a persistent gender pay gap that significantly compromises the equality principle. Women continue to contribute significantly to the IT industry, so it is imperative to look into the wider effects of gender pay gaps on sustainability, including social, environmental, and economic dimensions in addition to their financial implications. This goes beyond just looking at how gender pay disparities affect the bottom line. The gender pay gap is caused by differences between men's and women's average gross incomes in an economy. Economic reward is the component of job-related benefits that is most often measured. Another element adding to the significance of workplace inequality is the fact that not every one of them can be accounted for variations in human capital and skill capacities. This is particularly true for differences in the financial rewards that arise from fewer opportunities being accessible (Sebawit G. Bishu & Mohamad G. Alkadry, 2016).

This study intends to inspect the intricate elements of differences in wages between genders in the IT sector, to illuminate the fundamental reasons for these differences and examine their implications for sustainable growth. Our objective is to examine the long-term consequences of wages on the economic inequities on both the individuals who are directly affected and the industry as a whole, by employing a comprehensive and meticulous methodology. We look into how these variations contribute to broader sustainability issues such as corporate social responsibility, diversity and inclusion, and the long-term resilience of the IT workforce. The introduction of gender disparity in the workplace, the particular issues that women in the IT sector confront, as well as the complex interactions between social, organizational, and individual factors that contribute to this problem.

Our objective is to find practical ways to support an inclusive IT environment that honours the contributions of professionals of all genders and ensure that economic parity becomes a fundamental part of the industry's culture by sustainability principles for a just and resilient future. We will accomplish this through a thorough investigation and evaluation.

1.2 Theoretical Background

1.2.1 The Indian Context

India is placed sixth in South Asia and 127th out of 146 countries in the world by the 2023 Global Gender Gap Index survey. It will take decades for India to close the gender wage gap (Source: <https://theleaflet.in/international-equal-pay-day>). According to a Deloitte survey, women in India experienced a decrease in non-inclusive behaviours in the workplace, falling by nearly 10 percentage points to 48%. As women go up the corporate ladder, they encounter wider wage disparities. The most recent forecasts, as cited by the Economic Times, indicate that there would be an unadjusted difference in pay between genders in the IT industry in 2023. The survey also said that when women advance in their careers, there is a gender pay difference of 28-30%, whereas it is 8-10% for junior management. Women in India had a decrease in non-inclusive behaviours in 2023 compared to 2022, which was consistent with the worldwide trend. The Deloitte '2023 Women at Work Report' states that the occurrence decreased by nearly 10 percentage points to 48%. The World Economic Forum's (WEF) 2022 Global Gender Gap (GGG) Index ranked India 135th out of 146 countries. Men in India make up 82% of labour income, while women make up 18%, according to projections from the World Inequality Report 2022 (Source: Deccan Herald Published on 10 October 2023). A Pew Research Center study identified the majority of women's unequal treatment by employers as a primary cause of the wage disparity. Smaller proportions show that women are opting to work in lower-paying professions (34%) and are finding jobs where they can manage work and family (42%). The International Labour Organization noted in another analysis, show that a few possible causes include the lack of representation of women in positions of authority, career pauses, and reduced working hours due to additional obligations. According to a CFA Institute report published in March 2023, the wage gap grows as women advance in their careers. It was reported that for Key Management People (KMP) and directors, the median compensation ratio for women to males was 0.52 and 0.64, respectively. This implies that the salary of a woman in a key managerial role is just half that of her male colleague. The survey said that women in key management positions make around half as much as their male counterparts. It also mentioned that some practitioners thought

women may be overrepresented in company secretary positions, which had lower salaries than other KMP positions.

1.2.2 Gender Pay Disparity and Economic Growth

The World Economic Forum has increased its prediction that it requires more than 130 years to eliminate gender disparities globally from the previous estimate of roughly 100 years prior to the epidemic. Women are more likely to work in positions that are informal, brief, and freelance jobs, which are usually the first to be eliminated by enterprises during a downturn. These employment typically pay less and provide less social security benefits, which is why during the pandemic, 64 million women lost their jobs worldwide — twice as many as men. Moreover, according to UNDP (2016), 80% of those who are believed to have been displaced by climate change are women. Assuring equality of opportunity and involvement in the economy can hasten both a recovery from recent shocks and a potent development engine for future resilient, sustainable, and inclusive economies. Gender equality is closely associated with macroeconomic and financial stability; it can also reduce income inequality, stimulate economic growth, and enhance the performance of the public and private sectors. (Source: Speech by IMF First Deputy Managing Director Gita Gopinath at the Korea Gender Equality Forum, September 27–28, 2022). Women typically invest more money upfront in their education, but they also frequently end up in lower-paying jobs that don't match their skill level. As a consequence, Moody's noted that there has been "limited and divergent" progress in elevating women in economies during the previous ten years, leading to "both individual and macroeconomic economic loss". (Source: Moody's Analytics, Dawn Holland, Katrina Ell).

According to Klasen and Lamanna (2009), for example, who used an advanced technique to quantify the impact of overall female educational disparities on growth, economic growth is slowed by educational inequality. According to Schober and Winter-Ebmer (2011), this study continues to draw attention to the macroeconomic repercussions of gender inequality. Understanding how gender functions in the economy is necessary before we can enact macro-level policies that make gender (and other types of) equality

compatible with economic growth. The gender wage gap spurs economic growth and is not in favour of or even a defence of inequality. Instead, it is an evidence-based methodology for evaluating the current situation and the policy measures that should be taken to support equity-led growth.

1.2.3 Causes of Gender Pay Gaps

1. Disparities in Higher Education

Without a doubt, a person's chances of landing a well-paying job increase with their educational background. In the case of India's engineering field, where enrolment in science and technology courses is higher among men than among women. This results in women in these fields making less money overall (Das, 2023).

2. Difference in Year of Experience

Women may be compelled to leave the employment proportionately in order to fulfil caregiving and other unpaid duties. This is because, in the absence of paid family leave or medical/maternity leave, it takes longer for women to return to their normal lives, which makes it more challenging to get back to work. Additionally, in the absence of proper medical leave insurance, female employees may not turn up to jobs that they would otherwise consider lost, which could result in a break in their experience and, ultimately, lower earnings for them (Das, 2023).

3. Negotiation Difference

Research indicates that women may be less inclined than males to negotiate for higher pay. This may have an effect on long-term profits and result in variations in starting salaries.

4. Career Advancement Opportunities

Potential contributing factors to the gender wage gap include unequal access to leadership positions, mentorship, and career development chances.

5. Discrimination

Even when a woman's credentials and experience match those of her male co-workers, she may still encounter prejudice in terms of hiring, promotions, and compensation.

Source: The Economic Times published on 19/03/2023.

2. Literature Review

Galasi (2000): Contends that despite some inequalities in educational attainment, women nevertheless have less work experience than men because they take longer and more frequent breaks. Both vertical and horizontal segregation have a big impact on the degree of gender pay disparity.

Acker (2009): Defines the “glass ceiling” as a collection of barriers stemming from subjective, structural, and organizational factors that keep women from progressing to middle and upper management roles, collectively. This results in wider pay gaps among men and women at the appropriate point in the spectrum of earnings.

Miller (2008): The study compares the gender pay gap in the public and private sectors. The analysis finds evidence of sticky floors in the public sector but not in the private sector. According to this study, the glass ceiling is frequently experienced at the top of organizational hierarchies in the private sector.

Lips, 2013; Stockdale and Nadler (2013): Workplace limitations and differences in women’s attributes connected to their jobs contribute to a wider range in the gender wage gap. Gender is an important factor in explaining persisting wage disparities even after taking into consideration of human capital traits, profession areas, and agency-related impacts. Remarkably, this pattern holds true even for federal agencies, which are supposed to abide more closely by federal law that demands due process and equitable treatment. It should note that societal expectations and pressures can still impact employers and employees in the labour market, so career decisions and human capital investments made by individuals remain vulnerable to gender-based discrimination.

Altuzarra, González-Flores and Gálvez-Gálvez. (2021): Governments in addition to civil society are encouraged to take measures aimed at meeting the international standards for gender equality established by the Sustainable Development Goals (SDGs) of the United Nations for 2015–2030. According to the report, the objective is to raise the bar for women in all areas of their lives, including work, education, and participation in institutions that represent the public. This can be

particularly the case in the least developed countries and in those where the gender gap is more noticeable. The results suggest that boosting women’s educational opportunities is a good way to support emerging countries’ economic development.

Jakub Harman and Lucia Bartuskova (2023): According to the report, education widens the gender pay gap, with males generally benefiting more from education than women. The largest factor contributing to the gender wage gap’s expansion turned out to be post-secondary education. Accordingly, depending on the subjects in which they have studied, women are more likely to choose lower-paying occupations or to enrol in institutions that offer lower educational returns. There is a good chance that men will make more money than women in industries and professions where women predominate. This suggests that there is a significant “glass ceiling” or “sticky floor” impact that affects women in the workforce and lowers their prospective earnings relative to males.

Emily Grabham (2023): This paper has evaluated the possible effects of decertifying gender, which is defined as carrying the recognition of gender plurality, self-identification, and a protected characteristic of gender, on equal pay legislation and gender pay gap reporting. In order to evaluate how decertification can impact each step of the current legal framework—proving uneven compensation, identifying a comparator, and asserting a protected attribute, the study has concentrated on the procedure for pursuing an equal pay claim. For individuals with a greater variety of gender identities, claiming a protected trait would be easier. A comparison between the claimant and a person of a different gender would take place. The focus would continue to be on the gendering practices of the business rather than the identities of specific employees while addressing the issue in way that different job functions and structures have led to unequal pay.

Ricarda Anna-Lena Fischer, Emitzá Guzmán, and Janey Kok (2024): In the study women report witnessing and experiencing harassment and sexism when working in the software sector substantially more frequently than men do, and they report encountering micro-inequities much more frequently than males do. Furthermore, the findings demonstrate that although women bear comparable responsibilities for supervising and mentoring others,

a notably higher percentage of them believe they have insufficient authority and support to make critical decisions at work, are dissatisfied with their salaries, and feel underappreciated and unappreciated in their teams. Additionally, it discovered that men's main barriers are related to technical and project concerns, while women's key barriers are related to team chemistry and biases.

3. Research Design

3.1 Research Gap

The subject of gender pay inequalities has been investigated as part of some general research, but comparatively little in-depth examination of the IT sector has been done. Previous studies frequently concentrate on general salary disparities without exploring the particular characteristics of the IT industry. Furthermore, nothing is known about how these salary differences affect IT workers' ability to advance in their careers and their level of job satisfaction. The framework that is currently available falls short of giving a thorough analysis of the particular elements - like skewed assessments and negotiating assistance— that lead to gender-based compensation disparities in IT positions. In order to close this gap, focused research that examines the intricate details around gender wage disparities in the IT sector identifies the underlying causes, and analyses the effects on career progression and work satisfaction. The specific sustainability issues that gender-based wage differences present are to be identified, along with viable ways to close these gaps and initiatives to advance equality, inclusion, and long-term viability in IT organizations.

3.2 Problem Statement

Gender pay disparities persist in the IT industry, creating an unjust work climate where female employees are every so often paid less for equivalent roles compared to their peers who are male. This systemic problem endangers the long-term viability of the IT industry in addition to impeding efforts to cultivate a diverse and inclusive workforce. The continued existence of the gender pay disparity puts the industry's capacity to draw and keep top personnel from all demographic groups, notwithstanding the growing significance of sustainability in corporate operations.

3.3 Research Questions

RQ1: How do disparities between genders in salary exist in the IT sector?

RQ2: What are the primary factors contributing to the gender pay gaps in the IT sector?

RQ3: What is the impact of gender pay discrepancy on IT worker's career advancement and job satisfaction?

3.4 Objectives of the Study

1. To understand the present state of gender pay disparities in the IT industry.
2. To identify the primary drivers of the gender pay disparities in the IT roles.
3. To examine the disparities that impact work satisfaction and career advancement.
4. To recommend strategies based on findings, for promoting more inclusion and equity in the IT industry.

3.5 Design of the Study

A cross-sectional design is used in the investigation which makes it possible to gather data at single point of time. Information about gender pay gaps in the IT industry is gathered from the survey, The literature research yielded qualitative insights that explore the complex interplay between gender pay discrepancies in the IT industry, subjective experiences and environmental factors. A deeper comprehension of the phenomenon's complexity is facilitated by the examination of qualitative data from academic publications, case studies, and professional perspectives.

3.6 Data Collection Methods

1. Primary Data Collection

The primary data was collected using an online survey. Five factors were identified, which comprised over twenty-four statements that were examined thoroughly. All of the measurements except for the demographic data were assessed reliability for, five-point Likert scales, where 1 represented 'strongly disagree' and 5 indicated 'strongly agree'.

2. Secondary Data Collection

The Secondary data about gender pay gaps in the IT industry is sourced from previously published research, reports, and books.

3.7 Sampling Method

1. Quantitative Sampling

This sampling is used in this study.

2. Non-Probability Sampling

The sampling strategy is characterized by convenience and snowball sampling because participants are chosen primarily on their accessibility and recommendations from professional networks. Only 54 responses were received; this is due to employees busy schedules and the difficulty in finding the time to complete the survey.

Table 1. Demographic Profile of Employees from IT Industry

Basis of Classification	Classification	N	%
Gender	Male	26	48.1
	Female	28	51.9
	Total	54	100.0
Age	18-24	10	18.5
	25-34	34	63.0
	35-44	10	18.5
	Total	54	100.0
Educational background	Bachelor's Degree	35	64.8
	Master's Degree	19	35.2
	Total	54	100.0
Marital status	Single	31	57.4
	Married	23	42.6
	Total	54	100.0
Geographic location	Bengaluru	54	100.0
	Total	54	100.0
Designation	Associate Manager-Marketing	1	1.9
	Civil Software	2	3.7
	Data Analyst/Scientist	3	5.6
	Fraud Analyst	1	1.9
	IT Support/Help Desk	5	9.3
	Manager-Service Delivery	2	3.7
	Project Manager	3	5.6
	Recruiter	1	1.9
	Regional Manager-Team Lead	1	1.9
	Senior Business Analyst	1	1.9
	Senior Technology Support	1	1.9
	Software Developer/ Engineer	26	48.1
	System Analyst	3	5.6
	System Associate	4	7.4
Total	54	100.0	

Years of experience in the IT industry	0-2 Years	18	33.3
	3-5 Years	14	25.9
	6-9 Years	9	16.7
	10-14 Years	8	14.8
	15 or more years	5	9.3
	Total	54	100.0
Company size	Small (1-50 Employees)	1	1.9
	Medium (51-500 Employees)	8	14.8
	Large (501 -5000 Employees)	12	22.2
	Enterprise (5001 + Employees)	33	61.1
	Total	54	100.0
Annual income	Upto 3,00,000 Lakhs	7	13.0
	3,00,000 Lakhs - 8,00,000 Lakhs	21	38.9
	8,00,001 Lakhs - 13,00,000 Lakhs	10	18.5
	13,00,001 Lakhs - 18,00,000 Lakhs	4	7.4
	18,00,000 Lakhs	12	22.2
	Total	54	100.0

Source: Author (Desk Research)

4. Data Analysis and Interpretation

It might be inferred from Table 1, that the demographic profile of IT industry personnel exhibits a gender distribution which is balanced, with 51.9% women and 48.1% men. 63% of the respondents are between the age range of 25 and 34, and 68% of them possess a bachelor's degree. The proportion of individuals being single 57.4% and married 42.6% is equal. Bengaluru is the most common geographic place, accounting for all of the sample's 100%. Considering the technical focus of the industry, the most common designation 48.1% is "software developer/engineer." In regard to professional experience, a significant number of respondents had worked in the IT industry for 0–2 years (33.3%) and 3-5 years (25.9%). Since annual income distribution varies, the distribution of company size shows that large firms predominate (61.1%). 38.9% of the population earns between 3,00,000 and 8,00,000 lakhs. Overall, the data sheds light on the diversified nature of employees in the IT industry, showing

a range of income groups, educational backgrounds, and experience levels in the constantly evolving tech industry.

