PROFESSUR PRÄDIKTIVE VERHALTENSANALYSE

2025 ASIS&T Webinar
October 30, 2025

AI and the Transformation of Metadata Research and Practices: Global and Regional Perspectives (DCMI)

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Association for Information Science and Technology

TECHNISCHE UNIVERSITÄT
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AI and the Transformation of Metadata Research and Practices: Global and Regional Perspectives

DublinCore

DCMI ASIS&T Joint Webinar
30 October 2025

asis&t

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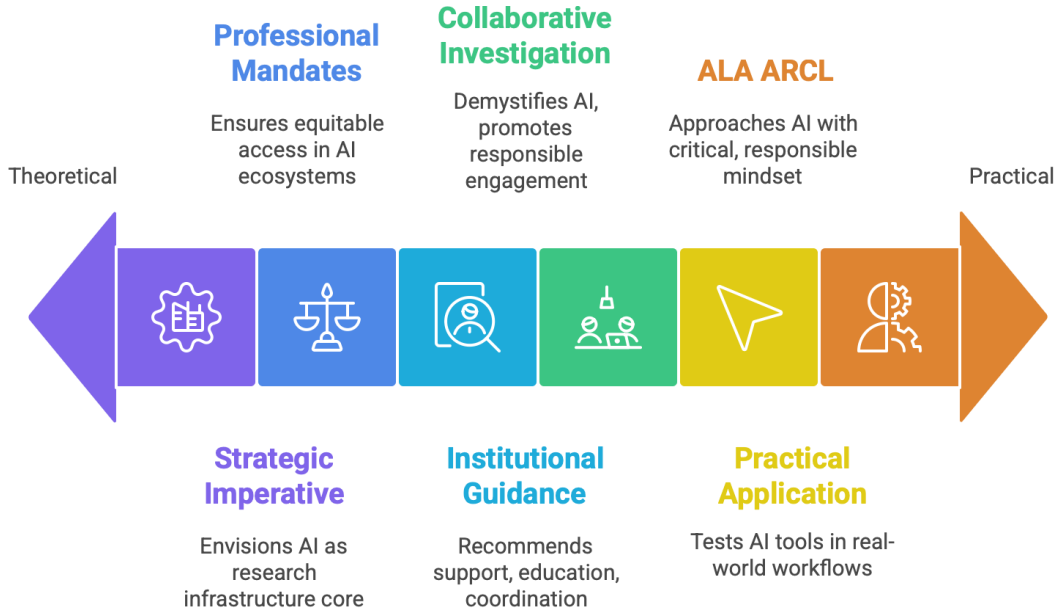
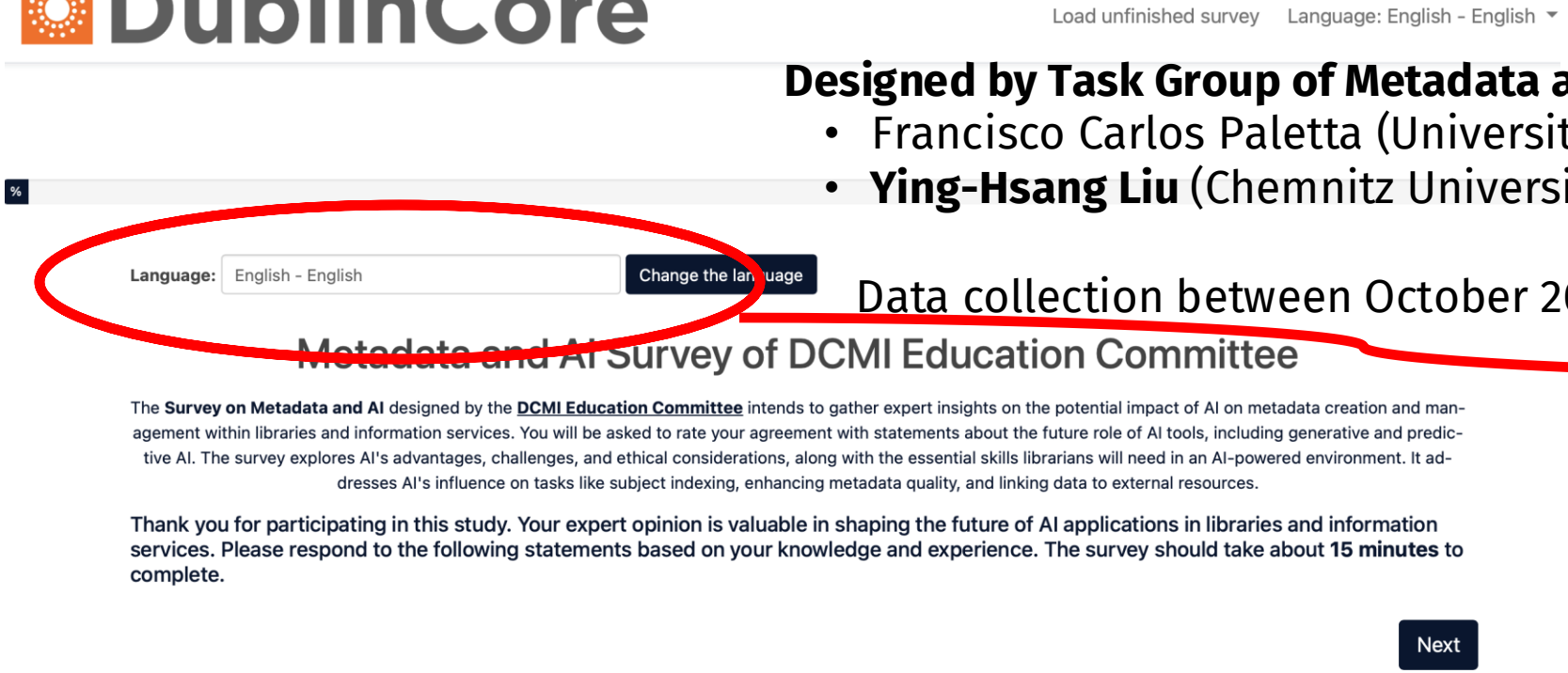
Introduction

