Rayyan Systems - Whitepaper

The Evidence Behind the Evidence:

Why Systematic Review Methodology Determines the Quality of Health Technology Assessment Submissions

---

Prepared by:
Mimi M. Kim, PhD
Head of Scientific Affairs
Health Services Researcher | Systematic Review Methodologist |Industry Executive

July 2026

sales@rayyan.ai www.Rayyan.ai

About Rayyan

Rayyan is the most widely adopted evidence synthesis platform in active research use: #1 in new PROSPERO protocol registrations since 2025, with over 1 million registered researchers across 30,900 organizational domains in 180 countries. Rayyan's foundational paper has been cited more than 30,000 times. With over 2.2 million reviews conducted and 3.27 billion screening decisions processed to date, Rayyan operates at a scale that far exceeds the published systematic review literature.

In January 2026 alone, researchers created 47,859 new systematic review projects on Rayyan, surpassing the 43,508 systematic reviews indexed in PubMed across all of 2025. By July 2026, Rayyan had supported 422,228 new review projects year-to-date, more than 16 times the number of systematic reviews indexed in PubMed over the same period (Rayyan internal platform data, 2026; PubMed systematic review publication type filter, retrieved August 7, 2026). Production and publication are distinct stages of evidence synthesis: the published record captures only a fraction of the research in progress. This comparison underscores Rayyan's substantial contribution to the global production of systematic reviews each year. That scale of adoption reflects a research community's trust in a platform built on a clear principle: that the transparency, auditability, and reproducibility that rigorous evidence synthesis demands can be delivered without sacrificing efficiency.

The author of this paper is **Dr. Mimi M. Kim**, PhD, Head of Scientific Affairs at Rayyan Systems, where she bridges deep expertise in systematic review methodology with product development, scientific communications, and strategic partnerships. Dr. Kim is a health services researcher and methodologist with over 60 peer-reviewed publications and experience spanning NIH-funded academic research, commercial biotech R&D, FDA regulatory submissions, and evidence synthesis methodology. She brings to this white paper the perspective of a practicing methodologist who has conducted and evaluated systematic reviews across clinical, academic, and regulatory contexts.

Methodological Note: PubMed Systematic Review Count

PubMed systematic review counts reported in this white paper were retrieved using the publication type filter systematic review[pt], applied via the PubMed advanced search interface at pubmed.ncbi.nlm.nih.gov. This filter identifies records formally designated as systematic reviews in the MEDLINE indexing process, and represents a conservative, independently reproducible count of published systematic reviews.

Two searches were conducted and retrieved on August 7, 2026:

Search 1 (2025 full year): systematic review[pt] filtered to January 1, 2025 through December 31, 2025. Result: 43,508 records.

Search 2 (2026 year-to-date): systematic review[pt] filtered to January 1, 2026 through August 7, 2026. Result: 24,893 records.

The 2026 year-to-date figure should be interpreted with the understanding that PubMed indexing for recently published articles is ongoing. Citations submitted for indexing within the preceding six to eight weeks may not yet appear in search results, meaning the 2026 figure will increase as indexing is completed. This indexing lag is a standard characteristic of the PubMed database and does not affect the 2025 full-year figure, which reflects a fully indexed and settled record. Both searches used an identical methodology to ensure comparability across time periods.

Rayyan new review project counts reflect internal platform data for the period January 1 through July 31, 2026, defined as new systematic review projects created by registered users within the Rayyan platform during the specified period.

Executive Summary

Health technology assessment (HTA) submissions are only as credible as the systematic reviews that underpin them. As global HTA requirements grow in complexity - driven by the EU Joint Clinical Assessment (JCA), multi-jurisdictional evidence demands, and compressed submission timelines - the methodological rigor of the underlying evidence synthesis has become a strategic asset, not merely an operational function; yet persistent gaps remain.

A 2024 systematic review of HTA transferability tools (Ahmadnezhad et al., *International Journal of Health Policy and Management*) identified that many existing tools are minimally validated, limited in practical functions that align with methodological requirements, and do not adequately address the multi-jurisdictional complexity that modern HTA demands. When the tools designed to evaluate whether HTA evidence transfers across contexts are themselves inadequate, the quality of the original systematic review can be compromised.

This white paper examines the evolving HTA landscape, the escalating methodological demands it places on systematic literature reviews, and why platform selection is a methodological decision with direct consequences for regulatory credibility. We argue for a distinction the field has not made clearly enough: the difference between **efficiency in service of rigor**, which Rayyan embodies, and **efficiency as a substitute for rigor**, which carries downstream regulatory liability that no time-savings claim can offset.

