

AI-Enabled Omnichannel Physician Engagement: An Evidence-Based Framework for Scientific Communication Across Digital Healthcare Platforms

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STRUCTURED ABSTRACT

Background: Pharmaceutical communication with health-care professionals has shifted from isolated representative visits and one-off digital campaigns toward coordinated use of apps, websites, email, messaging, webinars, search, and field-force follow-up. The practical appeal is clear: physicians seek information frequently, work under time constraints, and vary in channel preference. However, a greater number of touchpoints can also amplify promotional bias, message fatigue, privacy risk, pharmacovigilance obligations, and inequitable targeting.

Objective: To analyse Hidoc Dr's publicly described omnichannel content-marketing capability and develop an evidence-based, governance-led framework for AI-enabled physician engagement that is suitable for prospective evaluation rather than promotional extrapolation.

Approach: A targeted narrative synthesis was conducted using public Hidoc webpages and current peer-reviewed, regulatory, professional, and health-agency sources available through 6 August 2026. Priority was given to systematic reviews, official codes and guidance, implementation-science frameworks, digital-health evaluation standards, and primary studies concerning physician information needs, e-learning, pharmaceutical promotion, privacy, artificial intelligence, and pharmacovigilance. This was not a registered systematic review and no pooled product-effect estimate was attempted.

Findings: The literature supports digital and blended education as feasible methods for improving knowledge, although effects on clinical behaviour and patient outcomes are variable and context dependent. Physicians value rapid, credible, searchable and channel-appropriate medical information, but exposure to industry communication and financial relationships can influence prescribing. Consequently, omnichannel performance should not be defined by impressions or clicks alone. A defensible architecture requires verified professional identity, explicit purpose and permissions, approved evidence objects, channel-specific fair balance, frequency limits, adverse-event routing, model and content versioning, subgroup monitoring, and human medical, legal and regulatory oversight. AI may assist with prioritisation, sequencing and retrieval, but should not autonomously generate unreviewed claims or optimise toward prescribing volume.

Conclusions: AI-enabled omnichannel physician engagement should be treated as a regulated socio-technical intervention. Its value must be demonstrated through pragmatic comparative evaluation of reach, knowledge, relevance, safety, equity, implementation quality and professional trust. Hidoc's public multichannel foundation is compatible with such a model, but product-specific effectiveness and clinical impact remain hypotheses requiring prospective study.

Keywords: omnichannel engagement; physicians; pharmaceutical communication; digital health; artificial intelligence; continuing medical education; pharmacovigilance; privacy; implementation science; regulatory governance

Interpretive note: This manuscript distinguishes publicly described Hidoc capabilities from proposed design extensions. It does not report a clinical trial, independently verified campaign performance, or product-specific effectiveness.

1. Background

Physicians operate in an information environment defined by clinical urgency, expanding evidence, limited consultation time and fragmented sources. In a survey of 511 health-care professionals in the United States, most respondents reported searching for medical information daily or several times each week, illustrating that information retrieval is a routine clinical activity rather than an occasional task [5]. The relevant design problem is therefore not simply how to deliver more content, but how to provide the right evidence, at an appropriate moment, in a form that can be assessed quickly and traced to a reliable source.

Pharmaceutical companies have traditionally relied on personal detailing, congresses, printed materials and sponsored education. Digital channels added email, websites, portals, video meetings, mobile applications, social platforms and messaging. Early descriptions of e-detailing emphasised convenience, reach and interactive delivery, while also noting that evidence on prescribing effects was limited [7,8]. Contemporary omnichannel practice goes further: separate contacts are linked through common identity, content, consent and analytics so that the next interaction can reflect what occurred previously. Multichannel communication merely uses several channels; omnichannel communication attempts to coordinate them around one longitudinal professional journey.

This distinction matters because coordination can either reduce noise or intensify it. A physician who reads an evidence summary in an app may reasonably receive a follow-up knowledge check, access to the cited guideline and an option to request a medical-information response. The same physician should not receive repetitive banners, promotional messages, calls and webinar invitations simply because each channel has an independent performance target. Omnichannel design therefore requires an explicit theory of benefit and an equally explicit theory of harm.