Table 2. Descriptive Statistics of Factors Influencing the Gender Pay Gap

Factors	Mean	SD	Variance
Job Equality	15.30	3.462	11.986
Recognition and Fairness	15.19	3.905	15.248
Bias-Free Evaluations	15.22	3.893	15.157
Negotiation Support	14.24	3.453	11.922
Career Opportunities	15.59	3.569	12.737
Flexible Arrangements	14.91	3.891	15.142

Source: Author (Desk Research)

Table 3. Tests of Normality

Classification	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gender	0.349	54	0.000	0.636	54	0.000
Age	0.315	54	0.000	0.771	54	0.000
Education	0.415	54	0.000	0.604	54	0.000
Marital Status	0.377	54	0.000	0.629	54	0.000
Location	.	54	0.000	.	54	0.000
Designation	0.344	54	0.000	0.801	54	0.000
Experience	0.212	54	0.000	0.859	54	0.000
Company Size	0.289	54	0.000	0.869	54	0.000
Income	0.255	54	0.000	0.848	54	0.000
JE_1	0.244	54	0.000	0.837	54	0.000
JE_2	0.283	54	0.000	0.845	54	0.000
JE_3	0.216	54	0.000	0.879	54	0.000
JE_4	0.233	54	0.000	0.857	54	0.000
RF_1	0.230	54	0.000	0.837	54	0.000
RF_2	0.239	54	0.000	0.872	54	0.000
RF_3	0.256	54	0.000	0.871	54	0.000
RF_4	0.231	54	0.000	0.863	54	0.000
BFE_1	0.215	54	0.000	0.863	54	0.000
BFE_2	0.240	54	0.000	0.845	54	0.000
BFE_3	0.219	54	0.000	0.876	54	0.000
BFE_4	0.252	54	0.000	0.853	54	0.000
NS_1	0.222	54	0.000	0.891	54	0.000
NS_2	0.211	54	0.000	0.878	54	0.000
NS_3	0.223	54	0.000	0.890	54	0.000
NS_4	0.229	54	0.000	0.898	54	0.000
CO_1	0.286	54	0.000	0.827	54	0.000
CO_2	0.273	54	0.000	0.847	54	0.000
CO_3	0.267	54	0.000	0.838	54	0.000
CO_4	0.282	54	0.000	0.852	54	0.000
FA_1	0.183	54	0.000	0.880	54	0.000
FA_2	0.217	54	0.000	0.865	54	0.000
FA_3	0.234	54	0.000	0.886	54	0.000
FA_4	0.215	54	0.000	0.852	54	0.000
Lilliefors Significance Correction						

Source: Author (Desk Research)

Table 4. Mann Whitney U Test to Determine whether There is a Significant Difference between the Mean Rank of Males and Females in relation to the Factors Influencing the Gender Pay Gap Among IT Employees

Factors of Gender Pay Disparity	Gender		Z Value	P Value
	Male	Female		
Job Equality	27.63	27.38	0.062	0.951
Recognition and Fairness	29.25	25.88	0.798	0.452
Bias-Free Evaluations	26.19	28.71	0.599	0.549
Negotiation Support	26.72	28.64	0.564	0.573
Career Opportunities	26.83	28.13	0.316	0.752
Flexible Arrangements	26.87	28.09	0.292	0.770

Source: Author (Desk Research)

From Table 2 it is inferred that respondents generally have positive views of various aspects of the workplace. The highest mean score (15.59) for “Career Opportunities” indicates a favourable outlook on professional growth, while the lowest mean score (14.24) for “Negotiation Support” suggests fewer positive perceptions in this area. “Job Equality,” “Recognition and Fairness,” and “Bias-Free Evaluations” received similar mean scores, indicating consistent positive perceptions in these areas. The standard deviations and variances reveal some variability in responses, particularly for “Negotiation Support” and “Flexible Arrangements”.

From Table 3, the significance level is set at 0.05, and the p-values are compared to this cutoff, as can be estimated. The null hypothesis is often rejected when the p-value is less than 0.05, which denotes non-normality. The exceptionally low p-values ($\ll 0.05$) in all variables suggest that the null hypothesis of normality is rejected.

H₁: There is a statistically significant difference between the mean rank of men and women with respect to the factors determining the gender pay gap among IT employees.

From Table 4 it can be inferred that, at a significance level of 5% ($\alpha = 0.05$), the results of the Mann-Whitney U Test suggest that there is no statistically significant gender difference in the factors contributing to the gender wage gap. At the 5% level, we observed there are no significant

differences between male and female employees in areas such as career prospects, flexible work arrangements, fairness and recognition, bias-free evaluations, negotiation support, and job equality. All related p-values are more than the 0.05 threshold. Hence we reject alternate hypothesis H₁.

H₂: Level of Gender Pay Disparity of IT Employees is equally distributed.

Table 5. Chi-Square Test for Goodness of Fit of Level of Gender Pay Disparity of IT Employees

Level of Gender Pay Disparity	Frequency	Percent	Chi-square Value	P Value
Low	13	24.1	8.333	0.016
Moderate	28	51.9		
High	13	24.1		
Total	54	100.0		

Source: Author (Desk Research)

From Table 5, it can be inferred that the results of the chi-square test of goodness of fit at a significance level of 5% ($\alpha = 0.05$) indicate a statistically significant relationship between gender and the degree of gender pay disparity among IT workers. The observed frequencies for low, moderate, and high disparity categories revealed a significant deviation from expected values, resulting in

the rejection of the null hypothesis. The analysis suggests that the proportion of females in the moderate and high gender pay disparity groups is higher than would be expected by chance, indicating a higher likelihood of pay gaps for women compared to men. Overall, these results confirm a significant and meaningful association between gender and the extent of gender pay disparity within the IT industry, highlighting the need for targeted interventions or policies to address the issue. Hence we reject H_{1_2} .

H_{1_3} : There is a significant association between Years of Experience and Level of Gender Pay Disparity of IT Employees

Note:

1. Row Percentage is the value included in ().
2. Column Percentage is the value included in [].

From Table 6, it is inferred that the chi-square statistic of 14.199 is not significant at the 0.05 level, with a p-value of 0.077. This suggests that it is not possible to reject the

null hypothesis. Years of experience and the gender wage gap do not appear to be significantly correlated, according to the chi-square test results, although confounding factors might still have an effect. Hence, we fail reject H_{1_3} .

H_{1_4} : There is a significant difference among mean ranks towards factors of Gender Pay Disparity of IT Employees.

Table 7 suggests that the Friedman test statistic is 15.418%, with a p-value of 0.009. Given that the p-value (0.009) is less than the significance level (usually 0.05), we may reject the null hypothesis and conclude that there is a statistically significant difference in the respondents' median ranks on at least one of the factors causing gender pay inequality. Hence we accept H_{1_4} .

5. Key Findings

The small sample size prevents generalizing the study's findings to a large population. The number of

Table 6. Chi-Square Test for Association between Years of Experience and Level of Gender Pay Disparity of IT Employees

Years of experience	Level of gender pay disparity			Chi-square value	p Value
	Low	Moderate	High		
0-2 Years	4 (22.2%) [30.8%]	10 (55.6%) [35.7%]	4 (22.2%) [30.8%]	14.199	0.077
3-5 Years	2 (14.3%) [15.4%]	10 (71.4%) [35.7%]	2 (14.3%) [15.4%]		
6-9 Years	3 (33.3%) [23.1%]	2 (22.2%) [7.1%]	4 (44.4%) [30.8%]		
10-14 Years	2 (25.0%) [15.4%]	6 (75.0%) [21.4%]	0 (0.0%) [0.0%]		
15 or more years	2 40.0% [15.4%]	0 (0.0%) [0.0%]	3 (60.0%) [23.1%]		
Total	13 (24.1%) [100.0%]	28 (51.9%) [100.0]	13 (24.1%) [100.0%]		

Source: Author

Table 7. Friedman Test for Significance Difference among Mean Ranks towards Factors of Gender Pay Disparity Employees

Factors of gender pay disparity	Mean rank	Chi-square value	p Value
Job equality	3.61	15.418	0.009
Recognition and fairness	3.39		
Bias-free evaluations	3.80		
Negotiation support	2.90		
Career opportunities	3.89		
Flexible arrangements	3.42		

Source: Author (Desk Research)

employees who completed the survey is 54 and may not fully represent the perspectives of the entire target group.

1. Employees who were surveyed from the IT industry exhibited a balanced gender distribution (51.9% female, 48.1% male) with the majority of them (63%) falling under the age group of 25-34 and holding a bachelor's degree.
2. The most prevalent job designation was, "Software Developer/Engineer" (48.1%) indicating the industry's technological emphasis.
3. Employee impressions were generally positive, as evidenced by mean scores above 3.5 in all sectors (Job Equality, Recognition and Fairness, Bias-Free Evaluations, Negotiation Support, Career Opportunities, and Flexible Arrangements).
4. According to the results of the Mann-Whitney U Test, all the p-values exceed the 0.05 threshold, stating no significant difference in factors contributing to the gender wage gap, as both male and female employees perceive these factors to be the same.
5. The Chi-square test results $\chi^2 = 14.199$, $p = 0.077$, show that there is no significant relationship between the years of experience and the gender wage gap, indicating that there is no direct statistical association based on the data.
6. The Friedman test, where $\chi^2 = 15.418$, $p = 0.009$,

shows a significant difference in the mean ranks, indicating that employees' perceptions of various aspects may differ. 'Career Opportunities' and 'Bias-free Evaluations' ranked as the most influential factors.

7. In the workplace, non-inclusive behaviors among Indian women decreased by almost 10 percentage points to 48%. As women go up the corporate ladder, larger salary gaps become apparent.
8. The salary of women in senior management roles is approximately half that of men in similar roles.
9. The concept of the "glass ceiling" creates obstacles that prevent women from advancing to higher managerial positions.
10. Women report feeling underpaid and underappreciated in their teams, and they experience micro-inequities more frequently.

6. Implications of the Study

Empowering women and promoting their professional growth and self-assurance are two ways that initiatives that promote equal chances and negotiation skills can benefit women individually. Further investigation into the specific elements impacting career progression opportunities, negotiating gaps, and biases in performance evaluations could help clarify the minor characteristics that contribute to gender salary discrepancies. Longitudinal studies tracking changes in gender wage discrepancies over time may provide a comprehensive understanding of this dynamic when paired with qualitative research exploring the real-world experiences of people working in the IT business. To better understand how organizational initiatives and policies affect inclusion and lessen gender wage gaps, more studies may be helpful. Examining how gender intersects with other factors is vital given the global discourse on gender equality is always evolving, making a study of the intersection of gender vital.

Conclusion and Scope for Further Research

In examining gender pay disparities in the Indian IT industry in particular, the current study closes by highlighting the complex interplay of factors that lead to payment differences. Empirical evidence demonstrates the need for targeted interventions by demonstrating that disparities continue to exist even when women advance

in their jobs. The findings emphasize the significance of mediating conflicts during negotiations, promoting equitable access to chances for career advancement, and combating prejudice in hiring and advancement. The larger impacts of gender pay discrepancies on economic growth are highlighted in the research, which emphasizes the need for governmental adjustments. Still, given the complexity of gender pay disparities, more research needs to be done on how to adapt workplace practices to changing circumstances to guarantee gender equality in the IT sector is sustained.

There are several limitations to the study that must be acknowledged. First of all, only 54 responses out of an estimated 100 suggest that the sample size may not adequately represent the diversity of the IT industry. Moreover, this study solely examines Bengaluru and the gender wage discrepancies in other Indian cities are not taken into consideration. Self-reported data introduces the risk of response bias, where respondents give responses they believe to be acceptable to society. The study's over-reliance on quantitative data is more significant than the exploration of nuanced qualitative aspects that may provide more insight into participants' experiences in the IT industry.

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ICT - An Innovatory Intervention in Secondary School Education - A Focus Study on Quasi-Government Schools

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Abstract

ICT, an acronym, denotes the integration of 'Information Processing, Computing and Communication Technologies' in a continuum and a range of different, albeit, rapidly converging technologies that fall into the union of Information Technologies (IT) and Telecommunications. An umbrella term 'ICT', refers to the processing and maintenance of information and the use of all forms of computer, communication, network and mobile technologies for transmission, processing, storing, creating, displaying, sharing or exchanging information by electronic means. ICT Teaching-Learning means and modes inter alia include radio, television, video, DVD, telephone (both fixed-line and mobile phones), satellite systems, computer and network, hardware and software, as well as the equipment and services associated with these technologies, viz., video conferencing, e-mail, and blogs.

In the era of digital transformation, Information and Communication Technology (ICTs) plays an incredible role and catalyses achieving Sustainable Development Goals (SDGs). To realise SDG-4, a transformative and innovative approach, a committed and concerted effort would be required across all levels of Secondary Education from curricula, pedagogy, ICT technologies, and collaborations to governance and funding. In this context, an earnest attempt has been made to evaluate the impact of the integration of ICT in Teaching-Learning Pedagogy in Quasi-Government, Secondary Schools (Classes from VIII, IX and X) of the West Godavari District, Andhra Pradesh. The study also examines the level of integration of ICT in Mathematics, Physics, Natural Sciences and Social studies. Further, it suggests the ways and means for the efficient and effective integration of ICT in Secondary School Education.

The results indicate a significant difference in the adoption of ICT across various classes of instruction between Rurban and Tribal regions selected for the study. The confidence level in the adoption and implementation of ICT varies significantly across different Degrees of Freedom (DF) in integrating Telugu, English, Hindi, Mathematics, Physics, Natural Sciences and Social Sciences. ICT touches every sphere and space of human life profoundly influencing how we live, work and interact. ICT recognises the importance of subject and domain knowledge, didactic improvisations and an openness of mind in the moments of Teaching-Learning. ICT is undoubtedly an innovative intervention and a collaborative concierge in Secondary education that chisels educators, teachers, and students within and out of the persona of educators, teachers, and students. ICT has revolutionised teaching-learning in the 21st century by introducing innovative pedagogical approaches that enhance engagement and accessibility.

Keywords: ADB, DBR, HEI, ICT, IMT, SDG, SSE, TPACK, UNESCO.

JEL Classification Code: I21, I28, O33, Q01, C83

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1. Introduction and Theoretical Background

1.1 ICT in Secondary Education - A Global Perspective

The ICT functionalities and desired support are provided to European teachers through the European e-learning portal in Europe that integrates the classrooms with ICT tools and techniques. The European teachers can share resources and give and take feedback from stakeholders about the efficacy of ICT implementation in European schools. The ICT pedagogues' centres and pedagogical services were established in Sweden in 1994 to integrate ICT in Secondary School Education (SSE) and also to provide support to the teaching community (Gutterman, Rahman, Supelano, Thies, & Yang, 2009). The Education Policy of Finland specifically recognises ICT as a prime tool in the teaching and learning process and states that technology is necessary albeit not sufficient in a knowledge or information society. Keeping in view this, a proto-type information model i.e., closer to network society is recommended for the improvement of technical knowledge and skills among Finnish students (Castells & Cardoso, 2006). Competence, credentials and commitment are necessary for the adoption and implementation of ICT (Flanagan, 2011). In Greece's education system, digital competence and complacency are serious limitations to adopting ICT, yet, teachers' positive attitude towards ICT integration is crucial for successful implementation (Jimoyiannis and Komis, 2006).

The digital disruptions of ICT in 'Developing Economies' are relatively scarce (Walsham *et al.* 2007) though gradually the scenario is changing. Digital literacy as enunciated in SDG-4 is the prime concern, especially in Secondary Education in India and the rate of ICT adoption is around 45 percent in Secondary Schools compared to 17 percent in Primary Schools in India (ADB, 2012). Many countries in Asia and the Pacific region have developed policies on ICT teacher training and they need

to be looked at more carefully with broader educational objectives and the evolving landscape of ICT (UNESCO, 2004).

The 4-Asian Tigers in terms of growth and development viz., South Korea, Singapore, Hong Kong, Taiwan and Japan have also formulated educational policies concerning SSE (ADB, 2012).

Japan introduced and implemented the 'E-Japan Strategy' in 2001, a proactive approach, to enhance intellectual ability and creativity. The successful integration of ICT takes place in Singapore in two phases. The ICT Master plan was designed in 1997 to incorporate technologies into the school system (Mui, Kan, & Chun, 2004). Thereafter, the systematic and holistic approach was introduced in 2002, and it was aimed at integrating ICT in pedagogy, professional development, examinations, assessment, and school culture. The curriculum was reduced by 10 to 30 per cent and allowed technology integration in all subject areas (R. B. Kozma, 2005; Law *et al.*, 2008).

