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ARTIFICIAL INTELLIGENCE-AUGMENTED OPEN INNOVATION AND KNOWLEDGE MANAGEMENT: AN EXTENSION OF THE INTEGRATED OIKM FRAMEWORK FOR TELECOMMUNICATION ORGANIZATIONS

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| ABSTRACT

This paper extends the author's Integrated Open Innovation and Knowledge Management (OIKM) framework, originally developed for a telecommunications operator, to account for generative and agentic artificial intelligence (AI), which the original model predates. Literature published between 2024 and 2026 on generative AI's role in knowledge management, absorptive capacity and intellectual capital is reviewed and used to formulate five theoretical propositions that recast AI as a boundary condition strengthening or conditioning the OIKM framework's existing mediating and moderating relationships, and, in one case, contributing a new direct effect on the knowledge management process itself. A mixed-methods design combining qualitative case analysis with survey-based PLS-SEM is proposed for future empirical validation.

| KEYWORDS

Open Innovation, Knowledge Management, Knowledge-based view, absorptive capacity, Generative AI, Agentic AI, Telecommunications

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Abstract:-

This paper extends the author's Integrated Open Innovation and Knowledge Management (OIKM) framework, originally developed for a telecommunications operator, to account for generative and agentic artificial intelligence (AI), which the original model predates. Literature published between 2024 and 2026 on generative AI's role in knowledge management, absorptive capacity and intellectual capital is reviewed and used to formulate five theoretical propositions that recast AI as a boundary condition strengthening or conditioning the OIKM framework's existing mediating and moderating relationships, and, in one case, contributing a new direct effect on the knowledge management process itself. A mixed-methods design combining qualitative case analysis with survey-based PLS-SEM is proposed for future empirical validation. The paper offers an AI-Augmented OIKM (AI-OIKM) model comprising five propositions: AI-mediated open innovation, generative-AI-mediated knowledge flow, AI-enabled absorptive capacity, and AI/digital intellectual capital, each extending an original construct without altering its identity, plus a fifth proposition on generative AI's direct effect on the knowledge management process. As a conceptual paper, the propositions are not yet empirically tested; the proposed mixed-methods design offers a research agenda for future validation across telecommunication contexts. The paper builds a theory-driven connection between the knowledge-based view of the firm and the emerging literature on organizational AI capability, extending a previously validated framework while preserving comparability with the original study. The paper offers telecommunications executives a conceptual basis for integrating AI into innovation and knowledge processes as a core operating capability rather than a bolt-on efficiency tool.

Introduction:-

The telecommunication operators rely on open innovation to keep up with the technology cycles' speed in the telecommunication industry, engaging both their suppliers and customers as well as their OTOs in the process to discover new values for the business (Bigliardi et al., 2012). This pressure was the reason behind the development of an integrated Open Innovation based Knowledge Management (OIKM) framework by Prashanthan (2025) for a Telecommunication Operator based in Sri Lanka, through a mixed qualitative-quantitative case study, which revealed that the relationship between Open Innovation processes and Knowledge Management processes is mediated by Intellectual Capital and moderated by Absorptive capacity.

It was based on the same concept as many of the open innovation and knowledge management literature, namely that knowledge acquisition, storage, distribution, and use and the scanning of external innovation opportunities is largely a human-mediated process, using traditional information systems. Since 2024 this has been doubted. Generative AI (GenAI) can now summarize and synthesize information, and answer questions, directly from a knowledge base from an organization without relying on indexing (He & Yang, 2026), and in the telecom industry, agentic AI systems can now execute bounded tasks across processes involving customers, the network and partners (McKinsey, 2026; PwC, 2026). In the organizational level, the parallel research revealed that the absorptive capacity of the organization was positively and significantly influenced by the use of AI (Han et al., 2026), and that the returns from the innovation activity resulting from AI use was a boundary condition (Corvello, 2025).