The educational evidence is supportive but bounded. Internet-based learning in health professions education has generally improved knowledge compared with no intervention, while comparisons with traditional education show heterogeneous effects [9]. Cochrane reviews of e-learning and educational meetings suggest that digital or meeting-based interventions can improve knowledge and professional practice in some contexts, but patient outcomes and sustained behavioural effects are less certain [10,11]. Mobile, adaptive and spaced designs may increase accessibility, personalisation and retention, yet study quality and intervention heterogeneity remain important limitations [12-14]. These findings justify evaluation of well-designed digital engagement; they do not justify assuming that commercial exposure is equivalent to education or that engagement metrics are clinical outcomes.

A second evidence stream concerns pharmaceutical influence. Systematic reviews have found that exposure to information from pharmaceutical companies is not consistently associated with better prescribing quality and may be associated with greater frequency or cost of prescribing [16,17]. Industry payments have also shown consistent associations with prescribing in observational evidence, although causality and residual confounding require careful interpretation [18]. The ethical response is not to prohibit all industry-supported communication. It is to separate scientific service from promotional persuasion, disclose sponsorship, preserve fair balance, support independent verification and avoid optimisation objectives that reward a specific prescription outcome.

This article analyses Hidoc Dr's publicly described content-marketing service as a platform foundation and proposes a governance-led AI extension. The analysis does not independently validate Hidoc's audience-size or performance claims, and it does not report product outcomes. The aim is to define what a credible system would need to do, how it should be governed and how its effects could be tested.

2. Evidence identification and analytic scope

Public Hidoc sources were reviewed to identify the service elements that the company itself describes. These include content creation; distribution through app, web, email and WhatsApp;

audience filters based on factors such as specialty, region, interest and prescribing behaviour; quizzes, polls, continuing medical education and lead capture; campaign execution; and analytics and reporting [1-4]. One Hidoc page also describes one-click publication across multiple channels [2]. These descriptions establish a multichannel operating base, but they do not by themselves establish clinical effectiveness, causal return on investment, algorithmic performance, data provenance or regulatory compliance in any specific campaign.

The wider evidence search prioritised peer-reviewed systematic reviews and meta-analyses, official health-agency publications, regulatory documents, professional or industry codes, and implementation-science guidance. Sources were selected for relevance to five domains: physician information behaviour; technology-enhanced professional education; pharmaceutical promotion and conflicts of interest; privacy, AI and pharmacovigilance governance; and evaluation methodology. Vendor reports were not used as the principal basis for efficacy claims. Because this is a targeted narrative synthesis, the source set should be interpreted as an analytical foundation rather than a complete enumeration of the literature.

Three evidentiary categories are kept separate throughout. First, 'publicly described capability' refers only to functions explicitly stated on Hidoc webpages. Second, 'evidence-supported design principle' refers to a principle supported by external research or guidance, such as spaced learning, source transparency or frequency control. Third, 'proposed capability' refers to an AI or governance function that could logically be added but is not claimed as currently deployed. This separation prevents a common error in digital-health writing: converting plausible architecture into an implied product result.

3. Product and service analysis

Hidoc publicly describes an omnichannel content-marketing workflow that begins with audience definition, proceeds through asset collection and channel planning, deploys content across app, web, WhatsApp, email and search-related routes, drives engagement with articles, polls and CME, captures and qualifies leads, and produces analytics [1]. The company also describes targeting by professional and behavioural attributes and integration of quizzes or surveys with response capture [1,4]. At a service level, this is best understood as a campaign-orchestration and professional-audience platform rather than a clinical decision-support system.

A governance-led AI extension would add decision support around four questions: who is eligible to receive a communication, what approved evidence object is relevant, which channel and timing are suitable, and what next action is proportionate to the physician's response. AI can be useful where the option space is large, but the optimisation target must be constrained. A model trained only to maximise opening, clicking or conversion could select sensational, repetitive or narrowly promotional material. The target function should instead combine relevance, scientific utility, consent, fatigue, safety, equity and long-term trust.

The fundamental unit should be an approved evidence object rather than free-form promotional text. Each object would have a stable identifier, indication and audience scope, source references, date of medical review, jurisdiction, mandatory risk language, expiry or review date, permitted channels, language versions and relationship to the current product label. An AI recommender may rank these objects; it should not alter claims or remove risk context. Generative models, where used for summarisation or translation, should retrieve from approved sources, preserve citations, generate a change log and remain subject to human review before dissemination.