The school enrolment and completion rates in Sub-Saharan Africa-Secondary education are identified as serious concerns to meet SDG-4. Some of the reasons pertaining to the low deployment of ICT in Secondary School education are the traditional teaching practices, outdated curricula, examination system, digi-infrastructure, poverty and brain drain per se (GEM, 2016).

The teacher-to-student ratio, teachers' management, and ICT adoption in Kenya, Mauritius and Zimbabwe have achieved consistency in SSE. (Bashir *et al.*, 2018). The smart school project was initiated by the Government of Malaysia with a specialised feature of browser-based Teaching-Learning in Mathematics, Science and Languages. The ICT adoption and implementation in Thailand's Education System is aimed at developing learning skills and talents, reasoning capacities and competencies (Anderson, 2010; Plomp, 2009).

The Instruction, Media, and Technology (IMT) Strategy in the Malawian perspective, the significance of practicum teaching, pedagogical awareness and content knowledge in South Africa's context, the DBR (Design-Based Research) and LS (Learning Study) models in Chinese Primary Education, the contextualised e-learning interventions in Higher Educational Institutions (HEI) of Zimbabwe, the Design-Based Research (DBR) in Kenya pre-primary schools through a dialogic lens, the Professional Development Programmes (PDPs) for teachers in Finland, and the 'Japanese Education System' in the present era of 'Reiwa' and Society- 5. O are some of the innovative interventions across the globe (Agnes Chigona, Helen Crompton & Nyarai Tunjera, 2024).

1.2 ICT in Secondary Education - The Empirical Evidences

Teachers and the pedagogical approaches play a vital role in ICT-enabled education. The adoption of ICT pedagogy (curriculum and practicum) in secondary education depends on the skills and competencies of the teacher. Bariu, T.N. (2020) opined that ICT plays a transforming role in secondary schools in Meru County, Kenya and also evaluated the state of ICT infrastructure and the process of delivery and instruction in secondary schools of Kenya. Japhet E. Lawrence and Usman A. Tar (2018) opined that digitalisation and integration of ICT in teaching and learning indeed provide a plethora of avenues including personalised learning experiences, collaboration networks and professional development in a globalised space. ICT plays a pivotal role in classroom delivery and instruction, administration, online instruction, and other activities. The integration and implementation of ICT improves the Quality of Teaching (QoT) and enhances the Quality of Learning (QoL). Pervaiz Memon *et al.*, (2018) described the scenario and status of SSE in the Ghotki, a Sindh province. Some of the observations *inter alia* include irrespective of ICT infra and interests, the unavailability of electricity and high costs of maintenance can significantly impact the implementation of ICT in secondary schools.

P. Mailavelan and Dr. M. Baskaran (2018) studied the level of adoption of ICT among secondary schools in and around Chennai, Tamil Nadu. They found out that most of the students have a moderate level of ICT awareness and there is no significant difference observed

in ICT awareness between boys and girls. Sanat Kumar Mallick *et al.*, (2018) explicitly expounded on the importance of education reforms and innovations including ICT in secondary and higher school education in 24 North Paraganas of West Bengal viz., Nadia, Hooghly, Purulia and Malda Districts. They suggested the digi-infrastructure including the digi-library, and digi-technologies for enhancing student engagement and teachers' enrichment making ICT integration a success in/out of the classroom. Xiang Hu *et al.*, (2018) elucidated the adoption of ICT in 44 countries at the school and student level and also examined the relationship between ICT and mathematics, reading and scientific literacy. The observations reveal that there exists a positive relationship between ICT adoption and students' interests, competencies, and autonomy. Moreover, a negative relationship exists between ICT use for entertainment purposes and the academic performance of students.

Gil-Flores *et al.*, (2017) explored the factors influencing the adoption and use of ICT in SSE in Spain. The significant barriers to ICT use in classrooms include snags in software and hardware, organisational barriers, perceived lack of usefulness of ICT, and lack of integration of ICT in pedagogy and curriculum, etc. Therefore, it is suggested to re-orient the Spanish educational system that support teachers, engage students and prepare the next generation for a digital future. Lucian V. Ngeze (2017) empirically examined the integration of ICT in teaching and learning in secondary schools in Tanzania and found that there is a high level of adoption of ICT among secondary grade teachers. The recommendations include imparting ICT Training among teachers at an increasing pace, providing ICT infrastructure in many schools, and setting up an ICT framework for implementing ICTs in teaching and learning.

Prema Basargekar & Chandan Singhavi (2017) investigated the impact of non-manipulative and manipulative teachers' factors on their perceived proficiency in using ICT at high schools in Maharashtra, India. Gender, age group, work experience, and experience of working with computers are significant non-manipulative factors while manipulative factors include type of school board, language of delivery and teachers training program facilities. The suggestions *inter alia* include there is a need for orientation programs for teachers on ICT adoption

and the introduction of e-content in regional languages have a positive impact on perceived proficiency in using ICT in classrooms.

The integration of ICT in SSE is imperative and imminent to build knowledge societies, provide digital skills, (UNESCO, 2003), and meet the needs and demands of the 21st century (Alsied & Pathan, 2013). The competence and confidence in relation to the pedagogical use of ICT mostly depend on course material, course design, digital infrastructure, and classroom practices (Law & Chow, 2008). The diffusion of technologies persuades individuals to change either to reinvent or innovate.

Piet Kommers and Margriet Simmerling (2005) opined that ICTs emerged as vital factors in the 'sustainable development of education' as enunciated in SDG-4. Secondary education is a decisive stage of learning and studying and ICT has an impact on the 'age' of secondary school students. Hence, it is suggested that educational institutions promote ICT infrastructure, and restructure classroom-based learning and its complement to home-based learning, vocational training, and most importantly web-based learning networks and learning communities. The study of Niel McLean (2003) on the adoption of ICT in secondary schools evinced ICT as a central for improving standards and also acts as a catalyst in terms of pupil attainment, motivation, and attendance. The results reveal that there is a clear and positive relationship between ICT learning opportunities and pupil achievement in secondary education.

2. Research Design

Data plays a pivotal role in evaluating the efficiency and efficacy of ICT Teaching and Learning. It provides valuable insights and inferences to gauge the effectiveness of ICT adoption in Classroom Teaching and Learning. The meta-analysis of data focuses on qualitative and quantitative insights thereby synthesising the results. The study is based on both primary and secondary data. The primary data is collected by canvassing a semi-structured questionnaire among 1167 secondary school teachers and 6022 students of classes VIII, IX and X including 62 ICT instructors in 12 revenue mandals of the West Godavari district of Andhra Pradesh and the responses were duly

pilot tested. The scholarly articles from ScienceDirect, Springer, Taylor & Francis, MDPI, Frontiers, IJRCT, and the working group studies of UNESCO, UNICEF, RMSA, DISE, performance and review reports of the Directorate of School Education (DSE), and Office of the District Education Officer (DEO), Eluru, form the basis of secondary sources.

2.1 Objectives of the Study

The prime objective of the study is to evaluate the impact of the integration of ICT in teaching-learning pedagogy in quasi-government, secondary schools (Classes from VIII, IX and X) of the West Godavari District, Andhra Pradesh. The study also examines the level of integration of ICT in Mathematics, Physics, Natural Sciences and Social Studies. Further, the study suggests ways and means for the efficient and effective integration of ICT in SSE.

2.2 Hypotheses of the Study

H₁: There is a significant association between ICT integration and the teaching-learning pedagogy in secondary school education.

H₂: ICT integration has a significant impact on students' learning outcomes in Mathematics, Scientific Literacy, and Social Studies in Classes VIII, IX, and X.

2.3 Need for the Study

The digi-skills and competencies in the continuum influence education practices, processes and provisions. In the era of Artificial Intelligence (AI) and Generative Artificial Intelligence (GEN-AI), ICT has become an integral part of our lives especially linked to the education landscape. ICT is crafting the role of future education in India in the sphere of teaching, learning and assessment. There is an impact of ICT-enabled education across the globe and SDG-4 enunciated the Universal Vision of Education i.e., the provision of inclusive and equitable quality education at all levels, for all people, and across the life course. The integration of the ICT curriculum has a significant and positive impact on student achievement, specifically in terms of knowledge, comprehension, practical and presentation skills, Mathematics, Science and Social Study. In this context, an earnest attempt has been made in the study to evaluate the impact of

ICT-enabled teaching-learning pedagogy in quasi-government, secondary schools of the West Godavari district, Andhra Pradesh.

2.4 Sample Design

The elicited responses and reflections from 1167 secondary school teachers and 6022 students who are studying in classes - VIII, IX and X including the views and opinions of 62 ICT instructors are considered for the study from a sample of 12-revenue mandals in the West Godavari District of Andhra Pradesh. The Stratified Random Sampling Method was adopted for the study and the Semi-Structured Questionnaire and Focused

Group Discussions (FGDs) form the basis for the study.

2.5 Time Period of the Study

ICT-enabled teaching-learning pedagogy adopted in quasi-government, secondary schools (Class VIII, IX, and X) in the West Godavari district of Andhra Pradesh is considered for the study. The elicited responses and reflections from the secondary school teachers, students and ICT instructors are collected for pertinent analysis. The time period i.e., 01st April, 2022, to 31st March, 2023 is considered for the study.

Table 1. An overview of mandals, quasi-government, secondary schools, teachers, students and ICT instructors (classes VIII, IX and X) - The West Godavari district, Andhra Pradesh (academic year 2022-2023)

No. of Mandals		48	
No. of Quasi Govt., Secondary Schools		475	
No. of Students	Boys	43999	
	Girls	48731	
	Total	92730	
No. of Teachers	Maths	Male	763
		Female	180
	Physics	Male	665
		Female	72
	Biology	Male	705
		Female	78
	Telugu	Male	460
		Female	11
	English	Male	650
		Female	123
	Hindi	Male	501
		Female	18
Total	Male	3744	
	Female	482	
ICT Instructors		276	

Source: Office of DEO (2022-23), Eluru, West Godavari district, Andhra Pradesh.

Table 2. Sample design of no. of mandals, quasi-government, secondary schools, teachers, students and ICT instructors (classes of viii, ix and x) - the West Godavari district, Andhra Pradesh (academic year 2022-2023) (25% of the total population)

No. of Mandals		48	
No. of Quasi-Government, Secondary Schools		475	
No. of Students	Boys	2754 (11016)	
	Girls	3268 (13072)	
	Total	6022 (24088)	
No. of Teachers	Maths	Male	47 (187)
		Female	12 (50)
	Physics	Male	42 (169)
		Female	6 (25)
	Biology	Male	45 (178)
		Female	7 (28)
	Telugu	Male	30 (121)
		Female	1 (4)
	English	Male	43 (171)
		Female	9 (36)
	Social Studies	Male	43 (171)
		Female	7 (27)
	Total	Male	249 (997)
		Female	43 (170)
	ICT Instructors		62

Hindi Teaching Community	Tribal		Rural		Urban	
	Male	Female	Male	Female	Male	Female
	15	0	82	8	38	3

Source: Office of DEO, (2022-23), Eluru, West Godavari district, Andhra Pradesh

Table 3. Sample design of no. of mandals, no. of quasi-government, schools and no. of students (Classes of VIII, IX and X) - The West Godavari district, Andhra Pradesh (academic year 2022-2023) (25% of total population)

Area	Name of the Mandal	No. of Quasi-Govt., Schools	No. of Students		Total
			No. of Boys	No. of Girls	
Rural Area	Dwaraka Tirumala	9	529 (39.28)	818 (60.72)	1347 (100)
	Bhimadolu	7	792 (37.58)	1316 (62.42)	2108 (100)
	Pedapadu	10	649 (41.60)	911 (58.39)	1560 (100)
	Denduluru	7	795 (49.84)	800 (50.15)	1595 (100)
Urban Area	Tadepalligudem	24	2100 (48.45)	2234 (51.54)	4334 (100)
	Eluru	24	2248 (48.64)	2373 (51.35)	4621 (100)
	Tanuku	11	1332 (45.14)	1619 (54.86)	2951 (100)
	Bhimavaram	18	1402 (42.83)	1871 (57.16)	3273 (100)
Tribal Area	Jeelugumilli	3	271 (55.87)	214 (44.13)	485 (100)
	Buttaigudam	2	239 (48.26)	149 (51.74)	388 (100)
	Polavaram	2	166 (46.24)	193 (53.76)	359 (100)
	T. Narasapuram	5	493 (46.20)	574 (53.80)	1067 (100)
Total		122	11016 (45.73)	13072 (54.23)	24088 (100)

3. Data Analysis and Interpretation

Table 1 gives an overview of mandals, quasi-government, secondary schools, teachers, students and ICT instructors of classes VIII, IX and X in the West Godavari district, Andhra Pradesh for the academic year 2022-2023

Table 2 contains the Sample design of no. of mandals, quasi-government, secondary schools, teachers, students and ICT instructors of classes of viii, ix and x in the West Godavari district, Andhra Pradesh for the academic year 2022-2023 (25% of the total population)

Table 4. Sample design of no. of mandals, no. of quasi-government, schools and teachers -The West Godavari district, Andhra Pradesh (academic year 2022-2023) (25% of Total population)

Area	Name of the Mandal	No. of Quasi-Govt., Schools	No. of Teachers		Total	ICT Instructors
			Male	Female		
Urban Area	Dwaraka Tirumala	9 (7.37)	55 (96.49)	2 (3.51)	57 (100)	1
	Bhimadolu	7 (5.73)	73 (71.56)	29 (28.44)	102 (100)	6
	Pedapadu	10 (8.19)	87 (91.57)	8 (8.43)	95 (100)	6
	Denduluru	7 (5.73)	69 (87.34)	10 (12.66)	79 (100)	5
Rural Area	Tadepalligudem	24 (19.67)	188 (90.38)	20 (9.62)	208 (100)	12
	Eluru	24 (19.67)	176 (80)	44 (20)	220 (100)	11
	Tanuku	11 (9.01)	110 (78.01)	31 (21.99)	141 (100)	6
	Bhimavaram	18 (14.75)	153 (88.43)	20 (11.57)	173 (100)	9
Tribal Area	Jeelugumilli	3 (2.45)	21 (100)	0 (0)	21 (100)	2
	Buttaigudam	2 (1.63)	16 (84.21)	3 (15.79)	19 (100)	1
	Polavaram	2 (1.63)	12 (92.30)	1 (7.70)	13 (100)	1
	T. Narasapuram	5 (4.17)	37 (94.87)	2 (5.13)	39 (100)	2
Total		122 (100)	997 (85.43)	170 (14.57)	1167 (100)	62

Source: Office of DEO, (2022-23), Eluru, West Godavari District, Andhra Pradesh

Note: Numbers in parentheses indicate the percentage of total

Table 3 shows the Sample design of number of mandals, no. of quasi-government, schools and number of students of Classes of VIII, IX and X in the West Godavari district, Andhra Pradesh for the academic year 2022-2023 (25% of total population)

Table 4 depicts the Sample design of number of mandals, no. of quasi-government, schools and teachers in the West Godavari district, Andhra Pradesh for academic year 2022-2023 (25% of Total population)

ICTs are powerful educational tools that play a significant role in transforming teaching-learning pedagogy (Ludvigsen & Morch, 2010; Sutherland *et al.*, 2009). The methods of education are continuously evolving and the interactive teaching-learning methods make school Math and Science blossom and bloom (Aija Cunska & Inga Savicka, 2012). The integration of ICT can be effective in enhancing competency in physical, natural, social sciences and mathematics among teachers, particularly in the context of Technology Pedagogy and

Content Knowledge (TPACK). The hands-on experience in micro-teaching, lesson design, teaching plans, and sharing views and opinions with peers significantly influence the TPACK among teachers (Ayoub Kafyulilo, 2011).

Table 5 provides a comprehensive overview of the integration of ICT in Subject Knowledge, reinforcing the idea that ICT permeates all areas of education. The diffusion of ICT in Language Education is at an earlier stage compared to that in Applied Sciences. It reveals a critical need for individuals to learn ICT skills to effectively connect and communicate, particularly during times of turbulence.