- **Strategic Imperative:**
  Libraries + metadata at the center of AI-enabled research
- **Professional Mandates:**
  Information professionals ensure equitable access in AI contexts
- **Institutional Guidance:**
  PCC Task Group on AI guides community education and coordination
- **Collaborative Investigation:**
  OCLC–LIBER program promotes responsible AI engagement
- **Practical Application:**
  AI tools support metadata creation (MARC, LCSH)
- **ALA ARCL Guiding Mindsets:**
  Navigate AI with curiosity, skepticism, judgment, responsibility, collaboration



Questionnaire Design

DublinCore



Designed by Task Group of Metadata and AI, DCMI Education Committee

- Francisco Carlos Paletta (University of São Paulo) – Co-Chair
- **Ying-Hsang Liu** (Chemnitz University of Technology, Germany) - Co-Chair

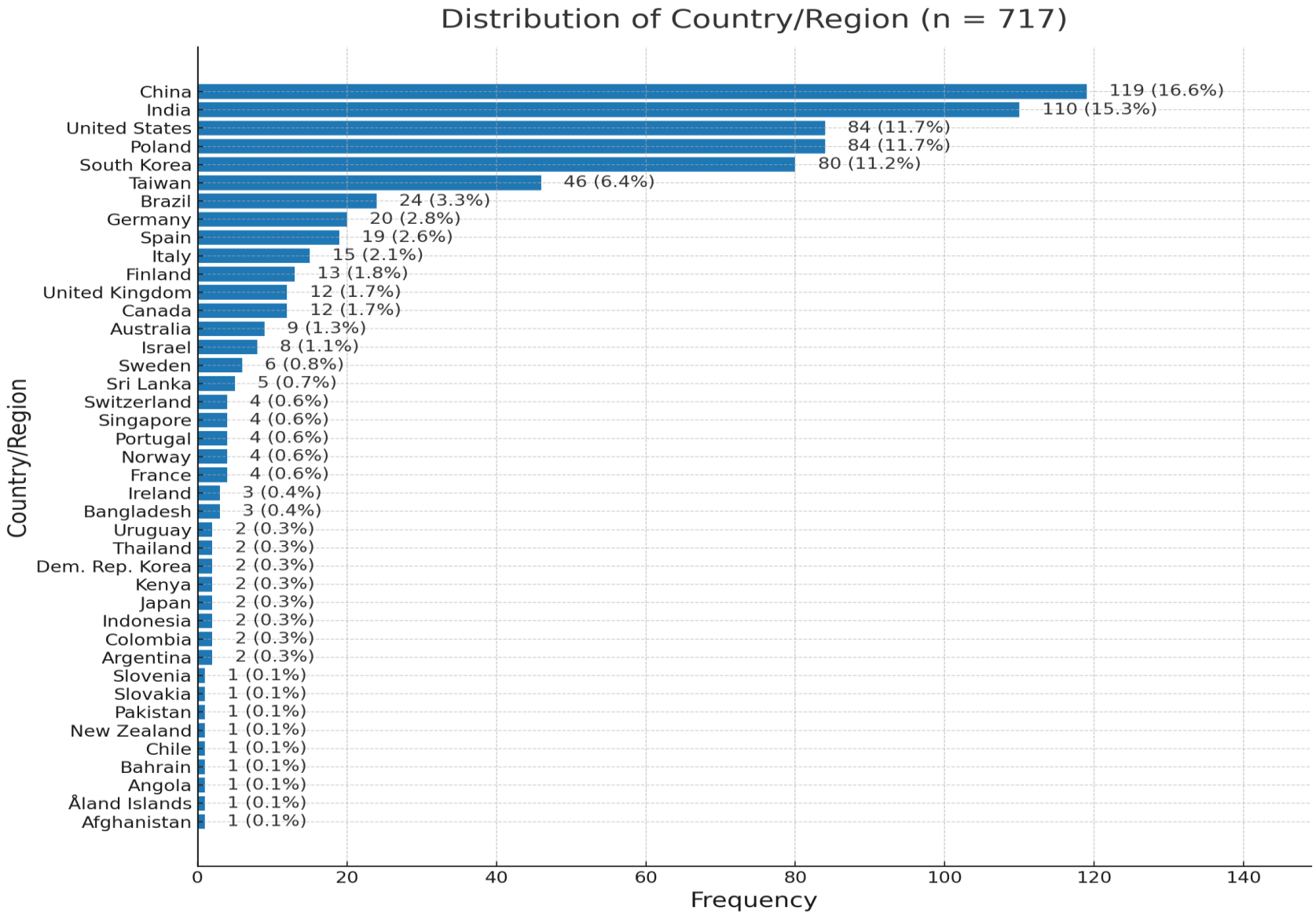
Data collection between October 2024 and March 2025

Available in 15 Languages

- हिन्दी - Hindi
- தமிழ் - Tamil
- 简体中文 - Chinese (Simplified)
- 繁體中文（台灣） - Chinese (Traditional; Taiwan)
- 한국어 - Korean
- 日本語 - Japanese
- Deutsch - German
- English - English
- Español - Spanish
- Français - French
- Italiano - Italian
- Polski - Polish
- Português - Portuguese
- Português do Brasil - Portuguese (Brazilian)
- Suomi - Finnish