Rayyan's methodology-first architecture, featuring validated deduplication, criteria-transparent AI screening with per-reference auditable decision logs, explicit PICO framework integration, and database-agnostic design, positions evidence teams to meet the full demands of HTA-grade evidence synthesis with scientific confidence.

> *Core argument: Systematic review methodology was designed to be thorough for a reason. Comprehensiveness, transparency, and reproducibility are not inefficiencies to be optimized away. These methodological characteristics are the critical mechanism by which evidence earns its authority in regulatory and policy contexts.*

Section 1: Health Technology Assessment and the Systematic Review as Its Methodological Backbone

The Global Role of HTA

Health technology assessment has become a cornerstone of evidence-based health policy globally. According to a 2020-21 World Health Organization survey, 102 countries and regions now employ a systematic, formal decision-making process to evaluate health interventions. In Europe, virtually all nations apply HTA principles to pharmaceutical coverage decisions; more than two-thirds extend this to medical devices and other health technologies. The scope of HTA has expanded to encompass clinical efficacy, comparative effectiveness, cost-effectiveness, budget impact, and organizational, social, and legal considerations.

HTA can be conducted at any stage of a health intervention's life cycle: prior to market entry, following market authorization, or when a new indication for an existing technology comes under consideration. As demand for evidence-based decision-making has intensified, so too have the volume and complexity of HTA submissions. European HTA agencies now face demands that have grown by as much as 83% over three years, with assessments expected within 90 days of market authorization in some jurisdictions.

The Systematic Review as Methodological Backbone

The systematic literature review (SLR) is not merely one input among many feeding into an HTA; it is the primary evidence-generating mechanism upon which clinical efficacy, comparative effectiveness, and cost-effectiveness analyses all depend. Comprehensiveness and transparency are definitional requirements of the systematic review, not aspirational goals: by design, systematic reviews attempt to offer a complete synthesis of all relevant evidence in a manner that is verifiable, reproducible, and resistant to selection bias.

The typical HTA systematic review encompasses PICO (Population, Intervention, Comparator, and Outcomes) framework development; comprehensive database and gray literature searching; deduplication and record management; title/abstract and full-text screening; data extraction; quality and risk-of-bias assessment; and evidence synthesis including meta-analysis or network meta-analysis where appropriate. Each stage carries methodological requirements that, if not met, compromise the integrity of the entire evidence base.

This point deserves emphasis beyond its technical dimension. The methodological quality of a systematic review determines whether its findings are credible and transferable across regulatory contexts. A landmark 2024 systematic review of HTA transferability tools (Ahmadnezhad et al.) found that even well-conducted HTAs frequently fail to transfer across jurisdictions because the underlying evidence synthesis does not adequately account for differences in healthcare systems, patient demographics, clinical practice patterns, and economic context. Rigorous upstream methodology is not a procedural formality. This methodology is the mechanism by which evidence earns the authority to inform policy decisions across geographies.

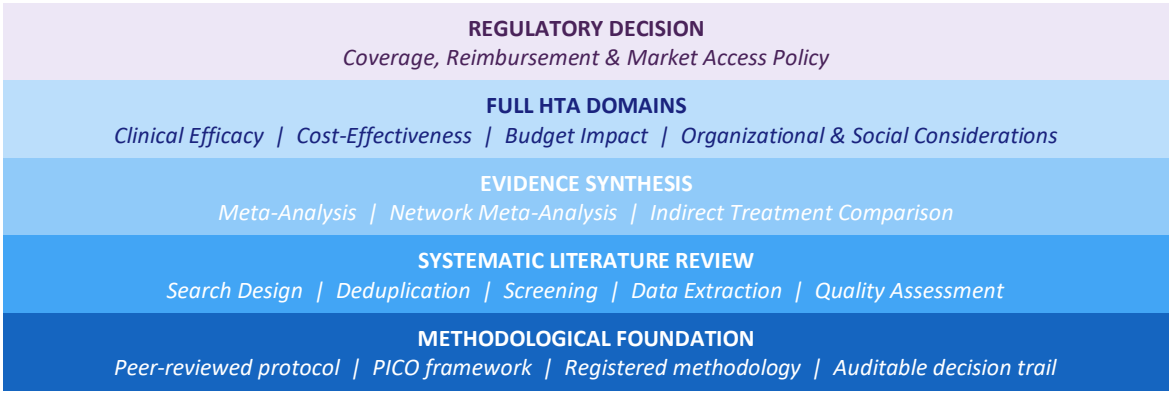

Figure 1: *The HTA Evidence Architecture: The systematic review is the methodological foundation upon which the credibility of all higher-order evidence synthesis and regulatory decision-making rests.*

Transferability: The Overlooked Methodological Dimension

The Ahmadnezhad et al. systematic review identified 13 tools developed globally for evaluating HTA transferability across jurisdictions and found significant limitations across the board. Only three models had been validated through published studies. The majority were checklists rather than comprehensive frameworks. Only two were considered suitable for full HTA. Critically, none had documented use in lower-resource settings, and none fully addressed legal, social, or organizational dimensions of transferability.