4. Key Findings

The adoption of ICT has profound effects on economies and societies, and it plays a crucial role in promoting sustainability. From a Secondary school perspective, the adoption of ICT plays a pivotal role in stimulating

Table 5. Integration of ICT in maths, sciences, social studies and languages sample secondary school teachers

Integration of ICT in Subject Knowledge	Residential Status			Total
	Urban	Rural	Tribal	
Mathematics	39 (65)	16 (26.6)	5 (8.33)	60 (100)
Physical Sciences and Natural Sciences	44 (57.89)	26 (34.22)	6 (7.89)	76 (100)
Social Studies	44 (65.67)	18 (26.86)	5 (7.47)	67 (100)
Telugu	18 (64.29)	7 (28)	3 (10.71)	28 (100)
Hindi	9 (64.28)	4 (28.57)	1 (7.14)	14 (100)
English	12 (57.14)	6 (28.57)	3 (14.28)	21 (100)
ICT-Skills	20 (74.07)	6 (22.23)	1 (3.70)	27 (100)
Total	186 (63.48)	83 (28.33)	24 (8.19)	293 (100)

Source: Questionnaire

Note: Numbers in parentheses indicate the percentage of total

Table 6. Integration of ICT in maths, sciences and social studies (Classes VIII, IX, and X)

ICT Applications in Mathematics Learning - The Level of Confidence			
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)
	126.474 ^a	6	0.000
ICT Applications in Physics and Natural Sciences Learning - The Level of Confidence			
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)
	261.534 ^a	6	0.000
ICT Applications in Social Sciences Learning - The Level of Confidence			
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)
	194.18 ^a	8	0.000
ICT Applications in Telugu Language Learning - The Level of Confidence			
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)
	189.986 ^a	6	0.000
ICT Applications in Hindi Learning - The Level of Confidence			
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)
	10.244 ^a	4	.037
ICT Applications in English Language Teaching - Learning - The Level of Confidence			
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)
	131.860 ^a	8	0.000

Source: Questionnaire

Table 7. Integration of ICT in classroom learning (Classes VIII, IX and X).

ICT Adoption in VIII Class Learning - The Impact and Incidence				
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)	
	329.163 ^a	6	0.000	
ICT Adoption in IX Class Learning - The Impact and Incidence				
Total No. of Valid Cases	3795	1652	575	6022
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)	
	26.285 ^a	6	0.000	
ICT Adoption in X Class Learning - The Impact and Incidence				
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)	
	223.923 ^a	6	0.000	
ICT-Integration in Classroom Learning - The Level of Confidence				
Pearson Chi-Square Test	Value	df	Asymp. Sig., (2-Sided)	
	484.958 ^a	8	0.000	

Source: Questionnaire

academic performance and enhancing the overall effectiveness and efficiency of the learning process. Adoption of ICT skills and talents can have a positive influence on both academic performance and academic success. Teachers with higher ICT competence tend to use ICT more frequently in their teaching practices. Incorporating ICT into Science education can be a transformative tool for increasing student engagement and motivating the learning environment. Integrating ICT into 'Language Pedagogy' significantly enhances communicative competence, fosters creative learning, and enhances listening and speaking skills.

From the **Factor analysis**, it can be observed that the primary factors influencing ICT integration in teaching pedagogy include internet connectivity, infrastructural bottlenecks and lack of integration between pedagogy and curriculum. Some of the secondary influences on ICT integration in teaching pedagogy comprise educational policies and planning, the need for ICT training, language barriers, etc., The infrastructural bottlenecks, lack of competencies, and digital illiteracy are deep-rooted inequalities observed in rural and urban areas. There exists a significant education gap and gender gap at its peak, along with an alarming digital divide among the urban, rural and tribal areas selected for the study.

It can be observed from **Table 6**, that the level of confidence in the adoption and implementation of ICT varies significantly across different df in the integration of Telugu, English, Hindi, Mathematics, Physics, Natural Sciences and Social Sciences. Among the various subtleties, the most prominent issues include a lack of ICT infrastructure, digital incompetence and web illiteracy. Technology Enhanced Language Learning (TELL), Computer Assisted Language Learning (CALL), Computer Aided Assessment (CAA), and Web-Based Learning (WBL) promote cognitive development and linguistic performance. From **Table 7**, the results indicate a significant difference in the adoption of ICT across various classes of instruction between rural and tribal regions selected for the study, with df of 6, 4, 6, and 8, and corresponding Chi-Square values of 329.163a, 26.285a, 223.923a, 484.958a respectively. ICT touches every sphere and space of human life profoundly influencing how we live, work, and interact. ICT recognises the importance of

subject and domain knowledge, didactic improvisations and an openness of mind in the moments of teaching-learning.

Conclusion

ICT is undoubtedly an innovative intervention and a collaborative concierge in secondary education that chisels within and out persona of educators, teachers and students. ICT has revolutionised teaching-learning in the 21st century by introducing innovative pedagogical approaches that enhance engagement and accessibility. To be globally competitive and develop engaged citizens, our schools should weave innovative skills and competencies throughout the teaching-learning process. The 21st century education offers life skills for work and life. These include the development of critical thinking, complex problem solving, collaboration and multi-media communication in the teaching of traditional academic subjects. (**Culp, k. m. et al., 2005**). Talking books, hypertexts, micro-worlds, interactive whiteboards, dynamic geometry systems, simulations and modelling environments have a positive effect on pupils' attainment and enhance ICT adoption among the students. Yet, the crucial component remains with the teachers and their pedagogical approaches.

ICT lies not just in theories but in practical application. It enhances performance, significantly impacts classroom learning, and provides valuable insights into educational processes. ICT is all-inclusive in nature. To thrive in the digital era, it is suggested that educators, instructors, and learners collaboratively build MOOCs, cMOOCs, xMOOCs, NOOCs, and crowd learning to delve into unexplored knowledge and skills. For the successful integration and implementation of ICT, reforms in the teaching-learning pedagogy of secondary education are recommended to foster learning and inspire Gen-Z, including those living in remote areas, enabling them to learn more effectively and acquire skills to meet the demands of tomorrow's India and the world.

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An Analytical Study on Equipment and Facilities Satisfaction for Senior Citizens with Special Reference to Wheelchairs and Walkers

Sumithra Sreenath

Abstract

Persons with different abilities are dependent on wheelchairs and walkers. They face a lot of problems in their daily life which are associated with inconvenience. The study focuses on people using wheelchairs considering various factors such as comfort, training, ambulation, etc., which they come across using wheelchairs or walkers across age groups. The study narrows down a few dimensions concerning their safety, quality, ambulation, training, comfort and mobility. A survey was done with 113 respondents asking about their experience of using wheelchairs and walkers. The study tries to prove that there is a paramount requirement for training the people to use these mobility aids.

Keywords: Ambulation, Comfort, Quality, Training, Walkers, Wheelchairs

JEL Classification Code: I12, I31, J14, R41, O33

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1. Introduction and Theoretical Background

In recent decades, the concept of disability has significantly influenced social phenomena. Therefore, it is a complex issue involving both the disabled person and society. In India, 2.21% of the total population is disabled. The highest prevalence is observed among senior citizens. The life of senior citizens in India is increasing rapidly. There are nearly 103 million senior citizens in India and is expected to grow to 300 million by 2050. Also, the growth rate of the disabilities is increasing rapidly. According to the census 2011, 17% of the differently abled are in the age group of 10-19 years, 16% of them belong to the age group of 20-29 years and 21% of them are elderly or senior citizens (60+ years). The reason for the growth of disabilities is due to the changes in the environment and food habits. Food

consumption is not very hygienic and the availability of healthy food is limited. People from rural areas are more disabled because of the lack of hygiene, cleanliness and proper facilities. In urban areas, there is an increase in the use of electronic gadgets which indirectly harm the brain and health due to electronic radiation. Many children using electronic gadgets such as smartphones and tablets end up with a disability.

The Government of India has initiated many schemes for senior citizens and disabled people such as pension and healthcare schemes for senior citizens and education and employment opportunities for adults with disabilities. This study helps us understand the perception and experiences of senior citizens about the use of these facilities, especially wheelchairs and walkers. Wheelchairs and walkers are accessible forms of transportation that help them to move from one place to another.

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There are many types of wheelchairs, manual and electric. In recent times, smart wheelchairs have been considered over power wheelchairs. Power wheelchairs are traditional/manual wheelchairs with battery chargeable or with power cables to plug into them. Normal wheelchairs lack the functionalities and safety features that Smart wheelchairs have. Continuous developments in the field of artificial intelligence and robotics have shaped the development of Smart wheelchairs. Smart wheelchairs consist of a remote control, which is responsible for the movements with the help of inputs from the sensors. A smart wheelchair can also be controlled manually by the user just like a normal electric-powered wheelchair. Electric wheelchairs are ideal for the elderly or senior citizens, who will have control over the chair which helps them be independent of others. Hence, it also helps in understanding the perception of these people, using the facilities for their benefit and also for the improvement of these equipment and facilities.

In addition to improving mobility, providing suitable wheelchairs starts the process of opening up a world of social, professional and educational opportunities. Apart from facilitating mobility, a suitable wheelchair enhances users' physical well-being and quality of life by assisting in the reduction of frequent issues including pressure sores, the advancement of deformities and better breathing and digestion.

Wheelchair interventions have created a drastic change in recent times for users. In the meantime, the usage of wheelchairs is not uncommon. Also, there is a huge scope in this field in the upcoming days because of global health factors that are affecting children, youngsters, middle-aged and senior citizens. Globally, there is a need to understand the cost-effectiveness of wheelchairs. The family and the disabled people should take into consideration the customization of wheelchairs. Low-quality products should be eliminated. Many innovations in the health sector have been happening. Also, in recent times, there has been a greater need for disabled equipment research so that disabled people feel more secure and respected.

Below mentioned are some of the schemes where the government has taken the initiative to help the public. Welfare is the main aim of the government and they should provide protection and safety for the disabled.

There should be more health benefits given to them along with affordable prices of equipment so that the people will be grateful and happier.

1. **Senior Citizens Saving Scheme (SCSS):** This scheme talks about providing a savings platform for Indian residents who have attained the age of 60. The deposit matures after 5 years from the date of opening of the account. The interest rate is 8.6% and this is the highest rate of interest available in public, private and post office banks and it is deposited into the account quarterly.
2. **Pradhan Mantri Vaya Vandana Yojana (PMVVY):** It is a pension scheme given or provided by the government and the maturity is 10 years. This scheme has also started offering death benefits since 31 March 2020.
3. **Indira Gandhi National Old Age Pension Scheme:** It is a central government scheme offered to old age people started in the year 1995. It is meant for the people who are below the poverty line.
4. **Varishta Pension Bima Yojana:** It is a scheme introduced by NDA, directed through the LIC. The subscribers should invest a lump-sum amount and they get a pension at a guaranteed price of 9% interest.
5. **Rashtriya Vayoshri Yojana (RVY):** It is a scheme provided for the Below Poverty Line (BPL) category, and the expenditure for implementation of the scheme will be met for the "Senior Citizens" scheme, which is provided for those over the age of 60 years.
6. **Bank customer services:** This is to help senior citizens get benefits from the bankers, to protect them from insecurity and also to provide them with favourable advantages to the government scheme.

The above schemes include benefits given to both disabled and senior citizens which will benefit many people who belong to this sector and it also helps to lead a livelihood.

With all the mentioned points, wheelchair accessibility in India remains a huge challenge. There are infrastructural issues such as lack of ramps in many places, difficulty in using public transport, etc. These days, malls, tech parks and other places have facilities that are wheelchair friendly. However, these are available in urban areas and most rural places are not wheelchair friendly.

2. Literature Review

The ageing population requires essential facilities, as individuals increasingly depend on wheelchairs for mobility, having previously relied on canes for support. Negotiating with the help of a walker and wheelchair is a recent phenomenon (Eileen J Porter et al., 2010). Freedman, et al., (2002) also presented the same. The usage depends on one's physical capacity and common medical conditions for which they use the support. Nancy M Gell (2015, 20) details in her research on older adults' incidence of falls due to the incorrect use of mobility devices as it does not give her support at crucial times of need. The study makes a comprehensive assessment of the usage of mobility devices by senior citizens. The study points out that older adults using these devices have increased off late.

Much research has been undertaken on wheelchair services. Mathias & Gowran, R. J., (2021) point out that wheelchair manufacturing companies hardly provide training, maintenance and follow-up. The authors also identify the lack of commitment of the government to establish support channels for wheelchair users. The study also diagnoses that there is very little financial support for buying wheelchairs and it does not reach the needy. Finally, the study advocates for a global policy to address these challenges.

Andrew J. Rentschler (2003) evaluates a new modernized robotic walker to assist visually impaired people. The study details the new wheelchair physical support with navigational assistance and enhances mobility for users. The new wheelchair reduces the risk of falls and provides independent movement to its user. It has advanced sensors, controls and a computerized hurdles avoidance system. The new Veterans Administration Personal Adaptive Mobility Aid (VA-PAMAID) wheelchair demonstrations show that it is best used for indoor environments only

and cannot be used for outdoor or climbing. The study concludes that traditional mobility aids are not very effective in real-world settings.

William C. Mann, et al., (1995) analyze the problems faced by senior citizens who use walkers, providing a holistic view based on user feedback and investigation. The consumer assessments study uses a battery of instruments to measure multiple dimensions relevant to the use of and the need for, assistive devices and environmental interventions. Their study involved 333 subjects, 69 of whom used walkers. Among these, 42 reported problems with their devices.

Common issues included difficulty and danger of use (57%), physical or mental impairments preventing use (17%) and decreased necessity due to improved health or other factors. The study identifies a couple of challenges, which are maintenance issues, discomfort and inefficiency in specific environments. Poor training and assessment led to inappropriate device selection for users' needs. A small proportion of users cited social stigma as a deterrent to use.

Beyond all, various types of walkers were discussed by T. Tamura et al., (2001) who noted minute details about the application and adaptation of these walkers. The walkers evaluated were conventional and were used by respondents as a routine. A caster walker which was power-assisted was used every day. Other walkers that were used to test the respondents were conventional folding walkers and used folding walkers. An important issue that was highlighted was the rehabilitation training and walking stages observed. The study highlights walking speed was checked between the aliments and movements were also measured during the process of the study. The activity was strictly under the supervision of a qualified therapist. The study revealed some of the respondents could not walk with power-assisted walkers.

With a significant rise in senior citizens, mobility aids must also increase. The situation is fair enough to discuss, physical mobility assistance, safety assistance, cognitive assistance and security assistance. Bernd Krieg-Brückner et al., (2012) studied different kinds of mobility aids for all kinds of disabilities but highlighted vision impairment for senior citizens. The authors were skeptical about the latest technology usage with navigation assistants

which automatically navigates the movements and path planning with Global Positioning System (GPS) sensors and odometry. Security assistance for emergencies automatically reaches the caretakers. The system should be able to support that at all times the caretakers can be in touch with.

A study by Amol M Karmakar (2012) is on prescription of wheelchairs to senior citizens. The sample size was 337 respondents of which 19 used manual wheelchairs and 318 used powered wheelchairs. The study considers patients with neurological conditions, pulmonary conditions, orthopedic conditions, hip conditions, spinal cord conditions or other ailments like cardiovascular, etc., for whom doctors would have prescribed using wheelchairs. The primary issues with the device were usability problems, positioning of wheelchairs, and disrepair conditions. The study finally concludes that wheeled devices should reduce the dependence on human assistance.

Erdmann WS (2018) in his study on equipment and facilities for the disabled concludes that in the future, the number of disabled will increase due to the usage of high-power gadgets and its side effects. The impact is more on youngsters. The disabled can achieve anything provided special training, care, support and strength from people around them. Training centres must be established for these people to help them learn and achieve better.

A study by Susan Allen, et al., (2006) focuses on understanding whether the home facilities or accommodations influence people who use wheelchairs. The study helps in understanding the life of people using wheelchairs and are dependent on others for help. The study concludes that there is a demand for providing suitable home care support and training to the care givers.

The study by Amol A. Kamarakar (2011) focuses on understanding the demographic factors of older or aged adults using wheeled mobility devices. Wheelchairs are classified into three main groups, they are manual wheelchairs, electric wheelchairs and scooters. According to this study, the demographic factors and the living standards of wheelchair users are associated with the difference in usage of the manual and powered wheelchair. Considering these factors help in advocating appropriate mobility device for the users.

3. Research Design

3.1 Objectives

1. To examine the present uses of wheelchairs and walkers for senior citizens.
2. To analyze the factors such as awareness, safety, training and equipment usage on the satisfaction level of users.

3.2 Data Collection

The data was collected by using convenience sampling from wheelchair users. The data was collected using an interview schedule from senior citizens using wheelchairs. The data was systematically collected and analyzed using IBM-SPSS 23.

Simple percentage analysis and regression is used to analyze and interpret the data. The research falls under descriptive study (research) as the researchers are identifying the satisfaction of users towards wheelchairs as a product.

