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About the Journal

The journal is published by Great Lakes Institute of Management, Gurgaon, India. The aim of the journal is to attract articles that address issues the industry is currently facing. A special focus is on articles that provide innovative solutions to these issues. The journal articles not only are of interest to academics, but also, with their focus on relevance, should be of interest to policy makers, think tanks, government, corporate and multilateral institutions, professionals, and industry leaders. Manuscripts undergo a double-blind peer review process, and the journal follows all international journal publication norms. The journal is published with an open-access format so that it reaches the maximum readers. Journal Publishing Services for publication are powered by Sage Spectrum.

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Aims and Scope

GLIMS Journal of Management Review and Transformation aims to publish scientific, empirical research on the theory, practice, and contemporary perspectives of management focusing on the problems, interest, and concerns of managers. It aims to explore interesting questions and phenomena in management, develop and/or test theory, replicate prior studies, and review and synthesize existing research.

Within its scope are all aspects of management related, but not limited, to strategy, entrepreneurship, innovation, information technology, digital business, analytics, artificial intelligence, machine learning, and policy and organizations, as well as all functional areas of business, such as organizational behavior, human resource management, accounting, finance, marketing, operations, data and analytics, and technology transformation.

This journal intends to publish a variety of articles including quantitative and qualitative empirical research articles and conceptual articles that provide novel perspectives on recent business phenomena. To achieve our aim of writing about business transformation, the journal will also include case studies and book review articles. It would also publish abstracts of PhDs that are relevant and in-line with the journal's objectives.

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Welcome to Volume 5, Issue 1 of the GLIMS Journal of Management Review and Transformation. Since our launch in 2022, the journal has continued to grow as a platform for rigorous, practice-relevant management research, and this issue is a strong reflection of that mission.

Today's organizations operate in an environment of rapid and simultaneous change. Technological disruption, shifting regulatory frameworks, evolving consumer expectations, and new questions about the nature of work are all demanding fresh thinking from researchers and practitioners alike. The articles in this issue respond to that demand directly, addressing themes that include global strategy, financial regulation, digital innovation, supply chain management, consumer behaviour in digital platforms, and the future of the global workforce.

What unites these contributions is a shared commitment to scholarship that is both methodologically sound and managerially meaningful. The issue brings together literature reviews, conceptual papers, empirical studies, and a commentary, offering readers a diversity of perspectives and approaches. Each article speaks to challenges that are real, current, and consequential for organizations across sectors.

We are grateful to our authors for the quality of their submissions and to our reviewers for the rigor and care they bring to every manuscript. Their collective effort is what makes this journal possible. We invite our readers to engage deeply with this issue and encourage scholars working on emerging management questions to consider submitting their work to future volumes.

Dr. Akhter Mohiuddin Rather
Editor, GLIMS JMRT

A Comprehensive Study on Evolution and Strategic Impact of Global Capability Centres (GCCs) in the Indian Industry

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Abstract

Global capability centres (GCCs) are playing a significant role in positioning India as a strategic hub in the global business landscape. This study explores the sustainability and growth of GCCs in India and their transformative impact on the Indian business ecosystem. Currently, around 1,800 GCCs operate across multiple domains and locations nationwide. Key drivers for GCCs' establishment are the availability of skilled talent, technological advancements and policy and infrastructure support. It is important to know that GCCs are evolving from cost-arbitrage back-office hubs to centres of innovation, leadership development and strategic decision-making, and are further expected to emerge as AI-driven enterprises. In this article, quantitative analyses were performed to examine how factors such as technological advancements, workforce upskilling, and policy support contribute to fostering GCC sustainability. The study shows that significant opportunities exist to expand GCCs into Tier II and Tier III cities and diversify into emerging sectors such as telecom, real estate and healthcare. Based on the data available in terms of the state policy framework, talent pool and other conducive key factors for the establishment of GCC, some recommendations and suggestions are proposed to ensure long-term growth of the country. In conclusion, GCCs currently contribute 1.5%–2.0% to India's GDP and employ approximately 1.9 million people and are expected to grow 3.5% GDP contribution with 2.8 million jobs by 2030, which showcases increasing economic significance. This indicates the significance of GCCs in the Indian business ecosystem.

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Global capability centre (GCC), sustainable development, R&D, knowledge economy, GCC policy, leadership

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Introduction

Global capability centres (GCCs), formerly known as captive centres of multinational companies, have evolved over the years into global in-house centres (GICs) and are now more commonly known as GCCs. These centres were established as cost-arbitrage hubs in the late 1990s and now emerged as strategic units within multinational corporations (MNCs) to manage key business functions across the regions. For example, Texas Instruments (TI) were the first global tech company for software design, which set up its GCC operation at Bangalore, India. However, this GCC was an R&D centre and more than cost saving move. At the same time, Citibank launched Citicorp Overseas Software Ltd. (COSL) in Pune, focused on banking software, effectively becoming India's first 'captive' IT services centre. Now GCCs are service centres as well as innovation centres, creating value-added services. The most common GCCs support functions such as IT services, finance, human resources and customer support, leveraging advanced technologies and a skilled workforce (Knowledge and Innovation hub) to drive operational efficiency and innovation (Six Imperatives to Scale up the Global Capability Centre Market in India, PwC, 2023). Over the years, GCCs evolved from back-office operations into strategic decision-making operations. Development phases of GCCs over the periods are given below and depicted in Figure 1.

1. Wave-1: Transactional operations (1990s–2000s): Centres focused on low-cost, repetitive tasks such as data entry and helpdesk support by relocating IT operations to India.
2. Wave-2: Process optimisation (2000s–2010s): Emphasis on operational excellence and process optimisation through tools like Six Sigma, lean methodologies and adoption of global quality standards, enterprise resource planning (ERP) system and introduction of automation.
3. Wave-3: Value creation and innovation (2010s–2020s): Known for innovation and skill development, there was a rise in the application of digital technologies such as cloud, artificial intelligence (AI), data analytics, blockchain, cyber security, capacity building, and incremental growth in the startup mindset that becomes an innovation hub from execution arms.
4. Wave-4: Strategic decision-making and global leadership (2020s–current): With deep expertise across sectors like banking, healthcare, manufacturing, retail and technology, GCCs have become knowledge powerhouses and help in making strategic decision-making and global leadership.

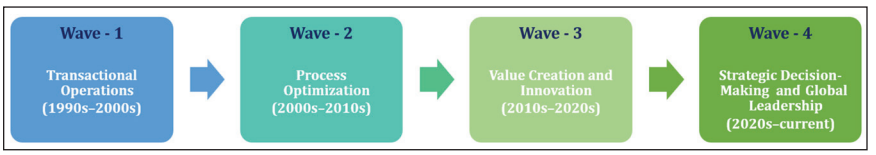

Figure 1. Representation of GCC Development Phases.

Note: GCC = Global Capability Centre.

In this context, a few examples are explained below to understand the transformation of back-office operations to become strategic decision-making and global leadership through a case study:

- J. P. Morgan GCC, Bengaluru and Hyderabad
  - Role: Initially established as a back-office operations for banking processes, now acts as a strategic hub for digital banking, cybersecurity and risk management. These centres design and deploy AI-powered fraud detection models, provide leadership on fintech partnerships and digital payment innovations.
- Microsoft India Development Centre (IDC), Hyderabad, Bengaluru and Noida
  - Role: Initially established as an offshore software development support, it now acts as the largest R&D centre outside the United States. These centres provide core products like Azure, Office 365 and Teams. It also plays a key role in shaping generative AI integration into Microsoft products.
- Bosch Global Software Technologies (BGSW), Bengaluru
  - Role: At the beginning, this centre was established as an engineering support for automotive products; now it acts as a global innovation and decision hub for Bosch in areas like connected mobility and Industry 4.0.
- Walmart Global Tech India, Bengaluru
  - Role: Support for supply chain IT systems, now acts as a decision-making centre for global retail technology and customer experience.
- Novartis GCC, Hyderabad
  - Role: Shared services for finance and HR, now act as a global decision-making hub for healthcare innovation and digital medicine. It drives AI-enabled drug discovery and patient care platforms.

Thus, GCCs are now nerve centres of innovation, leadership and global competitiveness for MNCs.

Review of Literature

To conduct this study further, an extensive literature review on GCC implementation and the policy frameworks in India was undertaken.

India Brand Equity Foundation, in its news reports, highlights that GCCs have emerged as a critical component of India's integration into global value chains. Over the past decade, India has consolidated its position as the world's leading destination for GCCs, hosting more than half of the global GCC footprint. According to industry and policy reports, India currently accommodates approximately 1,700–1,800 GCCs across diverse sectors, including information technology, engineering, banking and financial services, healthcare, manufacturing and telecommunications. The literature identifies key enablers for GCC growth include large skilled talent pool, cost efficiency, robust digital infrastructure and progressive policy support (IBEF, 2024).

Phadnis (2024), in her Times of India article titled 'How GCCs are powering India's Job Market', explains that several studies highlight the growing economic significance of GCCs within the Indian economy. GCCs are estimated to contribute between 1.5% and 2.0% to India's GDP while employing nearly 1.9 million professionals. As per projections, indicate that by 2030, employment generation could reach approximately 2.8 million, with a corresponding increase in GDP contribution to around 3.5%. This highlights the transition of GCCs from auxiliary service providers to core contributors to national economic growth (Phadnis, 2024).

An India Briefing article by Melissa Cyrill and Khyati Anand brings out a very interesting perspective on the structural transformation in the functional orientation of GCCs. Earlier research characterised GCCs primarily as cost-arbitrage and back-office support units; however, recent studies demonstrate a clear shift toward innovation-led functions such as research and development, AI, data analytics, cybersecurity, cloud engineering and product development. This transition reflects a strategic realignment wherein multinational enterprises increasingly leverage Indian GCCs for high-value and mission-critical activities. Also, the estimated GCC market should reach US$110 billion by 2030 (Cyrill & Anand, 2023).

In the report by PwC, India titled 'Catalysing value creation in Indian GCCs', research reveals that from a strategic management perspective, GCCs are now viewed as integral components of enterprise-wide value creation. PwC's empirical analysis highlights that Indian GCCs are contributing to global organisations at a compounded annual growth rate exceeding 11%, particularly through digital transformation and innovation initiatives. Leadership development, decision-making autonomy and closer integration with headquarters are identified as key determinants of GCC maturity and long-term sustainability (Ojha et al., 2025).

Methodology to Measure the Impact of GCCs

This study adopts a mixed-methods research design to comprehensively assess the impact of GCCs on the Indian economy. The mixed-method approach integrates quantitative techniques to measure measurable economic outcomes with qualitative techniques to capture strategic, institutional and innovation-driven impacts that are not fully reflected through numerical indicators.

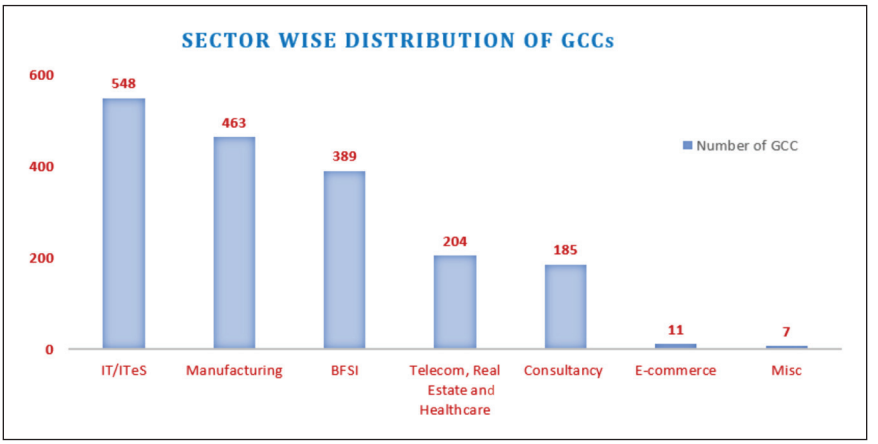

Figure 2. Sector-wise Distribution of GCCs in India.

Note: GCC = Global Capability Centre.

Sector-wise Distribution of GCCs

In the IT industry, it is a fact that many multinational companies have established their captive unit in India (offshore centres) to manage the entire work, such as operations, enhance innovation and drive technological advancements of the captive unit. As per the market report by JLL India, approximately 1,800 GCCs are currently operating in India in various sectors, as depicted in Figure 2. Of the total, 548 GCCs are in the IT/ITeS sector. The next three important domains for GCCs are Manufacturing, Banking Financial Services and Insurance (BFSI), Telecom, Real Estate & Healthcare which are represented by 463, 389 and 204 GCCs respectively in the said domains across the country. Further, GCC—Consultancy are known for its process-oriented and practical approach. They work closely with leadership teams with an objective to solve critical business challenges and unlock value-driven growth through the right workforce strategy, improving operational efficiency and unlocking long-term value. A few top GCCs in E-commerce, such as Amazon, Goldman Sachs, JP Morgan, Deloitte and Walmart in India, are transforming the country's business landscape and contributing significantly to global operations.

Key Factors for Evolution of GCCs in India

India has become a preferred destination for GCCs due to its vast talent pool, cost advantages, robust IT infrastructure and policy framework. Over the past two decades, the country has witnessed significant growth in the number of GCCs, with many global giants establishing their operations in cities like Bengaluru, Hyderabad, Mumbai, Pune, Chennai and Delhi-NCR (Ghosh, 2025). Initially,

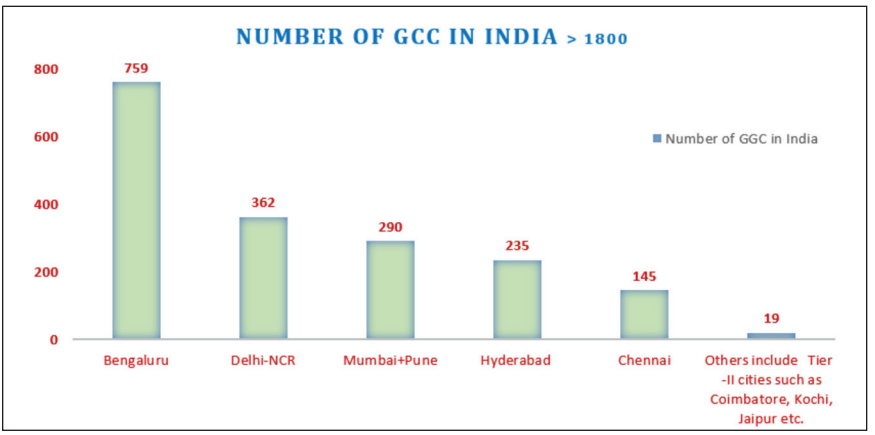

Figure 3. Location-wise GCCs in India.

Note: GCCs = Global Capability Centres.

GCCs in India were primarily set up for back-office operations, focusing on repetitive and transactional tasks. However, over time, they are converted into centres of excellence, innovation hubs and strategic enablers for their parent organisations. The location-wise distribution of GCCs in India is as follows:

From Figure 3, it is clear that the preferred destination for establishing GCCs is metro cities. However, the key factors for establishing new GCCs are also available in other locations of the country (India's Unique Value Proposition, 2025). Nowadays, many of the State Government have made GCC policies to attract their locations. For example, Uttar Pradesh, Karnataka and other states. Uttar Pradesh has issued a GCC policy 2024, which addresses the key factors that influence global companies to invest in that region (Bagri et al., 2024; GCC Policy, 2024). Gujarat has launched the GCC policy 2025–2030, aligning with union budget 2025. Now, the government is keen to expand GCCs into smaller cities by providing a conducive environment, such as robust infrastructure, improving the policy framework and strengthening the startup ecosystem required for the establishment of GCC. With regard to the startup ecosystem in Tier II locations, Next Generation Incubation Scheme (NGIS), with an objective to promote and support innovative startups, is entrusted by MeitY to STPI for implementation. The locations are Agartala, Bhilai, Bhopal, Bhubaneswar, Dehradun, Guwahati, Jaipur, Lucknow, Prayagraj, Mohali, Patna and Vijayawada. To strengthen infrastructure, STPI under MeitY has established Incubation facilities in the Tier II and Tier III locations (IBEF, 2024).

The evolution of GCCs has been driven by:

Policy and Infrastructure: Support by the central and state-level policy frameworks:

- Special economic zones (SEZs), made by the Central Government through the SEZs Act, 2005, area within a country where the trade

and business laws are different from the laws applicable to other parts of the country. There are various incentives, such as upfront GST exemption, tax benefit and other benefits as per the respective state's IT policy, to any unit operating in the SEZ.

- Dedicated GCC policy of a few States like Uttar Pradesh, Karnataka, Gujarat, Maharashtra and other states.
- Software Technology Park (STP) Scheme under Foreign Trade Policy, there is a single-point contact service to extend import duty benefit to the IT/ITeS companies.
- Digital Personal Data Protection Act (2023) ensures compliance with global data regulations (like GDPR), making India a safe destination for data-sensitive GCC operations.
- Government of India's initiatives, such as India like Digital India, Make in India, Startup India, and PLI schemes.
- Infrastructure support, world-class standard infrastructure in major IT hubs.
- World's second largest internet user base and fastest-growing data consumption.
- Policies to encourage cybersecurity infrastructure and cloud adoption.
- Union budget 2025 to promote GCCs in Tier II cities.
- Labour law reforms, digital and data policies.

Talent Availability: Access to a skilled and diverse workforce specialising in technology, analytics and business processes, that is:

- Largest pool of 1.5 million engineering graduates annually + around 1 million other graduates [STEM (Science, Technology, Engineering and Mathematics) + Legal].
- Government-sponsored skilling programmes like Skill India**,** Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and Future Skills Prime.

Technological Advancements: Adoption of automation, AI and cloud computing to enhance operational capabilities. With a strong digital infrastructure, focus on emerging technologies like AI, 5G, EVs, cloud and space tech, India is continuously moving towards becoming a global technology powerhouse.

Figure 4 depicts the conceptual framework for GCC growth, showcasing the interplay among key enabling factors that collectively contribute to the maturation of GCCs in India. The framework positions talent and workforce availability, technological advancement, policy and support, business and operating environment, strategic collaboration and partnerships and infrastructure and innovation ecosystem as the core determinants of GCC growth (Jha & Seth, 2025). Each factor contributes uniquely. Together, these factors are creating a synergistic ecosystem that drives continuous evolution, resilience and strategic importance of GCCs in India.

Figure 4. Conceptual Framework for GCC Growth.

Note: GCC = Global Capability Centre.

Operational Models for Setting up GCCs

- The most common operational models are
  - ✓ Do-it-yourself ('DIY') model.
  - ✓ Build operate transfer ('BOT') model.
  - ✓ Fusion/hybrid models.
- In the DIY model, the parent company holds 100% ownership and runs its business operation, whereas in the BOT model, the parent company hires a third party and allows the third party to build and operate the business for a certain period and then transfer to the parent company. On the other hand, the hybrid model is a mix of both the DIY and the BOT models (Yadav, 2025).

Role of GCCs in Shaping Global Business Landscape

The role of GCCs in shaping the global business landscape is multi-dimensional.

As per McKinsey's operations report, GCCs are evolving to become multifaceted and serve many purposes.

- ✓ The talent hub for the enterprise, aiming to follow the '10/30/50 approach'. Ten stands for 10% of the leaders for the enterprise come from the GCC, 30% of the overall employee base resides in the GCC, and 50% of the new central to enterprise innovation and strategic success. Skilled talent pools make them central to global business resilience.
- ✓ GCCs serve as experimentation labs for emerging technologies such as AI, cloud, blockchain and IoT solutions and so on and make scalable digital solutions for global operations.
- ✓ Some GCCs are evolving into centres of excellence (CoEs), focusing on ER&D, data science and product design.
- ✓ GCCs are increasingly integrating green practices and supporting environmental, social, governance (ESG) goals and driving corporate sustainability through supply chain monitoring, carbon footprint tracking and responsible AI usage.

Thus, GCCs are evolving from 'support arms' into strategic centres of global enterprises, shaping the business into innovation, digital transformation, decision-making and redefining the future of business.

Impact of GCCs on Indian Economics

As per industry estimates, GCCs in India generate revenue of $40–$50 billion annually and contribute 1.5%–2% of India's GDP directly through exports and are expected to contribute roughly 3.5% of India's GDP by 2030, generating an estimated revenue of $121 billion. According to a report by NASSCOM, the IT-BPM sector, which encompasses a substantial portion of GCCs, contributed approximately 8% to India's GDP in the last fiscal year. On the other hand, through driving ER&D, product design and digital transformation, GCCs improve India's knowledge economy and the inflow of foreign exchange (Reddy & Jain, 2024).

Around 1800 GCCs are operating in the country, employing over 1.9 million professionals, who are the strongest pillars of India's knowledge economy (Jones Lang LaSalle, 2024; Times Group, 2024).

Now, GCCs are expanding from Tier 1 cities to Tier II cities such as Coimbatore, Kochi and Jaipur. These are contributing towards regional economic growth.

- ✓ Incremental growth of GCCs shows that India has emerged as a hub for GCCs. This growth will generate employment for 2.5–2.8 million people, from the current employment of 1.9 million. Thus, India provides a deep bench of highly skilled professionals (Cyrill & Anand, 2023).
- ✓ Today, Indian GCCs are not only supporting operational needs but also driving strategic innovation by collaborating with startups, integrating global supply chains and developing proprietary solutions for their business operations.

Recommendations and Suggestions for GCCs

As per literature, 99% of total established GCCs are established in metro cities (Tier I cities) because of the availability of required factors such as well-developed infrastructure, talent pool, industry-academia collaborations, supportive policy framework and so on, which are required for smooth and sustainable business operations. But now it is time to think about the expansion of GCCs in smaller cities, that is, Tier II cities. However, some Tier II cities such as Coimbatore, Bhubaneswar, Indore, Nagpur, Mohali/Chandigarh and Jaipur have more potential for growth of new GCCs. In order to get more expansion, the following needs to be focused on.

- Dedicated GCC policies at the Central and State levels to support and promote GCC growth.
- Focus on Tier II cities and develop them align with GCC requirements.
- Strengthen the talent ecosystem through industry-academia collaborations.
- Infrastructure development with a strong focus on digital connectivity.
- Provision of Policy support wherever required.
- Availability of reliable and uninterrupted power supply.

Conclusion

The journey of GCCs in India reflects a clear paradigm shift, beginning with cost arbitrage, progressing through process excellence, advancing toward innovation, maturing into strategic decision-making roles and ultimately transforming into AI-driven enterprises. AI-driven enterprises are a futuristic theme which will transform the global business landscape by rapid and widespread integration of AI across multiple domains. Alongside this transformation, GCCs continue to play a pivotal role in India's growth story by creating high-quality jobs, fostering entrepreneurial mindsets and attracting substantial global investment into the Indian economy. Literature reveals that GCCs are contributing around 1.5%–2% in Indian GDP and generate substantial employment in the country. Further, increasing the number of GCCs in India and their sustainability is due to technology adoption in business operations across the Globe and policy incentives given by the Indian Government jointly.

Below is the summary of a few GCC policies launched by different states.