As reported by Ahmadnezhad and colleagues, the four most widely used tools (i.e., Welte, EUnet HTA Adaptation Toolkit, EROUNHEED, and ISPOR) each carry limitations, including workflows that require subjective judgment, complexity that impedes practical use, quantitative scoring approaches that may not accurately capture transferability, and gaps in country-specific contextual factors. The conclusion of the review is pointed: a comprehensive, validated tool for analyzing all factors affecting HTA transferability across jurisdictions remains to be developed.

The practical consequence is significant. When the tools designed to evaluate whether an HTA transfers across contexts are themselves inadequate, **the original systematic review must be methodologically robust enough to withstand scrutiny it was not specifically designed to be evaluated against.** This places a premium on the quality of the foundational evidence synthesis, and by extension, on the platform used to conduct it.

Section 2: A Landscape of Escalating Methodological Demands

The Three Well-Documented Operational Challenges

The HTA systematic review community has well-documented three core operational challenges: information volume, timeline pressure, and the need for transparency and accuracy (Cameron et al. 2024). Each is real and consequential. But they represent the operational layer of a more fundamental problem.

Information volume has grown dramatically. On average, only 3% of retrieved records are ultimately included in a systematic review (Chan et al. 2025), meaning that for every relevant study, reviewers process approximately 34 irrelevant ones. A typical HTA systematic review in the HEOR space may involve between 6,000 and 10,000 references per project for title/abstract screening alone, with multiple databases contributing to the initial yield. Literature indexed on ClinicalTrials.gov grew more than 250-fold between 2000 and 2019.

Timeline constraints are acute. European agencies typically have two to three months to complete an HTA for a pharmaceutical product. NICE aims to publish assessments within 90 days of market authorization. The WHO HTA survey found assessment timelines ranging from one to twelve months, with rapid assessments increasingly requested, putting systematic review teams under pressure to work faster without compromising the comprehensiveness and rigor that the methodology requires.

Transparency and accuracy failures in systematic review practice are common and consequential. Fewer than half of systematic reviews report using a standardized data extraction form (Buchter et al. 2021), and while the majority of systematic reviewers report having used automation tools, lack of methodological knowledge remains the primary barrier to their consistent adoption (Scott et al. 2021). The consequences of inadequate methodology are not merely procedural: a reproducibility study of 201 systematic reviews of adverse events found that 85% contained at least one meta-analysis in which data extraction could not be reproduced, with errors in some cases changing the direction of the reported effect entirely (Xu et al. 2022). Human reviewers may not apply inclusion/exclusion criteria consistently, introducing inadvertent bias that is difficult to detect and nearly impossible to reconstruct after the fact.

The Fourth Dimension: Jurisdictional Transferability and Methodological Defensibility

These three challenges represent the operational layer of HTA complexity. However, there is a fourth and less-discussed dimension that operates at the methodological level: the requirement that evidence not only be produced efficiently and transparently, but that it be structured and documented in a way that holds up to scrutiny across multiple regulatory contexts simultaneously.

The Ahmadnezhad et al. (2024) findings are directly relevant here. The persistent inadequacy of transferability tools means that evidence teams cannot rely on post-hoc adaptation to bridge the gap between a single-jurisdiction review and a multi-jurisdiction submission. Transferability must be built into the methodology from the beginning - in the PICO framework design, the search strategy, the screening criteria, and the documentation of every inclusion/exclusion decision.

The EU Joint Clinical Assessment as a Case Study in Complexity Escalation

The European Union's Joint Clinical Assessment (JCA), operational for oncology and advanced therapy medicinal products from 2025, represents the most significant structural change to the HTA landscape in a generation. Its implications for systematic review methodology are substantial.

Under the JCA framework, a central clinical assessment is conducted for selected health technologies, but this is not a harmonized one-size-fits-all process. Each of the 27 EU member states identifies its own PICOs of interest, defining the populations, interventions, comparators, and outcomes relevant to its national context. The JCA submission must address this entire matrix of PICO frameworks, requiring evidence reviewers to demonstrate that their evidence base is relevant and applicable to each country's specific clinical and policy context, all within a 100-day timeline, with limited manufacturer involvement and a premium on full methodological transparency.

