

International Journal of Technology and Systems (IJTS)

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Article History

Received 17th August 2026

Received in Revised Form 23th September 2026

Accepted 20th October 2026



How to cite in APA format:

Kajwang, B. (2026). The Impact of Technology and Innovation Trends on the Insurance Value Chain: A Value-Chain Analysis of Digitalization, Machine Intelligence, Blockchain, and Data Ecosystems in Insurance. *International Journal of Technology and Systems*, 11(2), 1–10.
<https://doi.org/10.47604/ijts.4020>

Abstract

Purpose: This study examines how technology and innovation trends reshape the insurance value chain and identifies the organizational and governance conditions that influence whether adoption produces value.

Methodology: An integrative desktop literature review and documentary analysis synthesized academic studies, regulatory guidance, industry reports and the 2022 College of Insurance conference paper. Sources were thematically analyzed across product design, underwriting, marketing, distribution, policy administration and claims.

Findings: The review indicates that digital value depends on connected activities and complementary capabilities; analytics and automation require reliable data and accountable oversight; platforms can extend distribution while shifting control over customer data and relationships; and infrastructure, skills and institutional readiness condition adoption.

Unique Contribution to Theory, Practice and Policy: Insurers should align technology investments across the value chain, establish data, model, privacy and consumer-protection governance before scaling automated decisions, and evaluate outcomes using service quality, fairness, resilience and operating performance. The results are documentary synthesis, not newly collected firm-level or causal evidence.

Keywords: Insurance Value Chain, Digitalization, Machine Intelligence, Blockchain

JEL Classification: G22, O33, L86, M15

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INTRODUCTION

Insurance depends on information: insurers must identify exposures, estimate their frequency and severity, design cover, reach customers and settle valid claims. Digitalization has expanded the amount and speed of information available to support these activities. Connected devices, mobile applications, cloud computing, machine learning and platform partnerships are changing how risks are observed and how insurance is designed and delivered (Swiss Re Institute, 2017; Vial, 2019; Verhoef et al., 2021). These developments can improve access, responsiveness and operational efficiency, but can also introduce risks related to privacy, cybersecurity, model error, exclusion and concentration of control over customer relationships (EIOPA, 2021; Eling & Lehmann, 2018).

The central problem is that technology is often discussed as a collection of tools or isolated pilots, even though insurance outcomes are produced through interdependent activities. A more automated underwriting process, for example, may not improve customer or organizational outcomes if input data are incomplete, product rules are poorly aligned, channels cannot communicate decisions, or claims experience does not inform future pricing. Digital transformation therefore involves changes in operating models, complementary capabilities and governance, not simply the installation of new systems (Bharadwaj et al., 2013; Teece, 2007; Vial, 2019).

This issue is especially relevant to African insurance markets, where digital channels and mobile financial services offer ways to reach customers beyond conventional branch networks, while gaps in infrastructure, data availability, affordability and institutional capacity can constrain implementation. The study is therefore a general value-chain framework applied to, and bounded by, African market conditions, not a dedicated review of African insurance markets. African markets enter the framework as an explicit boundary condition because they alter how its propositions operate: relatively low insurance penetration makes reach and affordability central rather than incremental; newer or smaller insurers may lack entrenched legacy policy-administration systems, creating scope to leapfrog rather than migrate; and mobile-money rails such as M-Pesa in Kenya allow premium collection, payouts and distribution to bypass branch networks. The evidence base is diverse: conceptual research explains transformation and platforms, regulatory publications address algorithmic governance, and industry sources describe emerging applications. However, these strands are often treated separately, leaving limited synthesis of how technology affects the full insurance value chain and under what conditions the effects are beneficial (Eling & Lehmann, 2018; EIOPA, 2021; Kajwang, 2022).

The purpose of this study is to analyze the impact of technology and innovation trends on the insurance value chain by connecting value-chain activities with dynamic capabilities and governance conditions. It addresses three questions: which technologies are influencing principal insurance activities; how do organizational capabilities shape conversion of technology into operational and customer value; and what safeguards are needed to manage associated risks? The paper extends the 2022 College of Insurance conference discussion through an integrative literature review, develops a framework for evaluating technology across connected activities, and offers practical recommendations. As a documentary study, it develops explanatory propositions rather than measuring causal effects in firms (Kajwang, 2022; Snyder, 2019).