Karnataka GCC Policy 2024–2029

Scope: Encompasses attraction and expansion of high-value GCCs specialising in IT, AI, fintech and emerging technologies through tailored state-level incentives, positioning Karnataka as a premier GCC hub leveraging its Bengaluru ecosystem.

Targets: Aims to establish 500–1,000 new GCCs, generate 350,000 direct jobs and contribute $50 billion to the state economy by 2029, with a focus on Tier I and emerging Tier II cities.

Key incentives: Up to 100% reimbursement on rental costs for certified spaces; skilling subsidies on 50% of training expenses; funding for innovation labs and R&D facilities; expedited single-window clearances.

Value propositions: Access to India's largest tech talent pool (Bengaluru hosts 40% of national GCCs); world-class digital infrastructure; proximity to global MNCs and startups for collaboration.

Limitations: Over-reliance on Bengaluru limits dispersal to rural areas; potential infrastructure strain from rapid scaling; competition from national policies.

Impact: As India's first dedicated GCC policy, it catalysed 20+ new GCC commitments within six months, enhancing Karnataka's 35% share of national GCC revenue.

Uttar Pradesh GCC Policy 2024

Scope: Targets GCC setups in tech parks and SEZs across Noida, Lucknow and Agra, emphasising electronics, IT and data analytics to diversify from traditional manufacturing.

Targets: 1,000+ GCCs and 500,000 jobs over five years, with emphasis on women-led and MSME-linked operations.

Key incentives: 100% stamp duty exemption for five years; payroll subsidies up to ₹20,000/month per employee; land cost rebates in state IT cities.

Value propositions: Cost-effective land (30%–50% cheaper than metros); young demographic with 50+ universities; improved air connectivity via Jewar Airport.

Limitations: Nascent ecosystem compared to southern states; bureaucratic delays in approvals; skill mismatches in non-metro areas.

Impact: Secured initial pledges from 10 GCCs, boosting UP's Tier II appeal and contributing to 15% YoY GCC space uptake in 2025.

Madhya Pradesh GCC Policy 2025

Scope: Statewide promotion of mid-sized GCCs in IT, AI, fintech and BFSI, with hubs in Indore, Bhopal and Gwalior.

Targets: 50 GCCs creating 37,000 jobs by 2029, prioritising non-metro growth.

Key incentives: Capital expenditure subsidies up to 20%; payroll rebates for five years; electricity duty exemptions.

Value propositions: Lowest operational costs among top states; central logistics advantage; government-backed skilling via Atal Bihari Institutes.

Limitations: Limited international brand visibility; underdeveloped high-speed internet in interiors; smaller talent pool.

Impact: Attracted five early movers in 2025, positioning MP as a cost-arbitrage leader for back-office GCCs.

Gujarat GCC Policy 2025–2030

Scope: Focuses on sustainable, green GCCs in GIFT City, Ahmedabad and Surat, targeting semiconductors, fintech and engineering R&D.

Targets: 200 GCCs with emphasis on high-IP value addition; unspecified job figures but aligned to $10B exports.

Key incentives: Green building certifications subsidised; tax rebates on ESG compliance; SEZ extensions for GCCs.

Value propositions: GIFT City's IFSC status for finance GCCs; port-led exports; renewable energy availability.

Limitations: High initial setup costs in GIFT; talent poaching by Mumbai/Pune; water scarcity risks.

Impact: Drove 15% growth in fintech GCCs; integrated with the national semiconductor mission.

Maharashtra GCC Policy 2025

Scope: Builds on existing GCCs in the Mumbai-Pune corridor for data-intensive operations like AI/ML and cybersecurity.

Targets: Double GCC footprint to 800+; add 200,000 jobs via tech park expansions.

Key incentives: Reliable power tariffs; data centre colocation subsidies; fast-track environmental clearances.

Value propositions: Mature infra (50% of India's data centres); finance-IT synergy; diverse talent from IITs/IIMs.

Limitations: Highest real estate costs; urban congestion; regulatory overlaps with central policies.

Impact: Retained leadership with 25% national GCC share; facilitated $5B expansions in 2025.

Telangana GCC Policy 2024–2025

Scope: Hyderabad-centric for ITES, pharma-tech and AI GCCs, leveraging T-Hub and Genome Valley.

Targets: 300 new GCCs; 150,000 jobs; $20B revenue by 2029.

Key incentives: 15% capital subsidies; SGST reimbursements; R&D grant matching.

Value propositions: Pharma-IT convergence; startup ecosystem (3rd largest globally); robust HYD airport.

Limitations: Peak power/water shortages; high employee attrition; flood-prone outskirts.

Impact: Hosts 200+ GCCs (10% national); $4B investments in 2025 alone.

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Conceptual Paper

Impact of Implementing IFRS-based Accounting Standards on the Financial Position of NBFCs in India: An Investigation on First-time Adopters

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Abstract

Converged form of global accounting standards (IAS and IFRS) Ind AS has been implemented in India in a phase-wise manner. The first two phases of Ind AS implementation (2016–2017 and 2017–2018) were applicable for the non-financial companies, while the next two phases (2018–2019 and 2019–2020) were meant for non-banking financial companies (NBFCs). However, banks and insurance companies have not yet received regulatory approval for the adoption of Ind AS for preparing Ind AS–based financial statements from their respective regulators. In the present research, we examined the impact of adopting Ind AS on the net worth of NBFCs. This study involved a sample of 100 listed NBFCs, focusing on the transition and comparative years for first-time adopters after reclassifying and restating their asset and liability figures. Our findings indicated that over 60% of the sampled NBFCs experienced a positive change in net worth during the transition and comparative periods for both groups of adopters. Additionally, more than 65% reported a change (both positive and negative) in net worth of 10% or less. We conducted a paired sample *t*-test, which showed no significant difference in net worth between 'AS' and 'Ind AS' for the adopters in the year 2018–2019, on both the transition and comparative dates. Conversely, for those who adopted Ind AS in 2019–2020, the same test revealed a significant difference

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in net worth between 'AS' and 'Ind AS' on both the transition and comparative dates. Therefore, we conclude that the impact of Ind AS on net worth was more pronounced for NBFCs that implemented Ind AS in 2019–2020, that is, for those with a net worth of less than 500 crore.

Keywords

Ind AS, NBFCs, Net Worth, IFRS, Financial Position, Global Accounting Standards

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Introduction

With the view of bringing uniformity in accounting practices across the world, the International Accounting Standard Board (IASB) (previously known as the International Accounting Standard Committee (IASC)) issues global accounting standards (AS), namely International Financial Reporting Standards (IFRS). India, being one of the prominent members of IASB, has decided to mandatorily implement Ind AS, that is, a converged form of global AS with effect from 2016–2017 in a phase-wise manner depending upon two parameters, that is, the net worth of the company and/or its listing status in the stock market. Ind AS, being a refined system of financial reporting, it was believed that its going to benefit the Indian corporates by bringing more transparency in the accounting and reporting system (Kaur et al., 2019).

The first two phases (i.e., 2016–2017 and 2017–2018) of Ind AS implementation were applicable on non-financial companies, and the next two phases, that is, 2018–2019 and 2019–2020, were applicable only on the NBFCs, though these two phases were supposed to be initially applicable on banks and insurance companies as well. But implementation of Ind AS by banks and insurance companies has been deferred by their respective regulators. Banks and insurance companies in India have not yet implemented Ind AS till date.

Several changes have been brought about by the implementation of Ind AS, particularly in the case of financial companies (mainly by Ind AS 32, Ind AS 107, Ind AS 109 and Ind AS 113), such as changes in the measurement, recognition and reporting of financial assets and liabilities. Some of the major changes are impairment provisioning under expected credit loss (ECL), application of effective interest rate on interest income or finance cost, fair valuation of investments through P&L (FVTP&L), fair valuation through other comprehensive income (FVOCI), fair valuation of employee stock option plan, etc. Due to these changes, NBFCs' financial performance, as well as their financial positions, that is, their balance sheets, have been affected.

The statement of financial position, popularly known as the 'balance sheet', is a statement that shows an entity's assets, liabilities and equity on a specific date. The accounting equation, which is also known as the balance sheet equation, is familiar to us:

Liabilities + Equity = Assets.

For NBFCs, assets are categorised into financial and non-financial assets. Similarly, liabilities are also classified into financial and non-financial liabilities as per Division III of Schedule III of the Companies Act, 2013.

Therefore, the equation can be elaborated as follows:

Liabilities + Equity = Assets

Or, (Financial liabilities + Non-financial liabilities) +
Equity/Net worth = (Financial assets+ Non-financial assets)

Or, Equity/ Net worth = (Financial assets + Non-financial assets) –
(Financial liabilities + Non-financial liabilities)

(Therefore, any increase in financial assets will positively impact equity/net worth and vice versa. Conversely, any increase in financial liability will lead to a decrease in equity/net worth, and vice versa.)

This study examines the impact on net worth resulting from the reclassification and restatement of asset and liability figures in accordance with Ind AS. The analysis aims to assess the effect of Ind AS adoption on the financial position of the NBFCs that implemented Ind AS in the financial years 2018–2019 and 2019–2020. A total sample of 100 listed NBFCs has been considered for this purpose.

Fair Value Changes due to Ind AS and Implications on Net Worth

A crucial requirement for adopting Ind AS is to determine the fair value of assets and liabilities. Ind AS 101 has mandated that any differences resulting from the fair value change in assets and liabilities must be adjusted against the retained earnings of the entity implementing Ind AS for the first time. It is known that, with the share capital, retained earnings are also added for computing the net worth of a company.

As per Section 2(57) of the Companies Act, 2013, net worth includes paid-up share capital, reserves from profits, securities premium account and P&L balance after deducting accumulated losses, deferred expenditure (if any) and miscellaneous expenditure (if any). Not to be included items are reserves from asset revaluation, write-back of depreciation, etc.

Net worth should accurately represent a company's true value. Net worth includes 'all reserves created from profits', but it excludes 'reserves from the revaluation of assets'. To decide if any changes arising on the account of fair

valuation are required to be adjusted through retained earnings, it is important to understand the nature of the adjustment.

Reporting entities are allowed to adjust the fair value at the time of transition to align the values of assets and liabilities in the Ind AS financial statements as closely as possible with Ind AS treatment. While retrospective changes in the figures of assets and liabilities are not feasible, the entity can adjust the opening values of assets and liabilities on the transition date. This adjustment is based on the assumption that if the entity had been following the Ind AS provisions since the beginning, some assets or liabilities that appeared in the financial statements under the previous AS might not have been shown under Ind AS and vice versa. Additionally, it is possible that the value of assets and liabilities under the previous AS differs from the provisions of Ind AS.

Hence, Ind AS permits reporting entities to implement these initial adjustments on the transition date itself by reclassifying, measuring and re-evaluating the assets and liabilities and incorporating the overall impact of these adjustments in retained earnings. The objective of these modifications is to ensure that the equity/net worth presented on the transition date complies with Ind AS. Consequently, such alterations in the carrying amount of liabilities and assets on the transition date should not be regarded as a revaluation of assets or liabilities.

Review of literature

The financial position of the commercial banks that implemented IFRS has significantly changed mainly due to the introduction of IFRS 9, which resulted in increased impairment provisions for loans (Juszczyk et al., 2023). The value of financial companies has significantly been affected due to the classification of financial assets (Ltaief & Moalla, 2023). Though the financial position of the banks has been adversely affected due to IFRS, there is a decrease in risk as a result of the implementation of the IFRS 9 based forward-looking approach to loan loss provisioning. Further, a more intensified effect has been observed in countries with stringent accounting regulatory enforcement and banking supervision (Kyiu & Tawiah, 2023). IFRS adoption did not cause any significant difference in the profits of IFRS adopted companies in developed countries and developing countries (Sharma & Gupta, 2019). On the other hand, another research conducted on 140 manufacturing companies in Turkey revealed that the transition from local GAAP to IFRS had a significant impact on inventories, fixed assets, long-term liabilities and shareholders' equity (Terzi et al., 2013). The impact of IFRS adoption on German companies from 1998 to 2002 revealed that under IFRS, the value of equity, total assets and net earnings variability significantly increased compared to the previous ASs (Hung & Subramanyam, 2007).

Analysing the impact of IFRS-based Ind AS on the profit of the Indian companies, it was found that unlike balance sheet items, the reported profit did

not significantly change due to the transition, the outcome arrived by analysing both the absolute profit figures and the relative return ratios (Basu & Mitra, 2020). In another study, Gray's comparability index on the different components of the profit and loss statement and balance sheet revealed that in most cases Ind AS adoption has no significant effect on the profit and loss statements and balance sheets in comparison to IGAAP (Pramanick, 2018). Ind AS introduces the concept of total comprehensive income (TCI), which comprises both profit/loss after tax and other comprehensive income (OCI), a study on how NBFCs highlighted the direction and size of OCI revealed that OCI's contribution to TCI was not significant in the first year of Ind AS implementation (Dey & Gandhi, 2024). The impact of OCI was not found to be significant when measured in terms of profitability ratios. Additionally, it was also determined that the influence of Ind AS adjustment on the day of transition was not significant in equity to market capitalisation (Ghosh, 2019). A study carried out on 19 public sector NBFCs revealed major changes are fair valuation of financial instruments, application of ECL, deferred tax and fair valuation of post-retirement employee benefits etc. It also highlighted that Ind AS has impacted key operating and financial ratios, which helps to understand companies' liquidity, operational efficiency and profitability (Comptroller and Auditor General of India, 2021).

Research Gap and Rationale of the Study

Since IFRS have been around for quite some time in the international context, there has been a significant amount of research conducted on the implementation of IFRS over the past 25 years or so in the international context. The existing research covers a wide range of dimensions related to IFRS implementation.

Contrary to the above, research relating to the adoption or implementation of Ind AS in the Indian context is relatively new since this accounting phenomenon is relatively new to this country. However, on the basis of review of existing literature, so far, it could be accessed, that there has been no research as regard to analysing the impact of Ind AS implementation on the net worth (i.e., on their financial position) of NBFCs. However, some research has been carried out at the corporate level by E&Y, KPMG, Motilal Oswal or by credit rating agencies like ICRA, etc.

Further, it NBFCs are the first financial companies in India that who adopted a converged form of global Accounting Standards (AS), that is, Ind AS. In this regard, banking and insurance companies are yet to implement Ind Accounting Standards (AS), though they were supposed to adopt Ind AS with effect from 2018–2019 in a phase-wise manner, but the implementation has been deferred by their respective regulators. Therefore, NBFCs are the first financial companies that implement Ind AS, which creates an interest in having an understanding of the impact of Ind AS on the net worth of NBFCs.

Sample Selection, Source of Data and Methodology

Sample Selection

In the current investigation, a comprehensive sample comprising the top 100 listed first-time Ind AS adopters, NBFCs, has been examined. The sample has been selected based on their market capitalisation at the Bombay Stock Exchange. Selecting the sample based on market capitalisation includes economically significant and publicly influential entities, thereby filtering out smaller, less active NBFCs, which may not represent mainstream industry practices. It is further to note that these 100 NBFCs typically cover the majority of the NBFC sector's total assets and market share, making them economically representative of the industry as a whole. The rationale behind choosing the listed NBFCs is owing to their enhanced disclosure norms, regulatory oversight and availability of consistent financial data, which ensures the reliability of comparisons before and after Ind AS implementation (Figure 1).

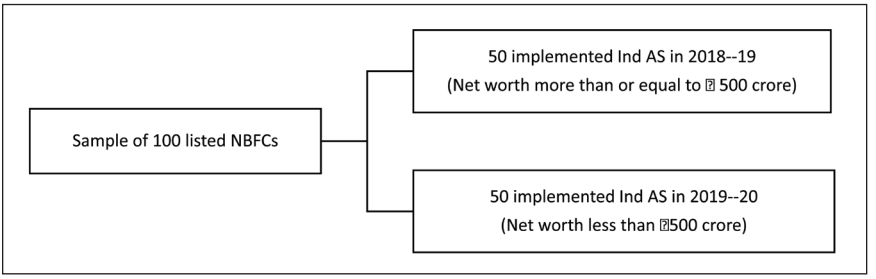

Figure 1. Pictorial Description of the Sample NBFCs Considered in the Study.

Source: Compiled by researchers.

Amongst this group of 100 sample NBFCs, 50 NBFCs commenced the implementation of Ind AS effective F/Y 2018–2019 (this phase was mandated for entities with a net worth of ₹500 crore or more). Concurrently, the remaining 50 sample NBFCs (those with a net worth of less than ₹500 crores) adopted Ind AS commencing from F/Y 2019–2020. This inclusion of both net worth ≥₹500 crore and net worth <₹500 crore NBFCs corresponds with the two regulatory phases of Ind AS adoption mandated by the Ministry of Corporate Affairs for NBFCs. This segmentation ensures that the sample captures the potential impact of accounting transition across two categories of NBFCs (i.e., net worth ≥ ₹500 crore and net worth <₹500 crore), thereby enhancing the robustness of the findings.

Source of Data

According to paragraphs 40A and 40B of Ind AS 1 (presentation of financial statements), an entity implementing Ind AS for the first time in preparation of its

financial statements is required to present a third balance sheet as at the beginning of the preceding period since the entity applies the accounting policy retrospectively, makes a retrospective restatement of items in its financial statements, or reclassifies items in its financial statements. Accordingly, an entity shall present three balance sheets as at:

(i) the end of the current period;
(ii) the end of the preceding period and
(iii) the beginning of the preceding period.

Let us understand the same, with the help of the following examples (Table 1):

Table 1. Requirements of Balance Sheets to Be Prepared by the First-time Adopters of Ind AS.

Sl No.	Ind AS Implementing Year	Current Period	Preceding Period (i.e., Comparative Year)	Beginning of the Preceding Period (Transition Year)
1.	2018–2019	As on March 31, 2019, i.e., the first Ind AS–based balance sheet.	As on March 31, 2018, i.e., comparative year balance sheet.	As on April 1, 2017, i.e., transition date balance sheet.
2.	2019–2020	As on March 31, 2020, i.e., the first Ind AS–based balance sheet.	As on March 31, 2019, i.e., comparative year balance sheet.	As on April 1, 2018, i.e., transition date balance sheet.

Source: Compiled by researchers.

For the NBFCs that implemented Ind AS with effect from 2018–2019, the transition date was April 1, 2017, and for the NBFCs those implemented Ind AS with effect from 2019–2020, the transition date was April 1, 2018.

On the other hand, Ind AS 101 (first-time adoption of Ind AS) requires a first-time Ind AS implementing entity to prepare its balance sheets on the transition date according to Ind AS by restating the figures of assets and liabilities. At the same time, the entity must also reclassify the assets and liabilities of the previous year according to Ind AS to make them comparable with the current year's Ind AS figures. Let us understand this with the help of proforma balance sheet depicted in Table 2.

According to Paragraph 23 of Ind AS 101, first-time adoption of Ind AS, an entity is required to disclose, in its notes to accounts, the effect of transitioning from the previous AS to Ind AS on its financial statements. The first set of Ind AS financial statements must include reconciliations showing the differences between net worth as reported under the previous AS and under Ind AS, both at the date of transition and at the end of the latest period presented under the earlier framework, that is, 'AS'. Further, reconciliations of profit or loss and cash flows must also be provided to explain the impact of Ind AS adjustments. These disclosures ensure clarity, transparency and comparability of financial information during the transition process.

Table 3 depicts a proforma reconciliation statement of the balance sheet, required to be prepared to explain what are the causes of differences in equity and how much is the impact on each of the items of the balance sheet.

- ➔ Balance sheets as of April 1, 2017 (transition date) and March 31, 2018 (comparative date) are available under both erstwhile AS and Ind AS for the NBFCs that adopted Ind AS from 2018–2019 onwards.
- ➔ Similarly, Balance sheets as of April 1, 2018 (transition date) and March 31, 2019 (comparative date) are available under both erstwhile AS and Ind AS for the NBFCs that adopted Ind AS from 2019 to 2020 onwards.

Lastly, reconciliation statements presented by the first-time adopters in their notes to accounts have been used as the basis for data collection.

This study employs a cross-sectional design, analysing net worth data at the transition date and the comparative date for two categories of NBFCs. The primary objective of the study is to assess the initial financial reporting effects of Ind AS adoption on financial position, rather than long-term outcomes. Cross-sectional analysis is considered to be appropriate for evaluating the impacts of first-time adoption, specifically those resulting from transition adjustments.

However, to assess the long-term impact of Ind AS on the financial position of NBFCs, as reflected through their net worth, future research may be extended by employing a longitudinal or panel research design that captures the effects over multiple reporting periods.

Table 2. Proforma Balance Sheet (Condensed) of the NBFCs in the First Year of Ind AS Adoption.

		Note No.	March 31, 20XX (First Year of Ind AS Implementation)*	March 31, 20XX (Comparative year of Ind AS Implementation)**	April 1, 20XX (Transition Date)***
	Assets				
(1)	Financial asset				
(2)	Non-financial assets				
	Total Assets		xxx	xxx	xxx
	Liabilities				
(1)	Financial liabilities				
(2)	Non-financial liabilities				
(3)	Equity				
	Total Liabilities and Equity		xxx	xxx	xxx

Source: Compiled by researchers.

Notes: *March 31, 2019, for the NBFCs implemented Ind AS in 2018–2019 and March 31, 2020, for the NBFCs implemented Ind AS in 2019–2020.

**March 31, 2018, for the NBFCs implemented Ind AS in 2018–2019 and March 31, 2019, for the NBFCs implemented Ind AS in 2019–2020.

***April 1, 2017, for the NBFCs implemented Ind AS in 2018–2019 and April 1, 2018, for the NBFCs implemented Ind AS in 2019–2020.

Table 3. Proforma of Reconciliation Statement That the First-time Adopters of Ind AS Are Required to Provide in their Financial Statements in the Year of Ind AS adoption.

Particulars	Notes to First-time Adoption	On the Day of Transition*			As on Comparative Date**		
		Previous GAAP	Adjustments	Ind AS	Previous GAAP	Adjustments	Ind AS
Assets							
Financial assets							
Non-financial assets							
Total Assets		XXX	XXX	XXX	XXX	XXX	XXX
Liabilities and equity							
Liabilities							
Financial liabilities							
Non-financial liabilities							
Equity							
Total liabilities and equity		XXX	XXX	XXX	XXX	XXX	XXX

Source: Compiled by the researchers.

Methodology

To check the normality of the data set, since it is one of the prerequisites of applying the paired *t*-test, we applied Kolmogorov–Smirnov and Shapiro–Wilk test and to test whether the net worth as per 'AS' and the net worth as per 'Ind AS' is statistically significant, we applied paired sample *t*-test.

Results and Discussion

We conducted an analysis of the impact of the transition to Ind AS on the net worth of the NBFCs that implemented Ind AS from 2018–19. The analysis was conducted on the transition date, that is, April 1, 2017, and the comparative date, that is, March 31, 2018.

Similarly, we have also analysed the impact of conversion to Ind AS on the net worth of the NBFCs, which implemented Ind AS from 2019–20 on the transition date, that is, April 1, 2018, and on the comparative date, that is, March 31, 2019.