3.3 Sample Size

The sample size is 113 responses, of which, 32 are male and 81 are female.

3.4 Sampling Method

Convenience sampling is a type of research methodology of non-probability sampling where the sample is considered from a group of people with whom we can contact easily and they include malls, grocery stores, etc. It is a kind of grab sampling.

3.5 Hypotheses

H1: There is a significant relationship between satisfaction from usage and comfort.

H2: There is a significant relationship between satisfaction from usage and safety.

H3: There is a significant relationship between satisfaction from usage and quality.

H4: There is a significant relationship between satisfaction from usage and mobility.

H5: There is a significant relationship between satisfaction from usage and ambulation.

H6: There is a significant relationship between satisfaction from usage and training.

4. Data Analysis and Interpretation

Reliability Statistics: Table 1 shows that the reliability coefficient is 0.871. The data is reliable and can be subject to further analysis.

Table 1. Reliability Test

Cronbach's Alpha	N of Items
0.871	13

Source: Desk Research

Table 2 denotes that the profile of respondents. The sample constitutes 32 male respondents (28.31%) and 81 female respondents (72.32%). The age factor consists of 4 categories in which 30 respondents are from 60-70 years with 26.54%, 27 respondents are from the age group of 71-75 with 23.89%, 32 respondents from the age group 76-80 with 28.31% and 24 respondents are above 80 years with 21.23%.

The education factor consists of 3 categories in which 39 respondents are from PUC and below at 34.51%, 40 respondents of Graduates at 35.39%, and 34 respondents are postgraduates at 30.08%. 18 respondents (15.92%) have been using a wheelchair for less than one year at 37 respondents have been using a wheelchair for the past 2-3 years, 25 respondents have been using a wheelchair for past 3-4 years, and 33 respondents have been using a wheelchair from the above 4 years.

Table 2. Demographic Profile of the respondents

Variable	Category	No of Respondents	Percentage
Gender	Male	32	28.31
	Female	81	72.32
Age	66-70	30	26.54
	71 – 75	27	23.89
	76-80	32	28.31
	80 and above	24	21.23
Education	Pre-University Course (PUC) and below	39	34.51
	Graduate	40	35.39
	Post Graduate	34	30.08
Years of Usage	less than 1 year	18	15.92
	2-3 years	37	32.74
	3-4 years	25	22.12
	4 years and above	33	29.2

Source: Desk Research

Table 3. Type of wheelchair/walkers used and the medical conditions of such users

Wheelchair/ Walker Users	Total Number	Percentage
Walkers	7	6.19%
Wheelchair Users	106	93.81%
Category of wheelchair users		
Manual	52	49%
Powered	29	27%
Electric	12	11%
Motorized	13	12%
Usage Conditions		
Temporary condition	55	49%
Permanent condition	58	51%
Medical Condition		
Osteoarthritis	17	15%
Osteoporosis	36	32%
Hip fracture	27	24%
Stroke	16	14%
Dementia	9	8%
Others		7%

Source: Desk Research

Table 3 shows that seven were using walkers and 106 were using wheelchairs. Out of this, manual wheelchair users were about 49 per cent, powered wheelchair users were

Table 4. Table showing Chi-square test Statistics (satisfaction level from usage of wheelchairs and walkers)

Variables	Chi-square value	P value
Safety	42.309	0.015
Comfort	44.301	0.004
Mobility	42.12	0.006
Training	55.609	0.73
Quality	42.301	0.023
Ambulation	45.203	0.042

Source: Desk Research

27 per cent and electric and motorized wheelchair users together were 25 per cent.

Among the respondents, 49% of the respondents use wheelchairs, temporarily post-surgery. 51% use wheelchairs because of some permanent conditions (severe osteoporosis), replacement of hip joints, stroke and dementia.

From Table 4, it can be analyzed that the satisfaction level in usage is significantly associated with safety, comfort, mobility, quality and ambulation services associated with wheelchair usage (Safety ($\chi^2 = 43.309$ and $p = 0.015$), comfort ($\chi^2 = 44.301$ and $p = 0.004$), Mobility ($\chi^2 = 42.12$ and $p = 0.006$), Quality ($\chi^2 = 42.301$ and $p = 0.023$), ambulation ($\chi^2=45.203$ and $p = 0.042$)).

It is evident from table 5 that R (Correlation Coefficient) = 0.362 shows moderate relationship between independent variables safety, comfort, mobility training quality and ambulation with satisfaction from usage of wheel chairs

Table 5. Regression-model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		df1
					R Square Change	F Change	
1	.362 ^a	0.131	0.086	1.14008	0.131	2.893	5

Source: Desk Research

Table 6. Table showing Anova test statistics

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.777	5	3.56	2.893	0.018b
	Residual	124.79	97	1.3		
	Total	143.567	102			

Source: Desk Research

Table 7. Table showing Co-efficient summary

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	15.221	3.317	--	4.588	0
Safety	0.002	0.085	0.279	0.371	0.02
Comfort	0.77	0.83	0.113	0.921	0.059
Mobility	0.074	0.113	0.065	0.649	0.018
Training	0.53	0.117	0.324	0.892	0.712
Quality	0.51	0.93	0.225	0.61	0.004
Ambulation	0.026	0.87	0.03	0.297	0.067

Source: Desk Research

and walkers. R^2 (Coefficient of Determination) = 0.131 that means only 13.1% of satisfaction level is explained by the independent variables considered in the study. Adjusted $R^2 = 0.086$ is lower than the R^2 value some predictors may not contribute notably to this model.

From Table 6, the goodness of fit of the regression model can be established through F statistics being 2.893. The significance value is 0.018 indicates the model is considerably significant.

From the above table 6 it is evident, that Sum of Squares (Total = 143.567) represents the total variability in satisfaction scores. It is the sum of the variation explained by the regression model. Regression Sum of Squares

= 18.777, (df = 5). Measures the variation explained by the independent variables (Safety, Comfort, Mobility, Training, Quality, Ambulation). A higher Sum of Squares Regression means that the model explains a greater proportion of satisfaction variability. Also, Residual Sum of Squares = 124.79, (df = 97) predicts unexplained variance or error in the model. Residual sum of squares suggests that a significant portion of variability is not captured by the model. Regression = 3.56, Mean Square Residual = 1.3- these values help calculate the F-statistic, which determines if the model is statistically significant. F-Statistic (F = 2.893, p = 0.018). Since p = 0.018 (< 0.05), the regression model is statistically significant, meaning at least one independent variable contributes to satisfaction.

From the coefficient table (7) it is derived that constant (15.221) baseline value. Standard Error (SE) = 3.317 variability of the coefficient estimate. The t-Statistic = 4.588 the standard error, coefficient is away from zero. The p-value is the significance test.

The unstandardized coefficients (B) predict how much each variable impacts on satisfaction, safety (0.002, SE= 0.085), comfort (0.77, SE= 0.83) mobility (0.074, SE = 0.113), training (0.53, SE= 0.117), quality (0.51, SE =0.93) and ambulation (0.026, SE= 0.87). The Beta value and t statistic of safety is 0.279 and 0.371, comfort 0.113 and 0.921, mobility 0.065 and 0.649, training 0.324 and 0.892, quality 0.225 and 0.61, ambulation 0.03 and 0.297. All the variables show significant with the p values 0.02, 0.059, 0.018, 0.004 and 0.067 except for training where the p value (0.712) does not show significance.

5. Key Findings

1. The maximum number of respondents in the study are female. 81 respondents (72.32 per cent) are female and the rest are male respondents.
2. 18 respondents used a wheelchair for less than one year, 37 respondents have been using a wheelchair for the past 2-3 years, 25 respondents have been using a wheelchair for the past 3-4 years with 22.12%, and 33 respondents have been using a wheelchair from the above 4 years (29.20%).
3. The outcome of the coefficient's table, training (p = 0.712) is not statistically significant in predicting satisfaction. Safety, Mobility, and Quality (p < 0.05) have significant effects on satisfaction.
4. There is a lack of training for the users especially those who are using walkers and wheel chairs.

Conclusion

The current research reveals that there is a lack of training programs. More importance needs to be given to train the wheelchair users to enable them handle new technology along with the best quality and convenience. The companies selling wheelchairs and devices should bring the latest technology for users so that they feel comfortable using the service. The company can develop

an application (app) to assist the customer or the users so that they feel confident enough to use the product with comfort.

A larger market can be reached with add-on navigation components for existing wheelchairs and walkers that help with additional sensors. Moreover, extension components can comprise security facilities. Moreover, Bernd Krieg-Brückner et al (2012) study also insists on training senior citizens in the usage helps more adaptability and comfort and reduces chances of injury or discomfort.

The study was limited to the Basavanagudi area of south Bangalore. The data was collected during September and October 2024. The scope of the study can be expanded to make the results more generalizable.

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Workplace Well-being and Mitigating Burnout Using Technological Tools

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Abstract

In today's work environment, employee burnout is one of the major factors of concern. Burnout is a condition of extreme emotional, physical and mental stress, excessive work, or overwhelming feelings (Maslach, C & Leiter, 2016) and is a common problem in the workplace. This paper looks at different aspects of people and organisations in relation to workplace well-being and the use of technology to mitigate it. It also emphasises the role of Artificial Intelligence (AI)-driven solutions like chatbots and virtual assistants in offering employees personalised support to lessen burnout. Utilising the capabilities of advanced technology such as generative AI, organisations can develop innovative ways to improve workplace well-being, avoid burnout, and foster a better work environment. This paper attempts to understand the acceptance level of employees for using tech tools to support their mental well-being at the workplace. This being a preliminary study about their level of usage of technology for fostering workplace well-being, further study can be conducted to understand the impact on their emotional well-being and its impact on productivity at work. The study was conducted with employees from the Information Technology (IT) sector, and the results show that AI tools aid in identifying and reducing burnout and the acceptance and usage of such tools can impact employee well-being in an organisation.

Keywords: Artificial Intelligence AI, Employee Burnout, Well-being, Work Environment, Work Stress

JEL Classification Code: J28, M54, O33, I31, M15

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1. Introduction

Employee well-being has gained importance in the recent decade and has garnered a lot of attention from organisations to develop various strategies to address the issue. Also, post-2019, the pandemic has doubled the challenges in relation to both the physical and emotional well-being of the employees. In one of the studies by BCG, 48% of the employees in organisations surveyed across eight countries were grappling with burnout (Boston Consulting Group report, 2024). Employee burnout has emerged as a pressing issue in contemporary

workplaces, posing significant challenges to both individuals and organisations. Recognised by the World Health Organisation as a syndrome and occupational phenomenon, burnout poses significant challenges to individuals, teams and businesses alike (WHO, 2019). Defined as a state of emotional, physical and mental exhaustion resulting from prolonged exposure to stressors, burnout permeates various industries and affects employees at all levels. Reasons for burnout could be many, notwithstanding the already identified role conflict, ambiguity, lack of personal growth, etc. (Vallasamy & Suriya, 2023).

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Though the term originated in the mid-1980s, there was extensive research work conducted by the end of the 20th century throwing light on the cause and the effect of burnout. Research indicates that burnout is not merely a personal issue, but it is influenced by various organisational and job-related factors, wherein excessive workloads are also characterised by an increased risk of burnout (Escalera, S, et al 2022). Exhaustion, Cynicism (Depersonalisation), and inefficiency are the three dimensions of Burnout (Christina Maslach *et al.*, 2001). With the advent of technological innovations, the usage of more and more technology and less human interaction has posed greater challenges to the physical and physiological well-being of employees. The degree of control over one's work, the workload, the working hours, various time zones, work-life balance, economic upheaval leading to job insecurity, and various other reasons could be the cause for both stress and burnout (Wilford, 2017).

The impact of burnout extends beyond individual well-being, manifesting in decreased productivity, eroded morale, and diminished organizational effectiveness. The prevalence of burnout is underscored by alarming statistics, with over half of high performers reporting symptoms of burnout. It could lead to increased absenteeism, lack of motivation towards work, and low morale. Left unchecked, burnout not only compromises an individual's health and job dissatisfaction but also jeopardizes organizational success. The quality of workplace relationships and the level of support from supervisors and co-workers play a significant role in mitigating burnout (Charoensukmongkol, P *et al.*, 2016). Therefore, addressing burnout has become a pressing imperative for contemporary workplaces, necessitating innovative strategies and proactive interventions to safeguard employee well-being and foster a culture of resilience.

2. Literature Review

There are three forms of core components for employee well-being and they are: subjective well-being, psychological well-being, and workplace well-being amongst these, employee well-being is considered a critical component (Page KM & Vella-Brodrick D.A, 2009). Employee wellness programs are planned to ensure that

people unwind, refresh, rejuvenate and bounce back after de-stressing (Kathleen O Donnelle, 2023). Technology has aided in developing advanced tools and interventions to support employees to overcome stress and fatigue and handle situations better. Though well-being at work is restricted by organisational constraints (Lia Tirabeni, 2024), tools as simple as Slack, Zoom and Asana have revolutionised the way people interact even when they are working remotely like, monitoring workload and work scheduling which facilitates systematic planning of work schedules and managing it based on the availability of the employees. Personalisation and increase in computing capabilities have improved productivity in employees, and AI-enabled chatbots are the latest addition to such technological interventions (Nishad *et al.*, 2024). These bots provide real-time support to the employees by aiding in customised support in terms of assessing stress levels and providing assistance based on the level and time of stress. Personalisation is crucial in delivering effective support through virtual chatbots. By collecting information about each employee's role, workload and preferences, chatbots can tailor their responses and share recommendations to address specific burnout triggers. It can suggest time management techniques or recommend mindful exercise for people struggling with anxiety (Sourav *et al.*, 2024).

Today, many organisations use AI software that analyses the daily routines of employees, monitoring patterns like extended work hours, decreased engagement in collaborative platforms, or deviations in routine task completion times. It can scrutinize email and chat room sentiments which can address the negative implications that cause underlying stress or dissatisfaction. AI can be leveraged to such an extent that it can identify the level and potential risks of stress in an employee by assessing a conversation during the meeting. It can also suggest various interventions which may help mitigate the stress levels thus improving the employee well-being. AI-driven solutions offer timely intervention including stress management tips, mindfulness exercises, and workload prioritised to individual needs, Ankita (2024). Moreover, Gen AI leverages advanced algorithms and predictive analytics to proactively identify burnout risk factors and prescribe targeted interventions, thereby reducing the incidents and severity of burnout, Ravi (2024). To aid such interventions, organisations have to create a robust

employee experience model that will ensure targeted action to ensure both the emotional and the physical well-being of every individual employee.

3. Research Design

This paper explores the role of technology-based interventions in mitigating employee burnout, examining their potential applications, ethical considerations and implications for organisational practice. A qualitative approach is applied to analyse the inputs shared by interviewees. The respondents from the IT industry were interviewed to gather inputs regarding the usage of tech tools for mitigating burnout and the accessibility of various tools and techniques for the same. Ease of use and its effect were tested through various questions during the interview process. Forty-eight respondents were interviewed and questions related to the following were asked: awareness about various interventions in the organisation for aiding employee well-being and reducing burnout; their level of usage of those tech tools; the level of ease in accessing and using them; the overall outcome of the tools in aiding their workplace well-being and reducing burn-out. Their answers were recorded and analysed to derive some conclusions.

3.1 Problem Statement

With employee well-being taking the front seat in human resource management, organisations have taken huge strides in developing interventions to ensure that they are facilitated with the right tools. Technology has enabled this to a large extent and modern methods have been adapted to provide the right assistance. Nevertheless, the challenges of employee burnout, anxiety, and stress still prevail. There is a lack of information about how these tech tools are supporting these interventions and to what extent are the employees able to leverage these tools.

3.2 Objectives of the Study

1. To identify the availability of technological tools in organisations to recognise burnout.
2. To assess the levels of ease of use of the technological tools to mitigate burnout.

3. To assess the extent of usage of various technological tools to address burnout or pre-burnout.
4. To make suggestions to effectively use various technological interventions to address burnout.

4. Key Findings and Discussions

Technical tools are a very vital component in mitigating employee burnout through efficiency, Productivity and work-life balance and in creating a supportive environment to prioritise employee wellness and reduce burnout at work. The responses to specific questions related to the technological tools available, ease of use and their implications are as mentioned below.