Identity and permission are equally important. Professional verification reduces inappropriate exposure and supports jurisdiction-specific rules. However, a professional identity graph can become intrusive when it aggregates inferred interests, prescribing proxies, web activity, location and third-party data without clear necessity. A defensible system would minimise data, distinguish declared preference from inferred behaviour, provide channel-level controls, record lawful basis, and allow correction, suppression and opt-out. Sensitive segmentation should be

prohibited where it is not necessary for scientific relevance or where it could create unfair exclusion.

The final layer is response management. Engagement should include more than passive impressions. Useful signals include completion of a knowledge check, access to a primary reference, a medical-information request, a request for representative follow-up, a stated channel preference, an opt-out, a report of suspected adverse reaction or a correction request. Each signal requires a different pathway. A safety report must be routed to pharmacovigilance and not left inside campaign analytics; an unsolicited off-label request must be handled under a separate medical-information process; a preference update should immediately influence future frequency and channel use.

Table 1 summarises the relationship between a potential capability, its defensible purpose and the principal guardrail.

Table 1. Capability-evidence-guardrail mapping

Capability	Defensible purpose and minimum guardrail
Audience selection	Purpose: professional relevance. Guardrail: verified HCP status, minimal data, lawful basis, correction and opt-out.
Content ranking	Purpose: surface useful approved evidence. Guardrail: claim-level provenance, mandatory risk context, expiry controls.
Channel choice	Purpose: match depth and urgency. Guardrail: global frequency caps, quiet periods and channel preference.
Generative AI	Purpose: retrieval, draft summary or translation. Guardrail: approved corpus, citations, human review and abstention.
Response capture	Purpose: learning and service follow-up. Guardrail: separate medical information, safety, privacy and commercial workflows.
Analytics	Purpose: evaluate reach and utility. Guardrail: no inference of clinical benefit from clicks or prescribing proxies.

4. Channel roles and journey design

Omnichannel architecture should assign each channel a defined clinical-communication role. The app or authenticated web environment is suitable for persistent, searchable evidence, long-form articles, interactive cases, references and longitudinal learning records. Email can provide concise notification and direct access to a reviewed asset. Messaging applications can support reminders, short questions and consented alerts, but their brevity and conversational tone create a risk that qualifications, risk information or sponsorship disclosures become less visible. Webinars enable expert discussion and questions, but they require faculty governance, disclosure, fair balance, moderation and archiving. Human representatives remain important for contextual interaction, but their follow-up should be informed by permission and documented scientific need rather than opaque behavioural scoring.

Sequencing should follow the physician's demonstrated need. A reasonable journey might begin with an opt-in notification linking to an evidence summary. A physician who opens it and requests more detail could receive the cited guideline, a short case-based question and an option to attend a webinar or contact medical information. A physician who does not engage should not automatically receive the same content through every other channel. Frequency caps, quiet periods, channel suppression and a global contact policy are essential because local optimisation by each channel produces cumulative overload.

Personalisation should be bounded by professional relevance. Specialty, language, location, declared interests and prior learning activity may improve usefulness. Personalisation based on inferred prescribing susceptibility, patient mix proxies or financial value is ethically more problematic. The safest approach is progressive personalisation: start with broad professional relevance, learn from explicit choices, and require stronger justification as data become more granular. Recommendation explanations can be simple - for example, 'shown because you selected cardiology and recently completed a hypertension module' - and should avoid implying clinical endorsement.

Content variety should serve learning rather than novelty. Evidence summaries may be followed by retrieval practice, case application, comparison tables or a moderated question session. Systematic reviews of adaptive and spaced digital education suggest that timing, feedback and repeated exposure can support knowledge outcomes, although intervention quality varies [13,14]. Accordingly, the platform should test educational hypotheses such as spacing and active recall separately from promotional hypotheses such as brand recall. Conflating them obscures both ethics and evaluation.

International deployment adds translation, cultural and regulatory complexity. A central approved evidence object may require local label alignment, medical terminology review, mandatory disclosures and channel restrictions. Translation by a generative model cannot be treated as clerical substitution; clinically meaningful terms, units, contraindications and risk language require controlled glossaries and human verification. Local medical and compliance ownership should remain identifiable even where the technical platform is global.