Table 4 shows that on the transition date, that is, April 1, 2017, 49 NBFCs reported changes in net worth after translating the figures of assets and liabilities as per Ind AS. Out of the 49 NBFCs, 19 NBFCs reported a decrease in net worth as per Ind AS, and the remaining 30 NBFCs showed higher net worth as per Ind AS compared to net worth as per the erstwhile AS. Similarly, it was also found

that on the comparative date, that is, March 31, 2018, 49 companies showed change in net worth, of which 16 NBFCs reported decrease and the remaining 33 NBFCs reported an increase in net worth compared to net worth as per the erstwhile AS.

When it comes to the NBFCs that adopted the Ind AS in 2019–20, it was found that on the transition date (April 1, 2018), 48 NBFCs reported changes in their net worth after adjusting and/or reclassifying the figures of assets and liabilities. Out of the 48, 17 NBFCs reported a decrease in net worth according to the Ind AS, while the remaining 31 NBFCs showed a higher net worth under the Ind AS compared to the net worth under the previous accounting standards. Further, the analysis revealed that as of March 31, 2019, that is, on comparative date, 49 NBFCs experienced changes in their net worth. Out of these, 18 NBFCs reported a decrease, while 31 NBFCs reported an increase in net worth compared to the previous AS, showcasing the positive impact of the changes.

Table 5 displays the percentage change in net worth compared to the net worth as per the previous AS on the transition date, which is April 1, 2017. It has been observed that out of 19 NBFCs that reported a decrease in net worth, seven reported a decrease of 'less than 5%', followed by four NBFCs with a decrease 'between 5% to 10%' and so on. Only three NBFCs reported a decrease in net worth of 'more than 30%' on the transition date.

Table 5 also indicates that out of 30 NBFCs that reported an increase in net worth as of the transition date, 15 (i.e., 50%) showed 'less than or equal to 5%' increase in net worth compared to the net worth as per the erstwhile AS. Additionally, 4 NBFCs reported an increase in net worth by more than '5% but less than or equal to 10%' and so on. Only 4 NBFCs showed 'more than a 30%' increase in net worth.

It is evident from Table 5 that out of 49 NBFCs that reported a change (either an increase or decrease) in net worth compared to the previous AS on the transition

Table 4. Impact of Ind AS on Net Worth of the Sample NBFCs Which Implemented Ind AS with Effect from 2018–2019 and 2019–2020.

	Implemented Ind AS w.e.f. 2018–2019		Implemented Ind AS w.e.f. 2019–2020	
	On Transition Date, i.e., April 1, 2017	On Comparative Date, i.e., March 31, 2018	On Transition Date i.e., April 1, 2018	On Comparative Date, i.e., March 31, 2019
Reported increase in net worth	30	33	31	31
Reported decrease in net worth	19	16	17	18
Reported no change in net worth	1	1	2	1
Total	50	50	50	50

Source: Compiled by the researchers.

date as well as on comparative date, more than 60% of them have shown less than or equal to a 10% change in net worth.

Furthermore, Table 5 illustrates the percentage change (i.e., increase or decrease) in net worth compared to the erstwhile AS on the comparative date, which is March 31, 2018. Out of 16 NBFCs that reported a decrease in net worth on March 31, 2018, 9 showed 'less than a 5%' decrease, followed by two NBFCs with a decrease 'between 5% and 10%' and so on. Only two NBFCs reported a decrease in net worth of 'more than 30%' on the comparative date, that is, March 31, 2018.

Table 5 indicates that out of the 33 NBFCs that reported an increase in net worth on the comparative date, approximately 51% (17 NBFCs) showed a 'less than or equal to 5%' increase in net worth compared to the net worth as per previous AS. Additionally, four NBFCs reported an increase in net worth of 'more than 5% but less than or equal to 10%' and so on. Only five NBFCs showed an increase in net worth of 'more than 30%'.

The table also shows that out of 49 NBFCs that reported a change (either an increase or a decrease) in net worth compared to the erstwhile AS, 32 (i.e., 65% approximately) of them have shown less than or equal to 10% change in net worth.

Table 6 shows per cent change (i.e., increase/decrease) in net worth compared to the erstwhile AS on the transition date, that is, April 1, 2018, as well as on the comparative date, that is, March 31, 2019. It shows that out of 17 NBFCs that

Table 5. Percentage Change in Net Worth Compared to Erstwhile AS on Transition Date, i.e., April 1, 2017, and on Comparative Date, i.e., March 31, 2018, for the NBFCs Implemented Ind AS in 2018–2019.

% Change (i.e., Increase/Decrease) in Equity/Net Worth Compared to the Previous GAAP	Transition Date, i.e., April 1, 2017		Comparative date, i.e., March 31, 2018	
	Number of Companies Reported Decrease in Equity	Number of Companies Reported Increase in Equity	Number of Companies Reported Decrease in Equity	Number of Companies Reported Increase in Equity
Less than or equal to 5%	7	15	9	17
More than 5% but less than or equal to 10%	4	4	2	4
More than 10% but less than or equal to 15%	2	5	1	3
More than 15% but less than or equal to 20%	1	0	2	2
More than 20% but less than or equal to 25%	2	1	0	2
More than 25% but less than or equal to 30%	0	1	0	0
More than 30%	3	4	2	5
Total	19	30	16	33

Source: Compiled by the researchers.

reported a decrease in net worth on the transition date, 12 showed 'less than 5% decrease' followed by four NBFCs with 'between 5% to 10% decrease', and only one NBFC showed 'more than 30% decrease' in the net worth as on the date of transition.

Table 6 also shows that out of 31 NBFCs which reported an increase in net worth on April 1, 2018, 13 (i.e., 42%) showed 'less than or equal to 5%' increase in net worth compared to erstwhile AS, three NBFCs reported an increase in net worth 'more than 5% but less than or equal to 10%' and so on. It is noteworthy to mention that 10 NBFCs showed 'more than 30%' increase in net worth.

Further, Table 6 also shows per cent change (i.e., increase/decrease) in net worth as per Ind AS compared to erstwhile AS on a comparative date, that is, March 31, 2019. It is seen that out of 18 NBFCs that reported a decrease in net worth on March 31, 2019, 12 showed 'less than 5%' decrease, followed by four NBFCs between '5% to 10% decrease' and so on. Only one NBFC reported 'more than 30%' decrease in net worth as of the comparative date, that is, March 31, 2019.

Table 6 also shows that out of 31 NBFCs reported an increase in net worth on comparative date, that is, on March 31, 2019, 17 (i.e., 51% approximately) showed less than or equal to 5% increase in net worth compared to erstwhile AS, followed by two NBFCs reported increase in net worth by 'more than 10% but less than or equal to 15%' and so on. Nine (i.e., 29% approximately) NBFCs showed 'more than 30%' increase in net worth.

Table 6. Percentage Change in Net Worth Compared to Erstwhile AS on Transition Date, i.e., April 1, 2018, and on Comparative Date, i.e., March 31, 2019, for the NBFCs Implemented Ind AS in 2019–2020.

	Transition Date, i.e., April 1, 2018		Comparative Date, i.e., March 31, 2019	
% Change (i.e., Increase/Decrease) in Equity/Net Worth Comparedto Previous GAAP	Number of Companies Reported Decrease in Equity	Number of Companies Reported Increase in Equity	Number of Companies Reported Decrease in Equity	Number of Companies Reported Increase in Equity
Less than or equal to 5%	12	13	12	17
More than 5% but less than or equal to 10%	4	3	4	0
More than 10% but less than or equal to 15%	0	3	1	2
More than 15% but less than or equal to 20%	0	2	0	2
More than 20% but less than or equal to 25%	0	0	0	1
More than 25% but less than or equal to 30%	0	0	0	0
More than 30%	1	10	1	9
Total	17	31	18	31

Source: Compiled by the researchers.

The table also shows that out of 49 NBFCs that reported a change (either increase or decrease) in net worth compared to erstwhile AS, 33 (i.e., 67% approximately) have shown less than or equal to 10%.

Statistical Significance of Impact of Conversion from 'AS' to 'Ind AS' on the Net Worth of NBFCs, Which Implemented 'Ind AS' with Effect from 2018–2019 and 2019–2020

We noticed that NBFCs experienced a change in net worth as on the transition date as well as on the comparative date. We have attempted to test the statistical significance of the difference in net worth as per the previous AS and as per the new Indian Accounting Standard (Ind AS) during the transition and on the comparative date.

Test of Normality

One of the prerequisites for a paired sample *t*-test is that the data should be normally distributed. To check this, we perform a normality test using the Kolmogorov–Smirnov and Shapiro–Wilk tests. These tests determine whether the data sets representing net worth reported on the transition date, as well as on the comparative date, for the sample NBFCs are normally distributed or not under both erstwhile AS and Ind AS. The tests of normality use the following hypotheses:

H_0: The data representing equity are normally distributed.
H_1: The data representing equity are not normally distributed.

Table 7 (for the sample NBFCs implemented Ind AS in 2018-19) & Table 8 (for the Sample NBFCs implemented Ind AS in 2019-20) show that before performing the log transformation on the data the *p* values of both the Kolmogorov–Smirnov and Shapiro–Wilk tests were less than .05. Therefore, we rejected the null hypothesis, indicating that both data sets (i.e., net worth as per the erstwhile AS and as per Ind AS) are not normally distributed for both the transition date and the comparative date.

Since the data of net worth as per the erstwhile AS and net worth as per Ind AS of the sample NBFCs are not found to be normally distributed, we log-transformed the data. We further applied Kolmogorov–Smirnov and Shapiro–Wilk test to check whether data set has now become normally distributed post log transformation. As the *p* values are found to be more than .05 for both Kolmogorov–Smirnov and Shapiro–Wilk tests, we accept the null hypothesis, that is, data are normally distributed.

For the NBFCs implemented Ind AS in 2018–2019

Table 7. Result of Kolmogorov–Smirnov and Shapiro–Wilk Test of Normality Before and Post Log Transformation of the Data Representing Net Worth for the NBFCs Implemented Ind AS in 2018–2019.

	Transition Date, i.e., April 1, 2017				Comparative Date, i.e., March 31, 2018			
	Before Log Transformation		Post Log Transformation		Before Log Transformation		Post Log Transformation	
	Kolmogorov–Smirnov	Shapiro–Wilk	Kolmogorov–Smirnov	Shapiro–Wilk	Kolmogorov–Smirnov	Shapiro–Wilk	Kolmogorov–Smirnov	Shapiro–Wilk
Net worth as per erstwhile AS	0.261 (.00)	0.576 (.00)	0.084 (.20)	0.969 (.22)	0.308 (.00)	0.499 (.00)	0.123 (.055)	0.959 (.08)
Net worth per Ind AS	0.260 (.00)	0.596 (.00)	0.078 (.20)	0.983 (.70)	0.310 (.00)	0.483 (.00)	0.106 (.200)	0.968 (.18)

Source: Computed by the researchers.
Note: Figures in parentheses represent *p* values.

For the NBFCs Implemented Ind AS in 2019–2020

Table 8. Result of Kolmogorov–Smirnov and Shapiro–Wilk Test of Normality Before and Post Log- Transformation of the Data Representing Net Worth for the NBFCs Implemented Ind AS in 2019–2020.

	Transition Date, i.e., April 1, 2018				Comparative Date, i.e., March 31, 2019			
	Before Log Transformation		Post Log Transformation		Before Log Transformation		Post Log Transformation	
	Kolmogorov–Smirnov	Shapiro–Wilk	Kolmogorov–Smirnov	Shapiro–Wilk	Kolmogorov–Smirnov	Shapiro–Wilk	Kolmogorov–Smirnov	Shapiro–Wilk
Net worth as per erstwhile AS	0.330 (.000)	0.400 (.000)	0.090 (.200)	0.936 (.090)	0.256 (.000)	0.799 (.000)	0.076 (.200)	0.970 (.242)
Net worth per Ind AS	0.213 (.000)	0.836 (.000)	0.105 (.200)	0.966 (.158)	0.305 (.000)	0.466 (.000)	0.085 (.200)	0.989 (.933)

Source: Computed by the researchers.
Note: Figures in parentheses represent *p* values.

Results of Paired Sample t-Test

After normalising the data sets, we used a paired sample *t*-test to determine if the difference between the net worth reported under the previous AS and the net worth reported under Ind AS for the sample NBFCs is statistically significant. The test was conducted to test the following hypothesis:

Transition Date	Comparative Date
H_0: The difference between the net worth reported as per erstwhile AS and as per Ind AS on the transition date is not statistically significant (for both 2018–2019 and 2019–2020 Ind AS adopters).	H_0: The difference between the net worth reported as per erstwhile AS and as per Ind AS on the comparative date is not statistically significant (for both 2018–2019 and 2019–2020 Ind AS adopters).
H_1: The difference between the net worth reported as per erstwhile AS and as per Ind AS on the transition date is statistically significant (for both 2018–2019 and 2019–2020 Ind AS adopters).	H_1: The difference between the net worth reported as per erstwhile AS and as per Ind AS on the comparative date is statistically significant (for both 2018–2019 and 2019–2020 Ind AS adopters).

As regards 2018–2019 Ind AS adopters, *p* value of paired sample *t*-test is .386; we accept the null hypothesis, that there is no significant difference in the net worth as per Ind AS and net worth as per erstwhile AS, reported on April 1, 2017, that is, on the transition date. Further, the table shows that the *p* value of paired sample *t*-test is 0.06 when applied for determining the difference between the net worth as per erstwhile AS and net worth as per Ind AS on March 31, 2018 (i.e., comparative date); we accept the null hypothesis at 5%, that there is a no significant difference in the net worth as per Ind AS and net worth as per erstwhile AS reported as March 31, 2018, that is, on comparative date for the 50 sample NBFCs; however, at the 10% level of significance, we reject the null hypothesis and accept the alternative hypothesis.

As for the NBFCs that adopted Ind AS in 2019–2020, Table 9 indicates that the *p* value of the paired sample *t*-test is 0.006. We accept the alternative hypothesis at both the 5% and 1% levels of significance. Therefore, the difference in net worth as per Ind AS and as per the previous AS on April 1, 2018 (transition date), and on March 31, 2019 (comparative date) for the sample NBFCs is considered to be statistically significant.

The difference in net worth calculated as per the previous accounting standards and as per Ind AS was found to be statistically significant for NBFCs with a net worth below ₹500 crore who adopted Ind AS in 2019–2020, both for transition and for comparative dates. However, the difference is not found to be statistically significant for NBFCs with a net worth of ₹500 crores or more for those who adopted Ind AS in 2018–2019.

Table 9. Summary of Results of Paired *t*-test to Test Difference Between the Net Worth as per AS and as per Ind AS.

Year of Ind AS Adoption	Paired Sample	Calculated *t*-statistic
2018–2019	Difference between the net worth as per erstwhile AS and net worth as per Ind AS on April 1, 2017 (i.e., transition date)	0.874 (.386)
	Difference between the net worth as per erstwhile AS and net worth as per Ind AS on March 31, 2018 (i.e., comparative Date)	1.89 (.06)
2019–2020	Difference between the net worth as per erstwhile AS and net worth as per Ind AS on April 1, 2018 (i.e., transition date)	2.887 (.006)**
	Difference between the net worth as per erstwhile AS and net worth as per Ind AS on March 31, 2019 (i.e., comparative Date)	2.900 (.006)**

Source: Computed by the researchers.
Note: Figures in parentheses represent *p* values. **$p < 0.01$.

Future Scope of Research

The present study employs a cross-sectional design as it analyses the net worth data at the transition date and the comparative date for two categories of NBFCs. Cross-sectional analysis is considered to be appropriate for evaluating the impacts of first-time adoption, specifically those resulting from transition adjustments since the primary objective of the study is to assess the initial financial reporting effects of Ind AS adoption on financial position instead of assessing the long-term impact. However, in order to assess the long-term impact of Ind AS on the financial position of NBFCs, as proxied by their net worth, future research may be carried out by employing a longitudinal or panel research design that captures the effects over multiple reporting periods.

Further, the study does not employ a control group or counterfactual analysis, as all NBFCs within the regulatory scope (i.e., having net worth of ≥₹500 crores and net worth <₹500 crores (listed)) were mandated to implement Ind AS, leaving no comparable non-adopting entities within the same regulatory environment. However, there are unlisted NBFCs having a net worth of less than ₹250 crores that is still following the previous AS. The research focuses on within-group cross-sectional differences across entities with varying net worth categories to understand the initial financial reporting impact. Future studies may extend this analysis by incorporating control samples (e.g., non-NBFC financial entities or pre-adoption period data) to establish stronger causal inferences.

Conclusion

The study aims to understand the impact of Ind AS on the net worth of the NBFCs during the transition and comparative periods for both 2018–2019 and 2019–2020

phase adopters. The study reveals that over 60% of the sample NBFCs demonstrated a positive change, showing an increase in net worth during the transitional and comparative periods for both phase adopters. Additionally, more than 65% of the sampled NBFCs across both phases reported a change (both increase and decrease) in net worth of less than or equal to 10%.

The paired sample *t*-test indicates that there is no significant difference in net worth as per 'AS' and net worth as per 'Ind AS' on both the transition date and the comparative date for the adopters of Ind AS for the year 2018–2019. However, in contrast to the above, the paired sample *t*-test reveals a significant difference between net worth as per 'AS' and net worth as per 'Ind AS' on both the transition date and comparative date for those adopting Ind AS in 2019–2020. Therefore, the effect of Ind AS on net worth was more pronounced for the NBFCs that implemented Ind AS in 2019–2020, that is, those having a net worth of less than 500 crore.

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Conceptual Paper

Metaverse Integration in Business and Management: Opportunities and Challenges

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Abstract

This article aims to examine how the metaverse is reshaping business and management by providing a review of existing literature, identifying critical research gaps, and proposing a novel conceptual framework—the Metaverse Ecosystem Model—that integrates technological, human, and sustainability dimensions with strategic business outcomes in the Web3 era. The article will embrace a conceptual knowledge and literature review that articulates conceptual underpinnings, marketing and consumer behaviour, sectoral uses, and sustainability/workforce/boundaryless futures. This was synthesised directly into the creation of the Metaverse Ecosystem Model that connects three pillars (technological infrastructure, workforce skills, and energy and sustainability) to the business opportunities, challenges, and quantifiable results. The review shows that, although the metaverse can be used to conduct immersive marketing, operational efficiency via digital twins, sustainable industrial use, and inclusive development in emerging economies, the studies are disjointed and siloed. Among the critical areas of gaps, there are the lack of integrated frameworks between the foundational enablers and outcomes and the scarcity of empirical focus on long-term sustainability and workforce readiness. The suggested Metaverse Ecosystem Model fills these gaps by showing causal relationships between the three pillars via opportunities and constraints to innovation, new business models, and high customer engagement. It represents the first comprehensive framework of the ecosystem, specific to business and management, which provides managers and policymakers with a useful roadmap to responsible adoption.

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Metaverse, ecosystem framework, Web3, digital marketing, business transformation, sustainability, digital twin

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Introduction

In recent years, the emergence of the Metaverse has created a significant impact worldwide. It represents the subsequent application of the latest information and communication technologies, introducing a brand new digital world to our society (Huang et al., 2023). The metaverse has quickly evolved beyond a futuristic vision popularised in science fiction to a real-world digital realm that can transform business processes, consumer relations, and marketing practices during the Web3 era. The metaverse is described as a persistent, real-time, interconnected virtual environment using immersive technologies, including virtual reality (VR), augmented reality (AR), extended reality (XR), artificial intelligence (AI), blockchain, and non-fungible tokens (NFTs) to mediate experiences in avatars, peer-to-peer social interactivity, content creation, and virtual economies (Vig, 2023; Zhang et al., 2022). It is different to the earlier digital spaces in that it evaluates both virtual and real worlds to form a seamless integration wherein users are able to transact, collaborate and world-build in spaces that reflect or surpass the limitations of the real world (Hazan et al., 2022). Such a combination of technologies, as it is a subset of the metaverse, makes the metaverse more than a technological creation; it is a paradigm shift like the advent of social media in the Web 2.0 era, which fundamentally alters the way value is created, exchanged, and experienced (Zhang et al., 2022).

In October 2021, the commercial push around the metaverse stepped up with Facebook renaming itself Meta, marking a strategic shift towards creating interconnected virtual worlds. This action sparked a rush of interest among both practitioners and academics, with businesses in all industries investigating ways to use the metaverse to engage customers, build brands, and improve business performance (Cheah & Shimul, 2023; Dwivedi et al., 2022). The metaverse presents a unique new channel to the conventional digital marketing delivery mixes: web, mobile, search engines, email, and social media, where the immersive, personalised, and co-creative experiences can drive deeper consumer immersion and loyalty (Zhang et al., 2022). Sectoral applications have been lay out: Hospitality and tourism companies use 360 VR tours and virtual destinations to increase engagement during, before, and after the trip (Foroudi et al., 2025); logistics and supply-chain management leverage digital twins and real-time modelling for traceability and optimisation (Bhardwaj et al., 2025; Zhang et al., 2025); industrial manufacturing explores sustainable factories through IoT-AI-XR integration (Waehrens et al., 2026); and business education integrates metaverse platforms for practitioner training and Industry 4.0 alignment (Rivas-Montoya et al., 2025).

Emerging economies, particularly in Asia and the Middle East, are positioning the metaverse as a vehicle for digital inclusion, workforce development, and cultural heritage preservation (Ashalakshmy, 2025).

Although this is a unique idea, academic knowledge on the metaverse in business and marketing is still discontinuous and not well-developed. Initial conceptual articles laid down some initial definitions and strategic patterns. Vig (2023) and Zhang et al. (2022), in consumer behaviour research, reported the following motivators, including the fear of missing out (FOMO), self-extension, status-seeking and innovativeness, with significant generational differences between millennials and Gen Z (Arghashi & Gunalay, 2025; Kaur et al., 2023). Multidisciplinary syntheses further highlight boundaryless challenges, including interoperability, governance, privacy, ethics, and sustainability concerns (Koohang et al., 2023; Pagani & El Sawy, 2026). Industry-specific studies have reported operationalisation channels within the logistics, hospitality and industrial settings, and are typically based on the dynamic capabilities theory or stimulus-organism-response frameworks (Bhardwaj et al., 2025; Foroudi et al., 2025; Waehrens et al., 2026).

However, a closer investigation reveals critical research gaps that undermine the field's coherence and practical utility. First, the literature is largely discipline or sector-specific (marketing studies are very narrow regarding consumer engagement, operations research is very technical in terms of implementation, and sustainability is not at the centre of discussion but rather on the margins; Kumar et al., 2025; Waehrens et al., 2026). This division does not allow a comprehensive view of the interaction of the technological, human and environmental aspects of a single ecosystem. Second, although opportunities and challenges are often enumerated, limited literature incorporates these factors into a more integrated framework to connect the underlying enablers (infrastructure, skills, sustainability) to quantifiable business results (innovation, new models, high engagement). The existing models are either descriptive or industry-based and contain insufficient systemic causal pathways that are needed in strategic decision-making (Firmansyah & Umar, 2023; Piñeiro-Chousa et al., 2024). Third, sustainability and workforce preparedness, two pillars that are consistently identified as key to scalable adoption, are underscored inadequately as compared to the technological hype, especially in the emerging-economy setting, where the lack of infrastructure contributes to digital divides (Ashalakshmy, 2025; Martins & Barbosa, 2026). These gaps are not merely academic oversights; they leave managers without actionable roadmaps and policymakers without evidence-based guidance for inclusive, responsible metaverse development.