This paper addresses this gap, as the original OIKM framework makes no mention of the influence generative and agentic AI can have on the relationships that tie open innovation, knowledge management, intellectual capital and absorptive capacity together. The paper has three contributions. First, it compiles and reviews literature published between 2024 and 2026 regarding GenAI for knowledge management, absorptive capacity and knowledge-related intellectual capital, which are explicitly linked to the original knowledge-based view of the firm that was the basis of the model. Second, it offers an AI-Augmented OIKM (AI-OIKM) model, which extends the original four constructs with a cross-cutting layer of AI, without altering their identities, thus maintaining the comparability of the original study. Thirdly, it proposes a particular mixed-methods design for the empirical investigation of the extended framework and this paper is conceptual foundation for the subsequent study.

In Section 2, the theoretical background is summarized, and each construct in the original model is supplemented by recent literature on AI, and gaps in the literature are detailed. The AI-OIKM conceptual model and propositions are introduced in Section 3. A method of empirical validation is suggested in Section 4. In Section 5, some theoretical and managerial implications are discussed. A summary of limitations and a future research agenda are presented in Section 6 and the conclusion is presented in Section 7.

Theoretical background:-

Open Innovation (OI) Processes:-

Gassmann, Enkel and Chesbrough (2010) categorized open innovation into three important processes: Outside In (acquiring knowledge from suppliers, customers, external sourcing), Inside Out (licensing, knowledge and using internal sources through spin-off), and coupled process (combined, through alliances). The adoption of open innovation has been reported in telecommunication services (Allee & Taug, 2006; Prashanthan, 2025) as well as in the whole telecommunications industry (Bigliardi et al., 2012; Prashanthan, 2025).

Knowledge Management (KM) Process:-

Research on knowledge management generally distinguishes between two types of knowledge; on one hand tacit knowledge, which is the type of knowledge that is difficult to codify, and can only be applied through practice (Polanyi, 1966), and, on the other hand, explicit knowledge in the form of procedures and documents (Kogut & Zander, 1992). The knowledge management process of an organization is often seen as a four-stage cycle, namely acquisition, storage, distribution and use or application (Di Vaio et al., 2021; Prashanthan, 2025; Salunke et al., 2019).

Intellectual Capital:-

Generally, the meaning of intellectual capital is the knowledge, competence and relationships that can be converted into value (Edvinsson, 1997; Klein & Prusak, 1994); which can be divided into three types: human capital, structural capital and relational (or customer) capital (Stewart, 1997). The three are associated with improved financial and innovation outcomes (Nadeem et al., 2019).

Absorptive Capacity:-

Cohen and Levinthal (1990) defined the absorptive capacity as the capacity of the firm to perceive, absorb and commercialize information from outside the firm. Zahra and George (2002) furthered this research and introduced the notion of the potential absorptive capacity (acquisition and assimilation), and the absorptive capacity (transformation and exploitation), which were directly mapped onto by AI-related studies (Section 2.6).

Knowledge Based View and the Original OIKM Model:-

The knowledge-based view of the firm by Grant (1996) focuses on the process of the firm being a mechanism for the integration of specialized knowledge and the transferability of this knowledge and the firm's absorptive capacity suggests its level of effectiveness. Prashanthan (2025) combined this perspective with the open innovation model of Gassmann et al. (2010) and empirically applied this OIKM (Figure 1) in a pilot survey and a qualitative case study in the organisation ABC Telecom. That study found that open innovation processes were partially adopted (only in the outside-in direction), that knowledge management was present, but not structured, and that absorptive capacity and intellectual capital were not well defined in the organisation and were subjectively perceived as mediators between open innovation and knowledge management processes. Specifically, the original model tested four hypotheses: H1, a direct positive association between open innovation processes and knowledge management processes; H2, a positive relationship between intellectual capital and knowledge management processes, completing the second stage of the OI → IC → KM mediation path; H3, absorptive capacity moderating the direct open innovation-knowledge management relationship (H1); and H4, absorptive capacity moderating the intellectual capital-knowledge management relationship (H2). The first stage of the mediation path, from open innovation processes to intellectual capital, was represented in the original model but was not assigned its own numbered hypothesis.