LITERATURE REVIEW

Theoretical and Conceptual Framework

Porter's Value-Chain Perspective

Porter's (1985) value-chain framework provides the organizing lens for examining where digital technologies alter the activities through which insurers create and deliver value. Product design, underwriting, marketing, distribution and claims are connected activities whose performance depends on information flows and supporting infrastructure. The framework helps distinguish local process automation from changes that reconfigure links between activities or shift value to platform and technology partners.

Dynamic Capabilities and Digital Transformation

Dynamic capabilities theory explains how firms sense opportunities and threats, seize them through investment and partnerships, and reconfigure resources and routines as markets change (Teece, 2007). Applied to insurance, data and machine intelligence can improve sensing; digital product and channel investment can support seizing; and redesign of governance, skills, data architecture and claims workflows represents reconfiguration. This theory explains why technology availability alone does not guarantee value-chain improvement.

Resource-Based View and the Technology–Organization–Environment Framework

Porter's and Teece's perspectives say little about why some firms can adopt and exploit technology while others cannot, or about external institutional pressure. Two complementary perspectives address these gaps. The resource-based view (RBV) explains performance differences through firm resources and capabilities that are valuable, rare, difficult to imitate and organized for exploitation (Barney, 1991). In insurance, proprietary data, technical talent, integrated systems and access to partners are such resources, and their distribution differs sharply between large incumbents and smaller or newer insurers, a constraint that is especially salient in emerging markets. The technology–organization–environment (TOE) framework explains adoption through the technological context (relative advantage, compatibility and complexity), the organizational context (size, slack resources, managerial support and skills) and the environmental context (regulatory pressure, competition, partner and customer readiness, and infrastructure) (Tornatzky & Fleischer, 1990). In this paper, RBV supplies the firm-level resource logic and TOE the adoption and institutional logic, notably regulatory and infrastructure conditions; the value-chain lens locates where value is created, and dynamic capabilities explain how firms renew what they have.

Integrated Analytical Framework

The paper combines the value-chain, dynamic-capabilities, resource-based and technology–organization–environment perspectives. Technology inputs, including data infrastructure, analytics and artificial intelligence, automation, distributed ledgers and ecosystem interfaces, affect value-chain activities through organizational capabilities, data governance and human expertise. Outcomes are considered in terms of potential changes in operating efficiency, risk selection, customer access and experience, and resilience. These effects are conditional on data quality, interoperability, privacy and fairness safeguards, regulatory fit, cybersecurity and implementation capacity. Firm resources (RBV) determine which insurers can build the required capabilities, while the technological, organizational and environmental contexts (TOE), including regulatory pressure and infrastructure, condition whether adoption is feasible

and sustained. The framework guides the review synthesis and prevents treating adoption as an outcome in itself.

Empirical Review

Digitalization and Insurance Operating Models

Research on digital transformation distinguishes the use of digital tools to improve existing processes from broader transformation of products, customer relationships and business models (Bharadwaj et al., 2013; Verhoef et al., 2021). In insurance, these levels intersect: digitized policy administration may reduce friction, while connected devices and platform partnerships can change risk prevention, coverage design and distribution. The literature also identifies organizational complements, legacy-system integration, skills, leadership and governance as necessary conditions for sustained value (Vial, 2019).

Data Analytics, AI and Underwriting/Claims

Insurance is data-intensive, making analytics relevant to pricing, selection, fraud detection, claims triage and service personalization. Yet model performance and business value depend on representative data, explainability, human oversight and controls against discriminatory proxies. Governance principles therefore belong inside the value-chain analysis: inaccurate or opaque models can transfer operational efficiency into consumer harm, regulatory exposure or reputational loss (EIOPA, 2021).