To address these shortcomings, the present study has three research objectives, which are interrelated to each other. First, it conducts a literature review which reorganises existing studies. This approach demonstrates the general trends and clearly shows gaps in integration as mentioned above. Second, it presents a novel conceptual framework, the Metaverse Ecosystem Model, which synthesises three pillars (technological infrastructure, workforce skills and energy and sustainability) behind the business opportunities with challenges and outcomes in a system organised logically and with feedback. This model is a direct answer to the

identified synthesis and linkage gaps. Third, it states implications but is classified as a special section to bring to the fore contributions to scholars, managers and policymakers.

The article achieved these goals by driving metaverse scholarship in business and marketing beyond the disjointed knowledge to a unified, ecosystem-based knowledge. It prepares stakeholders to navigate the transformative potential of the metaverse and reduces its limitations, which will ultimately lead to sustainable digital innovation in the Web3 era. The remainder of the article is structured as follows: The second section literature review; the third section introduces and explains the Metaverse Ecosystem Model; the fourth section offers a key applications; and the fifth section challenges, the sixth section future of the metaverse in the context of business and management, the seventh section limitations and future research directions and lastly we discuss the eight section conclusion and implications.

Literature Review

The Metaverse

The phrase 'Metaverse' amalgamates 'meta', signifying beyond, with 'Verse', representing the universe. Science fiction novelist Neal Stephenson referred to the term in his 1992 book Snow Crash, in a vision of an Internet successor in VR (Rathore, 2018). Furthermore, Kaur et al. (2023) examine the interaction between consumers and digital technology and enhance our understanding of the idea of immersive time in the metaverse. Studies explore the understanding of the metaverse as a set of virtual spaces that allow for a smooth transition between real and virtual worlds through the paradigm of avatars. They investigate that modern literature concentrates on primitive uses like Second Life, Fortnite and Decentral and, instead of the more advanced Web 3.0, where metaverse experiences are fully immersive, enduring, and can be linked (Gursoy et al., 2023). This differentiation is essential since the earliest phase provides minimal interaction, and the developed metaverse can result in an open-ended, perpetually online ecosystem that has the potential to host sophisticated business operations (Gursoy et al., 2023; Koohang et al., 2023; Weinberger & Holl, 2025; Zhang et al., 2022).

A major conceptual gap identified by Gursoy et al. (2023) is the absence of precise, multidimensional definitions that clearly describe the metaverse from existing VR/AR platforms. While Zhang et al. (2022) and Vig (2023) provide early definitions positioning the metaverse as a new marketing channel and a new business paradigm, they remain largely descriptive and do not operationalise key characteristics such as persistence, interoperability, and full sensory immersion. Similarly, studies by Piñeiro-Chousa et al. (2024) and Firmansyah and Umar (2023) examine exponential publication growth since 2021 but highlight that most studies are exploratory rather than theory-building. Future

research must therefore develop testable conceptual models that incorporate boundaryless characteristics, persistence, and full interoperability (Gursoy et al., 2023; Koohang et al., 2023). Without such definitional clarity, business and management scholars cannot reliably examine strategic implications, construct generalisable frameworks, or compare findings across sectors (Firmansyah & Umar, 2023; Piñeiro-Chousa et al., 2024). This definitional gap directly limits the development of an integrated ecosystem perspective, which the present study seeks to address.

Impacts of the Metaverse on Service Marketing and Management

The Metaverse Experience Co-creation

Gursoy et al. (2023) investigate the existing research that co-creation only in terms of interaction, neglecting the co-creation of the full purchase-experience process for actual products and services. This is an essential constraint since business value is generated not only in terms of avatars' interaction but in the whole process of awareness till post-purchase analysis (Cheah & Shimul, 2023; Dwivedi et al., 2022; Gursoy et al., 2023). While consumer-behaviour studies identify motivators such as FOMO and self-extension (Arghashi & Gunalay, 2025; Kaur et al., 2023), they rarely connect with psychological drivers to measurable purchase-process outcomes in organisational contexts. Future studies should, therefore, examine the processes of metaverse purchase-experience co-creation with avatars, service providers, AI agents and various stakeholders at the pre-purchase, purchase and post-purchase levels (Bhardwaj et al., 2025; Gursoy et al., 2023; Varriale et al., 2024; Vasist et al., 2025). Such studies are essential to understand how co-creation influences customer loyalty, firm performance, and competitive advantage in real business settings.

Co-creation of the Metaverse Purchase Experience

Studies categorised according to Gursoy et al. (2023) investigate the absence of empirical evidence on how the metaverse normalises the consumption co-creation process via digital twins and immersive previews. The wider literature acknowledges the shift from passive to active co-creation (Cheah & Shimul, 2023; Dwivedi et al., 2022) but provides limited insight into how avatar-mediated interactions reshape decision-making in B2B and high-involvement service purchases. Kumar et al. (2025) confirm that metaverse marketing research is theoretically rich yet empirically thin, with most studies skewed toward Western and East-Asian samples. Future research must test the effects of avatar-mediated co-creation on customer loyalty, firm performance, and decision quality, particularly in industrial, logistics, and emerging-economy contexts where purchase risk is high (Ashalakshmy, 2025; Gursoy et al., 2023; Meepung & Kannikar, 2022; Zhang et al., 2025). This gap highlights the necessary use of an ecosystem framework that connects with co-creation mechanisms to broader business outcomes.

Experience Offerings, Marketing and Hedonic and Functional Consumption

Metaverse Experience Offerings

The findings of Gursoy et al. (2023) examine three underexplored categories of metaverse experience offerings: purely virtual activities, digital previews of physical experiences, and 'phygital' experiences that seamlessly blend physical and virtual realms. Other studies allow gamification and previews. Foroudi et al. (2025) and Waehrens et al. (2026), they do not examine their differential impacts on hedonic versus functional consumption motives. Kumar et al. (2025) note that research remains leaning toward descriptive accounts rather than causal testing. Moreover, future studies should be based on experiment which provides moderating roles of these three categories on consumer decision-making, brand engagement, and willingness to pay, particularly among small and medium-sized enterprises (SMEs) and in emerging economies where resource gaps are very high (Ashalakshmy, 2025; Khatri, 2022; Martins & Barbosa, 2026). Such investigations are vital to determine whether phygital designs reduce perceived risk more effectively than traditional digital marketing and how they influence long-term customer behaviour (Gursoy et al., 2023).

Marketing

Based on Gursoy et al.'s (2023) findings, provide a deeper investigation into customer engagement, digital marketing, and virtual selling within the metaverse. Current work may be descriptive (Cheah & Shimul, 2023; Dwivedi et al., 2022; Periyasami & Periyasamy, 2022). With minimal consideration of the impact of avatar marketing, NFT-based loyalty programmes and virtual selling on engagement metrics and sales across industries. The practices should be studied empirically in future, especially their effectiveness in industrial and logistics applications where the complexity of decision-making is high (Bhardwaj et al., 2025; Zhang et al., 2025).

The Metaverse Experiences Hedonic and Functional Consumption

The findings of Gursoy et al. (2023) examine the lack of research on how the metaverse balances hedonic and utilitarian motives. Existing literature acknowledges these motives (Arghashi & Gunalay, 2025), but it provides no integrated analysis of their interaction in a business scenario. Future research must explore how metaverse experiences satisfy both motives simultaneously and their downstream effects on satisfaction, loyalty, and repeat purchase behaviour across different sectors (Gursoy et al., 2023; Kumar et al., 2025).

The Metaverse: Implications for Stakeholders

According to Gursoy et al. (2023), findings examine the seven stakeholder-level implications, which improved trust with blockchain, simplified information

processing, increased marketing research capacity, efficient employee training, less capital expenditure, collaboration with stakeholders, and reduced customer efforts, but examine that they are practical and do not support empirical validation. The findings of Kumar et al. (2025) and Rivas-Montoya et al. (2025) investigate the limited attention to how the metaverse reshapes internal operations, employee capabilities, or cross-stakeholder governance (Bhardwaj et al., 2025; Pagani & El Sawy, 2026). Future studies should thus focus on such multi-stakeholder dynamics, especially in the industrial and logistic contexts where interoperability and skills deficits are acute (Ashalakshmy, 2025; Waehrens et al., 2026; Zhang et al., 2025). Moreover, the gap is especially helpful for emerging economies where infrastructure and institutional barriers exacerbate digital divides (Ashalakshmy, 2025; Martins & Barbosa, 2026).

The Metaverse: Implications for Decision-Making

Gursoy et al. (2023) argue that the metaverse can reduce decision risks, information overload, and confusion through immersive 'experience sampling', a sense of presence, tangibilisation of services, and evaluation via immersion. Although consumer-behaviour studies find motivators such as FOMO and self-extension (Arghashi & Gunalay, 2025), they rarely connect these psychological motivations to actual perceived-risk reduction or better quality of decision-making in B2B or high-involvement service contexts (Kumar et al., 2025). Future research must test whether metaverse previews and avatar-assisted support genuinely lower cognitive load and purchase anxiety across B2B and B2C contexts (Gursoy et al., 2023). This gap reinforces the absence of an overarching model that causally links foundational enablers to decision outcomes.

The Metaverse: The Technology Challenges

According to Gursoy et al. (2023), the technology requirements for companies, employees, and users, as well as interoperability issues. These concerns are rolled in the wider literature (Ashalakshmy, 2025; Pagani & El Sawy, 2026; Waehrens et al., 2026), but there is a lack of scalable solutions or governance models. There are still critical gaps in the knowledge of how energy consumption, digital divides and interoperability influence business adoption, especially in emerging economies (Ashalakshmy, 2025; Waehrens et al., 2026). The future studies should focus on cost-effective implementation channels, user-friendly design, protocols that are energy efficient, and interoperability based on ethics (Gursoy et al., 2023). Without such research, the metaverse risks widening rather than narrowing inequalities in business access and capability.

Overall, Gursoy et al. (2023) investigate the gap in the field of integrated, cross-sector, and ecosystem-level understanding, filled with conceptual potential but a lack of systematic research. The lack of a standardised framework, which concurrently embraces technological infrastructure, workforce skills, energy and

sustainability factors, stakeholder dynamics and quantifiable business results, is the major theoretical gap.

The future research directions explored by Gursoy et al. (2023), as expressed as spanning experience co-creation, phygital offerings, stakeholder implications, decision-making mechanisms, and technology challenges, present the exact basis of the Metaverse Ecosystem Model presented in this research work. Through a rigorous approach to filling these gaps, the current conceptual article moves metaverse research beyond its separate investigations to a coherent, practical conceptualisation of its strategic place in business and management.

The Metaverse Ecosystem Conceptual Framework

To address the identified integration gap, this study proposes the Metaverse Ecosystem Model (Figure 1). The framework is connected with the views of the literature and provides a structured lens for understanding how foundational inputs shape business outcomes.

The model operates in three logical layers:

1. Foundational Pillars (Inputs): The core ecosystem has three drivers, which are based on each other, involving Technological Infrastructure (blockchain, AI, IoT, XR interoperability), Workforce Skills (digital literacy, immersive content creation, virtual collaboration competencies), and Energy and Sustainability (resource-efficient operations, alignment to the circular economy). These pillars are connected, and technological infrastructure does not do any useful work without skilled users, and both must depend on sustainability to prevent scalability failures (Ashalakshmy, 2025; Waehrens et al., 2026).

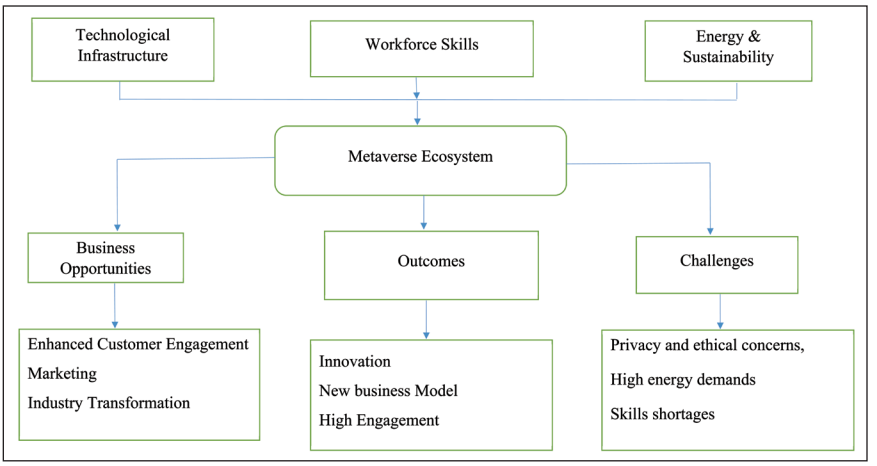

Figure 1. The Metaverse Ecosystem Model.

Source: Authors own work.

2. Core Metaverse Ecosystem: It highlights the interconnected virtual world in which inputs are merged to facilitate ongoing, avatar-mediated interactions and Web3 economies.
3. Business Opportunities and Challenges & Constraints (Mediating Layer): The ecosystem separates into two parallel lines. Examples of Business Opportunities are improved customer interaction, immersive marketing, and industry change (e.g., virtual supply chains, personalised tourism). Challenges and Constraints include interoperability, governance, privacy, ethical issues and digital divides (Bhardwaj et al., 2025; Kumar et al., 2025).
4. Outcomes: When opportunities are addressed in opposition to constraints, they lead to innovation, New Business Models (e.g., NFT-driven virtual economies, virtual apprenticeships), and high engagement. The model includes feedback loops: the pillars are reinforced by the outcomes of the tool through learning and investing.

This framework goes further than previous models in making sustainability and skills coequal pillars and causally linked to results, and making them available to managers as a diagnostic and strategic instrument.

Applications of the Metaverse in Business and Management

The metaverse has describes to be an imaginary technology but a realistic platform that is changing the fundamental operations in the business and management sectors. It facilitates value-generating, persistent, avatar-driven virtual worlds that are XR-powered, AI-enabled, blockchain-based, and digital twin-enabled to generate immersive, interoperable spaces that transcend conventional digital tools (Vig, 2023; Zhang et al., 2022). They are applied in marketing, operations, manufacturing, education and internationalisation, showing significant improvements in engagement, efficiency and innovation and revealing the complexity of implementation that requires an ecosystem approach. The metaverse in marketing acts as a unique Web3 channel, which outperforms Web 2.0 social media. Companies use immersive brand experiences, virtual showrooms, NFT loyalty programmes, and real-time co-creation events to create more emotional appeals and personalisation (Cheah & Shimul, 2023; Dwivedi et al., 2022). Furthermore, Adoption is supported by consumer research that shows that FOMO, self-extension and status-seeking become motivators as millennials seek to adopt a product that allows them to shift their passive advertising approach to active, embodied storytelling (Arghashi & Gunalay, 2025; Kaur et al., 2023). Moreover, in hospitality and tourism, 360° VR tours and virtual destinations can improve the overall customer experience, increase pre-trip interactions and post-trip retention, and contribute to sustainable tourism objectives (Foroudi et al., 2025).

Operations and supply-chain management represent another high-impact domain. Digital twins are used in metaverse platforms, which combine with IoT and real-time analytics, providing end-to-end visibility, predictive modelling, and

automated decision-making (Zhang et al., 2025). Virtual warehouses are used to provide simulation-based optimisation by logistics firms in order to cut physical inventory costs and enhance traceability across global networks (Bhardwaj et al., 2025). These applications expedite the accelerate-enable-mobilise process based on dynamic capabilities, enabling managers to experiment with scenarios virtually before actual deployment.

The metaverse is used in the manufacturing industry to operationalise sustainable factories of the future. By using XR-enabled digital twins, AI-driven process optimisation, and circular-economy workflows, companies can attain resource efficiency, less downtime, and closed-loop material flows (Waehrens et al., 2026). A new frontier of application is business education and workforce development. Furthermore, Metaverse platforms are used by practitioners and universities in immersive training, Industry 4.0 simulation, and virtual apprenticeships to bridge theoretical and practical aspects (Rivas-Montoya et al., 2025). In developing countries, programmes like the proposed Metaverse Platform for Apprenticeship, Collaboration and Training (MPACT) can support the diffusion of tacit knowledge across borders, filling skills gaps in digital content production and virtual co-working (Ashalakshmy, 2025). Finally, SMEs apply the metaverse for internationalisation. Virtual storefronts and cross-border networking allow resource-constrained firms to enter into global markets at low costs, and to democratise opportunities previously accessible only to large multinationals (Martins & Barbosa, 2026).

Despite these advances, applications remain fragmented and pilot-heavy. Interoperability issues, high energy demands, privacy concerns, and flat infrastructure—especially in emerging regions constrain scalability (Kumar et al., 2025; Pagani & El Sawy, 2026). Such constraints examine the fundamentals of a comprehensive ecosystem model that can interrelate with technological infrastructure, workforce capabilities, and sustainability with strategic results. Furthermore, the use of the metaverse in business and management shapes better customer interaction, business efficiency, sustainable innovation, and growth that is inclusive growth. However, to make its full potential, it is essential to shift beyond individual implementations towards a more holistic, ecosystem-oriented approach.

Challenges and Opportunities of the Metaverse in Business and Management

Despite the transformative opportunities presented by the metaverse in marketing, operations, and education, the implementation of the metaverse in business and management is conditioned by the interdependent nature of opportunities and challenges. These dimensions are based on the literature and the practical implementations that have been discussed above. This is a forward-looking, detailed analysis, combining technological, organisational, economic, social, and environmental views, and strategic insight into sustainable adoption and implementation.

Opportunities

The metaverse offers new ways of doing business that cross conventional limits. Blockchain-based virtual economies and NFTs allow organisations to convert digital assets in a way never before conceivable—generating revenue in the form of a constant stream of revenue through virtual real estate, brand experiences and avatar customisation (Koohang et al., 2023). For management, it means hyper-personalised customer experiences in which avatar history, movement and real-time emotional reaction data are ingested into AI analytics to give predictive insights that are much better than a traditional CRM platform. The metaverse enables seamless cross-border collaboration in global operations: distributed teams can meet in shared virtual workspaces that make them feel as if in the real world, eliminating the need to travel up to 80% and shortening their decision-making time (Martins & Barbosa, 2026).

The developing technologies will benefit the whole world. The proposed MPACT is a vivid example of how tacit knowledge can be diffused to other continents, providing SMEs with access to global talent pools and experience without physical relocation (Ashalakshmy, 2025). Digital twins in metaverse settings in supply-chain management allow stress-testing of complete networks through various disruption conditions, including geopolitical, climatic or pandemic-related conditions, to improve resilience and circular material flows without physical resource consumption (Waehrens et al., 2026; Zhang et al., 2025). Sustainability appears as a strategic differentiator: virtual prototyping and training reduce physical waste and carbon emissions, while immersive consumer experiences encourage low-impact tourism and retail models (Foroudi et al., 2025). Overall, these opportunities foster innovation, democratise market access, and position forward-thinking organisations to capture first-mover benefits in the Web3 economy.

Challenges

The barriers discourage the understanding of these opportunities. The most unfavourable barrier is technical interoperability. The existing platforms employ where avatars, assets and data cannot easily move between ecosystems, which results in breaking the user experiences (Pagani & El Sawy, 2026). Critical review points to blockchain technology in a decentralised metaverse and Web 3.0 tech, specifically on security, privacy, and governance of both, besides scalability (Mohammed et al., 2026). Lead time in real interactions, high-bandwidth requirements, and device compatibility further limit accessibility, particularly in regions with uneven 5G/6G infrastructure.

At the organisational level, there are still great skills gaps. In addition to fundamental digital literacy, managers and employees will need more specific skills related to the production of immersive content, virtual governance, and ethical AI moderation, which are at present rare even in advanced markets (Bhardwaj et al., 2025; Rivas-Montoya et al., 2025). The cultural fears of job displacement and

psychological imperatives of avatar-mediated work, such as identity fragmentation and the digital fatigue that becomes metaverse exhaustion, contribute to resistance to change. There is uncertainty about the value of money. Enterprise-level metaverse platforms are prohibitive in terms of development costs, and the unpredictability of cryptocurrencies and NFT markets may pose financial risk to SMEs (Kumar et al., 2025). Regulatory ambiguity compounds this: questions of intellectual property rights in virtual creations, taxation of cross-border digital transactions, and liability for harms occurring in decentralised spaces lack global consensus.

Uncertainty exists in the return on investment economically. Enterprise-level metaverse system development is prohibitive to SMEs, and cryptocurrency volatility and market changes in NFTs pose financial risk. This is compounded by the issue of regulatory ambiguity: The issue of intellectual property rights to virtual creations, taxation of cross-border digital transactions and liability for harms in decentralised spaces are not globally agreed upon (Arghashi & Gunalay, 2025). The metaverse presents particular cybersecurity risks, including avatar, virtual assets, and manipulation with effect, which require new governance frameworks altogether. In addition, the metaverse is a promising vision of improved innovation, operational efficiency, and inclusivity. Its effective implementation, however, will be determined by the active reduction of various key difficulties, such as interoperability constraints, employee skills, regulatory ambiguities, ethical considerations, and environmental impacts. These problems are all intertwined, and they cannot be dealt with satisfactorily independently. Moreover, the article proposes a comprehensive ecosystem approach, as discussed in the next section, to incorporate the technological infrastructure, human capital development and sustainability priorities with the overall strategic business goals. Organisations must align their systems in such a way as to be able to turn the potential of the metaverse into a sustainable competitive advantage.

Future of the Metaverse in Business and Management

The metaverse is the future of business and management infrastructure by 2030, leading to the transformation of current experimental systems into a seamless, boundaryless layer that connects physical operations, digital economies and human cooperation at scale. With the maturity of Web3 technologies, including interoperable standards, advanced AI agents, and energy-efficient XR devices, the metaverse will cease to be an activity of isolated pilots and become a constantly on ecosystem that redefines the organisational design, strategic decision-making, and value creation (Pagani & El Sawy, 2026; Waehrens et al., 2026). Furthermore, the future of marketing is hyper-embodied, predictive engagement. Avatars will be used as a consistent digital identity that transfers consumer preferences, behavioural histories and emotional profiles across platforms, allowing brands to provide context-aware experiences in real-time. Virtual world-building will be automated by generative AI, enabling SMEs to create pop-up metaverse campaigns with a small amount of capital. This will be expedited by generational changes:

with Gen Z and Alpha as the primary consumers, the self-extension tendencies of FOMO will be normalised as immersive commerce, and virtual showrooms will become the main source of revenue, making traditional e-commerce a secondary source (Arghashi & Gunalay, 2025; Kumar et al., 2025).

Management and organisational structures will undergo profound decentralisation. Traditional hierarchies will give way to DAO-style governance models embedded within metaverse environments, where decisions are executed via smart contracts and real-time stakeholder voting (Ashalakshmy, 2025). Leadership will require new competencies, virtual presence literacy, ethical avatar governance, and ecosystem orchestration, transforming the C-suite into 'metaverse strategists' who balance physical and digital operations. Operations and supply-chain management will achieve near-autonomous intelligence. Moreover, Digital twins will evolve into living, self-optimising entities that simulate, predict, and adjust entire value networks instantaneously, incorporating climate variables, geopolitical risks, and circular-economy loops in real-time (Bhardwaj et al., 2025; Zhang et al., 2025). However, Industrial metaverse applications will deliver zero-waste factories where XR-guided maintenance and AI-orchestrated production minimise downtime and material use, directly supporting net-zero targets (Waehrens et al., 2026).

