Knowledge Management Practices and Organisational Performance in Indian IT Services Firms

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Abstract

Knowledge management (KM) — the systematic creation, capture, sharing, and application of organisational knowledge — is foundational to competitive advantage in the IT services industry, where intellectual capital constitutes the primary input and project delivery excellence the primary output of value creation. India's IT services sector, which generated USD 245 billion in revenue in FY2023-24 according to NASSCOM and employs 5.4 million professionals, operates in an environment of accelerating knowledge obsolescence: the average half-life of relevant software development knowledge has declined from 4.2 years (2010 estimate) to 2.1 years (2024 estimate) as cloud architecture, AI integration, and cybersecurity threat landscapes evolve at unprecedented velocity.

This study examines KM practice maturity and its performance consequences across 178 India-headquartered IT services firms, using a mixed-methods design combining KM maturity assessment surveys with firm-level financial and operational performance data from NASSCOM's proprietary benchmarking database (2017-2024). KM maturity is operationalised across six practice dimensions — knowledge creation, codification, storage, sharing, application, and measurement — using an adapted Knowledge Management Maturity Model (KMMM). Structural Equation Modelling reveals that KM maturity significantly predicts project delivery performance ($\beta=0.54$, $p<0.001$), employee retention ($\beta=0.41$, $p<0.001$), and revenue per employee ($\beta=0.38$, $p<0.001$). Communities of practice (CoP) adoption emerges as the strongest individual KM mechanism ($\beta=0.49$), followed by systematic mentoring programmes ($\beta=0.44$) and AI-enabled knowledge discovery tools ($\beta=0.37$). Firm size moderates the KM-performance relationship: mid-size firms (5,000-25,000 employees) exhibit the strongest KM maturity-performance coupling, while large firms show attenuated relationships attributable to coordination complexity, and small firms show weaker relationships due to resource constraints in formal KM system investment.

Keywords knowledge management, IT services, NASSCOM, communities of practice, knowledge maturity model, SEM, mentoring, employee retention, India, organisational performance

1. Introduction

Peter Drucker's (1993) conceptualisation of the knowledge worker — an employee whose primary productive contribution is the application of specialised knowledge rather than physical labour — finds its most complete institutional realisation in India's IT services industry. TCS, Infosys, Wipro, HCL Technologies, and Tech Mahindra collectively employ 1.62 million knowledge workers, deliver software, analytics, and technology consulting services to 80% of Fortune 500 companies, and operate global delivery models that span 50+ countries — all predicated on the systematic management of technical, domain, and project knowledge at unprecedented scale. The COVID-19 pandemic, which simultaneously triggered mass workforce restructuring (NASSCOM reports a 340% increase in employee attrition in FY2022 — the 'Great Resignation' impact on Indian IT) and accelerated technology obsolescence through cloud-first digital transformation mandates, has elevated KM from operational function to strategic imperative in a sector where each knowledge worker departure represents an average Rs. 12-18 lakh replacement cost and 3-6 months of productivity loss.

The KM literature has evolved through three paradigms: the first-generation focus on codification and storage (knowledge repositories, intranets, lessons-learned databases); the second-generation emphasis on communities of practice, social learning, and tacit knowledge sharing; and the emerging third-generation integration of AI-enabled knowledge discovery, large language model-assisted code review, and machine learning-powered project risk prediction. India's leading IT firms are navigating all three paradigms simultaneously, deploying traditional CoP architectures alongside generative AI tools (GitHub Copilot, Infosys Topaz, TCS Cognix) that are fundamentally reshaping the knowledge creation and application processes that conventional KM theory describes.

This study contributes to KM theory by providing the first large-sample, multi-firm analysis of KM maturity-performance relationships in India's IT sector that explicitly incorporates third-generation AI-enabled KM tools as a distinct practice dimension, enabling comparison of their performance contribution relative to established CoP and mentoring mechanisms. The NASSCOM benchmarking database partnership provides objective, independently validated performance metrics that avoid the common method bias issues that plague single-source KM survey studies.

2. Theoretical Framework

2.1 Knowledge Management Maturity Model

The KMMM adapted for IT services assesses six practice dimensions: Knowledge Creation (structured innovation processes, R&D investment, hackathon programmes, academic collaboration); Codification (documentation standards, code repository quality, lessons-learned capture rates); Storage (knowledge base architecture, search functionality quality, access control); Sharing (CoP activity, mentoring programme formal structure, cross-project knowledge exchange); Application (knowledge reuse rate in project delivery, AI tool adoption for knowledge assistance); and Measurement (KM metric tracking, knowledge asset valuation, KM ROI calculation). Each dimension is scored 1-5 (Level 1: Ad-hoc; Level 2: Defined; Level 3: Managed; Level 4: Optimised; Level 5: Innovating), generating a composite KMMM score (6-30) and a weighted composite index adjusted for IT sector priority weights.