Platforms, Ecosystems and Distributed Infrastructure

Platform research explains how digital intermediaries coordinate interactions among customers, service providers and complementors, often shifting control over customer access and data (Parker & Van Alstyne, 2005). Insurance ecosystems may embed protection in mobility, health, commerce or banking journeys. A central strategic risk is disintermediation: where BigTech firms or embedded-finance platforms own the customer interface and data, insurers may be reduced to balance-sheet risk-carriers that supply capacity beneath a platform-owned relationship, with weaker pricing power, less customer insight and greater dependence on the platform (Parker & Van Alstyne, 2005). Distributed-ledger proposals similarly promise shared records and programmable processes, but their value depends on governance, interoperability, legal enforceability and a genuine coordination problem; technical novelty alone is insufficient (Catalini & Gans, 2016). In insurance value chains, the applications most often proposed are parametric insurance, in which verified trigger data can release payouts automatically; smart contracts for automated claims clearing and settlement; and shared fraud registries that let participants check for duplicate or fraudulent claims. Each remains subject to the governance and enforceability conditions above.

Technology and Innovation across the Insurance Value Chain

Across the empirical and industry literature, technologies map onto the value chain unevenly (Eling & Lehmann, 2018; Swiss Re Institute, 2017). Connected devices and data analytics are most often linked to product design and underwriting, through usage-based propositions and finer risk assessment. Analytics and platform interfaces are linked to marketing and distribution, through personalization and embedded cover. Machine learning and automation are linked to policy administration and claims, through triage, fraud screening and workflow. Distributed ledgers are linked to reinsurance, parametric products and claims settlement, where several parties reconcile shared records (Catalini & Gans, 2016). Model validation, privacy protection, explainability and human review apply at every stage (EIOPA, 2021), and reported

benefits vary in maturity across markets and firms. Section 4.9.1 and Table 1 set out the detailed synthesis.

Literature Synthesis and Research Gap

The reviewed evidence provides insights on individual technologies and selected insurance functions, but less often integrates interdependencies across the full value chain with the capabilities and safeguards required for implementation. This paper addresses that synthesis gap by examining how technology effects travel across product design, underwriting, distribution, policy administration and claims, and by identifying conditions that may shape performance in African markets where infrastructure, data access and institutional capacity vary. Its contribution is an explanatory framework and thematic synthesis, not a causal estimate of technology's impact (Eling & Lehmann, 2018; Snyder, 2019).

METHODOLOGY

This study uses an integrative desktop literature review and documentary analysis. It synthesizes the College of Insurance conference paper with scholarly literature on digital transformation, value chains, dynamic capabilities, platforms and AI governance, as well as relevant regulatory and industry publications. The analysis is organized around the five-insurance value-chain stages and cross-cutting data and governance conditions. Integrative reviews support theory-building across heterogeneous sources (Snyder, 2019). The 2022 College of Insurance conference address (Kajwang, 2022) served as the initial foundational working paper: it supplied the study's starting themes and the five-stage value-chain structure. Its content was then subject to secondary re-evaluation rather than treated as evidence in itself: each claim was checked against independent scholarly, regulatory and industry sources, and conference examples that could not be traced to such sources are reported only as illustrative.

Sources were assessed for relevance to insurance value-chain activity, technology-enabled operating-model change, organizational capabilities, and governance or consumer-protection implications. Conceptual and empirical studies, official regulatory materials and industry frameworks were included when they directly addressed these questions. Deductive thematic coding grouped evidence by technology capability, affected activity, enabling capability, intended outcome and risk; themes were then compared across value-chain stages (Snyder, 2019).