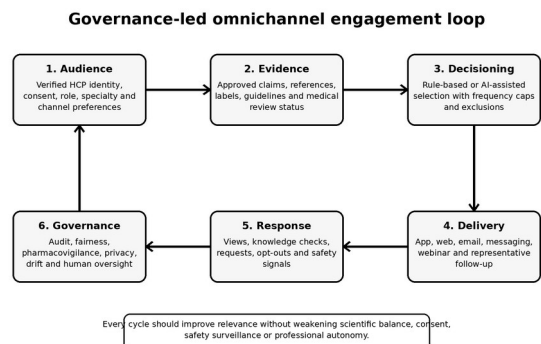


Figure 1. Proposed governance-led omnichannel engagement loop. The diagram is conceptual and does not represent a validated product architecture.

Table 2. Channel-specific role assignment

Channel	Primary role and characteristic risk
App/web	Persistent evidence, cases and references; risk: hidden sponsorship or stale content.
Email	Notification and access; risk: excessive cadence, weak context or misleading subject lines.
Messaging	Consented reminders and short interactions; risk: compressed risk information and privacy leakage.
Webinar	Expert discussion and questions; risk: speaker bias, inadequate disclosure or off-label drift.
Representative	Context and human follow-up; risk: opaque scoring, inconsistent claims or undue influence.
Search/SEO	Discoverability of reviewed resources; risk: audience ambiguity and promotion beyond intended jurisdiction.

5. International regulatory and practice examples

In India, the Uniform Code for Pharmaceutical Marketing Practices 2024 applies to pharmaceutical marketing and interactions with health-care professionals, and the government portal describes the code as mandatory for companies and third parties acting on their behalf [20]. An omnichannel vendor should therefore be contractually integrated into the sponsor's compliance system rather than treated as a neutral media outlet. Content approvals, sponsorship, hospitality, samples, gifts, record retention and complaint handling remain relevant when engagement is digital. India's Digital Personal Data Protection Act 2023 and Digital Personal Data Protection Rules 2025 add requirements concerning notice, consent or other lawful processing, security safeguards, rights handling and accountability [25,26].

In the European context, the EFPIA Code applies to traditional and digital communication and interaction with health-care professionals [22]. The General Data Protection Regulation requires lawful, fair and transparent processing, purpose limitation, data minimisation, accuracy, storage limitation and

appropriate security [24]. The EU Artificial Intelligence Act adds a risk-based framework and broader obligations for trustworthy AI, transparency and governance depending on system role and classification [27]. A physician-engagement recommender may not automatically be a high-risk medical AI system, but claims, profiling practices, data sources and downstream use can materially affect obligations and risk.

In the United States, the Food and Drug Administration's Office of Prescription Drug Promotion oversees prescription-drug promotion made by or on behalf of manufacturers and emphasises truthfulness, fair balance and disclosure of material facts [23]. FDA's internet and social-media materials illustrate that channel constraints do not remove the obligation to communicate risk appropriately [28]. The 2025 final guidance on firm communications of scientific information on unapproved uses provides a structured policy for certain HCP-directed scientific communications and underscores the need to distinguish scientific exchange from promotion [29].

International industry codes reinforce similar principles. The IFPMA Code covers interactions with health-care professionals, institutions and patient organisations, while the EFPIA Code explicitly extends to digital communication [21,22]. WHO publications on rational medicine use and drug promotion emphasise responsible, balanced information and the public-health consequences of promotional influence [19,30]. These instruments do not prescribe one technical architecture, but collectively support common controls: verified audience, evidence accuracy, clear sponsorship, balanced presentation, separation of medical and promotional functions, records, complaint pathways and monitoring.

Pharmacovigilance crosses all jurisdictions. Digital channels can receive suspected adverse reactions in comments, messages, survey responses, webinar questions or free text. EMA Good Pharmacovigilance Practices Module VI establishes expectations for collection and management of suspected adverse-reaction reports, with recent updates elsewhere in the GVP framework requiring continuing attention [31]. A platform must define what channels are monitored, how quickly potential cases are triaged, what constitutes day zero, how minimum case elements are pursued, and how duplicates and personal data are handled. Campaign teams should never be expected to make causality judgments; they should identify and route possible safety information under trained procedures.