Sustainability will be transformed into a competitive advantage. Blockchain protocols and data centres that use less energy, carbon-conscious rendering and immersive experiences will reduce the environmental footprint, and conscious consumption and virtual tourism will reduce the emissions of physical travel (Foroudi et al., 2025). Emerging economies will leapfrog legacy infrastructure, using metaverse platforms to build inclusive digital economies that close skills and opportunity gaps (Martins & Barbosa, 2026). This study suggests the Metaverse Ecosystem Model, which provides the strategic roadmap to this future. With the integration of technological infrastructure, workforce skills, and energy and sustainability as equal pillars, organisations are able to systematically transform opportunities into innovation, new business models, and high engagement, and actively manage constraints. Standards of interoperability, harmonisation of regulations, and ethical frameworks will become important facilitators within the next 5 years. In the end, the metaverse will not replace business, but it will augment and replace it to the point of establishing hybrid realities in which competitive advantage goes to those who are able to achieve ecosystem orchestration. Furthermore, Investors in the Web3 economy today are the winners of tomorrow by investing in the three pillars of the Web3 economy. Future empirical studies confirming the ecosystem model in sectors and geographies will be necessary to facilitate this transition in a responsible and inclusive manner.

Limitations and Future Research Direction

This is a purely conceptual study and is, as such, limited in a number of ways. Being a synthesis of the existing literature instead of an empirical study, the suggested Metaverse Ecosystem Model has not been tested in the real-world

organisational context yet. Although technological infrastructure, workforce skills, and energy and sustainability are integrated as coequal pillars in the model, the causal pathways and outcome relationships are logically derived from the literature; therefore, the practical predictive capability of the framework is not yet established. These restrictions would lead directly to some of the potential future research directions. A major limitation is the inadequacy of empirical research to validate and optimise the Metaverse Ecosystem Model in various industries and companies of different sizes. Moreover, there is a lack of longitudinal data to determine the long-term effects of innovation, circularity, resilience, and stakeholder value (Gursoy et al., 2023). Second, future work should examine the co-creation of metaverse purchase experiences in greater depth.

Although the Gursoy et al. (2023) findings indicate that most studies are limited to interaction-based co-creation, empirical studies are needed to learn how avatars, service providers, AI agents, and stakeholders influence the entire purchase process, including the awareness stage through post-consumption evaluation. These studies would provide real evidence on whether the pathways in the ecosystem model are valid in the contexts of B2B, B2C, and industrial. Third, the experiences of phygital, where there is a smooth transition between physical and virtual worlds, are an essential unexplored field. The researchers are supposed to explore the moderating effect of these hybrid offerings on hedonic and functional consumption motives and perceived risk, brand engagement, and willingness to pay, particularly in SMEs and emerging economies (Ashalakshmy, 2025; Gursoy et al., 2023). Fourth, stakeholder-level implications deserve rigorous examination.

Future research must also be used to test the propositions of the model on increased trust, employee training, decreased capital expenditure, and cross-stakeholder cooperation, especially in logistics, production, and emerging-market environments, where interoperability and skills gaps are acute (Gursoy et al., 2023; Waehrens et al., 2026). Finally, issues such as interoperability, energy use, digital divides, and ethical governance need to be tackled by interdisciplinary studies that integrate business, information systems, and sustainability approaches. Cost-effective, inclusive implementation pathways and scalable governance models can be tested through experimental and simulation-based research. The solution of these directions will transform the metaverse as a conceptual promise into a strategically mature area, allowing scholars and practitioners to explore its full transformative business and management potential.

Conclusion and Implications

The aim of this study was to propose an integrated ecosystem framework and articulate clear implications, thereby fulfilling its research objectives. The framework adds a new multilevel lens that cuts across the marketing, operations, and sustainability literatures. It also changes the emphasis on individual applications to systemic dependencies, providing a basis to further theory-building in business

research of the Web3 era. Besides, managers are also encouraged to focus on balanced investment, covering the three pillars, to audit technological readiness, invest in workforce metaverse literacy programmes and incorporate circular-economy metrics at the very beginning. In addition, they are also encouraged to market the engagement pathway to develop immersive campaigns that will adequately appeal to Millennials and Generation Z consumers. Marketers in emerging economies are advised to use this model to come up with inclusive digital infrastructure and focused training programmes (Ashalakshmy, 2025). This research enables its audience to respond to the dynamics of the metaverse by organising knowledge into a coherent ecosystem framework that gives scholars and practitioners a strategic viewpoint on their opportunities and constraints. Moreover, subsequent studies need to aim at empirically confirming the proposed framework in different industries and geographical settings to strengthen its explanatory and predictive capabilities.

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Empirical Research

Measuring Supply Chain Improvement: A Hierarchical Model for Cultural and Capacity Integration

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Abstract

This article analyses the impact of organisational culture on Lean Six Sigma (LSS) initiatives to enhance supply chain capacity and sustainability. LSS decreases waste and variability; nonetheless, a culture characterised by leadership commitment, employee empowerment, collaboration and ongoing improvement is essential to fully realise its potential. The review is structured to first address the general link between culture and LSS, then focus on its specific application in the supply chain, and finally, its impact on capacity management. A structured questionnaire will be developed based on the insights from the literature review. This questionnaire will be distributed to a broader sample of supply chain professionals. The survey will use a Likert scale to measure different dimensions of organisational culture and the perceived success of LSS projects in improving capacity. The study findings indicate that the supply chain management workforce mostly includes a substantial number of procurement professionals and demand planners, in addition to possessing considerable expertise. A culture that prioritises continuous improvement is positively impacted by robust leadership and management support, employee empowerment and engagement, along with effective communication and cooperation. To improve supply chain capacity using LSS, businesses must first develop a good culture. Clear communication, rewarding participation and empowering people may help companies overcome objections and develop a strong, efficient and sustainable supply chain.

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Keywords

Continuous improvement, Lean Six Sigma (LSS), organisational culture, supply chain capacity, socio-technical systems, strategic framework, operational resilience

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Introduction

The modern supply chain landscape is characterised by unprecedented volatility and the constant pursuit of operational resilience. To navigate these challenges, organisations have increasingly adopted Lean Six Sigma (LSS) as a dual-engine methodology to minimise waste and reduce process variability. However, despite the technical sophistication of LSS tools, a significant number of integration attempts fail to yield sustainable results in supply chain capacity management. Research suggests that this failure is often not a result of technical inadequacy, rather a lack of alignment with the prevailing organisational culture.

Supply chain capacity—the maximum amount of work that an organisation is capable of completing in a given period—is frequently treated as a static engineering metric. Yet, in practice, capacity is dynamic and highly dependent on human factors, including leadership commitment, employee empowerment and cross-functional collaboration. There is a growing recognition that 'soft' cultural enablers are the primary predictors of 'hard' operational outcomes. However, the literature remains fragmented regarding how these cultural dimensions can be systematically measured alongside technical capacity metrics.

This study addresses this gap by proposing a hierarchical model that integrates cultural enablers with supply chain capacity metrics. By shifting the focus from purely technical LSS implementation to a holistic cultural-capacity framework, this research provides a roadmap for practitioners to measure and sustain supply chain improvements. The following sections explore the theoretical foundations of LSS, the nuances of organisational culture in the Asian business context and the development of a hierarchical approach to capacity optimisation.

Research Questions and Objectives

Research Questions

RQ1: How do distinctive measurements of organisational culture (e.g., authority, communication and strengthening) impact the viability of LSS ventures in progressing supply chain capacity?

RQ2: What particular social components act as basic victory variables or critical boundaries in capacity management?

Investigate Objectives

The first objective is to recognise the key measurements of organisational culture in LSS, and the second objective is to identify the noteworthy obstructions in

capacity management. The third is to examine the Six Sigma in supply chain capacity management.

Review of Literature

LSS represents a synergistic approach that combines the speed and waste-reduction capabilities of Lean with the quality and precision of Six Sigma. In the context of the supply chain, LSS has evolved from a shop-floor tool to a strategic framework for managing complex networks. According to Antony et al. (2022), the integration of LSS into supply chain processes allows for the identification of non-value-added activities that consume capacity without contributing to customer value.

The Role of Organisational Culture as a Predictor

Organisational culture is defined as the shared values, beliefs and norms that influence how employees behave and interact. In LSS literature, culture is often cited as the 'make-or-break' factor. Previous studies have identified several 'Cultural Enablers' critical for LSS success:

- *Leadership commitment:* The top-down drive required to secure resources and provide vision.
- *Employee empowerment:* The degree to which the workforce is trained and authorised to make data-driven decisions.
- *Continuous improvement mindset:* A cultural readiness to view failures as opportunities for process refinement.

In Asian business contexts, these enablers are further influenced by institutional factors such as high power distance and collectivism, which can either accelerate LSS adoption through strong leadership or hinder it through a lack of bottom-up feedback.

Supply Chain Capacity Integration

Capacity management involves the balancing of demand with the ability of the supply chain to respond. Current frameworks often overlook the 'socio-technical' synergy required for capacity optimisation. A hierarchical model is necessary because supply chain improvement is not linear; it requires a foundation of cultural readiness before technical capacity gains can be sustained. As noted by Snee (2010), without a supportive culture, LSS initiatives often result in 'islands of excellence' that fail to integrate into the broader supply chain capacity framework.

Research Gap

While existing research explores LSS and organisational culture separately, there is a distinct lack of quantitative models that measure their simultaneous integration

into a hierarchical structure. Most models are descriptive rather than predictive. This study fills that void by testing a hierarchical model where cultural factors serve as the foundation for technical capacity improvements, specifically tailored for the complexities of modern business environments.

Theoretical Integration: LSS Mechanistic Alignment

The efficacy of LSS is both facilitated and moderated by a supportive organisational culture, which serves as the foundational architecture for process excellence.

- *Facilitating the DMAIC/Kaizen framework:* The effective execution of the measure and analyse phases within the Define, Measure, Analyze, Improve, and Control (DMAIC) methodology requires a socio-technical climate characterised by employee empowerment (clan culture) and a continuous improvement orientation (adhocracy culture). Such environments incentivise frontline practitioners to engage actively in Kaizen events, fostering the psychological safety necessary for data-driven problem-solving and radical innovation.
- *Institutionalising sustainability and control:* The longitudinal sustainability of LSS-driven gains in capacity and quality is contingent upon a process orientation (Hierarchy Culture). This cultural dimension ensures that optimisations achieved during the improve phase are codified through standardised work protocols. Consequently, improvements are institutionalised and rigorously monitored during the control phase, preventing regression and ensuring operational consistency (Jong & Klein, 2012).

The Evolution of LSS in Supply Chain (2016–2019)

During the mid-2010s, the literature primarily focused on the technical integration of LSS to drive efficiency. Researchers such as Antony et al. (2016) and Zhang et al. (2017) emphasised the 'hard' tools of LSS—such as value stream mapping and statistical process control—as the primary drivers for waste reduction in logistics. During this era, supply chain capacity was largely treated as a static variable. However, early studies began to acknowledge that high failure rates in LSS projects were not due to tool failure, but due to human resistance, marking the beginning of the 'soft' factor discourse in operations management.

Shift Towards Socio-technical Systems (2019–2022)

A significant pivot occurred as researchers began applying the socio-technical systems theory to supply chain frameworks. Tortorella et al. (2019) argued that the Fourth Industrial Revolution (Industry 4.0) required a new cultural mindset to manage the increased complexity of global supply chains. During this period, the Competing Values Framework became a dominant tool for measuring cultural

readiness. Al-Saidi et al. (2021) demonstrated that 'Clan' and 'Adhocracy' cultures were significant predictors of an organisation's ability to innovate within its supply chain capacity, while 'Hierarchy' cultures were essential for the stability required in the control phase of LSS.

Integration of Culture and Capacity Management (2022–2024)

Recent scholarship has moved towards capacity resilience. Following the global disruptions of the early 2020s, researchers such as Ivanov (2022) and Kumar et al. (2023) highlighted that 'rigid' capacity models failed because they lacked cultural agility. The literature in this phase began to propose that supply chain improvement must be measured through a hierarchical lens—where cultural alignment precedes technical capacity expansion. Studies by Dora et al. (2024) have specifically linked employee empowerment to the reduction of 'hidden capacity' losses, suggesting that culture is the key to unlocking underutilised supply chain assets.

Current Frontiers: Hierarchical and Predictive Models (2025–2026)

In the current research landscape, the focus has shifted to hierarchical modelling and predictive analytics. Scholars are now utilising structural equation modelling to quantify the exact 'weight' that leadership commitment and employee engagement have on LSS outcomes. The latest research (e.g., Sharma & Singh, 2025) suggests that a 'hierarchical model for cultural and capacity integration' is the most effective way to measure improvement, as it acknowledges that technical gains are unsustainable without a foundational 'Continuous Improvement' culture.

Research Methodology

Research Design

Drawing upon synthesised insights from the extant literature, a structured survey instrument was developed to operationalise the study's core constructs. This instrument was administered to a cross-sectional sample of supply chain practitioners to ensure a broad representation of industry perspectives. Organisational culture was measured across multidimensional scales—including managerial support, communicative transparency and employee empowerment—utilising a five-point Likert scale. Similarly, the perceived efficacy of LSS initiatives in optimising capacity was evaluated through performance metrics such as lead-time compression and inventory turnover rates. Inferential statistical techniques, including correlation analysis and multivariate regression, were employed to examine the predictive relationships between cultural antecedents and LSS performance outcomes.

Integration of Methodology and Discussion: A Mixed-methods Approach

The study utilises a sequential explanatory design to ensure a comprehensive evaluation of the research questions through a robust dialectic between quantitative and qualitative data.

- *Quantitative validation (PLS-SEM):* The 'hierarchical model' and the broader objective of 'measuring supply chain improvement' are empirically validated through partial least squares structural equation modelling (PLS-SEM). This phase provides critical indices of model fit, specifically the standardised root mean square residual and the coefficient of determination (R^2), which quantify the predictive utility of integrating cultural and capacity variables.
- *Qualitative contextualisation:* The 'cultural integration' component is further elucidated through semi-structured interviews. This qualitative phase provides nuanced, first-hand accounts of the mechanisms by which LSS converts abstract cultural ideals into tangible operational actions. By triangulating these narratives with statistical data, the research ensures that the 'soft' dimensions of organisational behaviour are not overshadowed by numerical abstraction, thereby providing a holistic view of capacity optimisation.

Sample and Data Collection

The target population for both phases of this research comprised senior supply chain and operations management practitioners within the manufacturing and logistics sectors. For the qualitative phase, a purposive sampling technique was employed to select participants from organisations with a documented history of mature LSS implementations, ensuring that the insights gathered were derived from established operational excellence.

For the quantitative phase, the survey instrument was disseminated to a target sample of 400 supply chain professionals. Of the total distributed, 378 completed responses were retrieved, representing a robust response rate of 94.5%. Following a rigorous data-cleaning process to ensure completeness and internal consistency, all 378 responses were deemed eligible for analysis ($N = 378$). The resulting data set underwent extensive statistical evaluation including descriptive and inferential analysis to ensure that the findings were grounded in empirical evidence and objective operational facts.

Data Analysis

The study utilised a dual-method analytical framework to ensure a comprehensive interpretation of the research objectives. Qualitative data gathered through semi-structured interviews were scrutinised using thematic analysis, allowing for the identification and categorisation of recurring patterns related to cultural predictors.

Concurrently, quantitative data derived from the survey instrument were processed using IBM SPSS Statistics (v. 28.0). This software was utilised to perform inferential statistical tests to validate the hypothesised relationships within the proposed hierarchical model.

The integration of these distinct data streams facilitated methodological triangulation, thereby enhancing the internal validity and construct reliability of the study's conclusions. Furthermore, the workforce composition was subjected to a stratified demographic analysis, with particular attention paid to the age distribution of employees within the supply chain management sector. This stratification ensures that the findings account for generational perspectives on organisational culture and LSS adoption.

Statistical information in Table 1 demonstrated that 38.9% of representatives are matured 40 to 50 a long time. The sexual orientation distribution is 65.9% female representatives and 34.1% male representatives. Acquirement pros and request organizers constitute 25.1% of the department's staff. With respect to involvement, 40.2% of the worker has 5–10 a long time, whereas 38.4% has 10–15 a long time, demonstrating an exceedingly capable workforce.

Data presented in Table 2 identify resistance to change, inadequate incentive structures and ambiguous communication as the primary impediments to successful LSS integration. All three constructs yielded high mean mu values, indicating a strong consensus among the 378 respondents.

Specifically, a mean score of 4.16 underscores a significant level of employee resistance towards LSS-driven process enhancements. This sentiment is compounded by the perception of LSS initiatives as uncompensated supplementary labour, which also achieved a mean score of 4.16. Notably, the most critical challenge identified was ineffective project communication, which recorded the

Table 1. Demographic Background of Employees in Supply Chain Management.

Demographic Characteristics		*n* (Total = 378)	% of *n*
Age	<30 years	43	11.4
	30–40 years	112	29.6
	40–50 years	147	38.9
	≥50 years	76	20.1
Gender	Male	129	34.1
	Female	249	65.9
Designation	Supply chain managers	53	14.0
	Supply chain analysts	51	13.5
	Logistics coordinators	84	22.2
	Procurement specialists	95	25.1
	Demand planners	95	25.1
Work experience	<5 years	25	6.6
	5–10 years	152	40.2
	10–15 years	145	38.4
	≥15 years	56	14.8

Source: Primary data.
Note: *n*: Number of respondents.

Table 2. Mean Score Analysis on Barriers in Capacity Management.

Particulars	Items	*N* = 378	
		Mean	*SD*
Employees in my department are resistant to changes proposed by LSS initiatives.	BCM1	4.16	0.975
LSS projects are often seen as extra work that does not get rewarded.	BCM2	4.16	0.935
Communication about the goals of LSS projects is often unclear.	BCM3	4.25	0.931

Source: Statistically calculated data.

highest mean value of 4.25. These findings suggest that the technical success of LSS is heavily predicated on addressing these foundational sociocultural barriers.

The empirical results presented in Table 3 indicate that LSS integration within supply chain capacity management effectively mitigates operational bottlenecks, optimises production throughput and compresses lead times.

According to the respondents (N = 378), the most significant operational advantage of LSS is the reduction of bottlenecks within logistics and distribution networks, as evidenced by a mean rank of 2.16 and a high mean assessment score of 4.18. Furthermore, LSS was found to significantly enhance production throughput, yielding the second-highest mean rank of 2.13 and a mean score of 4.21. Finally, the compression of supply chain lead times was ranked third, with a mean rank of 1.71 and an average score of 3.78.

The consistently high mean scores across these dimensions suggest a strong professional consensus that LSS is a highly efficacious methodology for enhancing supply chain performance and capacity utilisation.

The heat-map relationship information in Table 4 shows solid positive relationships among all four incline Six Sigma authoritative culture characteristics. Relationship values past 0.92 show that an increment in one measurement compares with increments in the others. The most grounded relationship (0.979) exists between representative strengthening and inclusion (EEI) and a persistent advancement culture (CIC). This demonstrates that enabled and locked-in people are altogether. Cultivate in people ceaseless enhancement. Authority and administration back (LMS) has a 0.967 relationship with continuous improvement culture (CIC). Authority was pivotal for cultivating a culture of ceaseless change. All other relationships, such as leadership and management support (LMS) and employee empowerment and involvement (EEI) (0.958) and communication and collaboration (CC) and CIC (0.952), appeared to have a high degree of affiliation.

The empirical results presented in Table 5 provide statistical validation for all six hypothesised relationships within the hierarchical cultural model of LSS. The analysis confirms that EEI, LMS, CC and a CIC are significantly interrelated.

The path analysis reveals that EEI exerts a strong positive influence on LMS (β = 1.071), CC (β = 1.075) and a CIC (β = 1.115). Furthermore, CC was found to significantly impact LMS (β = 1.050) and the CIC (β = 1.094). Finally, LMS demonstrate a significant positive effect on the CIC, with a path coefficient of 1.078.

Table 3. Mean Score Analysis on LSS in a Supply Chain Capacity Management.

Particulars	Items	N = 378 Mean	N = 378 SD	Mean Rank	Ranking
LSS projects have significantly reduced lead times in our supply chain.	LSS1	3.78	0.917	1.71	III
LSS has helped to increase our overall production throughput.	LSS2	4.21	0.933	2.13	II
LSS has reduced bottlenecks in our logistics and distribution network.	LSS3	4.18	0.913	2.16	I

Source: Statistically analysed data.

Table 4. Heat-Map Correlation for Key Dimensions of Organisational Culture in LSS.

Particulars	LMS	EEI	CC	CIC
Leadership and management support (LMS)	1	0.958	0.937	0.967
Employee empowerment and involvement (EEI)	0.958	1	0.941	0.979
Communication and collaboration (CC)	0.937	0.941	1	0.952
Continuous improvement culture (CIC)	0.967	0.979	0.952	1

Source: Statistically analysed data.

Table 5. Result of Hypotheses Testing for Key Dimensions of Organisational Culture in LSS.

Hypotheses	Proposed Hypothesis Relationship	Path Coefficients	S.E.	*t* Statistics	*p* Value	Hypothesis Test Results
H_1	EEI → LMS	1.071	0.079	13.574	.000	Supported
H_2	EEI → CC	1.075	0.079	13.562	.016	Supported
H_3	EEI → CIC	1.115	0.082	13.584	.040	Supported
H_4	CC → LMS	1.050	0.077	13.607	.000	Supported
H_5	LMS → CIC	1.078	0.080	13.563	.022	Supported
H_6	CC → CIC	1.094	0.080	13.629	.002	Supported

Source: Statistically analysed data.

All six hypotheses were supported at a high level of confidence, with *p* values consistently below the 0.05 threshold ($p < .05$). These findings underscore the interdependent nature of these cultural constructs, suggesting that a holistic rather than a siloed approach is required to foster an environment conducive to LSS sustainability. (Figure 1)

The psychometric properties of the measurement model were evaluated to ensure the robustness of the four latent constructs: LMS, EEI, CC and CIC. As demonstrated in Table 6, the results indicate high levels of internal consistency and convergent validity across all dimensions of the LSS organisational culture framework (Figure 2).