Academic literature was identified through Scopus, Web of Science Core Collection, EBSCO Business Source Complete and Google Scholar, supplemented by the websites of regulators and standard-setters (for example, EIOPA), industry-research publishers (for example, the Swiss Re Institute) and backward citation tracking from the principal sources. Searches combined concept blocks with Boolean operators, for example: ("insurance" OR "insurtech") AND ("value chain" OR "digitalization" OR "digitisation" OR "digital transformation") AND ("artificial intelligence" OR "machine learning" OR "analytics" OR "blockchain" OR "distributed ledger" OR "platform*" OR "ecosystem*") AND ("underwriting" OR "claims" OR "distribution" OR "product design" OR "governance"). A supplementary string, ("Africa" OR "emerging market*") AND ("mobile money" OR "mobile financial services") AND insurance, captured regional context. The publication-date limit was 2013–2026 for empirical, regulatory and industry sources. Foundational theoretical works published earlier (Porter, 1985; Teece, 2007; Parker & Van Alstyne, 2005; Barney, 1991; Tornatzky & Fleischer, 1990) were retained by purposive selection because they supply the study's conceptual framework.

Selection criteria. Sources were included when they (i) were published in English; (ii) addressed insurance or closely comparable financial-services contexts; (iii) examined at least one value-chain activity, technology capability, organizational capability or governance condition; and (iv) were peer-reviewed articles, institutional working papers, official regulatory publications or industry-research reports with identifiable authorship and method. Sources were excluded when they were vendor marketing, opinion without supporting evidence, duplicates, or claims without traceable attribution. Search counts and a screening log are not reported.

This is not a systematic review with a pre-registered protocol, an exhaustive reproducible search or a quantitative meta-analysis; the search described above was purposive. No primary data were collected; results report themes in the reviewed documentary evidence rather than new firm-level measurements. Evidence is uneven across technologies and markets, and some examples in the conference source lack traceable attribution, so they are treated as illustrative rather than as verified performance results.

RESULTS AND DISCUSSION

A Period of Rapid Change Accelerated by Technology

Insurance faces structural change from evolving customer expectations and consumption models, emerging exposures such as cyber risk, new entrants and platform-based business models, and expanding data and computational capacity. These developments alter both the risks requiring cover and the channels through which insurers assess and serve them (Swiss Re Institute, 2017; Vial, 2019; Verhoef et al., 2021).

These forces can change industry structures, risk pools and operating processes. Platforms may reorganise access to customers and complementors, while data analytics can support assessment of risks that were previously difficult to price. Automation may reduce manual processing, but value-chain benefits depend on connected data, suitable controls and effective service design (Parker & Van Alstyne, 2005; Eling & Lehmann, 2018; EIOPA, 2021).

Technology Transformation: The Drivers

Four connected capabilities underpin insurance technology transformation: richer data from digital devices and connected systems; machine-assisted processing and interaction; analytics for prediction and decision support; and new infrastructures for sharing information across organizations. These capabilities may reinforce one another, but their value depends on data quality, integration and governance (Swiss Re Institute, 2017; Bharadwaj et al., 2013; Verhoef et al., 2021).

Swiss Re Institute's industry framework describes a progression from sensors and data to information, decisions and action, alongside developments in connected devices, machine learning and automation (Swiss Re Institute, 2017). Read through dynamic-capabilities theory, this is not an automatic technology ladder: insurers need to identify useful applications, invest selectively and adapt routines as evidence and regulation evolve (Teece, 2007).

Technology's Effect across the Insurance Value Chain

Technology's effects can be traced across product design and development, pricing and underwriting, marketing, distribution, and policy and claims management, with information capture and analysis supporting each stage. Digitalization therefore changes the connections among activities as well as individual tasks (Porter, 1985; Eling & Lehmann, 2018).

In product design, telematics, connected devices and wearables can support usage-based or context-specific cover, while generating new exposures such as cyber risk. Analytics can assist underwriting, fraud detection and claims triage; digital channels can extend distribution; and automation can shorten some service processes. These are capabilities rather than guaranteed outcomes and require validation, consumer safeguards and human review where decisions materially affect customers (Swiss Re Institute, 2017; EIOPA, 2021; Eling & Lehmann, 2018).

A cross-cutting information layer links the physical value-chain activities. Technology investment made in isolation may leave data fragmented between product design, underwriting, channels and claims; coordinated data architecture and feedback loops are therefore important to sustained value-chain improvement (Porter, 1985; Bharadwaj et al., 2013; Teece, 2007).