6. Governance architecture

Governance should begin before campaign configuration. A cross-functional owner group - medical, legal, regulatory, pharmacovigilance, privacy, information security, data science and commercial operations - should approve the intended purpose, audience, source data, decision rules, prohibited uses, escalation paths and evaluation plan. Every campaign should have a named medical owner and a current approved-content inventory. Technical configuration should be reproducible from version-controlled records.

The content system should implement claim-level traceability. Each factual claim should link to an approved source and current label context. Mandatory risk and limitation text should travel with the claim as a non-separable component. Expired, superseded or jurisdiction-incompatible objects should be automatically blocked. Where a guideline changes, the platform should identify affected content and suspend it pending review. This is more robust than approving a complete visual asset once and then repeatedly repurposing fragments across channels.

AI governance should follow a lifecycle approach. WHO guidance emphasises autonomy, well-being, transparency, accountability, inclusiveness and sustainability in AI for health [32]. Its guidance on large multimodal models adds concerns about inaccurate outputs, automation bias, cybersecurity, data quality and the need for stakeholder participation [33]. NIST's AI Risk Management Framework organises work around govern, map, measure and manage functions [34]. For an omnichannel platform, these principles translate into model cards, data lineage, validation against intended use, threshold and override policies,

subgroup performance checks, drift monitoring, incident reporting and retirement criteria.

Human oversight must be substantive. Reviewers need access to the evidence, model rationale and content version, not a binary approve button. High-risk actions should be non-automatable: creation of a new clinical claim, response to an off-label inquiry, medical advice, modification of safety language, suppression of unfavourable evidence, or prioritisation based on predicted prescribing value. An AI tool may draft, retrieve or rank; accountable professionals remain responsible for release and exception handling.

Privacy governance requires a data map that distinguishes account data, professional verification, declared interests, inferred interests, device or engagement telemetry, event attendance, survey responses, safety information and any linked third-party data. Retention should be purpose-specific. Consent for a webinar does not necessarily authorise indefinite cross-channel profiling. Privacy notices should explain major recommendation logic and communication frequency in understandable terms. Data processors and sub-processors should be contractually controlled, and cross-border transfers assessed.

Equity requires more than avoiding protected variables. Models may disadvantage rural physicians, low-bandwidth users, older devices, less commonly used languages or specialties with smaller data volumes. Reach, relevance and error rates should therefore be stratified by geography, specialty, language, practice type and digital access. Alternative low-bandwidth formats and human support should remain available. Algorithmic bias in health systems can arise even when models do not explicitly use race or other protected attributes, because proxy variables and unequal historical data reproduce structural differences [35].

Table 3 presents a minimum control set.

Table 3. Minimum governance control set

Control domain	Minimum requirement
Purpose	Document scientific or service objective, intended audience and prohibited optimisation targets.
Evidence	Approved source library, label alignment, claim provenance, review date and expiry.
Privacy	Data map, notice, permissions, minimisation, retention, rights and processor controls.
Safety	Monitored channels, trained triage, day-zero logic, duplicate handling and audit trail.
AI	Intended use, validation, fairness, abstention, drift, incident response and retirement criteria.
Human review	Named medical and compliance accountability with meaningful access to rationale and sources.
Frequency	Cross-channel contact policy, caps, quiet periods, suppression and immediate opt-out propagation.
Transparency	Sponsorship, reason for recommendation, source citations and accessible complaint route.

7. Implementation considerations

Implementation should begin with a narrow, clinically coherent use case. A broad 'engage all doctors' programme makes it difficult to define relevance, outcomes and risk. Better starting points include a guideline update, a newly approved safety communication, an evidence-based disease-awareness module, or a structured medical-information pathway. The initial audience should be limited to verified professionals for whom the content is relevant, with explicit inclusion and exclusion criteria.

Content preparation is often the rate-limiting step. Scientific assets should be modular, source-linked and written at several depths: a short notification, a concise summary, a full evidence page, a primary reference and a response pathway. This modularity supports consistent claims across channels while preserving context. It also allows the same evidence to be evaluated in different instructional forms without creating multiple uncontrolled versions.