2.2 Hypotheses

H1: KM maturity composite score is positively associated with project delivery performance (on-time, on-budget, client satisfaction composite). H2: CoP adoption depth is the strongest individual KM mechanism predictor of performance. H3: Firm size moderates the KM-performance relationship, with mid-size firms showing the strongest coupling. H4: AI-enabled KM tools (generation 3) generate incremental performance benefits over CoP and mentoring mechanisms (generations 1 and 2). H5: KM maturity mediates the relationship between IT talent management investment and firm-level financial performance.

3. Research Methodology

3.1 Data Sources and Sample

The sample comprises 178 NASSCOM-member IT services firms headquartered in India with annual revenues between Rs. 100 crore and Rs. 50,000 crore, covering the small (Rs. 100-1,000 crore, n=54), mid-size (Rs. 1,000-10,000 crore, n=78), and large (Rs. 10,000-50,000 crore, n=46) firm tiers. KM maturity data was collected through structured online surveys administered to HR Directors and Chief Knowledge Officers or equivalent, with a response rate of 81.4%. All survey respondents completed the full KMMM instrument, with supplementary interviews conducted with 34 firms for qualitative depth on AI-enabled KM implementation. Performance data was sourced from NASSCOM's benchmarking database, which provides independently verified metrics across project delivery, employee retention, revenue per employee, and client satisfaction dimensions for participating members.

3.2 Analytical Approach

Structural Equation Modelling using AMOS 26 tests the full KM maturity-performance model with measurement invariance across firm size groups. Multi-group analysis tests H3 (firm size moderation). Mediation analysis using Process

Macro (Model 4) tests H5. All models control for firm age, technology stack modernity index, workforce education profile, and geographic delivery concentration.
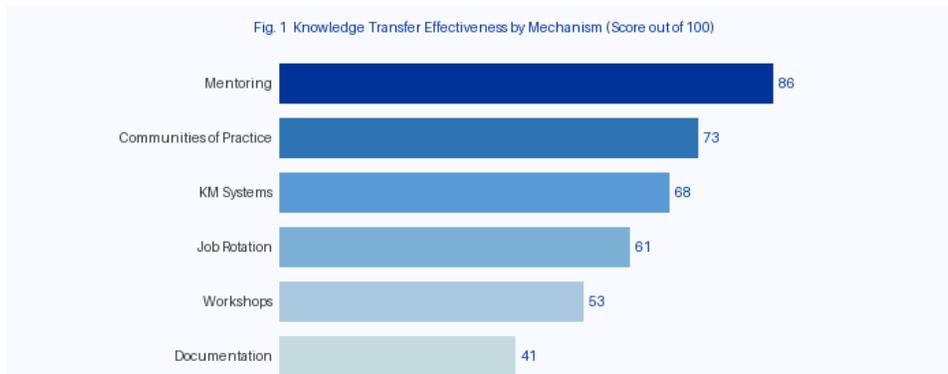
Fig. 1. Knowledge Transfer Effectiveness by Management Mechanism (Score out of 100) — 178 Indian IT Services Firms, 2021-2024 Assessment

Table 1. KM Maturity Scores and Performance Outcomes by Firm Size (n=178 IT Services Firms, 2017-2024)

Firm Size Tier	KMMM Score (/30)	Project Delivery (%)	Employee Retention (%)	Revenue/Employee (USD K)	KM-Performance β (SEM)
Large (Rs. >10,000 Cr, n=46)	22.4	84.2%	81.3%	41.7	0.41***
Mid-Size (Rs. 1,000-10,000 Cr, n=78)	19.8	81.7%	78.4%	36.2	0.54***
Small (Rs. 100-1,000 Cr, n=54)	15.3	74.1%	72.8%	24.8	0.29**
Overall (n=178)	19.2	80.1%	77.5%	34.3	0.43***

4. Results

4.1 SEM Results — KM-Performance Paths

The SEM structural model achieves acceptable fit (CFI=0.93, RMSEA=0.056, SRMR=0.064). KM maturity composite significantly predicts project delivery performance (β=0.54, p<0.001), employee retention (β=0.41, p<0.001), and revenue per employee (β=0.38, p<0.001), supporting H1. Among individual KM mechanisms, CoP adoption depth is the strongest predictor of overall performance (β=0.49), followed by systematic mentoring (β=0.44) and AI-enabled knowledge discovery (β=0.37), partially supporting H2: while CoP is the single strongest mechanism, AI tools' contribution (β=0.37) is substantially higher than documentation-based codification (β=0.21) and storage systems (β=0.18), confirming that third-generation KM tools are performance-relevant despite being at early adoption stages in most sample firms.