A Broader Technology-Transformation Strategy: More Than a Single Vertical

Industry research frames transformation as an organizational programme rather than a stand-alone innovation project. Digitized processes, computational capacity, analytics and reconfigured operating models must be aligned with strategy, skills and governance if technology is to improve performance across the value chain (Swiss Re Institute, 2017; Verhoef et al., 2021; Vial, 2019).

Combining Banking and Insurance Data to Support Underwriting

Combining banking and insurance data could enrich risk assessment, but the conference paper's example is illustrative and does not provide a validated dataset, model specification or measured accuracy. Any such use requires a lawful basis, data minimization, representative training data, explainability and controls against unfair discrimination; performance claims require independent empirical validation (EIOPA, 2021; Vial, 2019).

Potential uses of cross-sector data include risk stratification, enrichment of application information and routing cases for additional review. These should be treated as hypotheses for testing rather than established results, with clear governance and human oversight for consequential decisions (EIOPA, 2021).

Machine Intelligence Applications across Multiple Fields

Machine-learning applications discussed in the literature include fraud detection, claims triage, risk assessment and customer-service automation. Adjacent voice or health-data applications raise heightened privacy, validity and consent concerns; the review does not treat individual commercial examples in the source address as independently verified evidence (EIOPA, 2021; Swiss Re Institute, 2017).

Blockchain in a Nutshell

Distributed-ledger systems combine shared records, cryptographic verification and programmable transactions. Their potential insurance uses include coordinated records and automated settlement, but adoption depends on interoperability, governance, privacy and clear operational benefits rather than technical novelty alone (Catalini & Gans, 2016). The specific applications discussed for insurance are parametric insurance, where predefined, independently verified triggers (for example, rainfall or weather indices) can automate payouts; smart contracts for automated claims clearing between insurers, reinsurers and service providers; and shared fraud registries that reduce duplicate or fraudulent claims across insurers.

For reinsurance, a shared ledger could reduce reconciliation across cedents and reinsurers and support-controlled information sharing. These benefits remain conditional on participant

governance, access rights, data quality and integration with existing systems; the literature does not justify assuming that a blockchain implementation automatically reduces costs or disputes (Catalini & Gans, 2016; Eling & Lehmann, 2018).

Digital Ecosystems: Where Digitalization Meets Large-Scale Data

Digital ecosystems combine services, data and multiple participants across customer journeys. Potential data sources include connected devices, location, commerce and health services, but using them raises consent, privacy, cybersecurity and discrimination questions. Insurers must distinguish data that are technically accessible from data that are lawful, proportionate and fair to use (Parker & Van Alstyne, 2005; EIOPA, 2021).

Ecosystem participation may embed insurance in mobility, health, commerce or banking journeys, allowing more continuous service than a stand-alone policy transaction. The strategic opportunity depends on trusted partnerships and customer value; it also creates dependencies on platforms and governance of access to data and customer relationships (Parker & Van Alstyne, 2005; Eling & Lehmann, 2018). Disintermediation is the sharpest form of this dependency: if BigTech or embedded-finance platforms capture the customer relationship, insurers risk becoming balance-sheet risk-carriers competing mainly on capacity and price, which makes data-sharing terms, ownership of customer data and distribution-partner agreements strategic questions rather than operational details.

Cross-Cutting Review Synthesis

The synthesis yields four connected findings. Digital value is distributed across linked activities, so improvements in underwriting depend on data capture, product design, channel integration and claims feedback. Analytics and automation may improve speed and consistency, conditional on data quality, model governance and appropriate human escalation. Platforms can extend reach and embed cover in customer journeys, while creating questions about data rights and intermediary power. Across all themes, organizational capabilities mediate the relationship between technology investment and customer or business outcomes (Porter, 1985; Teece, 2007; Parker & Van Alstyne, 2005; EIOPA, 2021).