1. The respondents felt that Communication platforms like Slack and Microsoft have contributed to reorganising the effectiveness of communication, i.e. it has enabled the users to spend less time on emails, focus on collaboration, and streamline resource sharing. Overall, it has contributed to quicker resolutions of issues. Through its unique features, it encourages them to step away and recharge through the help of virtual break rooms and reminders to take breaks. By leveraging these features the respondents think that they can mitigate burnout to a certain extent.
2. All the respondents expressed that Mental Health apps like Headspace, Woebot, and Calm assist in guided meditation and breathing exercises that can help them calm their minds. These apps also offer features to practice techniques like mindfulness which helps them manage their thought processes by integrating these techniques into their daily life, they can regulate and channel their thought process and they also feel that sleep aid and routine-building facility that these apps provide, helps them in reducing stress and anxiety and contribute to their overall well-being.
3. Most of the respondents opined that digital platforms like Coursera, LinkedIn Learning, and Udemy have helped them continuously update their existing skills. They feel that it also provides them with the platform to equip diverse learning options that aid in career advancement. With the

- help of these apps, they can complete certifications that continuously update their knowledge, skills, and abilities, which contributes to their professional growth.
4. Most of the respondents stated that fitness apps like Apple Health Inc. and Fitbit help them build their physical health as these apps aid in developing comprehensive insights into their overall health and help them stay fit. These apps assist with activity monitoring, heart rate tracking, sleep tracking, goal setting about workouts and community support. They can build healthy routines which in turn makes them feel energetic at the workplace, thus combating workplace stress.
 5. All the respondents opined that project management software like Trello and Asana helps them with task organisation, collaboration, progress tracking and deadline management which are vital aspects of the project management office. The listed features in these apps allow them to organise their tasks well and the automated notifications and reminders assist them in ensuring that they wrap up projects within the deadlines.
 6. The respondent stated that HR Technical tools are helpful in employee burnout i.e. Recognition and Rewards Tools like Kudos and Bonuses provide ways to recognise and reward employees for their hard work and achievements, boosting their morale. Employee engagement platforms like Culture Amp and 15Five facilitate regular feedback and engagement surveys, helping HR identify and address burnout early. Time tracking and Paid Time Off (PTO) Management tools like TSheets and Kronos manage time tracking and PTO requests while encouraging employees to take time off and not overwork themselves. Some respondents mentioned the HR tools that provide employees access to Employee Assistance Programs (EAP). Interventions like counselling assistance and support services are provided to help employees manage stress and personal problems.

Most of the respondents opined that tech-based tools, virtual assistants and Chabot are beneficial for office

management and employee well-being as they offer accessibility and support around the clock, potentially reducing burnout. They feel that with the help of virtual assistants, employees' issues can be addressed, and automating routine tasks with virtual assistants can alleviate the workload. The 24/7 availability of AI chatbots ensures that employees can access support whenever needed and offers emotional support, personalised experiences and skills development which are vital for reducing employee burnout. They also opined that the AI tools interface is friendlier for usage. Accessibility to all the tools is easy and at their convenience, but privacy about their usage and confidentiality is a matter of concern for some respondents. Though the respondents are confident of the operational efficiency of the tools, proper implementation and consideration of privacy and security will develop confidence among the employees.

Conclusion

Present-day leaders realise that giving priority to employee well-being benefits the employees and the establishment as well, with increased productivity and reduced turnover rates. When employees feel valued and supported, they are likely to be engaged and motivated, which impacts the overall growth and productivity of both the individual and the organisation. By leveraging AI-driven solutions, organisations can proactively address burnout risk factors and cultivate a supportive work environment conducive to employees' growth, leading to a sustained organisation. However, the integration of technology in mitigating employee burnout is not without its challenges. Striking a delicate balance between leveraging the potential of tech-driven solutions and safeguarding employee rights and well-being remains a critical concern. Despite the challenges, research suggests that tech-driven solutions have the potential to revolutionise workplace well-being initiatives by providing accessibility and scalable personalised support. This study could further lead to understanding the impact of technological tools aiding mitigation of burnout on the overall productivity of the employee and further impacting the organisation's growth. That would provide greater insights to organisations to equip themselves with the right tech tools to navigate the ever-evolving landscape of employee burnout, prevention and interventions, thus ensuring a

conducive workplace that sets employee well-being at the fore.

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Navigating the Evolving Regulatory Landscape of India's Cryptocurrency Market

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Abstract

India's financial ecosystem has witnessed the explosive growth of Cryptocurrencies, driven by technological breakthroughs and heightened investor interest. This has brought both opportunities and challenges. With an emphasis on important regulations, market patterns, and international comparisons, this paper examines the regulatory environment surrounding cryptocurrencies and highlights the regulatory ambiguity surrounding digital assets. There is a need for a balanced approach through an examination of International regulatory strategies. Important takeaways include how taxes affect market participation, the potential of CBDC's and the future roadmap. The results offer insightful recommendations for investors, policymakers, and corporate executives on how to best utilize it.

Keywords: Cryptocurrencies, CBDC, DeFI, Digital Assets, Regulatory Environment

JEL Classification Code: G28, K22, O33, O32, E42

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1. Introduction

In recent years, cryptocurrency, a digital currency that functions without the assistance of a central bank has made notable progress in the Indian market. As cryptocurrencies like Bitcoin, Ethereum, and others have grown in popularity, more Indians are investigating the realm of digital assets as a potential source of investment and a way to conduct financial transactions. Numerous variables, including growing computer literacy, technology developments, and the possibility of large returns on investment, have contributed to this spike in interest.

Furthermore, cryptocurrency's ascent in the Indian market has also been aided by its widespread recognition as a valid asset class. As a diversification strategy and a hedge against economic risks, cryptocurrencies are attracting

interest from institutional investors, tech-savvy people, and even traditional financial institutions. The Indian cryptocurrency market now has more liquidity and trade volumes as a result of this expanding acceptance, which has drawn more players and raised prices. However, investors must be mindful of the risks and obstacles that come with the growing popularity of cryptocurrencies in addition to the benefits they bring.

This is evident with authorities voicing concerns about the possible risks associated with digital assets, such as money laundering, fraud, and market manipulation, and the regulatory landscape surrounding cryptocurrencies is still developing.

2. Background of the Study

The Cryptocurrency and Regulation of Official Digital

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Currency Bill, which aims to control the usage of Cryptocurrencies in the nation, was put forth by the Indian government in response to these worries. While possibly outlawing private Cryptocurrencies, the bill seeks to establish a framework for the establishment of a digital currency issued by a central bank. The Indian cryptocurrency market has seen volatility as a result of this regulatory uncertainty, with the value of digital assets responding to news and development actions. The prospects for cryptocurrencies in the Indian market are still bright, despite the difficulties and regulatory ambiguities. They demand technology and look for new financial options.

When appropriate laws and protection are in place cryptocurrencies transform India's financial system by providing fresh opportunities for investment, financial inclusion, and economic expansion. For investors, authorities, and stakeholders, the growing use of cryptocurrencies in the Indian market thus offers both opportunities and concerns. People can navigate the changing landscape of digital assets and take advantage of the potential advantages that this cutting-edge technology has to offer by keeping up with regulatory developments, comprehending the risks involved, and implementing best practices for trading and investing in Cryptocurrencies.

A look into the regulatory framework across countries reveals some indications as to the level of adoption

of cryptocurrencies and a detailed description of a future roadmap towards the same. As Cryptocurrency adoption grows globally, many countries are developing or refining their regulatory frameworks to address the opportunities and risks presented by digital assets. These regulations typically focus on issues like investor protection, anti-money laundering (AML), tax reporting, financial stability, and the prevention of fraud and misuse.

3. Key Findings and Discussions

3.1 Cryptocurrency Regulatory Framework

The Indian regulatory regime regarding Cryptocurrencies remains immature to date and the officials expressed their concerns over the potential dangers related to digital currencies, including money laundering, fraud, and manipulation in the markets. The Indian government introduced the cryptocurrency and regulation of the official digital currency bill following these concerns over regulating the use of Cryptocurrencies in the country. This was done to ban private Cryptocurrencies but allowed only official digital currencies issued by the central banks with a framework. This volatility in terms of value was seen in the market, considering that the uncertainty of regulators can prove to be a challenge.

The value of digital assets can prove to be a challenge as they are sensitive to the news and developments

Table 1. Cryptocurrency Regulatory Framework across major countries (2024-2025)

Country/Region	Current Regulatory Landscape (2024)	Projected regulatory changes by 2025)	Remarks
United States	<ul style="list-style-type: none"> a. SEC ongoing lawsuits: Regulates securities (e.g., Ripple lawsuit) b. CFTC: Overseas futures and derivatives. c. OCC: Regulates banks involved in crypto. d. Tax Reporting: Uncertain tax guidelines, IRS mandates reporting of crypto transactions. 	<ul style="list-style-type: none"> a. Digital Asset Market Structure Bill: Clarification of securities vs. commodities. b. Crypto ETF approvals. c. Increased Tax Reporting: Stricter crypto tax guidelines d. Stablecoin Regulation: Likely in 2024-2025 	More regulatory clarity will lead to increased institutional adoption but may stifle innovation in the short term. Tax compliance will be enforced.

European Union (EU)	<ul style="list-style-type: none"> a. MiCA Regulation: Full implementation by 2025. b. Investor Protection: Focus on transparency and market integrity. c. AML/KYC: Strengthened compliance for exchanges and wallet providers 	<ul style="list-style-type: none"> a. Full MiCA Implementation: Expected by 2025, providing clear rules for crypto businesses. b. Cross-Border Regulation: Simplification of regulations across the EU. c. DeFi and NFT Regulation: Likely next phase in MiCA updates 	<p>The EU will become a global leader in crypto regulation with investor protections and a uniform framework across member states. Further clarity on cross-border regulations and EU-union-wide CBDC rollout.</p>
China	<ul style="list-style-type: none"> a. Crypto Ban: Strict ban on trading and mining since 2021. b. Digital Yuan: Active development of CBDC (e-CNY) 	<ul style="list-style-type: none"> a. Continued Crypto Ban: No relaxation expected. b. Expansion of Digital Yuan: Likely adoption for domestic and cross-border use. 	<p>China's strict anti-crypto stance will limit industry growth, but the Digital Yuan could shape future global payments. Full CBDC launch expected.</p>
United Kingdom	<ul style="list-style-type: none"> a. FCA: Regulates crypto exchanges and wallets. b. Taxation: Guidelines for crypto tax introduced in 2022 c. AML/KYC: Ensures compliance for financial institutions offering crypto services. 	<ul style="list-style-type: none"> a. Clearer guidelines: Introduction of more structured crypto regulations by 2024-2025. b. Crypto-Friendly Hub: Post-Brexit, the UK may position itself as a crypto hub. 	<p>The UK aims to balance innovation and protection, creating a crypto-friendly environment for business and institutional investors.</p>
India	<ul style="list-style-type: none"> a. Regulatory Ambiguity: Conflicting reports on crypto's legality. b. Taxation: 30% tax on crypto earnings (2022) CBDC: Limited digital rupee pilots (RBI) 	<ul style="list-style-type: none"> a. Regulated Environment: Likely a clear regulatory framework by 2025. b. Ban on Private Cryptos: Potentially restricted while allowing CBDC. c. Tax Compliance: More structured tax framework expected 	<p>India remains uncertain, but a regulated environment with clearer tax guidelines is expected, though private crypto may face restrictions.</p>
Japan	<ul style="list-style-type: none"> a. FSA (Financial Services Agency): Strong regulatory oversight, and licensed exchanges are required. b. Taxation: Cryptos are classified as assets and taxed accordingly 	<ul style="list-style-type: none"> a. Stable Regulation: Continued strong oversight, with regulatory adjustments for emerging technologies like DeFi and NFTs b. Promotion of CBDC: Japan exploring digital yen (CBDC) 	<p>Japan's crypto market will remain well-regulated, with potential for CBDC adoption. Institutional and retail participation should continue to grow. Increased Blockchain adoption for banking.</p>

Australia	<ul style="list-style-type: none"> a. ASIC (Australian Securities and Investments Commission): Regulates crypto as a financial product, requiring licensing for exchanges. b. Taxation: Crypto considered property for tax purposes 	<ul style="list-style-type: none"> a. Clearer Regulations: Continued refinement of crypto rules as the market matures. b. DeFi and NFT Regulation: Likely to see more specific oversight. 	Australia will maintain a progressive stance on crypto, with strong regulatory oversight and clear tax obligations for crypto investors.
South Korea	<ul style="list-style-type: none"> a. Financial Services Commission (FSC): Oversees crypto exchanges and ICOs. b. AML: KYC and AML requirements for exchanges. c. Taxation: 20% capital gains tax on crypto earnings 	<ul style="list-style-type: none"> a. Increased Regulatory Focus: Enhanced focus on NFTs and DeFi, as well as consumer protection. c. Central Bank Digital Currency (CBDC): Pilot projects may expand. 	South Korea will continue to enforce strict regulations, with a growing focus on consumer protection and NFT/DeFi regulation.
Brazil	<ul style="list-style-type: none"> a. Provisional Measures: Crypto regulation still evolving. b. Taxation: Crypto earnings are taxed as capital gains. c. AML/KYC: Regulations for exchanges and service providers. 	<ul style="list-style-type: none"> a. Regulatory Framework: Comprehensive crypto regulations likely in 2024-2025, focusing on consumer protection and AML compliance 	Brazil will likely create a regulatory framework to provide clearer rules for crypto businesses and protect users.
Russia	<ul style="list-style-type: none"> a. Regulation in Progress: The regulatory body has implemented taxation rules and is exploring regulations for crypto usage b. Crypto Mining: Legal but requires compliance with regulations 	<ul style="list-style-type: none"> a. Possible Crypto Ban: While Russia has legalized crypto for payments, they may introduce stronger regulations or outright restrictions. b. State-Backed Digital Currency: Likely to expand the digital ruble (CBDC) 	Russia may continue to allow crypto mining but will likely face tight regulation on usage and trading. The digital ruble could take precedence.

Source: CoinMarketCap, CoinGecko, 2023 market updates

about proposed regulators. Despite such challenges and uncertainties related to regulations, the future of Cryptocurrencies in the Indian market does seem bright.

Demand for them is likely to increase as more Indians embrace digital technology and seek financial alternatives. By 2024, India's cryptocurrency sector will witness USD

6.6 billion in revenue with a projected total revenue of USD 6.4 billion for the year 2025 (statista.com, 2024). The cryptocurrency market has experienced significant growth and volatility over the past decade.

Table 1 provides a comparative overview of crypto regulations in 2024-2025, helping to visualize how each region is approaching the regulation of digital assets and offering insights into future developments in the crypto space. By 2024-2025, the global cryptocurrency regulatory landscape will likely be shaped by greater clarity in the U.S. and EU, with MiCA setting the tone for future regulatory approaches. China's strict anti-crypto stance and India's evolving regulations will present challenges, while countries like the UK are seeking to establish themselves as crypto-friendly hubs. Regulatory clarity will be key to enabling further institutional adoption, but challenges around AML, taxation, and security remain significant hurdles to overcome. Countries like the U.S., EU, and the UK are working towards clearer and more structured regulations. This will likely increase institutional participation in the market, boost investor confidence, and support growth in the crypto industry.

The U.S. is moving towards a more structured and clearer regulatory environment for cryptocurrency. The focus is also on Anti-Money Laundering (AML) and Know-Your-Customer (KYC) measures to prevent illicit activities in the crypto space. The CBDCs or digital currencies may complement or even compete with cryptocurrencies, impacting global adoption. Taxation rules and regulations for DeFi and NFT transactions focus on ensuring consumer protection and fair tax reporting for investors. India's regulatory environment remains one of the most uncertain in the world. However, as the country moves toward clearer regulations, tax compliance will likely become more defined, and institutional players may be encouraged to enter the market.

3.2 Regulatory Rollercoaster in India

The way that India has regulated cryptocurrencies is filled with unexpected turns and twists. The nation's central bank, the Reserve Bank of India (RBI), issued a strong warning in 2013 about the possible dangers of cryptocurrencies, pointing out their decentralized structure and susceptibility to fraud and money

laundering. It was taken to the extreme in 2017 when RBI issued a circular that prohibited banks and other regulated financial institutions from becoming a conduit for cryptocurrency transactions. As a result, trade in cryptocurrencies has been virtually stopped in India and the same has been driven underground with robust grey markets thriving. However, in 2020, the apex, the Supreme Court intervened and declared the RBI circular to be unconstitutional and an infringement on the basic rights of the people.