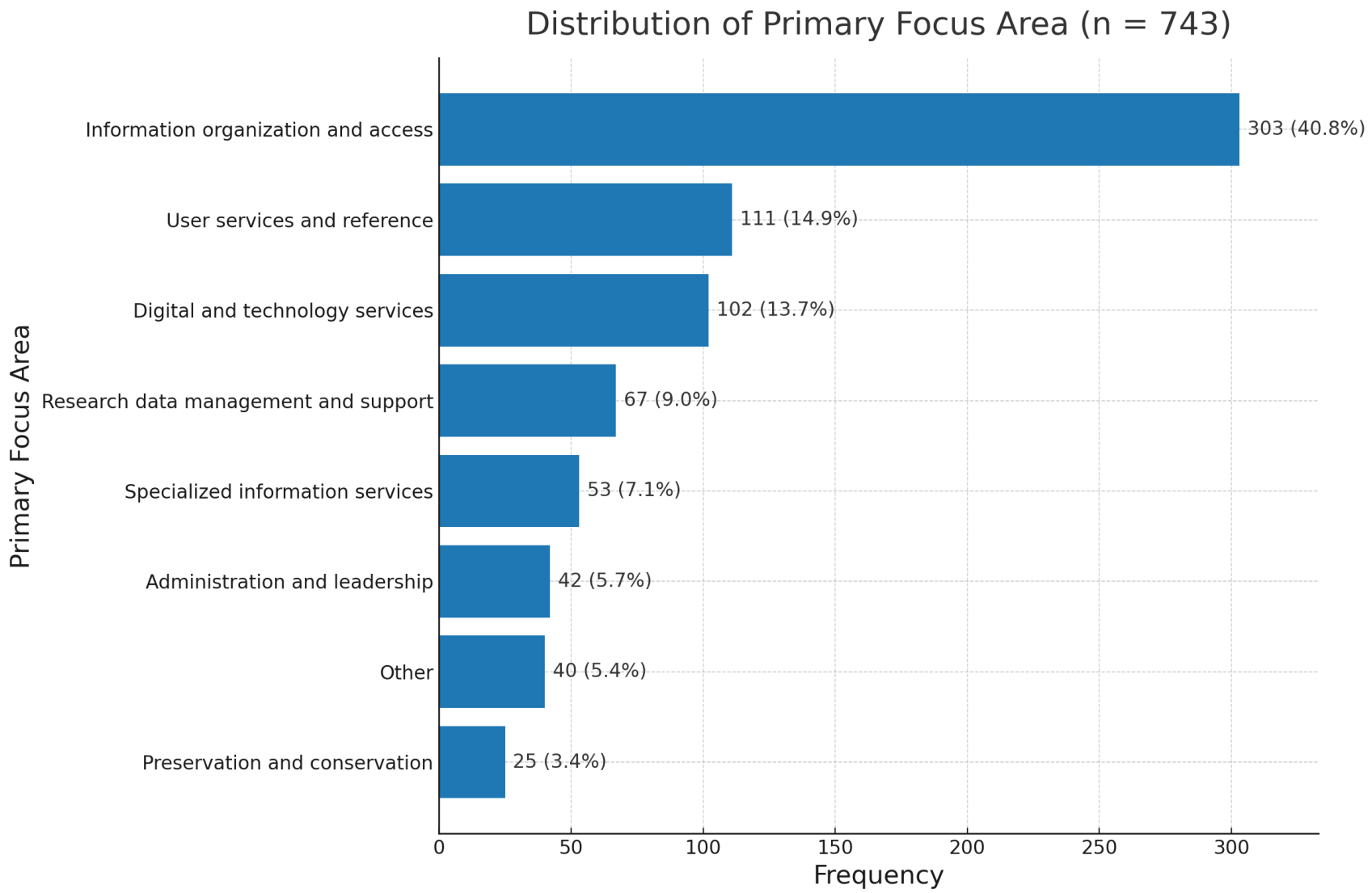
- Question items based on research literature, consultation, and expert review
- Four question groups:
  - A. Metadata tasks (A01) and AI applications (A02)
  - B. Perceived benefits (B01), challenges (B02), and concerns (B03)
  - C. Generative AI (C01), Predictive AI (C02) and professional competency (C03)
  - D. Respondent characteristics (D)