The JCA challenge is not primarily an efficiency problem. It is a methodological architecture problem. An evidence team that begins its systematic review without a PICO-structured framework, without validated deduplication, and without per-reference documentation of screening rationale will find themselves unable to construct the tailored, defensible multi-PICO dossier the JCA requires, regardless of how quickly they screened their references.

Evidence Requirement	NICE (England)	HAS (France)	IQWIG/G-BA (Germany)	ZIN (Netherlands)	TLV (Sweden)
Clinical Evidence Requirements					
Clinical data for technology and comparators	Yes	Yes	Yes	Yes	Yes
Comparative effectiveness data	Yes	Yes	Yes	Yes	Yes
Economic Evidence Requirements					
Economic models / cost-effectiveness	Yes	Yes	No	No	No
Resource use and cost data	Yes	No	No	No	No
Utility / quality-adjusted life year data	Yes	Partial	No	No	No
Quality & Methodological Requirements					
Quality / risk-of-bias assessment	Yes	Yes	Yes	Yes	Yes
Critical appraisal of RCTs and non-RCTs	Yes	Yes	Yes	Yes	Yes
Critical appraisal of economic models	Yes	Yes	No	No	No

Key: Yes = Required Partial = Conditional No = Not required or not applicable

Figure 2: *Jurisdictional Evidence Requirements Across Major European HTA Bodies: Evidence requirements vary substantially across geographies, underscoring the need for PICO-structured, multi-jurisdiction-ready systematic review methodology from the outset.*

The Efficiency Distinction That Matters

It is worth drawing a distinction that is rarely made explicitly in discussions of systematic review software, and that carries significant consequences for HTA teams: the difference between administrative efficiency and methodological expedience.

> *Administrative efficiency, in terms of reducing coordination overhead, eliminating redundant data entry, and streamlining reference management, genuinely supports methodological goals by directing reviewer attention toward the work that requires human judgment. Methodological expedience, in terms of accelerating or automating the substantive steps of the review itself in the name of speed, is a categorically different matter.*

The systematic review methodology was not designed to be fast. It was designed to be complete, transparent, and defensible. Comprehensiveness and rigor are not inefficiencies to be optimized away; they are the mechanism by which evidence earns its authority. When a platform leads with time savings as its primary value proposition, the appropriate question is: time saved from what, exactly? If the efficiency gains come from reducing administrative overhead, that is legitimate value. If they come from shortcutting deduplication, reducing screening rounds, or automating inclusion decisions without audit trails, the downstream regulatory cost may far exceed the upstream time savings.

In the HTA submission context, when a regulatory body or HTA agency challenges a screening decision, the team that optimized for speed may find itself unable to reconstruct the reasoning behind its review. A regulatory query, resubmission requirement, or credibility challenge at that stage will consume time that dwarfs any efficiency gain achieved in the original project. The hidden cost of methodological expedience is one that time-savings marketing claims never include in the calculation.

> *Efficiency in service of rigor is a design principle. Efficiency as a substitute for rigor is a liability.*