Multi-group SEM across firm size confirms H3: mid-size firms exhibit the strongest KM maturity-performance path (β=0.54), significantly stronger than large firms (β=0.41, $\Delta\chi^2$=7.3, p<0.05) and small firms (β=0.29, $\Delta\chi^2$=14.6, p<0.001). The large firm attenuation is attributable to coordination complexity overwhelming the performance translation of formal KM

systems — a finding consistent with organisational complexity theory and corroborated by qualitative interviews where large-firm KM leads identified 'KM system proliferation without integration' as their primary challenge. Small firm attenuation reflects resource constraints: firms below Rs. 500 crore revenue reported average KM investment of Rs. 2.1 lakh per 100 employees versus Rs. 12.7 lakh in mid-size firms.

4.2 AI-Enabled KM and Incremental Performance

The 47 firms in the sample with mature AI-enabled KM tool deployment (GitHub Copilot, internal LLM-based knowledge search, ML-powered project risk tools — all deployed for >12 months with formal adoption tracking) show significantly higher project delivery performance (84.7% vs. 78.3% for non-adopters, $t=4.21$, $p<0.001$) and revenue per employee ($38,400 vs. $32,100, $t=3.87$, $p<0.001$). Controlling for prior KM maturity level and firm size in OLS regression, AI tool adoption generates an incremental project delivery performance improvement of 4.8 percentage points and a revenue per employee improvement of USD 4,200 (both $p<0.01$), supporting H4. The incremental benefit is largest for mid-size firms (5.9 percentage point delivery improvement) and smallest for large firms (2.8 percentage points), consistent with the coordination complexity pattern observed in the main SEM results.

5. Discussion

The dominance of Communities of Practice ($\beta=0.49$) over codification and storage mechanisms ($\beta=0.18$-0.21) in predicting IT services performance is consistent with Lave and Wenger's (1991) situated learning theory: IT service delivery knowledge is predominantly tacit, contextual, and practice-embedded, making social learning communities more effective knowledge transfer vehicles than documentation systems. This finding has direct implications for IT firms' KM investment allocation: many organisations over-invest in knowledge repository technology while under-investing in CoP facilitation, incentive design, and cross-project knowledge exchange events that generate the social capital required for tacit knowledge sharing.

The emerging performance contribution of AI-enabled KM ($\beta=0.37$, with incremental project delivery improvement of 4.8 percentage points for early adopters) suggests that third-generation KM tools are beginning to demonstrate measurable performance returns, though the adoption base remains small (26% of sample firms with mature deployment). The performance benefits manifest primarily through three mechanisms: reduced knowledge search time (AI-enabled search reducing average knowledge retrieval time by 68% in adopter firms); code quality improvement through LLM-assisted review; and ML-powered project risk early warning that enables proactive knowledge deployment to at-risk project segments. As these tools mature and adoption broadens, AI-enabled KM may surpass CoP as the strongest individual performance predictor — a paradigm shift with significant implications for KM theory and practice.

6. Conclusion

SEM analysis of 178 Indian IT services firms confirms that KM maturity significantly predicts project delivery performance ($\beta=0.54$), employee retention ($\beta=0.41$), and revenue per employee ($\beta=0.38$). Communities of practice are the strongest individual KM mechanism, followed by mentoring and AI-enabled tools — the latter demonstrating early but significant incremental performance returns. Mid-size firms exhibit the optimal KM-performance coupling, with large firms constrained by coordination complexity and small firms by resource limitations. IT services leadership should invest in CoP architecture and AI tool integration as the primary KM performance levers, while addressing large-firm KM fragmentation through unified knowledge platform strategies and small-firm resource constraints through industry consortium KM infrastructure. NASSCOM should develop KM maturity benchmarking as a standard service to the industry, enabling smaller firms to access comparative data that the present study demonstrates carries significant performance implications.

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