Distribution of Country



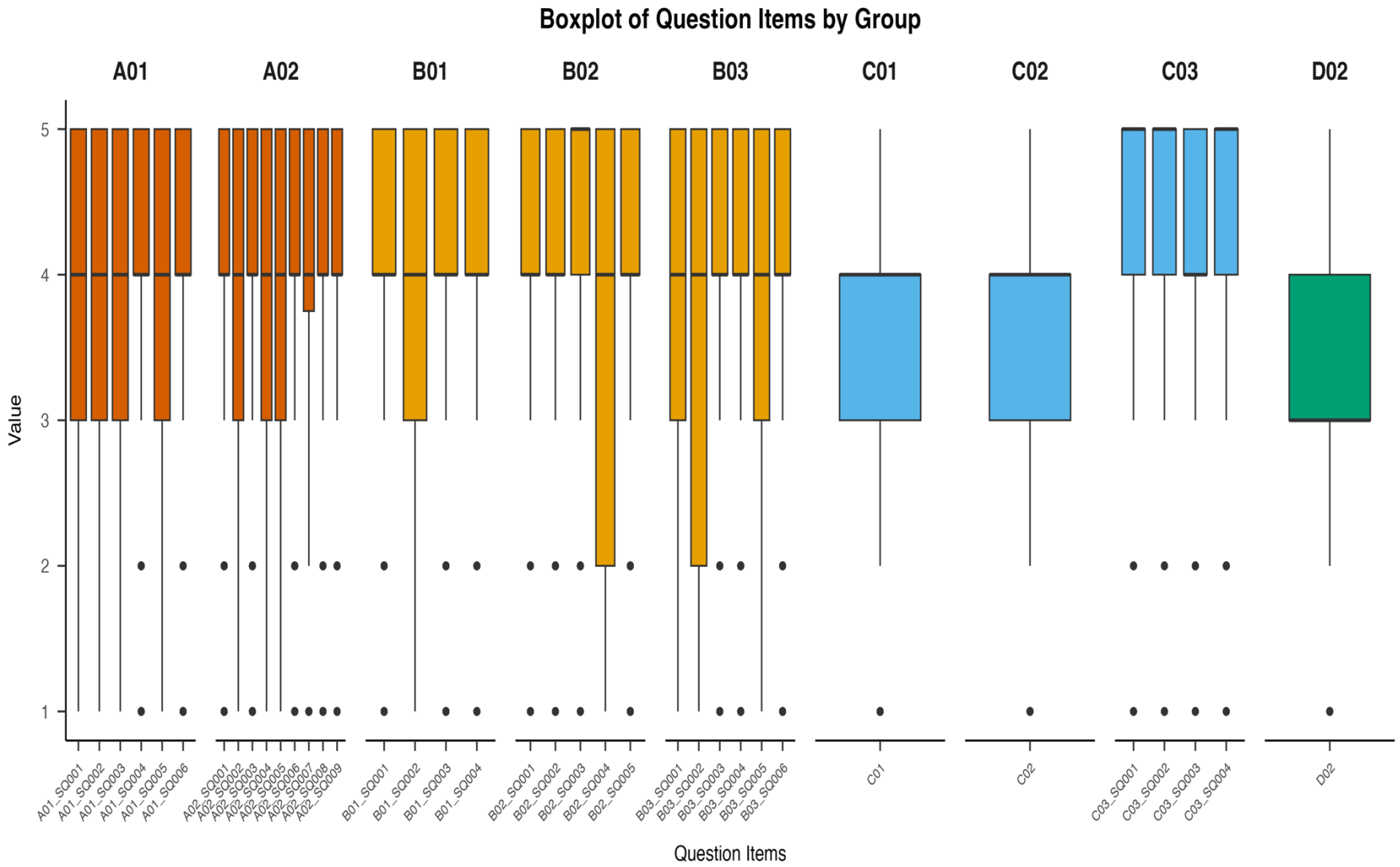
- The top five countries—**China, India, United States, Poland,** and **South Korea**—together comprise a large portion of the total distribution
- Other countries like Taiwan, Brazil, Spain, Germany, and Italy also contribute notable numbers, but to a lesser extent
- A broad and diverse global spread