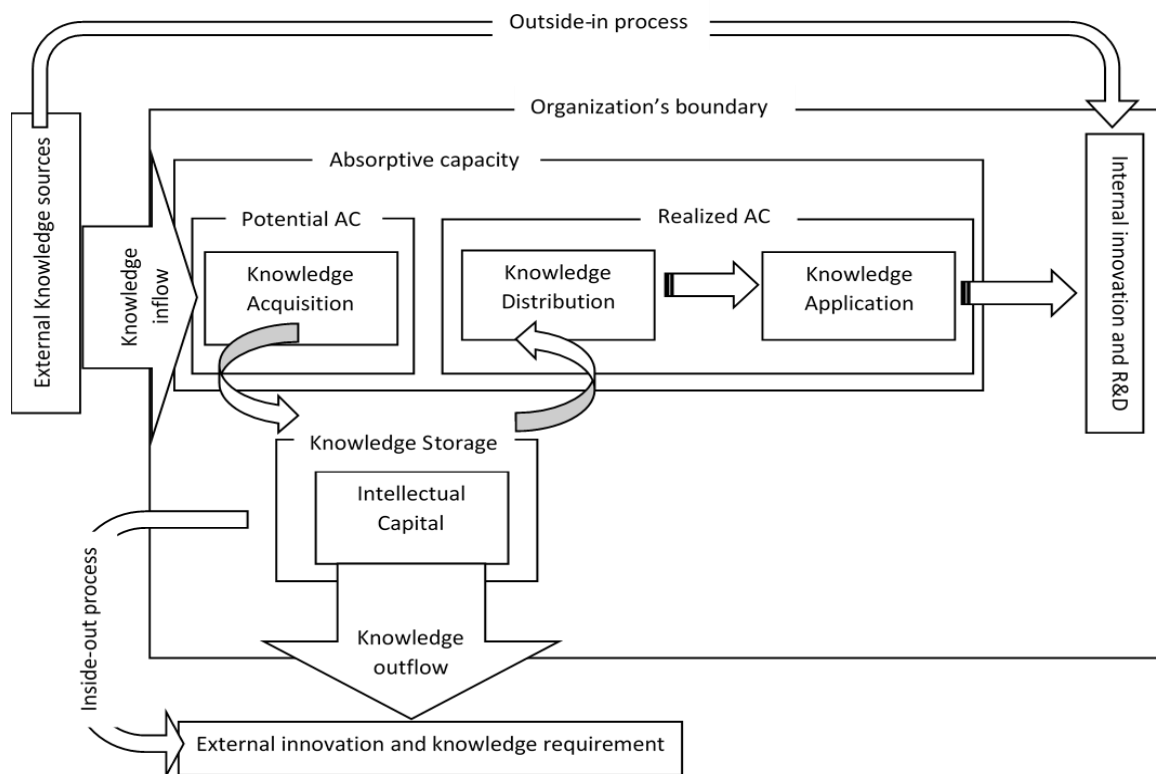


Figure 1: Original OIKM framework developed by Author (2025)

Generative and Agentic AI contribution to Organizational Knowledge and Innovation Systems:-

Each of the above constructs is reshaped by AI with a growing body of literature (2024-2026) taking a fresh look at each. In respect of knowledge management, GenAI not only poses a threat but also offers a possible assistance in the workplace learning and knowledge sharing, and a five-stage knowledge management cycle, where knowledge is acquired, shared, integrated, applied, and optimized, were inspired and tested in the manufacturing sector (He & Yang, 2026). The effect of KM capability with GenAI can vary in different scenarios and configurations, as described by Hussinki et al. (2026), where several different scenarios are possible on the tight rope between organizational process and outcomes. Regarding absorptive capacity, large-sample studies show that the use of AI is associated with increased absorptive, adaptive, and innovative capacity, and firm-level studies indicate that absorptive capacity (measured as R&D investment) is the channel through which greater AI intensity reduces corporate downside risk. Also, several sector studies show that, in addition to process innovation, the

potential benefits of generative AI are linked to the culture and flexibility of the company (Corvello, 2025), and the impact of the capability of generative AI in servitization on the outcomes of the process depends on the absorptive capacity of the company (Abou-Foul et al., 2023).