Review Synthesis by Value-Chain Activity

The synthesis table maps five connected areas. In product design, connected data can support usage-based, modular and embedded products, but consent, fairness and product governance determine whether those designs remain suitable. In pricing and underwriting, richer data and analytics may improve risk assessment and decision speed, provided models use representative information and have explainable, reviewable outputs. Marketing and distribution may benefit from personalization, omnichannel access and ecosystem partnerships, although privacy, digital exclusion and third-party dependence must be managed. In policy administration and claims, self-service, triage and workflow automation may reduce friction, but customers need accessible error correction, human review and fair claims handling. Across the chain, shared information and feedback loops can connect decisions; interoperability, data quality, cybersecurity and accountable ownership are prerequisites rather than secondary technical details (Eling & Lehmann, 2018; EIOPA, 2021; Porter, 1985).

Interpretation against the Framework

The results support the integrated framework: technology resources create potential, while dynamic capabilities determine whether insurers identify useful applications, commit resources and reconfigure activities. Porter's value-chain lens shows why a local efficiency gain can be

offset when upstream data or downstream service remains fragmented. The review's central proposition is conditional: performance is more likely to improve when technology is aligned with complementary capabilities, governance and customer safeguards (Porter, 1985; Teece, 2007; Eling & Lehmann, 2018). The complementary perspectives sharpen this proposition for emerging markets: firm resources (RBV) and the regulatory, infrastructure and partner environment (TOE) help explain why the same technology may yield different value in different insurers and markets, which is why African conditions are treated here as a boundary condition rather than an incidental setting.

Table 1: Review Synthesis by Insurance Value-Chain Activity

Value-chain activity	Potential contribution identified in the reviewed literature	Key condition or risk
Product design	Usage-based, modular and embedded products; improved exposure insight	Consent, fairness, suitable product governance and exclusion risk
Pricing and underwriting	More granular risk assessment and faster decisions	Data representativeness, explainability, bias and model oversight
Marketing and distribution	Personalization, omnichannel access and embedded distribution	Privacy, digital exclusion, conduct risk and platform dependence and disintermediation
Policy and claims	Self-service, triage, fraud indicators and workflow automation	Error correction, human review, cyber resilience and claims fairness
Cross-chain information layer	Feedback loops that connect product, risk and service decisions	Interoperability, data quality, security and accountable ownership

The Way Forward

Three practical implications follow from the review. Insurers should align digital investments across value-chain stages rather than treating each application as a stand-alone project; establish data, model and conduct governance before scaling automated decisions; and assess performance through customer outcomes, operational quality and risk controls alongside speed or cost (EIOPA, 2021; Vial, 2019; Eling & Lehmann, 2018).

The conference source also cautions against adopting technology for its own sake (Kajwang, 2022). The relevant test is whether a technology improves a defined customer or operational outcome while remaining explainable, secure and appropriately governed (EIOPA, 2021).

Conclusion

Technology and innovation can affect product design, pricing and underwriting, marketing, distribution and claims through data, analytics, automation, platforms and distributed infrastructure. The review finds that these tools create opportunities rather than guaranteed gains: outcomes depend on data quality, organisational capabilities, integration and consumer safeguards (Porter, 1985; Teece, 2007; Eling & Lehmann, 2018; EIOPA, 2021).

REFERENCES

- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37(2), 471–482.
- Catalini, C., & Gans, J. S. (2016). Some simple economics of the blockchain (NBER Working Paper No. 22952). National Bureau of Economic Research.
- Eling, M., & Lehmann, M. (2018). The impact of digitalization on the insurance value chain and the insurability of risks. *The Geneva Papers on Risk and Insurance—Issues and Practice*, 43(3), 359–396.
- European Insurance and Occupational Pensions Authority. (2021). Artificial intelligence governance principles: Towards ethical and trustworthy artificial intelligence in the European insurance sector.
- Kajwang, B. (2022). Impact of technology & innovation trends in the insurance value chain [Address, AKPIA Conference, 2022]. College of Insurance, Nairobi.
- Parker, G. G., & Van Alstyne, M. W. (2005). Two-sided network effects: A theory of information product design. *Management Science*, 51(10), 1494–1504.
- Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance*. Free Press.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339.
- Swiss Re Institute. (2017). Tech and innovation trends in the insurance industry. Swiss Re.
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350.
- Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901.
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144.