Interoperability should be pragmatic. A physician identifier, consent record, content identifier, campaign identifier, channel event, timestamp and outcome taxonomy are more important than

a large undifferentiated data lake. APIs should support identity reconciliation, content status, contact permissions, CRM follow-up and safety routing. Event data should be semantically defined: 'viewed' might mean loaded for one second or read to completion; 'engaged' might mean a click or a completed knowledge check. Governance depends on precise definitions.

Operational teams need training in both system use and boundary recognition. Medical reviewers should understand how content fragments are recombined. Campaign managers should understand fair balance and frequency policy. Data scientists should understand promotional restrictions and pharmacovigilance. Representatives should know why a recommendation was generated and when not to act on it. Safety and privacy teams need access to logs and service-level metrics.

Change management should acknowledge that omnichannel coordination redistributes control. Channel owners may resist global frequency caps, and commercial teams may prefer short-term activity metrics. A shared outcome framework is therefore essential. Implementation-science frameworks such as CFIR can be used to assess intervention characteristics, organisational context, individual roles and implementation processes [40,41]. Proctor's taxonomy helps distinguish acceptability, adoption, appropriateness, feasibility, fidelity, cost, penetration and sustainability from downstream service or clinical outcomes [42].

Rollout should proceed through sandbox testing, internal simulation, a small prospective pilot, independent review of safety and privacy performance, and staged scale-up. Failure criteria should be pre-specified. Examples include unacceptable opt-out rates, inability to deliver required risk context, delayed adverse-event routing, material subgroup disparity, model drift, or repeated human overrides. Stopping or simplifying a model is a governance success when risk exceeds value.

8. Proposed evaluation methodology

A prospective evaluation should compare an AI-assisted omnichannel strategy with at least one meaningful control. A three-arm pragmatic design is preferable where feasible: usual campaign practice; coordinated rule-based multichannel communication; and AI-assisted omnichannel communication under identical content, frequency and compliance constraints. This separates the value of coordination from the incremental value of AI. Randomisation could occur by physician, practice, territory or specialty cluster depending on contamination risk. Cluster randomisation is attractive when field-force behaviour or local communication affects multiple physicians.

The primary outcome should not be prescription volume. For a scientific-education use case, a defensible primary outcome could be change in objectively scored knowledge or application to standardised clinical vignettes at four to six weeks. For a medical-information use case, it could be the proportion of verified inquiries receiving a complete, referenced response within a defined time. For a safety communication, it could be verified receipt and comprehension among the intended professional population. Selection should be registered before analysis.

Secondary outcomes should cover RE-AIM domains: reach among eligible professionals; effectiveness on knowledge, confidence and intended practice; adoption by practices and internal teams; fidelity to content, frequency and safety rules; and maintenance of effect and system use [39]. Engagement metrics remain useful but should be interpreted as process measures. Time on content, reference access, quiz completion, repeat exposure and medical-information requests can help explain mechanism, while clicks alone cannot demonstrate educational value.

Safety and trust outcomes should be co-primary or key secondary outcomes rather than afterthoughts. These include opt-out and complaint rates, frequency-cap breaches, proportion of messages with complete mandatory information, suspected adverse events routed within the required interval, unapproved-claim incidents, off-label response deviations, privacy incidents, hallucination or unsupported-summary rate, and human override rate. Physician-reported trust, perceived relevance, intrusiveness and ability to verify sources should be measured with pretested instruments.

AI performance should be evaluated as a decision system, not merely as a prediction model. Metrics should include recommendation coverage, calibration, ranking quality, abstention rate, stability, drift, subgroup differences and the effect of overrides. An offline model with high discrimination can still fail prospectively if it increases fatigue, selects trivial content or performs poorly in low-volume specialties. Decision logs should permit reconstruction of why an individual received a particular item at a particular time.

A mixed-method process evaluation should use interviews with physicians, representatives, medical reviewers and compliance staff to identify mechanism and unintended effects. CFIR can structure analysis of context and implementation determinants [40,41]. Proctor outcomes can assess feasibility and fidelity [42]. Reporting should use TIDieR for intervention description and CONSORT-EHEALTH for digital trial details [37,38]. If an AI decision-support component materially influences intervention delivery, DECIDE-AI and CONSORT-AI principles should be incorporated [43,44].