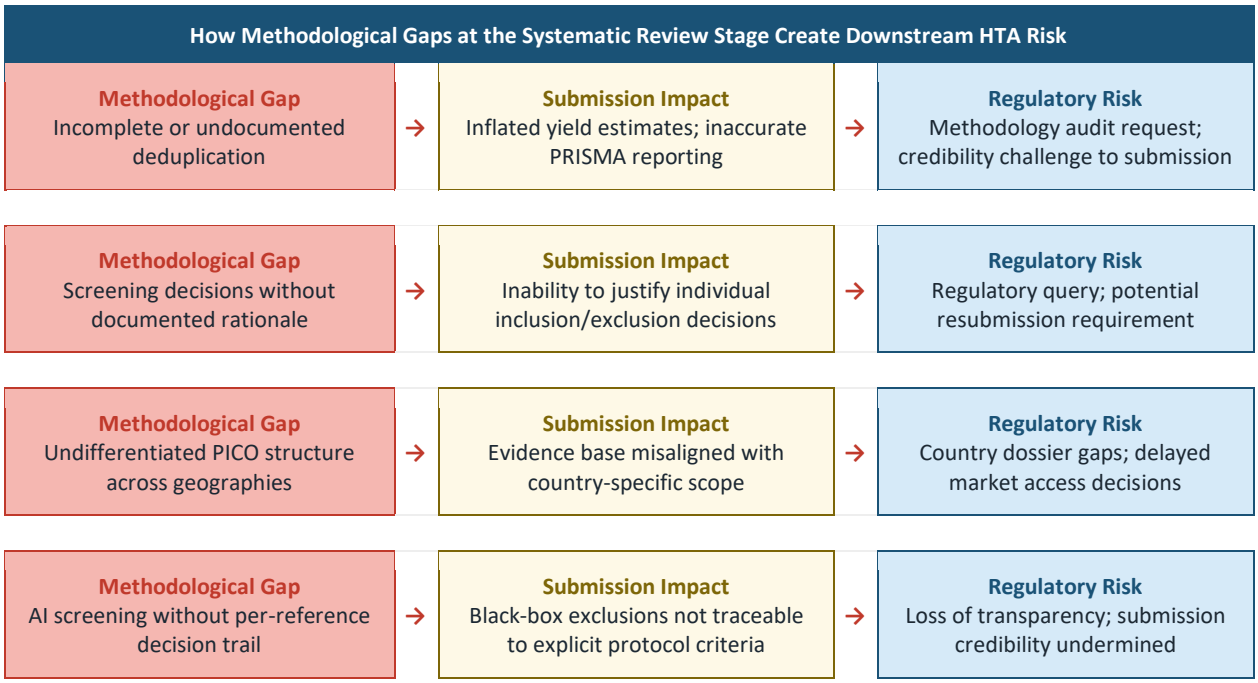

Figure 3: *The HTA Submission Risk Cascade: Methodological gaps at the systematic review stage create compounding* **downstream regulatory and credibility risk.**

Section 3: Rayyan - A Methodology-First Platform for HTA-Grade Evidence Synthesis

Rayyan was built by researchers *for* researchers, and that origin is reflected throughout the platform's design. Where many evidence synthesis tools are engineered primarily around operational metrics (e.g., screening throughput, workflow automation, project management efficiency), Rayyan's architecture begins from a different question: *what does methodologically rigorous evidence synthesis require, and how do we build a platform that supports every one of those requirements without introducing friction, shortcuts, or opacity?*

This commitment extends to an active peer-reviewed publication program. Rayyan does not merely build methodology into its platform; it submits that methodology to independent scientific scrutiny. A peer reviewed journal article on the Rayyan deduplication method has been recently published (Kim et al., Interact J Med Res. 2026;15:e94317), and prospective validation of other advanced tools that support methodological rigor at scale and research integrity with optimized efficiency are in progress. **Rayyan is distinguished by a growing body of peer-reviewed evidence, both from its own development team and from independent research groups, validating the methodology behind its core features, a scientific foundation that remains uncommon across systematic review platforms.**

Pillar 1: Validated Deduplication Methodology

Deduplication is routinely underappreciated as a methodological step, yet errors at this stage propagate through every subsequent phase of the review. In HTA systematic reviews that aggregate search results from multiple databases (i.e., MEDLINE, Embase, Cochrane CENTRAL, gray literature repositories, clinical trial registries), accurate deduplication directly affects yield estimates, PRISMA flow diagram accuracy, and the representativeness of the included evidence base. A missed duplicate inflates the apparent comprehensiveness of a search; an incorrectly merged record may remove a study that should have proceeded to screening.

The Rayyan deduplication method is formally documented and published in the Interactive Journal of Medical Research (IJMR) as a tutorial article. This means that Rayyan's approach to deduplication is not a proprietary black box. Rayyan supports systematic reviews according to a scientifically driven, human-reviewed methodology that evidence teams can cite, evaluate, and rely upon. For HTA submissions that require full methodological transparency, this distinction is significant.

Pillar 2: Criteria-Transparent AI Screening with Auditable Decision Logs

Rayyan's AI Reviewer applies large language model (LLM)-based, criteria-driven screening that generates a per-reference evidence justification, with a documented rationale for each inclusion or exclusion decision, traceable to the explicit criteria defined in the review protocol. This architecture reflects a fundamental design principle: the AI's role is to support and document human judgment, not to replace it.

This is categorically different from AI tools that reorder or prioritize references based on predicted relevance. Prioritization-based AI produces efficiency gains in screening throughput, and it presents reviewers with more likely-relevant records first, but it does not produce per-reference justification logs tied to explicit protocol criteria. When an HTA body or regulatory agency asks why a specific study was excluded, a relevance score is not a defensible answer. **A criteria-linked justification log is.**

Prospective publication of validation data for the AI Reviewer and Auto Extraction is currently underway, designed to assess sensitivity, specificity, and inter-rater agreement metrics, the same performance standards applied to human reviewers in methodological validation studies. This approach reflects Rayyan's commitment to **holding its AI to the same scientific standards as the human researchers it supports.**

Pillar 3: Explicit PICO Framework Integration

Rayyan's PICO framework is built into the platform's organizational architecture from the outset of a review, not added as a post-hoc tagging or annotation layer. This matters particularly in the JCA context, where submissions must address individual PICOs across 27 EU member states and evidence must be demonstrably mapped to each country's specific clinical and policy scope.