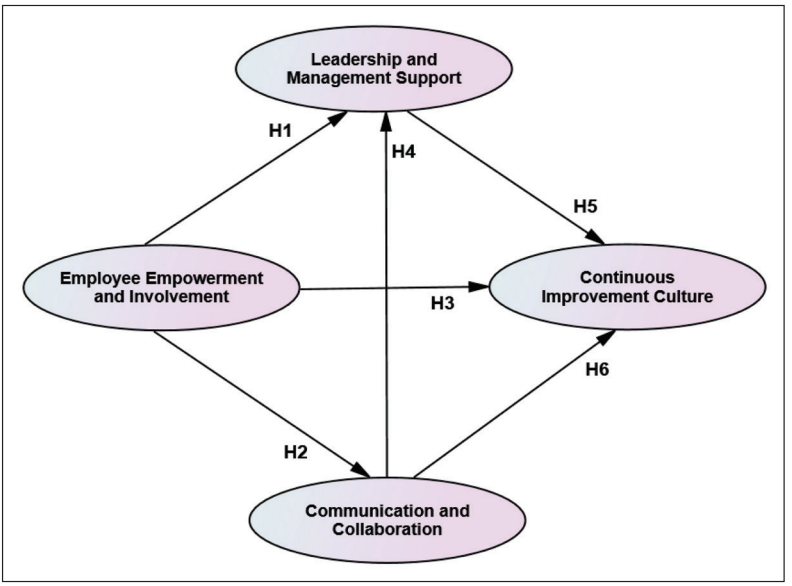

Figure 1. Result of Hypotheses Testing for Key Dimensions of Organisational Culture in LSS.

Source: Statistically analysed data.

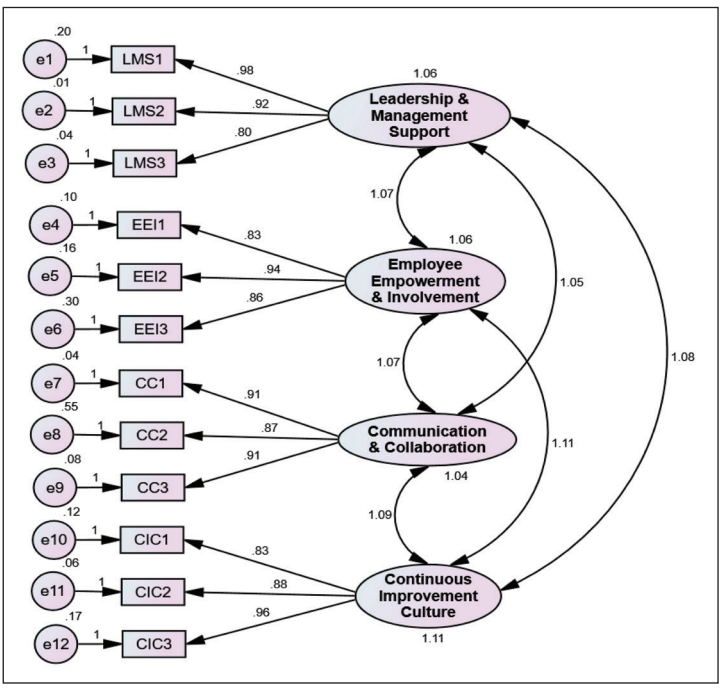

Figure 2. Measurement Model of Key Dimensions of Organisational Culture in LSS.

Source: Model framed during research study.

Table 6. Measurement Model of Key Dimensions of Organisational Culture in LSS.

Item(s)	Factor Item	CFA Loading	Cronbach α (Item-wise)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Leadership and management support					
Our top management actively champions LSS initiatives.	LMS1	0.980	0.985	0.975	0.952
Leaders in our organisation allocate sufficient resources (time, money and personnel) for LSS projects.	LMS2	0.920	0.983		
My managers encourage me to take ownership of process improvements.	LMS3	0.800	0.983		
Employee empowerment and involvement					
Employees at all levels are encouraged to participate in LSS projects.	EEI1	0.830	0.983	0.989	0.969
I have received adequate training to contribute effectively to LSS initiatives.	EEI2	0.940	0.984		
My ideas for process improvement are valued and considered by management.	EEI3	0.860	0.986		
Communication and collaboration					
There is open and transparent communication about LSS project goals and results.	CC1	0.910	0.983	0.990	0.970
Different departments (e.g., production, logistics and sales) collaborate effectively on LSS projects.	CC2	0.870	0.989		
Information and data for LSS projects are easily accessible across the organisation.	CC3	0.910	0.983		
Continuous improvement culture					
Our company's culture emphasises continuous improvement as a core value.	CIC1	0.830	0.983	0.989	0.967
We celebrate both the successes and learning from LSS projects, regardless of the outcome.	CIC2	0.880	0.983		
Our organisation is proactive in identifying and solving problems, rather than reactive.	CIC3	0.960	0.984		

Source: Statistically Analysed Data.

The reliability of the instrument was confirmed through several rigorous metrics:

- *Cronbach's α:* The coefficients for each construct ranged from 0.983 to 0.989 signifying exceptional internal reliability.
- *Composite reliability (CR):* The CR values ranged from 0.975 to 0.990, well above the recommended threshold of 0.70, further validating the internal consistency of the constructs.
- *Average variance extracted (AVE):* To assess convergent validity, AVE values were calculated. The results ranged from 0.952 to 0.970 significantly exceeding the 0.50 benchmark. This indicates that each latent construct explains a substantial proportion of the variance in its respective indicators.

Furthermore, confirmatory factor analysis was conducted to evaluate the factor loadings of individual items. The loadings ranged from 0.800 to 0.980, demonstrating that each item is a statistically significant representative of its underlying latent construct. These collective findings confirm that the measurement methodology is both reliable and valid, providing a stable foundation for the structural model analysis.

As illustrated in Table 7, the measurement model demonstrates robust discriminant validity, confirming the empirical distinctiveness of the four primary constructs: LMS, EEI, CC and CIC.

According to the Fornell–Larcker criterion, discriminant validity is established when the square root of the AVE for each construct represented by the bolded values on the diagonal exceeds the correlation coefficients between that construct and all other latent variables in the model.

The analysis reveals that the square root of the AVE for each dimension consistently surpasses its inter-construct correlations. Specifically, the square root of the AVE for LMS (0.975) is significantly higher than its correlations with EEI (0.958), CC (0.937) and CIC (0.967). This consistent pattern across all four dimensions validates that each latent construct captures a unique conceptual domain, ensuring that there is no multicollinearity or conceptual overlap between the variables.

Table 7. Discriminant Validity: Fornell–Larcker Criterion for Key Dimensions of Organisational Culture in LSS.

Particulars	LMS	EEI	CC	CIC
Leadership and management support (LMS)	0.975			
Employee empowerment and involvement (EEI)	0.958	0.984		
Communication and collaboration (CC)	0.937	0.941	0.985	
Continuous improvement culture (CIC)	0.967	0.979	0.952	0.983

Source: Statistically analysed data.

Results and Findings

Sample Demographics and Operational Obstacles

The demographic analysis reveals that the supply chain workforce is characterised by a significant concentration of procurement specialists and demand planners possessing extensive domain expertise. Despite the demonstrated efficacy of LSS in optimising production throughput and mitigating logistics bottlenecks, the findings indicate that internal organisational barriers significantly impede the realisation of its full potential.

Structural Model Assessment: Rationale for PLS-SEM

The application of PLS-SEM is justified by the study's predictive orientation. Unlike covariance-based SEM, PLS-SEM is superior for explaining the variance in endogenous constructs and is robust when handling non-normal data distributions.

The structural model's quality was evaluated using two primary indices:

- Coefficient of determination (R^2): This serves as the primary metric for predictive power. In this study, the R^2 values provide a 'substantial' (> 0.67) to 'moderate' (> 0.33) explanation of the variance in supply chain capacity integration, underscoring the model's explanatory strength.
- Standardised root mean square residual: As an absolute measure of model fit, the standardised root mean square residual was utilised to assess the discrepancy between observed and model-implied correlations. The resulting value fell below the 0.08 threshold, confirming a satisfactory model fit (Hair et al., 2017).

Discussion and Managerial Implications

The empirical evidence confirms that while LSS methodologies enhance supply chain capacity, their efficacy is contingent upon the organisational climate. The primary deterrents identified include active employee resistance, the perception of LSS as uncompensated labour and ambiguous project communication.

The results suggest that a CIC is not a standalone phenomenon but is effectively driven by a hierarchy of cultural antecedents. Specifically, leadership support, employee empowerment and cross-functional collaboration act as catalysts for institutionalising LSS.

Strategic Recommendations:

1. Communication transparency: Organisations must move beyond top-down mandates to clear, goal-oriented communication.

2. Incentive alignment: To overcome the 'supplementary work' stigma, concrete reward systems must be integrated with LSS participation.
3. Leadership commitment: Management must demonstrate 'active backing' through strategic resource allocation rather than passive approval.

Conclusion

This study concludes that the successful implementation of LSS in supply chain capacity management transcends the mere deployment of statistical tools; it is fundamentally a socio-technical transformation. The integration of human and cultural components is the primary determinant of whether LSS yields sustainable operational resilience or transient gains.

The findings provide a clear roadmap for practitioners: To achieve a flexible and high-performing supply chain, the 'soft' cultural foundation must be established before 'hard' technical optimisation can succeed. By fostering an environment of empowerment and collaborative change, organisations can transition LSS from a perceived administrative burden into a core strategic competency, ensuring long-term competitiveness in an increasingly volatile global market.

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Effect of Perceived Benefits and Risks on Continuance Intention of Using Mobile Banking Applications: User Satisfaction as Mediator

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Abstract

This article examines the link between perceived benefits, perceived risks and continuance intention of using mobile banking applications through the transmission mechanism of user satisfaction. The primary mode of data collection, comprising a structured questionnaire, was used, and a sample of 422 respondents belonging to the union territories of Jammu & Kashmir (J&K) and Ladakh was chosen. The mobile banking applications, namely Yono and Mpay Delight of two reputed banks, namely the State Bank of India and the Jammu & Kashmir Bank Ltd., respectively, were considered for study. Structural equation modelling and an independent samples *t*-test were used for analysing data. The results of the research study depicted a significant and positive effect of perceived benefits and user satisfaction, and a negative impact of perceived risks on continuance intention of using mobile banking applications. Moreover, user satisfaction partially mediated the link between perceived benefits and continuance intention. This study provides a fresh perspective for managerial practices to comprehend the crucial elements pertaining to users' desire to stick with mobile banking applications. This research advocates that engineering managers should provide straightforward and easy-to-use technology to increase the rate at which mobile banking applications are maintained. Furthermore, the findings suggest the crucial role of mobile banking in encouraging financial inclusion, thereby contributing to economic development. In this digital age, banks that provide mobile banking services may find strategic value in the study's conclusions.

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Introduction

Technology is seen as the cornerstone of today's rapidly changing world, which is developing at an alarming rate. Technology has permeated every part of our lives, as seen by its development and applications. Many jobs are now finished electronically due to the extensive use of information and technology at work and at home. As a result, time and location are no longer significant to various trades, making the internet a truly global marvel. Our daily lives have been impacted and transformed by the expansion and development of the internet and information technology (Mladenovic & Krajina, 2020; Raudeliuniene et al., 2018).

With the introduction of this wonder, practically every industry changed. The financial industry also began making large investments in this technology after realising its importance. Because banks needed to automate their operations to meet the ever-increasing demands of their customers and keep up with the technological changes occurring globally, the 'evolution of electronic banking that started from the use of automatic teller machines (ATM) and passed through telephone banking, direct bill payment, electronic fund transfer, and the revolutionary mobile banking' was the outcome (Baabdullah et al., 2019). Banks serve their clients' diverse requirements and desires, which are becoming more and more specific (Komulainen & Saraniemi, 2019). Online banking, mobile banking, and near field communication are some of the technologically oriented delivery platforms that banks use to provide banking services (Shankar et al., 2020).

Mobile banking was the most significant change that represented a significant departure from traditional banking among the positive innovations brought forth by the banking industry. It is regarded as the most valuable and adaptable business application currently available (Singh & Srivastava, 2018), whose rise can be 'ascribed to technological advancement and evolving consumer demands in terms of affordability, flexibility, choice, and convenience' (Chawla & Joshi, 2017).

As cited by Mullan et al. (2017), Mobile banking is defined as 'A transaction in which a client connects to the service provider through a mobile gadget, like a smartphone or Personal Digital Assistant'. Through the extension of remote correspondence, mobile banking has made it easier to develop and expand commercial transactions. It has also created a wide range of business opportunities by making it easier to trade, acquire goods and services, pay bills, and conduct fund transactions. This advancement has not only improved the bank's operations in terms of staff workload reduction, catering time reduction, digital device use, and customer acquisition, but it has also made customers' daily banking activities more convenient, which is why the industry is moving toward digitalisation.

Thus, researchers' assertion that this banking administration approach has paved the way for innovative economic advancement in both wealthy and developing nations is supported.

> Mobile banking is a great example of a mobile technology innovation in the banking industry, allowing customers to independently conduct financial transactions (such as checking their balance, transferring funds, or paying bills) using smartphones, PDAs, or mobile devices at any time and location of their choosing. (Alalwan et al., 2017)

Furthermore, increased smartphone usage has increased interest in M-banking services, leading nearly all financial institutions to provide this ground-breaking service along with a new suite of goods and apps designed to increase their clientele (Mohammed & Rozsa, 2024). Therefore, the mobile phone has become an essential tool for banking clients' daily tasks.

When the internet revolution became apparent in the late 1990s, the idea of mobile banking was developed. The first service was initiated and launched by a German company called Pay-box in collaboration with Deutsche Bank (Shaikh & Karjaluoto, 2015). Banks in India have been particularly competing with one another to adopt innovation in order to provide and improve better customer services and to move toward a computerised shift in order to stay competitive.

For this reason, banks must look into mobile banking trends to comprehend the market and stay ahead of the competition. However, numerous financial institutions have made an effort to integrate this innovation into their banking procedures throughout time. According to industry projections, India is becoming the fastest-growing portable market (Chawla & Joshi, 2017), with advertisers projecting growth of over 75% of the population by the end of 2025 (Global System for Mobile Communications, 2018). Analysts must give this rapidly changing consumer of the massive mobile banking sector considerable thought. Since India was a latecomer to the demonetisation wave, the Central Government and the nation's financial regulatory body have focused on facilitating an ever-increasing number of cashless transactions.

Numerous industries, including banking, have seen changes as a result of the widespread adoption of mobile phones, the creation of smartphones, and the more affordable, generally available internet (Domazet et al., 2018). Because of this, a growing number of banks, software firms, microfinance organisations, and service providers are now providing this innovative service in addition to new product and application sets meant to enhance client retention, boost market share, expand their clientele (including to unbanked populations), increase operational efficiency, and create new job opportunities (Shaikh, 2013). Banking is a highly regulated industry with relatively stable business models and significant transaction and operating costs. In a developing market like India, mobile banking still has a long way to go. Banks and Financial institutions have been focusing on cashless transactions, and the majority of banks have already released fully secure mobile banking software and applications.

Numerous research studies have used both qualitative and quantitative methodologies to examine M-banking and related aspects that affect customers'

adoption of it. It is possible for someone who used a certain technology in the first phase to quit using it for a variety of reasons. In their analysis of the factors influencing users' continuing intention to use (CI) of mobile banking technology, Foroughi et al. (2019) discovered that users will only stick with mobile banking if they find it helpful and are happy with their experience. Customers believe that using mobile banking is justified when the advantages (like convenience, cost savings or performance) outweigh the risks (like fraud involving transaction integrity or authenticity, reputational harm, privacy or confidentiality breaches; Chang et al., 2016). Therefore, it is critical to comprehend the benefits and risks of mobile banking from the viewpoint of the user.

There is not much peer-reviewed literature on mobile payments, even if the number of papers has increased. Numerous studies on mobile banking have been published in recent years due to the FinTech industry's explosive expansion and the complexity of the factors impacting its use and adoption. Recent research indicates that numerous articles have looked at the components that have a bearing on the results, consumer approval, and adoption of different mobile payment platforms, particularly following the COVID-19 pandemic, as well as customer satisfaction, security concerns, design features, and innovation (Al-Qudah et al., 2022; Dahlberg et al., 2015; Makki et al., 2016).

There is a dearth of literature on the usage of M-banking apps in India, particularly in J&K and Ladakh. Therefore, the current study intends to assess the use of different mobile banking apps of select banks operating in J&K and Ladakh. The study would provide implications for various stakeholders, namely, banks, the government, and customers, by making thorough research on the use of mobile banking applications. As the leading financial institutions in the union territories of J&K and Ladakh, the State Bank of India and the J&K Bank have also launched the high-end applications, 'Yono' and 'Mpay Delight', respectively. However, M-banking is still relatively new in J&K and Ladakh compared to online banking; hence, the bank's job is to make it more appealing to clients to recognise using the mobile channel for banking services. Yono is a mobile application introduced by the premier institution of India, namely the State Bank of India. There are 250 computerised SBI branches across J&K and Ladakh. Mpay Delight is a mobile application introduced by the most prominent bank, namely J&K Bank, in the UT of J&K and Ladakh. The said bank owns a wide network of 1,001 computerised branches across J&K and Ladakh. Given their clientele, the research has a lot of room to grow because these banks are leading the way in the valley's transition to a digital economy. J&K and Ladakh are perfect locations for the study because of the high percentage of mobile users, the rapid expansion of m-commerce, and the clients' preference for more modern banking services.

The current study was carried out in order to learn how users react to mobile banking, especially in light of the lack of adequate banking services, especially in remote areas, and the periodic interruptions of banking services for a variety of reasons. Given that the Kashmir Valley has been a region plagued by conflict over the past 30 years, with regular strikes and the occasional suspension of banks and other commercial facilities, the current study is especially important. Customers can choose to use mobile banking to get uninterrupted financial services

whenever it is convenient for them, which will help them get out of this unpleasant scenario. Nevertheless, in spite of everything, there does not appear to be any favourable reaction to the customers' usage of M-banking. In order to resolve the concerns, a comprehensive investigation is required to determine the causes of any potential inhibition, hesitation, internet troubles, or ignorance among mobile users regarding the usage of mobile banking in general.

The current research is being conducted with the following objectives:

1. To study the effect of perceived benefits on continuance intention of using mobile banking applications.
2. To understand the effect of perceived risks on the continuance intention of using mobile banking applications.
3. To know the effect of user satisfaction on continuance intention of using mobile banking applications.
4. To explore the mediating relationship of user satisfaction between perceived benefits & continuance intention of using mobile banking applications.
5. To assess the difference in perceived benefits, perceived risks, user satisfaction and continuance intention of two mobile banking applications, namely Mpay Delight and Yono.

The primary source of data collection was used comprising of a well-structured questionnaire to attain the specific objectives of the research. These research questions are at the centre of the primary research problem that motivates our investigation: (a) How much (if at all) does the likelihood that users will continue (or stop) using mobile banking applications depend on their perceptions of the risks and benefits? (b) To what extent (if at all) do user-perceived benefits and the satisfaction of consumers play a vital role in using mobile banking applications?

A review of the literature on the impact of several prognosticators on the intention to continue using mobile banking applications is included in the next portion of this research study. The study framework and the formulation of the hypotheses are based on the literature review. The section addressing the study sample's descriptive statistics and methods, along with its variables, comes next. The results are next discussed, and then the conclusions, limitations, implications, and future directions of the research are covered.

Literature Review and Hypothesis Development

Theoretical Background of Mobile Banking

Scholars have defined mobile banking differently and used a variety of terminologies to describe it. Liu et al. (2009) have referred to it as M-banking, Ivatury and Mas (2008) termed it as branchless banking, and Donner and Tellez (2008) called it M-finance. Muñoz-Leiva et al. (2017) described it as a remote service provided by financial organisations to meet the needs of their clients via

mobile devices, PDAs, tablets, etc., whereas Tam and Oliveira (2017) proposed that 'M-banking is a service or product offered by financial institutions that makes use of portable technologies'. Accordingly, this study defines M-banking as a platform that allows users to access information associated with their bank accounts and conduct financial transactions using a mobile device at any time and from any location. Over time, a variety of theoretical stances have emerged, including well-known models to examine the adoption of mobile banking, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003), the Task-technology Fit by Goodhue and Thompson (1995), the Technology Acceptance Model (TAM) by Davis (1989), the Social Cognitive Theory by Bandura (1989), and the Innovation Diffusion Theory (IDT) by Rogers (1983).

Perceived Benefits and Continuance Intention of Using Mobile Banking Applications

Relatively little research has been conducted on continuance intention in comparison to the bulk of studies on initial adoption. It was confirmed that the intention to continue using mobile internet services was influenced by perceived enjoyment, familiarity, utility, uncertainty avoidance, and access quality (Lee et al., 2007; Shin et al., 2010; Zhou, 2011). Likewise, researchers have discovered that consumers' intentions to stick with mobile data services can be influenced by elements like perceived enjoyment, social impact, information quality, and perceived cost (Choi et al., 2011; Kim, 2010; Kim et al., 2009). Chen (2012) proposed that the intention to stick with mobile banking is significantly influenced indirectly by service quality and technological preparedness. According to Chen (2012), users' expectations are positively impacted by the ongoing development of mobile content services. According to Kang et al. (2012), three key factors that influence long-term M-banking use are perceived value, channel preference, and usability.

The influence of service quality and justice on the happiness of users, which in turn influences the intention to continue using mobile value-added services, was investigated by Zhao et al. (2012). They investigated how user satisfaction is impacted by service quality and fairness, and how this influences users' intentions to continue using mobile value-added services.

Thus, we formulated the hypotheses as:

H_1: Perceived benefits have a positive impact on continuance intention to use mobile banking applications.

User Satisfaction and Mobile Banking Continuance Intention

In order to determine which elements need to be addressed in order to enhance the system's service quality and, consequently, please consumers, researchers are also investigating how satisfied users are with mobile banking (Khan et al., 2018).

User satisfaction is a critical and potent response to purchase situations in retail banking. Numerous scholarly studies indicate that satisfaction with mobile banking is a component that affects its results (Mohammadi, 2015; Püschel et al., 2010). The idea of net valence states that customers should only utilise a product or service if they feel the benefits outweigh the risks in order to maximise the product's or service's net value (Featherman et al., 2006; Li & Wang, 2017). Because they have a positive attitude toward a product or service, consumers are more likely to use it when they intend to (Fishbein & Ajzen, 1975). According to this hypothesis, the belief that the benefits of a product or service outweigh the drawbacks is the foundation for the intention to keep using it (Yousafzai et al., 2010). In their examination of consumers' inclination to utilise (and persist in utilising) mobile payment systems, Qasim and Abu-Shanab (2016) clarified that consumers' propensity to use mobile banking is influenced by their perceptions; therefore, the more highly they value a product or service, the more likely they are to use it. Accordingly, it is hypothesised as:

H_2: User satisfaction bears a positive influence on continuance intention to use mobile banking applications.