Sample-size calculation should be based on the chosen primary outcome and expected intracluster correlation. Analysis should follow intention-to-treat principles with pre-specified handling of missing data. Multiple comparisons across engagement submetrics should be controlled or clearly identified as exploratory. Subgroup analyses should be limited and pre-specified. Patient outcomes should be considered only where the intervention plausibly affects care, data linkage is lawful and the study is adequately designed; otherwise, they should not be inferred from physician engagement.

Table 4 provides a compact evaluation matrix.

Table 4. Proposed prospective evaluation matrix

Evaluation domain	Recommended approach
Design	Pragmatic three-arm comparison: usual practice, rule-based coordination, AI-assisted omnichannel.
Primary outcome	Pre-specified knowledge, vignette application, verified response quality or safety-comprehension endpoint.
Process	Reach, dose, reference access, completion, medical-information requests and representative follow-up.
Safety/trust	Opt-outs, complaints, fair-balance failures, PV timeliness, privacy incidents, unsupported outputs and trust.
AI quality	Coverage, calibration, subgroup performance, drift, abstention, override and decision reconstruction.
Implementation	RE-AIM, CFIR and Proctor outcomes; mixed-method interviews and fidelity assessment.
Reporting	TIDieR, CONSORT-EHEALTH and relevant DECIDE-AI/CONSORT-AI items.
Interpretation	No inference of patient benefit or prescribing quality from engagement alone.

9. Limitations

This article is a narrative product and evidence analysis, not a systematic review. Searches were targeted, no formal risk-of-bias instrument was applied across all included sources, and the available literature uses heterogeneous interventions and outcomes. Much of the evidence concerns digital education, e-detailing, pharmaceutical interaction or AI governance separately rather than integrated AI-enabled omnichannel systems.

Public Hidoc descriptions are marketing materials and were not independently audited. The article therefore uses them only to identify stated service elements. It does not validate audience size, engagement, return on investment, targeting accuracy, lead quality or technical implementation. Proposed AI, content-object and governance functions should not be interpreted as existing Hidoc features unless separately documented.

Engagement is an intermediate outcome. Even robust improvements in knowledge do not guarantee changes in practice, and changes in prescribing are not necessarily improvements. Commercial objectives, clinical evidence and

patient welfare can diverge. Evaluation must therefore define a clinically legitimate purpose and avoid using educational language to mask promotional optimisation.

Regulation is jurisdiction-specific and continues to evolve. The DPDP Rules 2025, the EU AI Act and updated pharmacovigilance guidance require implementation-specific legal interpretation. This article is not legal advice. Sponsors and platform operators remain responsible for local review, contracts, records and ongoing surveillance.

Finally, AI is not required for every decision. Transparent rules may perform as well as complex models when campaigns are small, content choices are limited or data quality is poor. The burden of proof should increase with model complexity, data sensitivity and potential influence on clinical behaviour.

10. Conclusion

Omnichannel physician engagement is best understood as coordinated scientific communication across a longitudinal professional journey. Its promise is not that every physician can be reached more often, but that relevant evidence can be made easier to find, verify and use while unnecessary contacts are reduced. Hidoc's publicly described combination of professional targeting, app and web distribution, email, WhatsApp, educational content, lead capture and analytics provides a plausible operational base for this model [1-4].

AI can assist with evidence retrieval, content ranking, channel selection, timing and next-best-action recommendations. It should remain constrained by approved evidence, professional permission, fair balance, pharmacovigilance, privacy, frequency controls, subgroup monitoring and human accountability. Optimising solely for clicks, leads or prescriptions would be scientifically weak and ethically hazardous.

The next step is prospective comparative evaluation. A credible programme would measure knowledge, relevance, trust, safety, equity, implementation fidelity and maintenance alongside engagement. It would distinguish the effect of coordination from the effect of AI and would publish null or adverse findings as well as positive results. Until such evidence exists, AI-enabled omnichannel effectiveness should be described as a testable hypothesis, not a proven product outcome.

Practice principle

The system should optimise for verified scientific usefulness under explicit safety and autonomy constraints - not for maximum contact frequency, click-through rate or predicted prescribing value.

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