On intellectual capital, recent studies have been able to differentiate between the ability of AI to create infrastructural capability and the ability to reconfigure workflows and decision making processes based on AI-generated insight (He & Yang, 2026) which helps in differentiating between the effect of AI on structural capital and human and relational capital. So far, open innovation has been studied in terms of AI systems that can understand context, sense conditions, and take limited actions – as AI-powered customer care and AI-powered network operations, respectively (PwC, 2026); but the benefits of AI-RAN and related agentic deployments remain uncompromised at scale (ABIresearch, 2026). In McKinsey & Company's opinion (McKinsey, 2026), it is a turning point where operators need to incorporate AI into their operating model, rather than seeing it as an efficiency measure that can be bolted on.

Research Gap:-

There is a gap between the following review and the two gaps. First, AI has been shown to affect knowledge management, absorptive capacity, intellectual capital and open innovation, but, to date, there is no modelling of AI as a mechanism within all four constructs but not as an independent variable. Secondly, of the evidence of AI capabilities above, very little comes from telecommunications specifically, considering this is a space where agentic AI has been adopted early and heavily (ABIresearch, 2026; PwC, 2026). This paper is set to fill both gaps, and is not a disjointed model for AI-innovation, but rather an extension of the original OIKM model.

The AI-OIKM Conceptual Framework:-

The proposed framework of the AI-Augmented OIKM (AI-OIKM) is presented in Figure 2. The four constructs as described by Prashanthan (2025) (open innovation processes, knowledge management process, intellectual capital and absorptive capacity) remain the same, along with the relationship between the constructs. The top is a layer of AI mediated cross-cutting where four mechanisms are suggested through which AI is supposed to percolate through the existing ones, without being added into the causal chain.

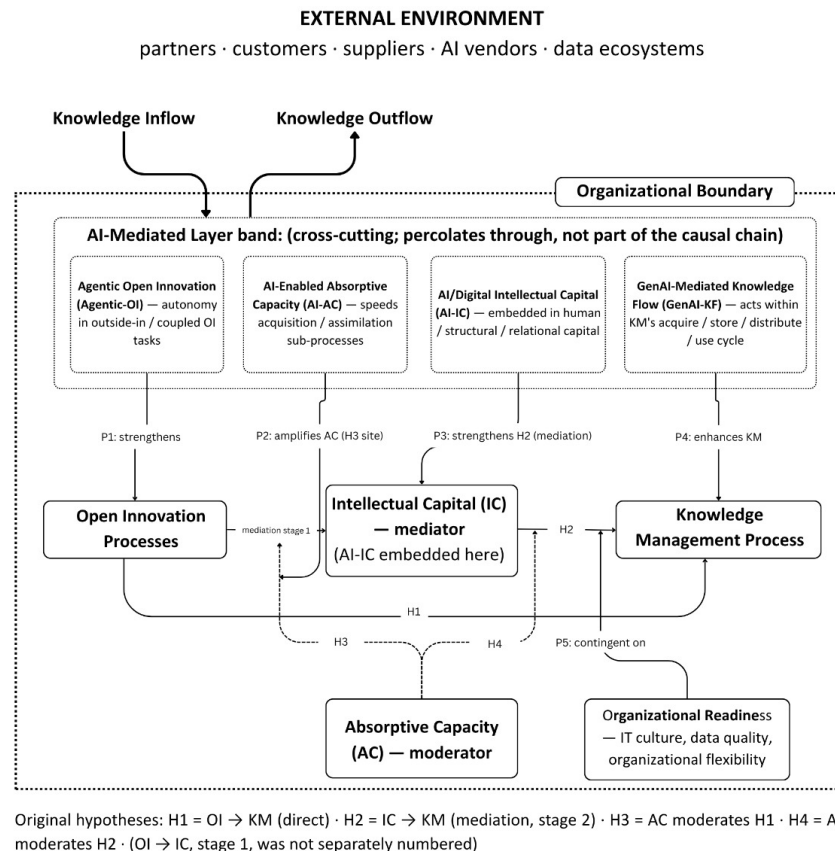


Figure 2. AI-Augmented Open Innovation based Knowledge Management (AI-OIKM) framework.

