An AI-Based Model Explainer to Support Onboarding and Knowledge Transfer for Excel Cost-Effectiveness Models

MSR195

Tushar Srivastava, MSc[1]; Hanan Irfan, MSc[1]; Kunal Hriday, MSc[2]; Shilpi Swami, MSc[1]

[1]ConnectHEOR Limited, London, UK; [2]ConnectHEOR, Delhi, India.
Email: tushar.srivastava@connectheor.com

connectHEOR

KEY MESSAGE

An AI-based model explainer reduced onboarding time to complex Excel cost-effectiveness models by 70% (from 20 to 6 hours) and cut information retrieval time by ~95%, enabling faster knowledge transfer and improved communication across distributed HEOR teams with varied technical backgrounds.

BACKGROUND

Within Health Economics and Outcomes Research (HEOR), Excel-based cost-effectiveness models (CEM) are widely used to support structured economic evaluation and reimbursement-related evidence generation, but their complexity can reduce transparency for new users and slow effective knowledge transfer across project teams. [1]

Complex cost-effectiveness models often present a steep learning curve for new project team members, delaying onboarding and complicating communication across technical and non-technical stakeholders.

This study evaluated an AI-based model explainer designed to facilitate structured understanding and interrogation of existing economic models during team onboarding.[2]

OBJECTIVES

1. Support natural-language interrogation of uploaded CEMs in Excel
2. Improve understanding of model structure and assumptions for both technical and non-technical audiences
3. Facilitate communication and knowledge transfer across distributed HEOR project teams
4. Evaluate impact on onboarding time, query latency, and stakeholder communication

Practical Use Cases in HEOR

1. Rapid onboarding to legacy Excel models
2. Understanding inter-sheet dependencies and logic flow
3. Explaining model assumptions to non-technical stakeholders
4. Supporting scenario analysis and model modifications
5. Cross-functional and cross lingual communication (clinical, HE, policy teams)

METHODS

Study Design

A comparative case study was conducted during the onboarding of two newly formed project teams (3 members each) to an existing multi-state Markov cost-effectiveness model.

Control group: Standard onboarding : review of technical documentation and manual cell-tracing within Excel with the assistance of manual team members.

Intervention group: AI model explainer generating structured representations of model components (worksheets, formulas, linkages, outputs) with natural-language querying.

AI Model Explainer — How It Works

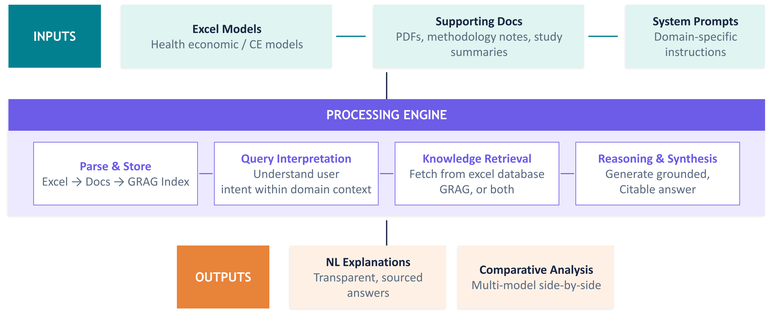


Fig 1: Input to output journey within the AI model explainer

Query Domains

Domain	Description
Model Structure	Navigation across worksheets, identification of parameter dependencies
Key Assumptions	Identification of key drivers and assumptions within the model
Inter-sheet Linkages	Tracing dependencies and formula linkages across worksheets
Output Interpretation	Interpretation of results logic and output translation for stakeholders
Model Modifications	Ability to implement changes (time horizon, discounting, scenario inputs)

Outcomes Measured

1. Time-to-competency (hours to pass model logic assessment)
2. Query latency for targeted information retrieval
3. Ability to communicate model results across different technical audiences

RESULTS

70%
Reduction in Onboarding Time

~95%
Faster Information Retrieval

100%
Scenario Modification Success Rate

Time-to-Competency (Hours)

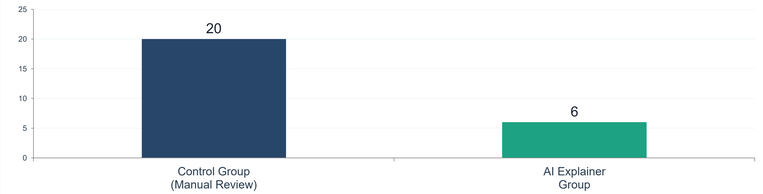


Fig 2: Time to competency (hours) between manual review group vs AI assisted review group

Key Findings

- AI explainer was particularly valuable for tasks requiring rapid localization of model logic and explanation of dependencies across linked worksheets.
- Successfully supported re-framing of model outputs for different stakeholder profiles - from clinical to quantitative audiences.
- Audience-aware design supported multilingual querying for local adaptation teams

CONCLUSIONS

The AI-based model explainer substantially reduced onboarding time and improved accessibility of complex Excel-based cost-effectiveness models.

Such tools may support more efficient knowledge transfer and communication within distributed HEOR teams, while preserving transparency of model structure and logic.

Future evaluations could assess reproducibility across additional model types, onboarding contexts, and stakeholder groups, including comparative use across multiple model versions and multilingual settings.

LIMITATIONS

AI-based explanation layers may offer a practical way to improve model accessibility without removing expert oversight or altering the underlying analytical framework. It is however recommended to double check all AI responses when output is being used in high-stakes environment such as HTA submissions, following human in the loop principles.[3]

References:
1. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. Methods for the Economic Evaluation of Health Care Programmes. Oxford University Press.
2. Srivastava T, Irfan H, Swami S. Agentic-AI analyzer to chat with your Excel-based cost-effectiveness models [poster]. Value Health. 2025;28(Suppl 2):S—. Presented at: ISPOR Europe 2025; 2025 Nov; Glasgow, Scotland.
3. Srivastava T, Irfan H, Babiy V, Swami S. Integration of generative AI with human expertise in HEOR: a hybrid intelligence framework. *Adv Ther*. 2025 Sep;42(9):4103-4130. doi:10.1007/s12325-025-03273-w.

Financial Disclosure: Authors are employees of ConnectHEOR Limited. No external funding received. No conflict of interest to declare.