3.3 The Crypto Bill: A Thrilling Regulator Journey

The government of India had come out with the Cryptocurrency and Regulation of Official Digital Currency Bill 2021, as a response to the verdict given by the Supreme Court and the growing popularity of Cryptocurrencies. This bill is looking to present a comprehensive framework of governance over cryptocurrency exchanges and custodians in India by banning the use of cryptocurrency exchanges and custodians. The measure awaits to be passed into law by parliament, having been put through several rounds of consultations, facilitating a regulatory framework for Cryptocurrencies. Cryptocurrency regulation aims to tame the wild bull. It certainly is no easy feat. The decentralized nature of cryptocurrency makes it impossible to track and monitor transactions, which has concerned many that it might be used more freely for illicit activities in the future. Of course, the biggest risk of investigating Cryptocurrencies relates to how extremely price-volatile they can be.

Despite such challenges, Cryptocurrencies have immense scope in India as well. The underlying technology for Cryptocurrencies, namely blockchain, has the potential to revolutionize a great section of industries including finance, supply chain management, and healthcare.

3.4 Performance Evaluation of 2024 Cryptocurrency Regulations in India

Market growth and the protection of investors in terms of metrics, along with tax revenue, are some of the prime performance measures that would point out whether the new regulations function with due effect. These would show the effective fostering of laws that are prudent

enough to expand and stabilize the Indian cryptocurrency market.

1. **Balanced approach:** The 2024 rules are a proactive step toward establishing a balanced approach to encourage innovation while also protecting the interests of investors with financial soundness.
2. **Investor Protection:** The Consumer Protection Act 2019 has been found useful in dealing with investor grievances for better protection. This makes the individuals liable and provides an account to keep the investors abreast of the kind of risks associated with cryptocurrency investments. Such drastic rules come into effect in 2024 and indicate a complete transformation in the manner in which India handles its digital assets. These indeed reflect the growing awareness of the need for a structured and well-defined regulatory regime in dealing with the increased complexities and risks of such cryptocurrencies.
3. **Digital asset classification:** The new framework has introduced accurate classifications such as security and utility tokens. Rules specific to each category cater to the risks of each one and its distinct characteristics.
4. **Taxation structure:** To legalize the market and generate the required revenues, the income from Bitcoin has been taxed at a rate of 30%. Along with it, there is a 1% tax deduction at source in the case of Rs. 50,000 or more transactions that induce compliance and drive away tax evasion.
5. **Monitoring and evaluation:** Market growth, investor protection metrics, and tax revenues would be some of the performance indicators measuring the effectiveness of the new laws. The above performance indicators will help tell precisely how well the laws are to work by enlarging and stabilizing the Indian market for Cryptocurrencies.

3.5 Effects of the 2024 India Cryptocurrency Regulations

The India cryptocurrency regulatory environment in 2024 was even more complex, featuring a sophisticated

interaction of taxes, policy formation, and compliance needs. This analysis marshals the latest studies and policy reviews to determine if these prohibitions achieve their intended effects.

1. **Market stability and investor Confidence:** This policy will increase investor confidence, as there will be a safe trading environment due to transparent tax laws and an AML/KYC procedure. However, the high tax rate will deter a few investors and delay market growth. The prevailing uncertainty with long-term investment decisions will be due to an unsound regulatory framework that lacks complete regulation. The laws about KYC and AML are also strict and add to the complexity and expense of operations and other processes within the organization. These requirements are different to satisfy for many small businesses and may lead to market concentration with only a few big firms able to survive. This would stifle the level of competition and the extent of innovation in that sector.
2. **Improved market integrity:** SEBI's regulations such as the requirement to disclose proportionate details as well as classify digital assets have enhanced the integrity of the market significantly. There has been growth in investor confidence and a decrease in incidents of fraud in business transactions as well. Stable economic environment. The Reserve Bank of India has enhanced the stability of this economy by curbing the extent to which virtual currencies impact monetary policy and financial stability.

Conclusion

Indian policymakers are caught in a tight spot between innovation facilitation and consumer and financial system protection while navigating the complexities of Cryptocurrencies. As long as risks are available for informed choices, an appropriately designed regulatory framework can facilitate the responsible use of cryptocurrencies. The cryptocurrency space offers an interesting new area for investors who are after fresh chances and cutting-edge technology but require caution, research, and a long-term perspective. Through a view

of the benefits, risks, and best practices for investment, individuals can adequately navigate the complex terrain of cryptocurrencies and unlock their full potential, being the next-generation assets class. Such will, indeed, be the case with the crypto market in such a state of flux and development. Staying knowledgeable and alert will prove a prerequisite for prudent investment choices in this dynamic and revolutionary field.

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Impact of Augmented Reality on AIDA Model of Consumer Buying Behaviour

B. A. Karpagam

Abstract

Augmented reality is the recent form of digitalization with broad applications for business and society as a whole. This article aims to analyse the benefits of augmented reality in marketing over traditional marketing, the demerits of augmented reality, and the gaps due to these demerits. Secondary research suggests that Augmented Reality has made its impact everywhere, be it customer attention, creating interest, desire to buy the product, or purchase the product. It has created a major impact in retailing, furniture, jewellery, etc, influencing the purchase behaviour of the consumer. Mobile devices are AR ready, and software is available. AR has positive effects on product knowledge, customers' attitudes towards brands, purchasing intentions, trust, and cognitive processes interactivity, thus potentially supporting all phases in the AIDA (Attention Interest Desire Action) model. Companies focus mostly on drawing awareness and creating interest but they are not efficient in creating a desire for purchasing the product.

Keywords: AIDA-model, Augmented Reality, Consumer Buying, Customers, Digitalisation

JEL Classification Code: M31, L86, D11, M37, O33

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1. Introduction

We live in the era of digitalization. When we have multiple vendors, the competition is also tight. So, the companies have to use competitive breaking technology to attract and retain customers. Augmented Reality (AR) will be the technology that will help convince the customers to have a glimpse of the product and draw the attention of the customer.

Augmented reality helps in attention creation, creating interest in the product, which in turn creates a desire for the product, which finally leads to a purchase, which is action. AIDA formula can be applied through augmented reality.

Augmented reality creates 3D interactive images wherein the customer can virtually try the products. Augmented

Reality can be best utilized in apparel, retail, and e-commerce industries.

2. Literature Review

Patrick *et al* (2024) proposed how Augmented Reality builds on cue-utilization and habituation theories to understand if the proposed effects are subject to erosion over repeated use of AR applications. The intensity of Augmented Reality has a better and stronger impact on affective responses for first-time users compared to habitual users, and augmentation exerts a stronger effect for habitual users on their cognitive and affective responses.

Söderström, C., Mikalef, P., Landmark, A. D., & Gupta, S. (2024) suggested that first time users of the product believe

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in perception whereas habitual users in entertainment, hence augmented reality plays a major role in evoking cognitive and emotional response among habitual users

Jelínková and Nosková (2023) opined that AR has earned a prominent space in marketing, be it in the field of tourism and cultural heritage or in the area of positively influencing consumer purchasing behaviour.

Prodea *et al* (2023) proposed that augmented reality intensified the choice of the consumer which, in turn, enhances the marketing strategies and this can be assessed through the dimensions of brand awareness, brand associations, perceived quality, and brand loyalty, as well as consumers' buying intention.

Rauschnabel, P. A., Babin, B. J., Tom Dieck, M. C., Krey, N., & Jung, T. (2022) observed how AR has inspired and convinced people regarding brands and suggested the difference between traditional and AR marketing techniques.

Sung, E., Han, D. I. D., & Choi, Y. K. (2022) experienced that AR mobile app advertising creates positive impact among consumers to respond through customer engagement.

Kyguolienė, A., & Braziulytė, R. (2022) analysed how AR can be used in packaging of a product and what are the challenges and opportunities that can be encountered during the process.

Sung E. C. (2021) investigates consumer responses to AR mobile app advertising by the consumer experience that is shared through viral marketing and purchase intentions.

Vinci et al ,(2020).Augmented Reality (AR) is a new technology that combines virtual elements with the real environment, creating new, interactive experiences for users.

Haumer, F, Kolo, C., & Reiners, S. (2020) sensed that AR is the emerging technology that is going to create a experience through its interaction in the virtual world. Brands use AR to recognise a Brand, by creating associations building loyalty and brand equity.

Scholz and Smith (2016) advocated innovative marketers can now force augmented reality to engrave immersive brand experiences, create more interactive advertising,

and enable consumers to experience products and spaces in innovative ways.

Javornik (2016) suggested that augmented reality has emerged in the marketing environment and due to its unique method of connecting physical environments and virtual elements, offers a major innovation in access to commercially relevant content.

3. Key Findings and Discussions

3.1 Benefits of Augmented Reality

According to research, customers feel that their buying experience can be enhanced and comparison between competitive products is easy due to augmented reality.

When the customers start using augmented reality the usage rate and customer engagement can be measured.

Augmented reality can boost the confidence of traditional marketers by including QR codes in their Posters and help in more customer engagement.

AR can inform customers in a reliable way which helps in building trust among customers.

Indian companies that have adopted augmented reality are:

1. **Myntra:** It has developed an app where customers can try to apply make-up and eyewear before purchasing the products.
2. **Lenskart:** Here, customers can try on different frames using augmented reality. This helps get a virtual experience without the pain of visiting the store.
3. **Pepper Fry:** The furniture store helps its customers align their furniture through virtual reality and then buy furniture.
4. **Reliance trends:** They capture the look of their trendy dresses through their interactive dressing room mirrors and help customers try the fit virtually.
5. **Shoppers stop:** They have interactive trying Kiosks that help select products and offer recommendations and virtual try-ons.

3.2 Impact of Augmented Reality

- i. AR amplifies the trust among the customers, which is a deficit in online shopping, especially for elite items like jewellery and furniture.
- ii. AR helps in Omnichannel marketing creating a great shopping experience both offline and online.
- iii. Customization is the key due to AR: this helps with individual preferences and improves customer satisfaction and retention.

3.3 Application of Augmented Reality to AIDA

1. Attention: The sellers capture the attention of the customers through AR-like interactive displays, which use the movement and some gestures of the audience. It can also use filters to attract the youth, as we can see in Snapchat and Instagram for GenZ who are tech-savvy. Gamified AR experience can use games like treasure hunts and other types of product revelation techniques.
2. Interest: Augmented reality helps create interest in customers. It helps spark curiosity and customer engagement by using techniques like virtual try-ons used by Lenskart and Nykaa Products. Visualization is a technique of AR that helps customers relate better, for example, where can the pepper fry furniture fit in the living room. Product features like foldable furniture can be highlighted that consume less space, allowing the customer to build a strong relationship.
3. Desire: AR helps to enhance the interest to preference of the customer to buy the product through customization or personalization, creating an experience where the customer feels special. Ex: Adding the initials of the customer on a leather purse that is customized or any jewellery. Creating stories for elite brands and asking customers desirability towards that brand. Ex: Being a member of Mahindra holidays. When customers start sharing their stories of how they stay at different places using Mahindra holidays, it creates an aspirational value that creates preference.

4. Action: AR helps in the final stage of purchase after the customer is convinced to buy the product. AR can guide users to navigate to the nearest store to shop faster and easily. It can have limited offer deals, which we see on Amazon so that products that are of high quality can be sold quickly to valued customers. Buy-now options lead to final checkout options.

3.4 Advantages of Opting Augmented Reality in AIDA

1. Customer engagement is good as Augmented Reality gives a bird's eye view and has a better chance than traditional marketing.
2. Augmented reality arouses a lot of interest in the customer and gives them a personalized experience.
3. Purchase intentions are enhanced through virtual reality which, in turn, enhances decision making.
4. Word-of-mouth marketing with augmented reality spreads virally, and reach is more.
5. The conversion rate is higher as customers are satisfied with Augmented Reality and can guide customers better through different stages of AIDA.

3.5 Disadvantages of Opting Augmented Reality in AIDA

1. AR influence requires sophisticated and exorbitant technology. Small and start-up firms cannot adopt AR technology because it's expensive.
2. All smartphones cannot have AR hardware so the majority of users cannot have access to AR technology.
3. Customers who are not conscious of AR technology during different stages of AIDA reduce customer engagement.
4. Flashy advertisements of AR may not generate interest in customers.
5. Too much exposure to media may, in turn, lead to fatigue and less engagement.

6. AR may raise privacy concerns where it may affect AIDA in its Action stage.
7. Slow loading time and technological glitches create a negative impression on the customer.
8. AR may not suit all industries and products. There may be information overload.

Conclusion

Augmented reality creates innovative dimensions through its integrated marketing campaigns using digital technologies to develop better consumer experiences through user-friendly choices. It helps in attracting and engaging customers. Augmented Reality can evaluate benefits for different industries, segments, and target customers and optimize marketing strategies for success. When AR is used it becomes effective when it's used in the AIDA model. However, AR has to focus on how it is going to be used, where its relevance is, and how it should enlighten the customers' experience.

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The Healing Power of Mantras: A Study on Mental Health Transformation

N. S. Sudarshan

Abstract

The possible advantages of mantra meditation for both physical and mental well-being are investigated in this study. It has been proposed that mantras, which are repeated sounds or words employed in a variety of spiritual and contemplative disciplines, might enhance mental peace and general well-being. The purpose of this study is to explore how frequent mantra practice affects mental clarity, stress reduction, and health issue prevention. Through an extensive analysis of literature on mantra meditation, this study aims to establish a relationship between the practice of mantra meditation and enhancements in mental health indicators, such as decreased levels of anxiety and depression. Furthermore, this study will look at physiological markers including heart rate, blood pressure, and cortisol levels.

Keywords: Anxiety, Depression, Chanting OM, Mantra Meditation, Mental Health, Stress

JEL Classification Code: I12, D91, Z12, I31, I18

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1. Introduction

It is believed that numerous saints are still alive in the hilly regions of Northern India and Kailas (also known as Kailasa Giri) by chanting Sanjivani and other mantras. It is believed that even today, these saints survive on air and water. Puranas suggest that during the period of satyayug, a boy named Markandeya had gained the blessing of the almighty, Lord Shiva in winning his life back from the Lord of Death (Yamaraja). Many Hindus believe that there are seven other Chiranjeevis. With reference to the above statements and citations, this paper aims to showcase the power of mantra recitations in enhancing mental health benefits and reduction of nervousness and anxiety.

The Bija Mantra “AUM” is first mentioned in the Upanishads and is believed to be from lord Brahma. It is believed that chanting develops a positive vibe around the Phraser. The other mantras also reduce stress and

anxiety. There is much research that has been undertaken to provide proof of how chanting mantras or cultivating mantra meditation daily helps overcome anxiety, reduces stress levels as well as provides health benefits. There are several mantras like the Vittala mantra, the Hare Krishna Mantra, and Gayatri Mantra.

2. Literature Review

Goyal et al. (2014): The researchers have attempted to study the effectiveness of meditation programs in improving stress-related outcomes. To evaluate the outcome, researchers have made a meta-analysis from various sources and found that mindfulness meditation programs had a moderate level of impact on stress-related issues, while very minimal evidence was generated to showcase the effects of meditation in enhancing positive mood, mental attention, eating habits, and sleep patterns. The researchers disclaim that the results obtained

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are subjective and may not be generalized across all populations. They also recommend more robust tests to determine the efficacy of meditation in improving the mental health of participants.

Yadav et al. (2024): This research has attempted to study how chanting Gayatri Mantra and silence help improve quality of life. The researcher has undertaken the study by considering 120 participants, which includes 60 higher-level students. The study found a significant positive difference among the experimental student group who practised chanting the Gayatri Mantra for 30-45 minutes for 60 days.

Pundir et al. (2023) opine that chanting the core mantra AUM enhances immune function. The research data is collected using academic journals, books, and other literature sources using several parameters like EEG recording, fMRI scan, cognitive function tests, heart rate variability, etc. Chanting the AUM mantra also improves sleep quality, and quality of life, and enhances emotional well-being.

Dudeja (2017): The author emphasizes the influence of coherent thinking through the practice of meditation on a healthy body, mind, and soul. The common method like meditation based on mantras, especially choosing the ideal mantra sound frequency for a certain person, and adding trust to one's practice of the meditation method can have remarkable results.

3. Objective of the Study

From a comprehensive literature review, this study aims to explore how regular adoption of Mantra-based meditation helps reduce mental stress, anxiety, and depression; and how it also helps maintain a constant mindset and concentration.