Extended Constructs:-

Table 1 defines the four AI-mediated constructs added to the original model, each explicitly anchored to an existing construct's theoretical base rather than introduced as a free-standing variable.

Table 1. Constructs added to the original OIKM with the help of an AI.

Construct	Theoretical anchor	Definition used in This study
Agentic Open Innovation (Agentic-OI)	Open innovation model (Chesbrough, 2003; Gassmann et al., 2010) + agentic-AI literature	The level of autonomy of AI agents in the implementation of bounded outside-in, inside-out or coupled innovation tasks such as partner scanning, idea screening, IP drafting etc. with human actors.
GenAI-Mediated Knowledge Flow (GenAI-KF)	Knowledge-Based View (Grant, 1996) + human-AI collaboration theory	The extent to which generative artificial intelligence devices summarise, translate or generate new knowledge as it passes through acquisition, storage, distribution, and use.
AI-Enabled Absorptive Capacity (AI-AC)	Absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002) + AI-capability literature	The speed of the acquisition and assimilation sub-processes of potential absorptive capacity, and the transformation/exploitation sub-processes of realized absorptive capacity, facilitated by AI tools.
AI/Digital Intellectual Capital (AI-IC)	Intellectual capital theory (Edvinsson & Malone, 1997; Stewart, 1997)	Organizational AI competence, data/prompt literacy and proprietary AI assets – as a fifth, separate capital no longer exists, but as part of human and structural and relational capital.

Propositions:-

Building directly on the four hypotheses tested in the original study, the following propositions treat AI as a boundary condition that strengthens or conditions the original relationships, rather than as a replacement mechanism:-

- P1: The positive association between open innovation processes and knowledge management processes (original H1) is strengthened where agentic AI is embedded in outside-in scanning and coupled-process collaboration.
- P2: AI-enabled absorptive capacity amplifies the original moderating effect of absorptive capacity on the direct relationship between open innovation processes and knowledge management processes (original H3), because AI accelerates the acquisition and assimilation sub-processes specifically.
- P3: AI/digital intellectual capital strengthens the original mediating role of intellectual capital in the knowledge management process (original H2: intellectual capital → knowledge management), reinforcing the second stage of the open innovation → intellectual capital → knowledge management mediation path. AI-IC is not a parallel path alongside intellectual capital: consistent with Table 1, it is embedded within intellectual capital's existing human, structural and relational components, and strengthens the OI → IC → KM mediation path from within, rather than acting as an antecedent or a separate moderator of it.
- P4: Generative-AI-mediated knowledge flow accelerates and enhances the internal stages of the knowledge management process – acquisition, storage, distribution, and use – independent of its role in the OI–KM mediation path linking open innovation to knowledge management.
- P5: The original moderating effect of absorptive capacity on the relationship between knowledge management processes and intellectual capital (original H4) is contingent on organizational readiness factors such as IT culture, data quality, and organizational flexibility.

The Proposed Methodology for the Empirical Validation:-

This paper is conceptual: The propositions P1-P5 have not been tested yet. It is proposed to conduct a mixed-method validation study for the follow-up study with methodological comparability with the original pilot study, to ensure that pre- and post-AI results can be meaningfully compared, as per the case study design used in the original study, Prashanthan, (2025).

Research Design:-The proposed research design is a cross-sectional, descriptive case study which builds upon Yin's (2018) case study logic: research questions, propositions, unit of analysis, logic linking data to propositions, and interpretation criteria, and is to be used for one or more telecommunication operators who have successfully implemented generative or agentic AI tools in the last 12-24 months.

Collecting Samples of Data:-There are two data sources suggested. A quantitative survey of decision-making level executives will be conducted measuring the original OIKM constructs and new items for agentic-OI, GenAI-KF, AI-AC, and AI-IC. The original study's pilot guidance (n = 50-100, x 10-30%) is retained as a starting reference, but because the extended model estimates moderated-mediation paths across four new constructs, the required minimum sample should be confirmed with a formal power analysis (e.g., G*Power, or the PLS-SEM minimum sample size guidance in Hair et al., 2019, based on the largest number of predictors for any construct and the smallest expected effect size in P1-P5) before data collection begins,

rather than relying on the pilot heuristic alone. Secondly, will be conducted semi-structured interviews with a sample of 20-25 executives from the core four processes directly involved in AI-related innovation or knowledge activities and analysed them thematically as they did in the original case study, to capture the qualitative texture of how AI is altering these processes.