Perceived Risks and Continuance Intention of Using Mobile Banking Applications

The results of Alonso-Dos-Santos et al. (2020) revealed that there exists a strong relationship between perceived risk and mobile banking usage. According to net valence theory, users perceive a number of risks associated with utilising mobile banking, including operational, legal, security, and financial risks. Perceived risk is a significant aspect in e-banking that indicates a user's intention to continue using a product or service (Arner et al., 2015). Due to the growing global context of mobile banking, the most recent study in the field by Marafon et al. (2018) indicated that the analytical model needs to be improved, particularly in order to comprehend the relationship between intention to use mobile banking and perceived risk. Real or perceived hazards or challenges related to a product or service, like mobile banking, lead to negative views that deter use (Britton et al., 2019). Research on innovation, information systems, and consumption indicates that if consumers perceive a risk involved in using IT services, their intentions to do so are negatively influenced (Zhou, 2015). Zhou examined the advantages and disadvantages of location-based services from the perspectives of enablers (benefits of usefulness and trust) and inhibiters (privacy risks). The results showed that propensity to use a product or service was correlated with perceived benefits (like trust), outweighing risks. He did this by using the dichotomy of facilitators and inhibitors to evaluate the elements that influence the uptake of location-based services. Wu and Wang (2005) discovered that behavioural intentions in e-commerce are significantly influenced by perceived risk. According to various studies, one of the primary factors influencing users' acceptance of M-banking is perceived risk (Brown et al., 2003; Luarn & Lin, 2005). Therefore, it is hypothesised that:

H_3: Perceived risks have a negative impact on continuance intention to use M-banking applications.

User Satisfaction as a Mediator Between Perceived Benefits and Continuance Intention to Use M-banking Applications

Satisfaction has a mediating role between application continuing intention and hedonic advantages. Additionally, the relationship between application continuing intention and utilitarian gains is mediated by satisfaction (Akel & Armağan, 2021). The relationship between different customer-perceived benefits, including learning, self-realisation, and hedonic benefits, and the intention to continue in online China brand communities is mediated by satisfaction (Han et al., 2018). Based on the above literature, it is hypothesised that:

H_4: User satisfaction mediates the relationship between perceived benefits and continuance intention to use M-banking applications.

Based on the objectives of the study and the proposed study model (Figure 1), further hypotheses were framed as:

H_5: A significant difference occurs between Mpay and Yono users with respect to perceived benefits.
H_6: A significant difference occurs between Mpay and Yono users with respect to user satisfaction.

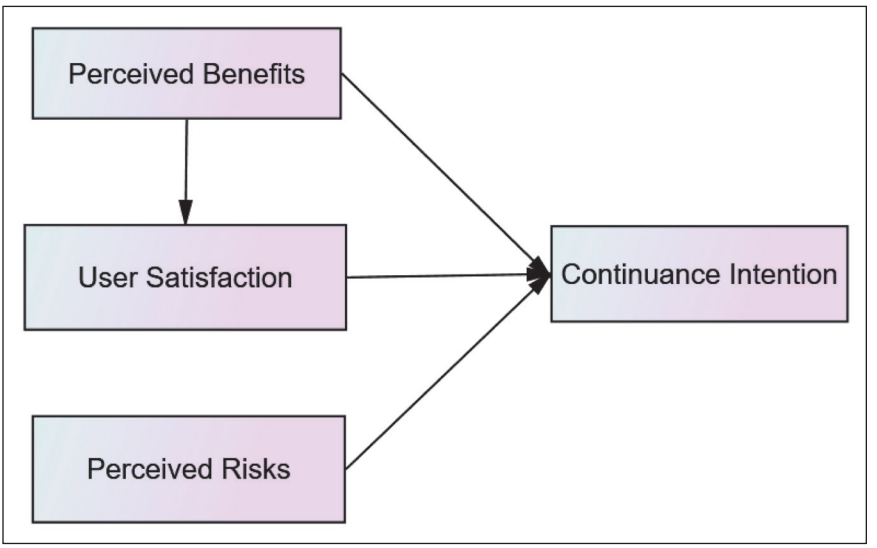

Figure 1. The Proposed Research Model.

H_7: A significant difference occurs between Mpay and Yono users with respect to continuance intention.

H_8: A significant difference occurs between Mpay and Yono users with respect to perceived risks.

Research Methodology

Population and Sample

The proposed study is delimited to the mobile banking applications of select banks operating in Jammu and Kashmir. The data was collected from customers of the select banks operating in Jammu and Kashmir. A questionnaire survey was used to perform this cross-sectional investigation. The main method of data analysis was structural equation modelling (SEM), which uses a two-step process that combines measurement and structural models to concurrently create a graphical depiction of the research relationships. Also, an independent samples *t*-test was used to check the difference between two mobile banking applications in different aspects covered under the objectives of the study.

This study was conducted between September 2024 and February 2025. The usage of mobile banking applications is increasing day by day. As such, many banks are providing mobile banking services to their customers to satisfy their changing requirements (Etikan et al., 2016). We selected convenience sampling because it is widely accepted in the social sciences and ensures timely availability and accessibility, geographical vicinity, and respondents' willingness to participate. The lack of a suitable sample frame led to the adoption of convenience sampling, which allowed researchers to collect data that would have been impossible otherwise.

The population targeted comprised employees working in different public and private organisations, professionals, businessmen, students and scholars belonging to the union territories of J&K and Ladakh. The non-probability sampling method of snowball sampling was employed to gather responses because it was difficult to reach such a broad group of interest. Questionnaires were physically distributed among the respondents. Participants were made aware of the purpose of the study prior to the survey being administered.

The sample size for the study was calculated as per Krejcie and Morgan's (1981) formula, as 384, as the total population exceeded 10 lakhs. The total number of 422 questionnaires was distributed, taking the attrition rate of 10%. Twenty-two questionnaires were omitted from the study due to incomplete replies. As a result, only 400 questionnaires were deemed suitable for the data analysis.

Research Design

The survey questionnaire was divided into two sections: the first portion gathered demographic data from the respondents, while the second part contained

information regarding the study constructs (refer to Appendix A). Below is a comprehensive overview of these two sections:

The participant's age and gender were ascertained in the first segment.

The second section involves: Perceived benefits -this construct was measured using Rahim's twelve-item scale (Abdul-Rahim et al., 2022). This scale's representative item is, 'This application is user-friendly in terms of setting up, configuring and using the service'.

User satisfaction: A four-item scale was adapted from Geebren et al. (2021) to measure the user satisfaction construct. This scale's sample item is, 'I think I did the right thing when I selected this application'.

Perceived risks: A 10-item scale adapted from Lee (2009) was used to assess the perceived risks of the mobile banking construct. This scale's representative item is, 'This application may not perform well because of servers being down due to undergoing maintenance'.

Continuance intention: Poromatikul et al. (2020) provided a four-item scale, which we modified to assess the continuing intention construct. This scale's sample item is, 'I would continue using this application rather than discontinuing it'.

In order to document respondents' responses about the study items, a 5-point Likert scale was employed, with 1 denoting strongly disagree, and 5 denoting strongly agree. The study variables were confirmed using a pilot study comprising 30 respondents before the final data collection. To examine the links between the study variables, a confirmatory factor analysis (CFA) (using AMOS 24.0) is conducted after an exploratory factor analysis (EFA) (using SPSS 27.0). Additionally, the average variance retrieved, CR, and squared correlations were used to confirm the validity and reliability of the study components.

Reliability and Validity

The reliability was assessed using composite reliability (CR) and convergent validity using average variance extracted (AVE) (Table 1). Reliability is indicated by the composite reliability estimates above 0.70 values, which is the minimal criterion (Zafiropoulos et al., 2012). In order to evaluate dependability, this study gave CR values precedence over Cronbach's alpha because the latter can provide biased findings (Peterson & Kim, 2013). Furthermore, when evaluating reliability,

Table 1. The Average Variance Extracted (AVE), Composite Reliability (CR) and Shared Variance Estimates.

	AVE	CR	Continuance	Benefits	Risks	Satisfaction
Continuance	0.694	0.900	0.833			
Benefits	0.779	0.977	0.395	0.883		
Risks	0.619	0.942	0.441	0.395	0.786	
Satisfaction	0.725	0.912	0.410	0.544	0.374	0.851

the CR is superior to Cronbach's alpha. Since the AVE values are higher than the 0.50 level, or the lowest threshold level, the results also show convergent validity (Fornell & Larcker, 1981).

We adhered to Fornell & Larcker's (1981) suggestion that the AVE estimates of any two constructs be greater than the shared variance estimate (squared correlations) in order to guarantee discriminant validity. Since the AVE estimates for each factor are greater than their corresponding squared correlations, the results demonstrate discriminant validity (Table 1).

Therefore, the above results indicate the reliability and validity of the dataset.

The Descriptive Statistics of the Study Sample and Its Variables

Respondents Demographic Profile

Most respondents were male, that is, 84%, followed by females, 16%. Regarding age, 30% of the respondents belonged to the 18–30 years; 43.30% were from 31 to 45 years age group, followed by those above 45 (26.80%) (see Table 2).

Exploratory and CFA

Principal components analysis with Promax rotation was employed in EFA to investigate the study constructs. According to the EFA results, every item had loadings greater than 0.6 on its corresponding factor (see Table 3). Furthermore, according to Ford et al. (1986), factor loadings higher than 0.4 lessen subjectivity in the interpretation of data. The validity of the study constructs is thus indicated by the EFA results.

Also, CFA was used to validate the factor structure that was taken from EFA. For reliable outcomes, it is essential to have higher model-fit values (Moslehpour et al., 2018). According to the findings, every fit index met the suggested threshold values (see Table 4). As a result, the study's suggested model aligns well with the empirical data.

Table 2. The Demographic Information.

Category	Frequency	%
Gender		
Male	336	84.00
Female	64	16.00
Age (in Years)		
18–30	120	30.00
31–45	173	43.30
Above 45	107	26.80

Table 3. Pattern Matrix.

	Component			
	1	2	3	4
PB1	0.786			
PB2	0.847			
PB3	0.881			
PB4	0.931			
PB5	0.933			
PB6	0.906			
PB7	0.961			
PB8	0.810			
PB9	0.857			
PB10	0.873			
PB11	0.952			
PB12	0.936			
PR1		0.591		
PR2		0.849		
PR3		0.859		
PR4		0.841		
PR5		0.831		
PR6		0.813		
PR7		0.842		
PR8		0.780		
PR9		0.784		
PR10		0.812		
SAT1				0.896
SAT2				0.951
SAT3				0.899
SAT4				0.660
CONT1			0.845	
CONT2			0.865	
CONT3			0.894	
CONT4			0.906	

Notes: Extraction Method: Principal Component Analysis. Rotation method: Promax with Kaiser normalisation.
[a]Rotation converged in five iterations.

Table 4. The Model-fit Summary.

Fit Index	Resultant Value	Recommended Value (Source)
CMIN/df	2.872	≤3.00 (Carmines et al., 1981)
GFI	0.838	Closer to 0.90 (Hooper et al., 2008)
AGFI	0.885	Closer to 0.90 (Hooper et al., 2008)
NFI	0.917	Closer to 0.90 (Hooper et al., 2008)
CFI	0.944	Closer to 0.90 (Hooper et al., 2008)
RMSEA	0.068	<0.10 (Bollen, 1989; Browne & Cudeck, 1993)
RMR	0.072	<0.10 (Bollen, 1989; Browne & Cudeck, 1993)

Hypothesis Testing

Structural Equation Modelling

SEM was employed for testing the study's proposed hypotheses (H_1 to H_3). Research model compatibility is confirmed, and causal linkages are assessed through the use of SEM (Tobbin, 2010). In the structural model, the path coefficients are represented by the standardised betas (β) (Saadé & Bahli, 2005). Furthermore, since the correlations between the independent variables were less than 0.8, there were no problems with multicollinearity.

The results show that the model explains cumulative variance of 75.61%, with 44.61% of the variance in perceived benefits, 16.95% in perceived risks, 7.99% in user satisfaction, and 6.03% in Continuance intention. The findings validated the hypothesised connections regarding H_1, H_2, and H_3 (Table 5).

Mediation Analysis Using Hayes Approach

According to several researchers, SEM is the best method for examining the mediation effect in any study (Baron & Kenny, 1986; Frazier et al., 2004; Hoyle & Smith, 1994; Preacher & Hayes, 2004). This is because it liberates the mediator and the dependent variables from their measurement mistakes; if they are not included, the correlation between the variables is diminished. By examining numerous independent and dependent variables at once, SEM is also far more adaptable and examines the complete causal model. In the present study, mediation analysis has been used to examine whether the causal effect of perceived benefits on continuance intention of using mobile banking applications is caused by user satisfaction (refer to Figure 2). Preacher and Hayes (2004) state that determining whether the indirect pathway from independent variable to mediator to dependent variable is statistically significant is a prerequisite for obtaining evidence in favour of mediation. With this method, the overall impacts are divided into direct and indirect effects.

Independent Sample t-test.

An independent sample *t*-test has been performed to assess the disparity between the means in two unrelated groups, that is, whether the mean value of the test variables (perceived benefits, user satisfaction, perceived risks and continuance intention) for one banking application, namely J&K Bank Mpay Delight differs

Table 5. Structural Model Coefficients (*Hypothesis Testing:* H_1 to H_3).

Hypotheses	Path	Standardised Beta (β)	Result
H_1	Perceived Benefits→ Continuance Intention	0.157*	Supported
H_2	User Satisfaction→ Continuance Intention	0.196***	Supported
H_3	Perceived Risks→ Continuance Intention	–0.290***	Supported

Note: ***$p < .001$; *$p < .05$.

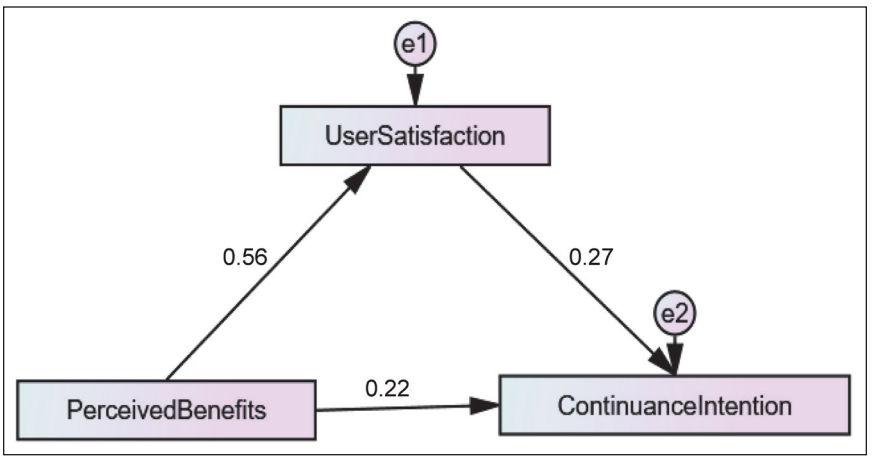

Figure 2. The Mediation Model.

significantly from the mean value for the other one, that is, Yono SBI. The results of the test are depicted in Table 7.

Findings and Discussion

This study explored the continuance intention of mobile banking applications through the perceived benefits, user satisfaction and perceived risks mechanisms. Existing models were used to accommodate the research constructs. The constructs included perceived benefits, user satisfaction and perceived risks as the antecedents and continuance intention as the outcome variable. The inclusion of user satisfaction as the intermediary variable in the current research model strengthens the validity of the study's conclusions, as responsiveness and security features have a big impact on people's acceptance of technology (Barnes & Vidgen, 2002; Parasuraman et al., 1985).

Our results support H_1, that is, a significant positive relationship between perceived benefits and continuance intention ($\beta = 0.157$; $p < .05$). This finding supports prior studies (Looney et al., 2004) and signifies that the more benefits offered by mobile banking applications to the users, the greater their willingness to continue with the mobile application. Moreover, Additionally, this emphasises how crucial it is to promote mobile banking's benefits to guarantee its continued growth and use (Baganzi & Lau, 2017). Further, H_2, a significant and positive association between user satisfaction and continuance intention, is also supported ($\beta = 0.196$; $p < .001$). This finding supports the existing literature (Mohammadi, 2015; Püschel et al., 2010). It may be because when the users are highly satisfied with the services of a mobile banking application, their continuance intention of using the application would also be positive. Because happy customers are more likely to intend to make additional purchases in the future, happiness has thus historically been recognised as an antecedent (Chiang et al., 2008).

H_3, a negative relationship between perceived risks and continuance intention of using mobile banking application, is also supported (β = –0.290; p < .001). The financial, performance, security/privacy, time and social risk of mobile banking adversely affect its continuance intention to use. This finding also aligns with the literature (Abrahao et al., 2016; Alonso-Dos-Santos et al., 2020; Lee, 2009; Zhou, 2015). As depicted in Table 6, the perceived benefits exert their effect on continuance intention both directly and indirectly. There is partial mediation of user satisfaction between perceived benefits and continuance intention, indicating significant values (β = 0.218; p < .001) and (β = 0.149; p < .001) for both direct and indirect effects, respectively. We can conclude that there is a positive effect of both perceived benefits and user satisfaction on continuance intention of using mobile banking applications. This aligns with the previously established literature (Akel & Armağan, 2021; Han et al., 2018). The user satisfaction does not fully mediate the perceived benefits and continuance intention relationship.

As depicted in Table 7, the findings of the study reflect that there is a significant difference in perceived benefits with respect to Mpay Delight and Yono with (t = –6.822, p < .001). Hence, H5 is accepted. It was found that the Yono provides more benefits in comparison to Mpay Delight. There is also a significant difference in user satisfaction with respect to Mpay Delight and Yono (t = –6.422,

Table 6. The Mediation Results (Hypothesis Testing: H_4).

Hypothese: H_4	Direct Effect	Indirect Effect	Result
Perceived Benefits→ User Satisfaction→ Continuance Intention	0.218***	0.149***	Partial mediation

Table 7. Independent Samples *t*-test for Perceived Benefits; User Satisfaction, Perceived Risks and Continuance Intention with Respect to Mobile Banking Applications (Hypothesis Testing: H_5 to H_8).

Hypotheses	Mobile Banking Application	Construct	*N*	Mean	Standard Deviation	*t*-value	*p* Value	Result
H_5	J&K Bank Mpay Delight	Perceived benefits	200	3.0500	1.2971	–6.822	.000	Supported
	Yono SBI		200	3.8583	1.0607			
H_6	J&K Bank Mpay Delight	User satisfaction	200	3.0500	1.2123	–6.422	.000	Supported
	Yono SBI		200	3.7963	1.1093			
H_7	J&K Bank Mpay Delight	Perceived risks	200	2.1300	0.6944	3.441	.194	Not supported
	Yono SBI		200	1.8870	0.7176			
H_8	J&K Bank Mpay Delight	Continuance intention	200	3.5875	1.1129	–4.126	.000	Supported
	Yono SBI		200	3.9925	0.8296			

$p < .001$). Hence, H6 is also accepted. User satisfaction was more prominent in case of Yono users than Mpay users. With respect to perceived risks regarding Mpay Delight and Yono ($t = 3.441$, $p = .194$), indicating there is no significant difference between the two groups. Therefore, H7 is rejected. It was seen that there is a slight difference in the perceived risks of both Yono and Mpay Delight. There is a significant difference in continuance intention between Mpay Delight and Yono with ($t = –4.126$, $p < .001$), thereby leading to acceptance of H8. The intention of users to continue using Mpay Delight was found to be negative as compared to those using Yono.

Implications

Theoretical Implications

This research study proposed and tested a mobile banking continuance model in the Indian context. This study explored the continuance intention of mobile banking applications through the perceived benefits, user satisfaction and perceived risks mechanisms. First, the results of the study contribute to the understanding and explanation of the prognosticators of technology adoption by advancing the TAM and UTAUT models, especially mobile banking continuance (Davis, 1989; Venkatesh et al., 2003). Second, our study results show that perceived benefits and user satisfaction together play a vital role in enhancing and maintaining continuity with mobile banking applications of different users. These benefits include convenience, ease of use, security, privacy, control, customisation, interactivity, and so on (Alalwan et al., 2016).

Furthermore, on account of findings of the study, it is inferred that risks perceived by users in terms of poor performance of banking applications on account of servers being down due to ongoing maintenance, fear of losing money due to information leakage, and so on, affect the continuance intention of users. In this regard, banking organisations should focus on improvement in facilitating hassle-free service to their customers, such as minimising the updating time for applications, leading to the least interruption of server operations and superior performance. Also, the banks can enhance security measures and develop trust of their users by introducing biometric technology such as facial mapping, fingerprint and voice recognition.

Practical Implications

Regarding technology (mobile banking) suppliers and users, including the Indian financial services sector, our findings also have some ramifications for managers and regulators. Furthermore, this study sheds light on the core priorities of users regarding M-banking usage and continuity. For engineering management practice, this study has some commendable implications. For instance, this study highlights that engineering managers should simplify mobile banking applications to

increase their use and retention rate by creating solutions that are user-friendly and beneficial.

Moreover, our study signifies that J&K Bank engineering staff need to focus on technology specifications for stimulating tech continuance. Many respondents using Mpay Delight reported that giving both transaction personal identification number (TPIN) and mobile personal identification number (MPIN) details, waiting for one-time password (OTP) while making a simple transaction, becomes tedious for users. It adversely affects the continuance intention of users and makes them switch to other applications. Therefore, when it comes to mobile banking, engineering managers should put an emphasis on added value and simplicity. Enhancing technology's usability, cutting down on time waste, and speeding up transactions are all examples of the simplicity perspective, which is connected to the added value perspective.

To enable user-friendly products, technology providers can concentrate on improving the general user interface (UI) of their solutions. In order to help project managers, system developers, and human factor engineers, Opaluch and Tsao (1993) provided 10 ways to enhance usability engineering. Identifying end users, appointing a UI designer early on, and listing end-user tasks are some of these strategies. Furthermore, by increasing awareness of its features and advantages, mobile banking service providers can encourage users to keep using it. It becomes crucial to be aware of a new technology since its acceptance is preceded by user (organisation or individual) knowledge about how simple (easy-to-use) and valuable the technology is. To achieve the desired goal, internal marketing initiatives should concentrate on encouraging word-of-mouth advertising. This implies that customers must be aware of the advantages and capabilities of mobile banking in order to support its continuity. Furthermore, as mobile banking has been viewed as a promising element in this field, it is imperative that both the public and commercial sectors support it to assist India in achieving the goal of financial inclusion. To summarise, our study offers a candid view for banking organisations on improving the performance and overall continuance of their mobile banking applications.

Conclusion

This study is the first to explore the role of perceived benefits, user satisfaction, and perceived risks in influencing continuance intention of mobile banking applications in the union territories of J&K and Ladakh. The applications of two reputed banks, namely the State Bank of India and the Jammu & Kashmir Bank Ltd., have been taken into consideration. By incorporating these research constructs into the usage and continuation of mobile banking, this study contributes to the body of literature on TAM/technology acceptance theories.

Summarising the findings, it can be concluded that both J&K Bank and SBI are doing their best to deliver better mobile banking services to their customers. But J&K Bank needs to work a bit harder to improve the efficacy of Mpay Delight, as has been found from the study results that many Mpay Delight users

are switching to other mobile banking applications rather than continuing with the same one. The study recommends that engineering managers should offer simple and user-friendly technology to enhance the continuance rate of mobile banking applications. Additionally, the results emphasise the significance of mobile banking in encouraging financial inclusion, thereby contributing to economic development. Banks offering mobile banking services could use the study findings strategically in this digital era.

Limitations and Future Research Directions

This research has certain limitations despite its noteworthy achievements. First off, the quality and validity of the data were limited because this study used self-reported questionnaires, which are more likely to contain bias due to respondents concealing their genuine emotions (Fan et al., 2002). To get around this restriction, future research can concentrate on objective data. Second, this study focused on only two mobile banking applications, namely J&K Bank Mpay Delight and Yono SBI, limiting the results' generalizability. Moreover, the area of study was confined to the union territories of J&K and Ladakh, which again raises concern for the generalizability of results. Future studies could focus on more mobile banking applications to make more assertive statements. Third, this study was cross-sectional in nature; future studies could be longitudinal in nature.