PICO alignment at the screening stage, rather than the reporting stage, ensures that inclusion decisions are made within a framework that is explicitly calibrated to the submission requirements. **The result is an evidence base that is not merely comprehensive but structured: teams can generate PICO-stratified evidence maps directly from their Rayyan project, enabling more defensible multi-jurisdiction dossier preparation without re-reviewing or re-extracting data.**

Pillar 4: Database-Agnostic Design

Rayyan operates on uploaded search results generated through researcher-designed Boolean strategies, independent of any platform-linked database integrations. This architecture reflects a methodological principle that the evidence synthesis field has long recognized: search design and search management are distinct activities that should not be conflated.

HTA systematic reviews require comprehensive searching across multiple databases using strategies designed by qualified information specialists. A platform that encourages searching through its own integrated database connections introduces subtle pressure toward search convenience over search comprehensiveness. In an HTA context, where completeness of the evidence base is a fundamental methodological requirement, this is the wrong trade-off. Rayyan's database-agnostic design respects the separation between expert search design and evidence management that rigorous HTA methodology demands.

Rayyan's Methodology Pipeline: Rigor at Every Stage				
01 **Search Upload** Import results from any database or source *Database-agnostic; Boolean strategy integrity preserved*	**02** **Validated Deduplication** Peer-reviewed methodology removes duplicate records *Manuscript under peer review at JMIR Medical Informatics*	**03** **PICO-Structured Setup** Project organized around explicit PICO framework from the outset *Supports multi-jurisdiction, multi-PICO evidence mapping*	**04** **AI Reviewer Screening** Criteria-driven LLM screening with per-reference justification logs *Auditable decision trail; human judgment preserved and supported*	**05** **Synthesis & Export** PRISMA-compliant reporting; export ready for HTA dossier preparation *Transparent, traceable, submission-ready evidence base*
Design principle: *Efficiency in service of rigor. Administrative friction reduced at every stage; methodological thoroughness preserved at every stage.*				

Figure 4: *Rayyan's Methodology Pipeline: Each stage is designed to reduce administrative friction while preserving, and actively supporting, methodological rigor.*

Rayyan's Peer-Reviewed Publication Program

Rayyan's commitment to methodological transparency extends beyond platform design to scientific publication. The platform's core methodologies are not proprietary claims. They are submitted for independent peer review, making them citable, evaluable, and trustworthy in precisely the way that evidence teams using Rayyan must evaluate the studies they screen.

Publication	Status	Methodological Contribution
Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan: a web and mobile app for systematic reviews. Systematic Reviews. 2016;5:210.	***Published, December 2016*** ***https://link.springer.com/article/10.1186/s13643-016-0384-4***	*Foundational peer-reviewed description of Rayyan as a systematic review platform, including screening methodology, prediction algorithm validation, and usability testing with published Cochrane reviews.*
Enhancing Transparency, Auditability, and Reproducibility of Deduplication in Systematic Reviews: A Tutorial for the Rayyan Method and Systematic Auto Resolver	***Published, July 2026*** **IJMR** https://www.i-jmr.org/2026/1/e94317	*Peer-reviewed documentation of Rayyan's deduplication methodology; establishes the scientific basis for accurate, transparent, and reproducible record management in multi-database systematic review searches.*
AI Reviewer Validation Study	**Prospective Validation in Progress**	*Prospective validation of Rayyan's criteria-driven LLM screening tool using sensitivity, specificity, and inter-rater agreement metrics, the same performance standards applied to human reviewers in methodological validation studies.*
Auto Extraction Validation Study	**Prospective Validation in Progress**	*Prospective validation of Rayyan's automated data extraction tool against gold-standard manual extraction, evaluating field-level accuracy, completeness, and error rates across study design characteristics, outcomes, and population parameters.*
Rayyan's commitment: *Every core platform methodology is submitted for independent peer review. We publish our science.*		

Figure 5: *Rayyan's Peer-Reviewed Publication Program: Core platform methodologies are subject to independent scientific scrutiny. We publish our science.*

Section 4: Choosing the Right Platform for HTA-Grade Systematic Reviews

Platform selection for HTA-grade systematic reviews is a methodological decision with direct consequences for the credibility of the submission it supports. The following section offers a framework for evaluating the methodological design patterns that carry risk in HTA contexts, and a set of evaluative criteria that evidence teams should apply to any systematic review platform under consideration.