Measurement and Analysis:-Based on the exploratory nature of the new constructs related to AI, and the small expected sample, the quantitative model should be estimated using PLS-SEM as was done in the original study (SMART PLS). Before conducting the structural-model test of P1-P5, convergent validity (AVE ≥ 0.5 or ≥ 0.4 with composite reliability above 0.6 as suggested by Fornell and Larcker, 1981) as well as internal consistency (Cronbach's alpha ≥ 0.7) and indicator reliability (loadings ≥ 0.7) should be evaluated for the original and new constructs (Hair et al., 2019). To make comparisons, code frequencies of qualitative data should be determined in the same manner as code in the original study, by using both thematic and frequency-analysis coding.

Ethical Considerations:-Data collection should be preceded, as in the original study, by informed consent and anonymization of the case organization, and by ethical clearance from the research governance function of the operator involved in the study.

Discussion:-

Theoretical Implications:-

The AI-OIKM framework contributes to the knowledge-based view literature by providing a more complete picture of how the models, frameworks and theories of OIK can be enriched by the embedding of AI, rather than creating a parallel set of models, frameworks and theories of AI-adoption in OI and KM. This is consistent with recent studies that have called for the incorporation of AI capability into Absorptive capacity and intellectual capital (Han et al., 2026; He & Yang, 2026).

Managerial Implications:-

Three things can be learnt by telecommunication executives. One, the adoption of AI should be followed by an absorptive-capacity investment: Although the literature from Section 2.6 indicates that the return on GenAI in knowledge management will depend on how a company's routines will change and the quality of the data, the purpose of this concept is to ensure that the company has the capacity to absorb and make the best use of the new technology. Secondly, the two parts of the intellectual capital audit should be separate: the AI infrastructure (structural capital) is different from the organization's ability to act on the insight from AI (human and relational capital) (He & Yang, 2026). Third, agentic AI should be adopted first for bounded open-innovation activities, such as partner scanning or idea screening, before it is implemented in coupled activities, such as working with external partners, because of the uncertainty regarding ROI and governance.

Future Research and Limitations:-

This paper has two important shortcomings. It is first of all conceptual, in that all the propositions in P1 – P5 must be tested empirically before any causal or even correlational conclusions can be drawn, and the design in section 4 is a research programme, not a completed research programme. Second, much of the underlying evidence for the AI-capability found in the synthetic sectors presented in Section 2.6 is derived from manufacturing, financial services and cross-industry panels, and is not specific to the telecommunications industry, and therefore it is important to recognize that transfer to the telecommunications industry is a claim that requires empirical support. In conclusion, empirical research on the P1-P5 in the telecom sector, comparative case studies between the P1-P5 of different AI maturity of the operators, and longitudinal studies to separate the short-term efficiency gains of AI and the longer-term effects of AI on the absorptive capacity and intellectual capital are suggested for future studies.

Conclusion:-

This paper furthered the integrated "Organizations and Innovation Knowledge Management (OIKM)" framework developed by Prashanthan (2025) that includes the swift integration of generative and agentic AI technologies into organizational knowledge and innovation processes. The concept of AI-OIKM does not propose a new, standalone and isolated AI-innovation model, but instead builds on the four constructs of the original OIKM model, adding a cross-cutting layer of AI-mediated layer, agentic open innovation, GenAI-mediated knowledge flow, AI-enabled absorptive capacity, and AI/digital intellectual capital, while maintaining the established mediating and moderating relationships between these constructs and updating the process mechanisms by which they mediate and moderate. Five propositions are presented as a basis for an empirical study following this design which is mixed-method. To accommodate both telecommunication operators and scholarship, the transition from AI pilots to AI as a fundamental operating infrastructure is increasingly important to link with existing knowledge-based scholarship on the subject, rather than considering the transition as an issue of itself.

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