4. Key Findings and Discussions

This research is on the positive effects of regular mantra meditation on the physical and mental well-being of a person. Mantra meditation is not only for reducing stress and anxiety, it also gives a positive mindset and relief from mental and physical stress.

1. An extensive review of the literature indicates that chanting the OM mantra has a beneficial effect on mental health and can improve psychological well-being. The study by Anubha Pundir and her fellow found that reciting OM aloud regularly assisted individuals in reducing tension, anxiety, and depressive symptoms. According to available research, chanting OM can be an effective supplemental tool for managing good mental health, nevertheless, further research is needed to fill the gap in scientific understanding of this practice. Chanting OM has a positive impact on a wide range of mental health issues. One 12-minute rhythmic OM chanting, for instance, has been demonstrated to dramatically lower stress and enhance mental well-being. Another study revealed similar results, indicating that chanting OM can be a useful intervention for lowering anxiety and depression symptoms.
2. The work done by Jai Dudeja uses a mixed-method approach, combining both quantitative and qualitative data collection and analysis methods. Participants (N=100) were randomly assigned to either a mantra meditation group or a control group. The meditation group practiced mantra meditation for 30 min, twice a day, for 12 weeks. Pre- and post-intervention measures included surveys, cognitive function tests, and physiological assessments. The benefits of mantra-based meditation on one's physical, mental, and emotional well-being are supported by empirical evidence in this study. According to the research, practicing mantra meditation regularly can significantly enhance stress reduction, cognitive performance, and general quality of life. There is compelling evidence that practicing MM helps manage hypertension and relieve stress. Further high-quality research in the field of immunity and anxiety is advised to be necessary to come to a more certain conclusion. Before definitive results can be made, larger samples, better designed (e.g., guidelines for chanting or meditation periods), more electronic instrumental measures (e.g., ECG, EEG, EMG, and fMRI), and fewer self-reporting surveys are required.

Conclusion

The practice of chanting OM and engaging in Mantra Meditation (MM) appears to hold significant benefits for mental health and general well-being. With multiple studies demonstrating reductions in anxiety, depression, stress, and even improvements in cognitive performance and quality of life, OM chanting is found as a viable tool for mental health management. The research further shows how regular OM chanting aids in alleviating psychological distress. Empirical studies at the University of Southern California and the University of Nevada's research further highlight that chanting OM reduces stress and anxiety. The mixed-method study on mantra-based meditation illustrates notable stress reduction and cognitive enhancements among participants engaged in mantra meditation. Although the connection between MM and physical health markers like immunity and hypertension is promising, studies indicate the evidence remains less definitive in areas such as immunity enhancement, warranting more comprehensive research. Additionally, research on the effects of meditation on oxygen saturation suggests further exploration into breathing patterns and their impacts on health. This review advocates for further, well-designed studies with larger sample sizes, standardized protocols, and objective

measures like EEG and fMRI to better understand and substantiate these benefits, ultimately enhancing one's comprehension of meditation and chanting and its scope in mental and physical health applications.

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Thesis Review

A Cointegration Trading Strategy for Currency Exchange Rates

By: *Jeroen Goudvis*^{1*}

-Reviewers: **Avinash M. Nayak** and **Sudarshan N. S.**²

This review critically examines the thesis on 'Cointegration Trading Strategy for Currency Exchange Rates' by Jeroen Goudvis. The author explores the possibility of designing a trading strategy for currency exchange rates based on the concept of cointegration i.e., utilizing the long-term equilibrium relationship between currency pairs to detect profitable trading possibilities. The study analyses the dataset consisting of 27 currency pairs spanning from 2000 to 2019, utilizing the Engle-Granger two-step cointegration test to identify the currency pairs exhibiting mean-reverting characteristics. Trades are initiated when currency values vary greatly from their normal levels, and finalized when they return to equilibrium, maximizing profits from temporary price adjustments. The research shows that this market-neutral approach produces a yearly average gain of 12% and shows minimal connection to big indicators such as the S&P 500, lowering the impact of systemic risk. The pairs that exhibit synchronized movements are used as samples, and USD is used as the base currency. This approach remains effective in different market conditions. This study presents valuable perspectives on utilizing statistical arbitrage in forex markets by providing an attractive option to conventional trading methods. The review evaluates every segment of the paper to craft a detailed review and offer suggestions and avenues for future research.

The study offers a valuable contribution to financial trading with its utilization of a cointegration-based approach in the FOREX market. The thesis questions the traditional market efficiency theory by showing how short-term price differences in currency exchange rates can influence the existence of arbitrage. The main aim of the research is to evaluate the effectiveness of utilizing cointegration methods in pairs trading, providing fresh perspectives on currency market behaviour and introducing a different investment approach for FOREX traders. The author tries to identify cointegrated pairs to determine the average returns of the proposed strategy.

Fama (1970) proposed the Efficient Market Hypothesis (EMH) in financial markets, stating that asset prices incorporate all known information, making it difficult to consistently outperform the market using past data analysis. Goudvis disputes this concept by examining the temporary inefficiencies that may arise from delays in absorbing information. The study presents a strategy known as pairs trading, commonly used in stock markets, for trading currency pairs in the FOREX market. The Forex market stands out for its high liquidity, significant

¹The review is based on the Bachelor Thesis submitted to Erasmus School of Economics, by Jeroen Goudvis under the supervision of L.A.P. Swinkels, dated 2 August 2020

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trading volume, and lower transaction costs in comparison to other financial markets, potentially making it a perfect setting for these strategies.

The thesis is notable for using a familiar trading strategy from the stock market in a different and riskier market. This alteration proves to be innovative and efficient as currency pairs frequently display long-lasting balance connections because of macroeconomic factors like interest rate parity and purchasing power parity (PPP). Goudvis's research centres on pairs trading in currency markets, a subject often overlooked in present studies, filling a significant void in the existing literature.

The literature review is comprehensive, providing a discussion of theoretical foundations and existing literature including noted works by Gatev et al. (1998), Goetzmann, and Rouwenhorst (1998, 2003, 2006). The study conducts a comprehensive exploration of literature in the context of equity markets and also identifies the strength of cointegration as a strategy and its relevance to the FOREX market.

The literature review includes key theories such as Purchasing Power Parity (PPP) and interest rate parity, which uphold the enduring equilibrium of currency pairs. The theory is in a broader economic context by integrating macroeconomic ideas, demonstrating the significance of cointegration in assessing fluctuations in currency values. Despite being thorough, the literature review could have delved deeper into the recent advancements in machine learning and artificial intelligence, which are increasingly important in predicting financial markets and could improve traditional cointegration methods.

The thesis outlines its research objectives and hypotheses in a clear manner. The research hypotheses are clearly stated and offer a solid structure for practical examination. The thesis guarantees a thorough examination of its research question by paying attention to both identifying cointegrated pairs and assessing the profitability of the strategy.

The study makes use of the daily exchange rate of 27 currencies across various continents, covering a period of two decades (2000-2019) divided into 10-year formation years and 10 years of trading. Using USD as the base currency simplifies the analysis by lessening the number of datasets needed for testing cointegration. The Dickey-Fuller test confirms the series are first-order integrated. The Engle-Granger two-step error correction method is adopted in the thesis to detect cointegrated pairs and ensure methodological soundness. However, stability in cointegration relationships may not hold well in volatile markets. Further studies can test the stability and also include transaction costs and spreads to evaluate the profitable scenario.

During the formation period, the Engle-Granger method observed 23 significant cointegrated pairs out of 351 combinations tested. Throughout the trading period, 38 trades were completed, resulting in an average realized gain of 6.5%, deemed statistically significant at the 1% level. The Russian Ruble (RUB) pairs displayed high volatility following geopolitical and economic events after 2014, resulting in varying returns among pairs. Empirical results demonstrate statistical significance at returns significantly different from zero.

Goudvis finds that using a pairs trading strategy based on cointegration in the FOREX market is feasible, with substantial returns backing its effectiveness. Nevertheless, the thesis recognizes several constraints, such as:

- 1. Unused Trading Days:** Only 21.8% of potential trading days were utilized, suggesting opportunity costs.
- 2. Fixed Formation Period:** A rolling window for pair identification could enhance adaptability.
- 3. Lack of Risk Management:** The absence of stop-loss mechanisms increases exposure to extreme market conditions.

4. Transaction Costs: Ignoring transaction costs may overestimate net returns.

To enhance the strategy, upcoming studies could investigate:

- 1. Dynamic Pair Selection:** It involves the utilization of machine learning algorithms to detect pairs that are cointegrated.
- 2. Sophisticated Risk Management:** Integrating stop-loss strategies and adjusting position sizes based on volatility.
- 3. Transaction Cost Analysis:** This involves considering bid-ask spreads and trading fees to improve the accuracy of return calculations.

Future research can build on these study findings to create more robust trading strategies. This review emphasizes the academic contribution of the paper.

Book Review

John Bogle on Investing: The First 50 Years

Published by: Wiley; Author: John C. Bogle

-Reviewer: S. Sathyanarayana

John C. Bogle, the founder of the Vanguard Group and a pioneer of index investing, is celebrated for his unwavering dedication to promoting low-cost, long-term investment strategies. In *John Bogle on Investing: The First 50 Years*, Bogle compiles a selection of essays, speeches, and writings that reflect his insights accumulated over half a century in the financial industry. This book is both a testament to Bogle's philosophy and a call to action for investors to focus on simplicity, discipline, and the power of compounding. However, while the book is undeniably impactful, it is not without its limitations, which warrant a critical analysis.

One of the greatest strengths of Bogle's book lies in its timeless principles. His advocacy for index funds, which offer broad market exposure at a low cost, is well-supported by empirical evidence and resonates with both novice and experienced investors. Bogle's ability to distil complex financial concepts into accessible language ensures that the book has a broad appeal. His warnings about the corrosive impact of high fees and speculative behaviour are particularly pertinent in a financial landscape often dominated by high-frequency trading and costly mutual funds. Bogle's writings also emphasize the importance of long-term thinking. He frequently critiques Wall Street's short-term focus, arguing that true wealth generation comes from patient, disciplined investing. This perspective aligns with his well-documented belief in the "**majestic power of compounding**," which he describes as a mathematical wonder capable of transforming modest savings into significant wealth over time.

The book's structure, comprising essays written over five decades, provides a unique historical perspective on the evolution of the financial markets. It allows readers to witness the consistency of Bogle's message despite changes in the economic environment. This consistency is a testament to the robustness of his principles and his resistance to the transient fads that often dominate the financial world.

While *John Bogle on Investing* is a treasure trove of insights, it is not without its flaws. The compilation nature of the book, although providing historical depth, can sometimes feel disjointed. Readers seeking a cohesive narrative or systematic framework might find the structure somewhat lacking. The repetition of themes while reinforcing Bogle's core beliefs can become monotonous, especially for readers already familiar with his work. Another critique lies in Bogle's unwavering focus on index funds as the ultimate investment vehicle. While his arguments for indexing are compelling, they leave little room for exploring alternative investment strategies. For instance, value investing, dividend growth investing, or even certain active management approaches can offer valid pathways to financial success, depending on an investor's goals and risk tolerance. Bogle's dismissal of these strategies might seem overly rigid to some readers.

Additionally, Bogle's criticism of Wall Street's profit-driven culture, though valid, can come across as overly idealistic. His vision of a financial industry focused solely on serving investors is aspirational but arguably detached from

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the realities of modern capitalism. Some readers may find his tone overly moralistic, which could detract from the practicality of his advice.

The principles outlined in *John Bogle on Investing* remain highly relevant in today's financial world, characterized by an explosion of investment options and the rise of robo-advisors. The book serves as a reminder of the value of simplicity in an era where complexity often reigns. Bogle's emphasis on cost efficiency and long-term thinking is particularly pertinent as investors grapple with inflation, market volatility, and an uncertain global economy.

However, the financial industry has also evolved in ways that Bogle's book does not fully address. For instance, the rise of environmental, social, and governance (ESG) investing and the growing popularity of cryptocurrency are absent from his discussions. While this omission is understandable given the book's historical scope, it does highlight the need for contemporary investors to complement Bogle's insights with additional perspectives.

John Bogle on Investing: The First 50 Years is an indispensable resource for anyone seeking to understand the fundamentals of sound investing. Its enduring principles, emphasis on low-cost indexing, and critique of speculative behaviour make it a valuable guide in an often-chaotic financial world. However, its limitations including a repetitive structure, lack of exploration of alternative strategies, and a somewhat idealistic tone suggest that it should be read alongside other investment literature to provide a more balanced perspective. Nonetheless, Bogle's legacy as a champion of the individual investor remains unassailable, and this book is a fitting tribute to his remarkable contributions to the world of finance.

Book Review

Corporate Finance - Theory and Practice 2e: 14

Published by: John Wiley & Sons Inc. (ISBN-13: 978-0471283324)

Author: Aswath Damodaran

-Reviewer: Pushpa B V

“*Corporate Finance: Theory and Practice*” by Aswath Damodaran is widely regarded as a seminal work in the field of corporate finance. First published in 1997 and updated through several editions to reflect evolving market practices and financial theories, the book provides an in-depth exploration of the principles that govern financial decision-making in corporations. Damodaran, a highly esteemed professor at New York University’s Stern School of Business, is celebrated for his ability to synthesize theoretical concepts with practical application, making this text a valuable resource for students, academics, and professionals alike.

The book is structured into three major sections, reflecting the key pillars of corporate finance: investment decisions, financing decisions, and dividend policy. Damodaran begins with the foundational principles of finance, such as the time value of money, risk and return, and the cost of capital. He explains these concepts in a manner that is both thorough and accessible, using real-world examples to ground the theory in practical scenarios. This approach is particularly beneficial for readers who may struggle with abstract concepts, as it allows them to see how these ideas manifest in everyday business decisions.

The second part of the book shifts focus to investment analysis, where Damodaran delves deeply into valuation methods, including discounted cash flow (DCF) analysis and relative valuation. His discussion of DCF is especially noteworthy for its clarity and rigor. Unlike many textbooks that provide only a cursory explanation of the method, Damodaran walks readers through each step, offering practical tools and templates to reinforce learning. The case studies included in this section are drawn from various industries, providing a diverse set of examples that help readers appreciate the versatility and limitations of different valuation techniques. This is complemented by a detailed examination of project analysis, which provides insights into how companies evaluate and prioritize investment opportunities.

In the final section, Damodaran addresses financing and policy decisions, discussing topics such as capital structure, the trade-off between debt and equity, and the implications of dividend policy. His analysis is rooted in both theory and empirical evidence, which adds depth to his arguments. For instance, he explores the Modigliani-Miller theorem in a practical context, showing how real-world factors such as taxes, bankruptcy costs, and agency issues influence financing decisions. His treatment of dividend policy is equally comprehensive, examining how companies balance shareholder expectations with their reinvestment needs.

Despite its strengths, the book is not without its shortcomings. One of the most notable challenges is its density. At over 700 pages in later editions, the text can feel overwhelming, particularly for readers who are new to the subject. While Damodaran explanations are clear, the sheer volume of material may make it difficult for beginners to digest without

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supplemental resources or guidance. Additionally, the book leans heavily on quantitative models and calculations, which may be intimidating for those without a strong background in mathematics or statistics. Although the author provides ample support in the form of spreadsheets and online resources, some readers may still find the technical content challenging.

Another limitation is the book's U.S.-centric perspective. While Damodaran does incorporate examples from global markets, the primary focus remains on American companies and financial practices. This can make it less relevant for readers from other regions, where financial systems and regulatory environments may differ significantly. A more balanced global perspective would enhance the book's utility for international audiences and provide a broader understanding of corporate finance in a globalized economy.

That said, Damodaran's writing style is a major strength of the book. Unlike many technical finance texts that are dry and difficult to follow, his prose is engaging and often conversational. He anticipates the reader's questions and addresses them proactively, which makes complex topics more approachable. His use of real-world data and contemporary case studies further enriches the learning experience, bridging the gap between theory and practice in a way few textbooks manage to achieve.

In conclusion, "*Corporate Finance: Theory and Practice*" by Aswath Damodaran is an authoritative and indispensable resource for anyone seeking a deep understanding of corporate finance. Its comprehensive coverage, practical insights, and analytical rigor make it a standout text in the field. While its density and U.S.-centric focus may pose challenges for some readers, these are minor drawbacks compared to the wealth of knowledge it offers. For students, academics, and practitioners, Damodaran's book remains a benchmark in corporate finance education, combining theoretical depth with practical relevance in an exemplary manner.