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Appendix A

Informed Consent Form

Dear Respondent,

This questionnaire is purely for academic/research purposes. This questionnaire seeks to collect data on the topic: 'Effects of Perceived Benefits and Risks on Continuance Intention of Using Mobile Banking Applications: User Satisfaction as Mediator'. For this research, we need some information from users of Mpay Delight+/YONO SBI.

The data collected would be used in aggregate, and no individual's data would be named/quoted in the research. Please note that you are not required to disclose your identity while filling out this questionnaire. Therefore, you can be assured that your answers are completely confidential.

Your cooperation is highly important for the successful completion of the study. As such, it is requested to answer each statement included in the questionnaire correctly after due consideration.

Thanking you in advance.

Part A

General information

(1) Gender _____(2) Age in yrs_____(3) Contact No.(optional)_____

Select one of these mobile banking applications and mark your responses for the questions that follow.

JKB Mpay Delight + ☐ **YONO SBI** ☐

Part B

Instructions: Based on your experience of using a mobile banking application, please rate your responses by marking a tick (✓) on the scale of 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree Nor Disagree (N), 4 = Agree and 5 = Strongly Agree.

S.No	Perceived Benefits	1	2	3	4	5
PB1	This application is easy to use and provides a user-friendly interface in terms of setting up, configuring and using the services					
PB2	This application provides round-the-clock accessibility					

(Continued)

(Continued)

S.No	Perceived Benefits	1	2	3	4	5
PB3	This application provides security via biometric and multi-factor authentication					
PB4	Using this application enables me to perform core banking functions more quickly (like making fund transfers, balance inquiry, checking account statements)					
PB5	It improves efficiency as it saves my time in performing banking tasks (avoiding going to branches and traffic jams)					
PB6	It offers me a wider range of banking products and services (like online account opening, apply for instant loans, cheque status enquiry)					
PB7	This application allows me trading in stocks and other financial market products directly					
PB8	This app allows me to invest in various government schemes					
PB9	Beyond standard banking, the app's connection with e-commerce platforms and lifestyle services for travel, shopping and entertainment adds value					
PB10	This application allows me to save money by providing best offers, rewards, discounts and coupons					
PB11	It is easy to become confident at banking application for the cell phones					
PB12	This application has 'all-in-one' functionality feature by consolidating numerous banking and financial services in one place					
S.No	**Perceived Risks**	**1**	**2**	**3**	**4**	**5**
PR1	This application may not perform well because the servers being down due to undergoing maintenance					
PR2	This application sometimes processes payments incorrectly					
PR3	Concerns regarding transaction problems, such as incorrect debits, inaccurate recipient information, or delays, lead to waste of time in fixing transaction errors					
PR4	When transaction errors occur, I am worried that I may not get compensation from the bank					
PR5	Transacting via unprotected public Wi-Fi networks carries a high risk					
PR6	I do not feel totally safe in providing personal information over this application because of falling for phishing scams that could lead to financial losses					

(Continued)

S.No	Perceived Benefits	1	2	3	4	5
PR7	The concern that a lost or stolen mobile device will be utilised for unauthorised transactions					
PR8	The complex user interface of this application limits its use among less tech-savvy users					
PR9	I am sure that if something went wrong with online transactions, my family, friends and colleagues would think less of me					
PR10	This app requires a functioning smartphone with a stable internet connection, which becomes a drawback and limits its use					
S.No	**Satisfaction**	**1**	**2**	**3**	**4**	**5**
SAT1	I think I did the right thing when I selected this application					
SAT2	I am satisfied with the way this application carries out transactions					
SAT3	I am satisfied with the services I avail using this application					
SAT4	Overall, I am delighted with this mobile banking application as it is secure and reliable					
S.No	**Continuance Intention**	**1**	**2**	**3**	**4**	**5**
CONT1	I would continue using this application rather than discontinuing it					
CONT2	I intend to continue using this application rather than using any alternative means (traditional or web-based banking)					
CONT3	I am likely to recommend this application to my friends, neighbours and relatives					
CONT4	I prefer this application over other available mobile banking applications					

Part C

What do you suggest for the overall improvement of this mobile banking application to enhance its future use?

_____

_____

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Thank you for your precious time.

Commentary

Beyond the Shadows? Rethinking Informality in the Workforce

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Abstract

The study attempts to draw on a commentary approach to comprehensively document the extensive theoretical landscape of the informal economy, drawing from an International Monetary Fund Report in 2021 and a vast body of existing literature. With over 60% of the global labour force participating in the informal economy, its multifaceted nature, encompassing a wide array of small-scale economic activities, presents a formidable challenge for economists and policymakers. Within this study, we critically examine and synthesise the prevailing theories, including the dualistic theory, Inclusive Theory, Structuralism, Neo-Liberalism, and Modernisation Theory, each offering distinct perspectives on the informal economy's intricacies. This article underscores the vital role of comprehensive literature reviews in advancing our understanding of complex economic phenomena, thereby contributing to the ongoing discourse on the informal economy and shedding light on its multifarious theoretical foundations and diverse definitions.

Keywords

informal economy, dualistic theory, neo-liberalism, informality theories, shadow economy, inclusive theory

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Introduction

With more than 2 billion global workers, or over 60% of the global labour force participation in the informal sector, it is a global phenomenon to understand the

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various theories and definitions in the vast subject (International Monetary Fund [IMF], 2021). The informal economy, which operates outside the umbrella of government regulation, makes it an important and wider subject to be studied with a deeper understanding of the theories and definitions associated with it. Though the vast population operating in the informal sector are on the small-scale economic activities. This makes it more difficult for economists to study it, and sometimes it is referred to as the 'Shadow' economy.

The working of the informal economy across different regions, states and continents makes it difficult to tailor the types, numbers and labour conditions in the informal economy. With more than 90% of the global workforce participating in micro and small enterprises (MSEs), the informal economy comprises a significant part. The work life of the labourer in the informal economy is often characterised as unsafe, unhealthy, low productivity and low or irregular incomes. Various studies cite the root cause of informality as poor regulatory government policies, low level of education, poverty and limited access to economic resources. However, informality has always been a challenge in the development of an economy. The shadow approach of the legal production of goods and services hidden from public authority and the nature of informality make it even more difficult to document, observe and measure its functioning in the economy.

Due to the lack of economic opportunities, lack of job security and low wages for the informal workers. The dualists argue for the exclusion of the informal sectors from sectors with no linkages with each other. Keith Hart, a British anthropologist who formulated the concept of the informal sector in his study on low-income activities amongst low-skilled migrant workers, found that the existence of the informal economy was the outcome of the dualistic tendency of the urban labour market.

In addition, the existence of both informal and formal economies is both a reality and an artificiality. The latter is capital-intensive and growth-oriented, and the former is labour-intensive in nature. However, the study of Hart (1973) isolates the informal and formal sectors as two distinctive aspects in an economy. However, further studies (Portes, 1983; Roy, 2005) challenge the dualistic approach and see informality from an inclusive lens. Therefore, in theorising informality, the inclusive theory views it from a more holistic and broader cross-country narrative to avoid generalisation of informality.

The nature of informality itself has its own layers. Determinants such as unemployment, underemployment, and poverty lead a large chunk of the population and labour force into informality; therefore, such components and elements from different structures frame the informal economy. The prospective study of the existence of informality in the rural and urban regions and also across different geographical regions makes the existence of structuralism more evident. Also, the evidence of 'Regular' informal workers, 'Causal' informal workers, unpaid informal workers, and industrial informal workers in the pyramid of the WIEGO Model of Informal Employment opens the door to documenting structuralism in the informal economy.

Acknowledging the findings mentioned in the existing literature, this article aims to argue that informality can be viewed from different lenses through the

Table 1. Comparative Theoretical Analysis of Informality.

Theory	Core Idea	Strength	Limitation	Contemporary Relevance
Dualist	Informal sector as a survival mechanism	Highlights the poverty link	Ignores linkages with the formal sector	Limited
Structuralism	Informality linked to capitalist systems	Explains systemic inequality	Overgeneralization	Strong
Neo-liberal	Excess regulation causes informality	Policy insight	Overemphasis on state failure	Partial
Inclusive	Blurred boundaries between sectors	Realistic and flexible	Conceptually diffuse	High

sight of the mentioned theories. This article explicitly delves into the theories by critically synthesising dominant theoretical perspectives and contemporary development, by moving beyond statistical or descriptive study and rather to a policy-relevant understanding of informality. An overview of the theories is provided in Table 1.

To be precise, the article aims to address the following questions:

1. How do existing theoretical frameworks (dualist, structuralist, neo-liberal, and inclusive approaches) differ in explaining the persistence and dynamics of the informal economy across regions and sectors?
2. To what extent does the proposed continuum approach provide a more comprehensive and policy-relevant framework for understanding emerging forms of informality, particularly within the gig and platform economy?

The study is organised as follows: literature review, followed by theoretical foundations, understanding theories, the fourth section represents an explanation of rethinking informality, the fifth section explains the determinants, and it concludes with a discussion and conclusion.

Literature Review

The informal economy, over time, has evolved from being perceived just as a residual part of the economic activity to a central and core component of the labour markets across the world. Various studies reflect that informality is just a by-product of the underdeveloped world, but it is a structure embedded in the modern economic system. It is estimated that around 60% of the global workforce is associated with informal employment (IMF, 2021). In addition, the IMF's measurement indicates that there are extensive studies in understanding informality, its employment, production and firm activities within the national accounting system. This academic study, in fact, challenges the prior classification of sectors into a dichotomous nature of just informal and formal sectors.

In addition, empirical studies have shifted the focus on improving the measurement and modelling of informality. Yao (2024) has introduced an augmented factor model that precisely captures the multidimensional nature of the informal economy, documenting the existing limitation of traditional proxy-based methods such as the Multiple Indicators Multiple Causes (MIMIC) model. The study registered that informality is correlated to macroeconomic variables such as institutional quality, inflation, and employment. Another important lens of study examines the relationship between informality and economic development. This study employs nonlinear econometric techniques that precisely impact informality across different stages of development (Medina & Schneider, 2019; Williams, 2023). These findings challenge linear modernisation assumptions. The literature also highlights the role of economic crises and institutional fragility in shaping informal economic activities (Elgin et al., 2021).

Conceptual debates remain central to the study of informality. A systematic review by Dell'Anno (2022) demonstrates the absence of a universally accepted definition, with over 100 conceptualisations identified in the literature. While most definitions emphasise the lack of regulation, taxation, and legal recognition, fewer studies incorporate social and institutional dimensions. Overall, the existing bodies of literature demonstrate a clear shift toward recognising informality as a complex, heterogeneous, and evolving phenomenon. However, significant gaps remain in integrating traditional theories with contemporary labour market transformations, particularly in the context of digital and platform economies.

Theoretical Foundation

The informal economy's theoretical underpinnings come from a variety of schools of thought, each of which provides a unique account for how it came to be, persisted, and interacted with formal economic systems. When used alone, these frameworks show limitations but also offer important insights. According to the dualist viewpoint, the informal economy is a residual sector made up of excess labour that is not able to find formal work. This theory, which has its roots in early development economics, makes the assumption that there is little interaction between the official and informal sectors. Thus, informal activities are typically seen as survival tactics used by underprivileged groups.

Although this framework successfully draws attention to the connection between poverty and informality, it has come under growing criticism for failing to account for the interdependencies among various sectors. The idea of complete separation is challenged by empirical research showing that informal businesses frequently interact with formal businesses through supplier chains and subcontracting agreements (La Porta & Shleifer, 2014). This perspective holds that in order to lower costs and increase flexibility, informal labour is integrated into formal production systems rather than being eliminated. This framework emphasises systemic inequalities, highlighting how the formal sector relies on informal labour arrangements to remain competitive in global markets.

When it comes to the explanation of continuing informality in labour-intensive industries and global value chains, structuralist theory is especially pertinent. However, it has a tendency to generalise these processes and might ignore micro-level variability and local variations (Chen, 2012). According to the neo-liberal viewpoint, excessive government interference, regulations, and high taxes are the causes of informality.

It asserts that people and businesses logically decide to operate informally in order to save money on formalisation-related compliance expenses. This method has been criticised for oversimplifying the causes of informality, even if it offers insightful policy information, especially with reference to regulatory reform. It frequently ignores systemic limitations such as restricted access to formal employment prospects, credit, and education (Williams, 2023)

Modernisation theory views informality as a transitional phenomenon that diminishes with economic development, industrialisation, and institutional strengthening. According to this perspective, the expansion of formal employment opportunities and improved governance will gradually absorb informal activities (Chen, 2012). However, recent empirical evidence challenges this linear progression. Informality persists and in some cases expands, even in relatively advanced economies, suggesting that modernisation alone is insufficient to eliminate informal economic activities (Medina & Schneider, 2019).

Understanding Theories

In this section, we particularly aim to draw an overview of the theories mentioned in Table 1. The dualist perspective, rooted in early labour market segmentation theories, views informality as a residual sector disconnected from formal economic structures. However, empirical evidence increasingly demonstrates strong interdependencies between formal and informal activities, undermining this rigid separation.

Structuralism, or structuralist theorists, provide a more compelling explanation by understanding informality within broader capitalist social structural dynamics. They aim to highlight how formal firms rely on informal labour to reduce costs and integrate informality into global industrial sectors.

Further, neo-liberals document the role of excessive regulations; they tend to oversimplify the importance of policy regulation in the broader sense of the functioning of the informal labourers. This perspective neglects structural inequalities and labour market constraints. Inclusive approaches offer a deeper understanding by recognising the fluidity between formal and informal work. However, their conceptual breadth often comes at the expense of analytical precision.

Rethinking Informality: Toward a Continuum Approach

The limitations inherent in existing theoretical frameworks, particularly their tendency to conceptualise informality as a distinct and residual sector,

necessitate the development of a more flexible and analytically robust perspective. Traditional approaches, such as the dualist and structuralist frameworks, often rely on binary distinctions between formal and informal economies. However, these rigid categorisations are increasingly inadequate in capturing the complex and evolving realities of contemporary labour markets. In response, this article proposes a continuum-based conceptualisation of informality, wherein economic activities are understood to exist along a gradient rather than within mutually exclusive categories. This continuum can be represented as:

Formal ← Semi-formal ← Informal ← Digital Informal

At one end of the spectrum, formal employment is characterised by full regulatory compliance, contractual security, and access to social protection mechanisms. Moving along the continuum, semi-formal arrangements emerge, where certain aspects of regulation or protection may be present but remain incomplete or inconsistently enforced. Further along, informal employment is marked by the absence of legal recognition, limited social security, and precarious working conditions. At the far end, digital informal work—facilitated by platform-based and technologically mediated systems—represents an emergent form of informality that often operates within formally registered entities yet reproduces informal characteristics such as income insecurity, lack of benefits, and ambiguous employment relationships.

This continuum framework emphasises several key dimensions. First, it recognises that economic activities vary in degrees of formality, shaped by regulatory environments, institutional capacity, and market dynamics. Second, it highlights the fluidity of labour mobility, wherein workers frequently transition between different points along the spectrum in response to economic shocks, technological changes, and livelihood strategies. Third, it acknowledges the coexistence and interdependence of formal and informal practices, particularly within globalised production systems where formal enterprises may rely on informal labour arrangements to maintain flexibility and reduce costs.

By moving beyond binary classifications, the continuum approach provides a more nuanced understanding of informality as a dynamic, hybrid, and context-dependent phenomenon. It is particularly useful in capturing emerging labour trends, including the rise of gig and platform economies, where the boundaries between formal and informal work are increasingly blurred. As such, this framework not only enhances theoretical clarity but also offers a more relevant foundation for empirical analysis and policy formulation in the context of rapidly transforming global labour markets.

Gig and Platform Economy

One of the most significant developments in recent years is the rise of the gig and platform economy, which has fundamentally reconfigured traditional employer-employee relationships. Digital labour platforms such as ride-hailing, food

delivery, and freelance marketplaces operate through technologically mediated systems that match labour supply with demand in real time.

Moreover, platform-based work is characterised by algorithmic management, wherein digital systems allocate tasks, monitor performance and determine compensation. This form of control, while less visible than traditional managerial supervision, introduces new dimensions of dependency. Workers often have limited transparency regarding how algorithms function, thereby constraining their autonomy despite the nominal independence associated with gig work.

Determinants of Informality/Informal Economic Activities

Absence of Government Regulations

Informality, in economic terms, is frequently characterised by economic activities that operate outside the purview of formal government regulations and institutions. This includes businesses and labour arrangements that are not registered, fail to comply with taxation requirements, or do not adhere to established labour laws. Informal workers often engage in activities that are not officially recorded, leading to challenges in regulating and taxing these activities.

Lack of Social Protection

Informal work is often associated with a lack of access to the social protections and benefits typically enjoyed by formal sector employees. This encompasses the absence of health insurance, retirement benefits, unemployment benefits, and other safety nets that can provide economic security to workers and their families.

Low Levels of Education and Unskilled Human Resources

Informal labour markets are frequently characterised by lower levels of education and skills among participants. Workers in the informal sector may have limited access to formal education and training programmes, resulting in a workforce with fewer qualifications and lower skill sets compared to the formal sector. Moreover, informality is also closely linked to poverty and economic vulnerability. Many individuals turn to informal work out of necessity due to limited opportunities in the formal sector. This can result in precarious employment, income instability, and a higher risk of falling into poverty.

Unregistered Businesses/Enterprises

In the realm of entrepreneurship, informality refers to businesses that operate without proper registration, licences, or adherence to formal business regulations.

Such businesses may operate in cash economies and avoid the oversight of government authorities.

Marginalisation and Exclusion

Informal labour markets can marginalise and exclude certain groups, such as migrants, women, or minority populations. These individuals may face barriers to entering the formal workforce, leading them to participate in informal activities that offer limited legal protections and opportunities for advancement. In addition, informal employment or informal economic activities can encompass underemployment, where workers have part-time or irregular work that does not fully utilise their skills or provide a stable income. This can result in workers holding multiple jobs or engaging in sporadic, low-paying work to make ends meet.

Discussion

The findings of this study highlight that the informal economy cannot be adequately understood through a single theoretical lens. Rather, it emerges as a complex, adaptive, and context-dependent phenomenon shaped by overlapping structural, institutional, and market-driven forces. The discussion builds upon the comparative theoretical analysis and the proposed continuum framework to critically examine how informality should be reconceptualised in contemporary economic discourse.

A key insight from the literature synthesis is that traditional theories—particularly the dualist perspectives offer a limited explanatory scope in the present global context. While the dualist approach successfully underscores the link between poverty and informality, its rigid separation between formal and informal sectors does not align with empirical realities. Increasing evidence demonstrates that informal and formal economies are deeply interconnected, with supply chains, subcontracting arrangements, and labour mobility blurring these boundaries. Thus, the persistence of informality cannot merely be attributed to exclusion from formal employment, but also to systemic integration within broader economic structures.

In contrast, structuralist perspectives provide a more compelling explanation by situating informality within capitalist production systems. The reliance of formal firms on informal labour to reduce costs and enhance flexibility illustrates that informality is not an anomaly but an embedded feature of modern economies. However, structuralist theories tend to generalise these dynamics, often overlooking regional variations and micro-level heterogeneity. For instance, informal work in developing economies may be driven as much by survival strategies as by capitalist exploitation, suggesting that structural explanations must be complemented by localised analysis.

Neo-liberal interpretations, which attribute informality primarily to excessive state regulation, introduce an important policy dimension but remain insufficient in capturing the full complexity of the issue. While regulatory burdens can indeed discourage formalisation, this perspective tends to oversimplify the problem by placing disproportionate emphasis on state inefficiencies. It neglects deeper structural inequalities, labour market rigidities, and socio-economic barriers such as education and access to capital. Consequently, policy prescriptions based solely on deregulation risk exacerbating worker vulnerability rather than addressing the root causes of informality.

The inclusive approach attempts to bridge these gaps by recognising the fluidity between formal and informal work. It acknowledges that workers and enterprises often operate across multiple economic spaces simultaneously. This perspective is particularly relevant in today's globalised and digitalised economy, where hybrid forms of employment are increasingly common. However, the broad and flexible nature of the inclusive framework can sometimes reduce analytical precision, making it challenging to derive clear empirical or policy conclusions.

Against this backdrop, the continuum approach proposed in this article offers a more nuanced and integrative framework. By conceptualising informality as a spectrum rather than a binary category, it captures the gradations and transitions that characterise real-world labour markets. This framework is especially useful in understanding semi-formal arrangements, which are often overlooked in traditional analyses. These include workers who may have partial legal recognition or intermittent access to social protections, reflecting the incomplete nature of formalisation processes in many economies.

Moreover, the continuum model is particularly effective in addressing the rise of the gig and platform economy. Digital labour platforms have introduced new forms of work that challenge conventional definitions of employment. Although these platforms operate within formal regulatory environments, the nature of work they generate often mirrors informal characteristics such as income instability, lack of social security, and ambiguous employment relationships. This hybridisation underscores the inadequacy of binary classifications and reinforces the need for a spectrum-based understanding.

Another important dimension highlighted in this discussion is labour mobility across the continuum. Workers frequently transition between different forms of employment in response to economic shocks, seasonal variations, and personal circumstances. For example, an individual may engage in formal employment during certain periods while relying on informal or gig-based work at other times. This dynamic movement challenges static categorisations and calls for longitudinal approaches in both research and policy design.

The determinants of informality further reinforce the multidimensional nature of the phenomenon. Factors such as limited education, lack of social protection, unregistered enterprises, and socio-economic marginalisation interact in complex ways to sustain informal economic activities. Importantly, these determinants are not isolated; they are deeply interconnected and often mutually reinforcing. For instance, low educational attainment can restrict access to formal employment,

which in turn perpetuates income insecurity and limits opportunities for skill development.

In conclusion, this discussion underscores that informality is not merely a residual or transitional phenomenon but a fundamental component of contemporary economic systems. The continuum approach provides a valuable conceptual tool for capturing its complexity and evolving nature. By integrating insights from multiple theoretical perspectives, it offers a more comprehensive and policy-relevant understanding of informality. Future research should build on this framework by incorporating empirical analyses across different regions and sectors, particularly focusing on the long-term implications of digital transformation on labour markets.

Conclusion

This study rigorously employs a commentary approach, grounded in an extensive scholarly literature corpus, to comprehensively investigate the intricate theoretical framework underpinning the informal economy. Additionally, it explores multifaceted definitions, spanning from regulatory absence to limited social protection and low educational attainment in informal labour markets, highlighting the multifarious challenges posed by informality. In conclusion, this column underscores the pivotal role of comprehensive literature reviews in enhancing our grasp of complex economic phenomena. Through critical examination and synthesis of these theories and definitions, it enriches the ongoing discourse on the *informal economy*, emphasising the far-reaching implications for economic development and societal well-being. Addressing its multifaceted dimensions and challenges necessitates continual exploration and well-informed policymaking.

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