Three Design Patterns That Carry Methodological Risk in HTA Contexts

Platforms built primarily around AI-based reference prioritization offer genuine value in accelerating screening throughput by presenting likely-relevant records first. However, prioritization-based AI produces efficiency gains, not methodological transparency. For HTA submissions that require auditable, per-reference documentation of the criteria-based logic behind each screening decision, prioritization does not substitute for criteria-documented decision logs. The value of AI in systematic review is not in question; what matters is whether the AI architecture produces the documentation that regulatory scrutiny requires.

Platforms designed for living evidence synthesis and continuous evidence surveillance serve an important function in ongoing evidence monitoring programs. However, these platforms are architecturally optimized for a different use case than discrete HTA dossier preparation. The living review model, with its continuously updated repositories of tagged and synthesized evidence, operates on a different methodological logic than the bounded, protocol-driven, PRISMA-reported systematic review that an HTA submission requires. These are complementary capabilities, not interchangeable ones, and evidence teams should distinguish clearly between their use cases.

Platforms designed with a primary focus on a specific regulatory geography provide valuable alignment with that context's requirements. The limitation, as the Ahmadnezhad et al. review makes clear, is that geography-specific tools may not generalize to multi-regional submissions, particularly those that must simultaneously satisfy the JCA, major national HTA bodies, and organizations like ICER in the United States. Evidence teams operating across multiple markets require a platform architecture that supports multi-PICO, multi-jurisdiction flexibility by design, not by manual adaptation after the fact.

A Decision Framework for Platform Selection

The following evaluative criteria are offered as a practical decision framework for evidence teams assessing systematic review platforms for HTA-grade use. Each criterion is grounded in the methodological requirements established throughout this paper.

Evaluative Criterion for HTA-Grade Systematic Review Platforms	Rayyan	Rayyan's Approach
Does the platform produce auditable, criteria-linked rationale for each individual screening decision? *Why it matters: Required for regulatory challenge response and HTA body queries*	**Yes**	Yes — AI Reviewer generates per-reference justification logs traceable to explicit protocol criteria
Is the deduplication methodology formally documented and submitted to independent peer review? *Why it matters: Deduplication errors propagate through all downstream review stages and affect PRISMA accuracy*	**Yes**	Yes — Rayyan deduplication method manuscript currently under peer review at JMIR Medical Informatics
Does the platform support explicit PICO framework organization from the screening stage? *Why it matters: Essential for multi-jurisdiction HTA submissions and JCA multi-PICO compliance*	**Yes**	Yes — PICO framework is architecturally integrated into project setup and evidence organization

Can search results from any database or gray literature source be imported without platform-linked search constraints? *Why it matters: HTA SLRs require multi-database comprehensive searching per qualified information specialist design*	**Yes**	Yes — fully database-agnostic; any exported search results accepted regardless of source
Does the platform preserve and amplify human reviewer judgment rather than replacing it? *Why it matters: Human oversight is a methodological requirement in HTA-grade evidence synthesis, not a bottleneck to automate past*	**Yes**	Yes — AI supports and documents human decisions; final inclusion/ exclusion authority rests with the reviewer
Does the vendor publish peer-reviewed methodology supporting the platform's core evidence synthesis features? *Why it matters: Scientific credibility of the platform directly affects the credibility of submissions built upon it*	**Yes**	Yes — active peer-reviewed publication program: foundational platform paper (2016), deduplication method under review, AI Reviewer validation in progress
Is efficiency designed to reduce administrative friction while fully preserving methodological thoroughness? *Why it matters: Time savings achieved by reducing rigor create downstream regulatory liability that exceeds any upstream gain*	**Yes**	Yes — Rayyan's core design principle: efficiency in service of rigor, never as a substitute for it

Figure 6: *Platform Selection Decision Framework for HTA-Grade Systematic Reviews: Seven evaluative criteria grounded in methodological requirements for regulatory-grade evidence synthesis.*

Conclusion

Health technology assessment has always been a methodology-intensive enterprise. The systematic review that underpins an HTA submission is not a preliminary administrative step. It is the primary mechanism by which clinical evidence is made credible, comprehensive, and transferable across the regulatory contexts that will evaluate it.

The escalating demands of the HTA landscape, including the 100-day JCA timeline, the multi-PICO complexity of 27 member states, the persistent inadequacy of transferability tools, and the growing scrutiny applied to AI-assisted evidence synthesis, do not change this fundamental reality. They intensify it. In this environment, the choice of systematic review platform is a strategic decision about the methodological foundation of every HTA submission built on it.

The efficiency gains that matter in this context are those that make rigorous methodology more manageable, not those that accelerate past it. **Efficiency in service of rigor is a design principle. Efficiency as a substitute for rigor is a liability.**

Rayyan is built on the former principle: a platform designed by methodologists, validated through peer-reviewed publication, and architected to support the full demands of HTA-grade evidence synthesis without compromise. For evidence teams navigating a landscape in which the credibility of the systematic review has never mattered more, that distinction is the one that counts.

> *To learn more about how Rayyan's methodology-first platform can support your HTA evidence program, contact the Rayyan Scientific Affairs team to schedule a methodological consultation or platform demonstration.*

Key References

1. Ahmadnezhad E, Kheirandish M, Akbari-Sari A, Rashidian A. Systematic Review of Tools and Approaches for Evaluating the Transferability of Health Technology Assessments Across Different Jurisdictions. Int J Health Policy Manag. 2024;13:8218. doi: 10.34172/ijhpm.8218. Epub 2024 Oct 2. PMID: 39620521; PMCID: PMC11549564.
2. Cameron A, Ma N, Babidge WJ, Maddern GJ. Changes and challenges in health technology assessment. ANZ J Surg. 2024;94:986-988. doi:10.1111/ans.19023
3. Chan GCK, He E, Leung J, Verspoor K. A comprehensive systematic review dataset is a rich resource for training and evaluation of AI systems for title and abstract screening. Res Synth Methods. 2025;16(2):308-322. doi:10.1017/rsm.2025.1
4. Chase D, Rosten C, Turner S, Hicks N, Milne R. Development of a toolkit and glossary to aid in the adaptation of health technology assessment (HTA) reports for use in different contexts. Health Technol Assess. 2009 Nov;13(59):1-142, iii. doi: 10.3310/hta13590. PMID: 19958718.
5. EUnetHTA JA3WP6B2-2 Authoring Team. Process of information retrieval for systematic reviews and health technology assessments on clinical effectiveness. Methodological Guidelines. Diemen (The Netherlands): EUnetHTA; 2019. Permissions: This document was published under the Creative Commons licence CC-BY-SA.)
6. O'Rourke B, Oortwijn W, Schuller T. Announcing the New Definition of Health Technology Assessment. Value Health. 2020 Jun;23(6):824-825. doi: 10.1016/j.jval.2020.05.001. PMID: 32540240.
7. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan-a web and mobile app for systematic reviews. Syst Rev. 2016 Dec 5;5(1):210. doi: 10.1186/s13643-016-0384-4. PMID: 27919275; PMCID: PMC5139140.
8. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021 Mar 29;372:n71. doi: 10.1136/bmj.n71. PMID: 33782057; PMCID: PMC8005924.
9. Scott AM, Forbes C, Clark J, Carter M, Glasziou P, Munn Z. Systematic review automation tools improve efficiency but lack of knowledge impedes their adoption: a survey. J Clin Epidemiol. 2021 Oct;138:80-94. doi: 10.1016/j.jclinepi.2021.06.030. Epub 2021 Jul 7. PMID: 34242757.
10. Xu C, Yu T, Furuya-Kanamori L, Lin L, Zorzela L, Zhou X, Dai H, Loke Y, Vohra S. Validity of data extraction in evidence synthesis practice of adverse events: reproducibility study. BMJ. 2022 May 10;377:e069155. doi: 10.1136/bmj-2021-069155. PMID: 35537752; PMCID: PMC9086856.
11. Büchter RB, Weise A, Pieper D. Reporting of methods to prepare, pilot and perform data extraction in systematic reviews: analysis of a sample of 152 Cochrane and non-Cochrane reviews. BMC Med Res Methodol. 2021 Nov 6;21(1):240. doi: 10.1186/s12874-021-01438-z. PMID: 34742231; PMCID: PMC8571672.
12. Kim MM, Shanaa AM, Hammady H, Aboelnour M, Ayan R. Enhancing Transparency, Auditability, and Reproducibility of Deduplication in Systematic Reviews: Tutorial for the Rayyan Method and Systematic Auto Resolver. Interact J Med Res. 2026 Jul 14;15:e94317. doi: 10.2196/94317. PMID: 42447231; PMCID: PMC13367408.
13. World Health Organization. Health Technology Assessment Survey 2020/21. https://www.who.int/data/stories/health-technology-assessment-a-visual-summary