Distribution of Primary Focus Area



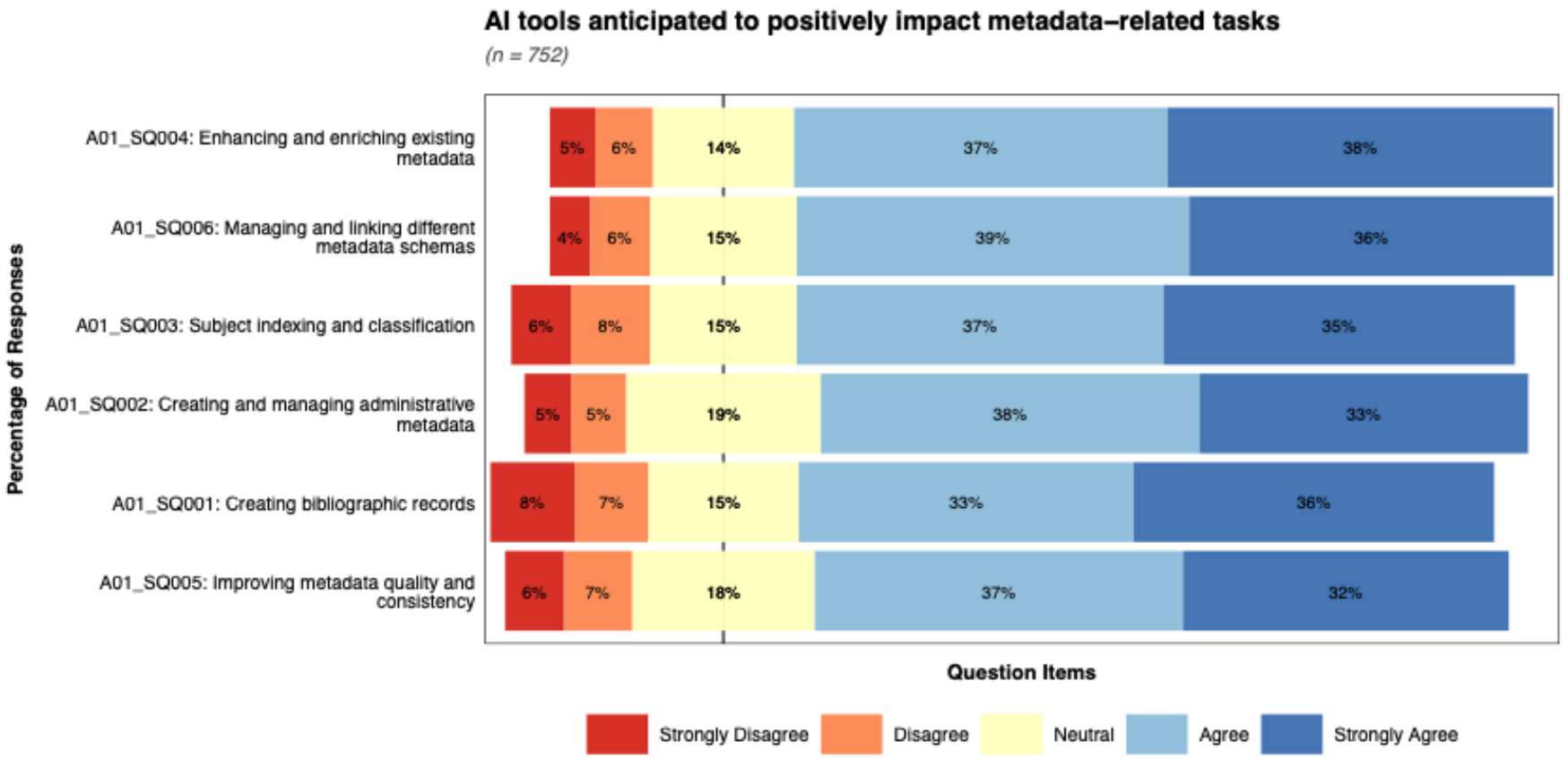
- The largest focus area is **Information Organization and Access** (40.8%)
- **User Services and Reference** accounts for 14.9%, and **Digital and Technology Services** comprises 13.7%
- Other: Engagement with AI, workflows and concerns about its impact on data integrity and employment within the sector

Distribution of Responses to Question Items (n=752)



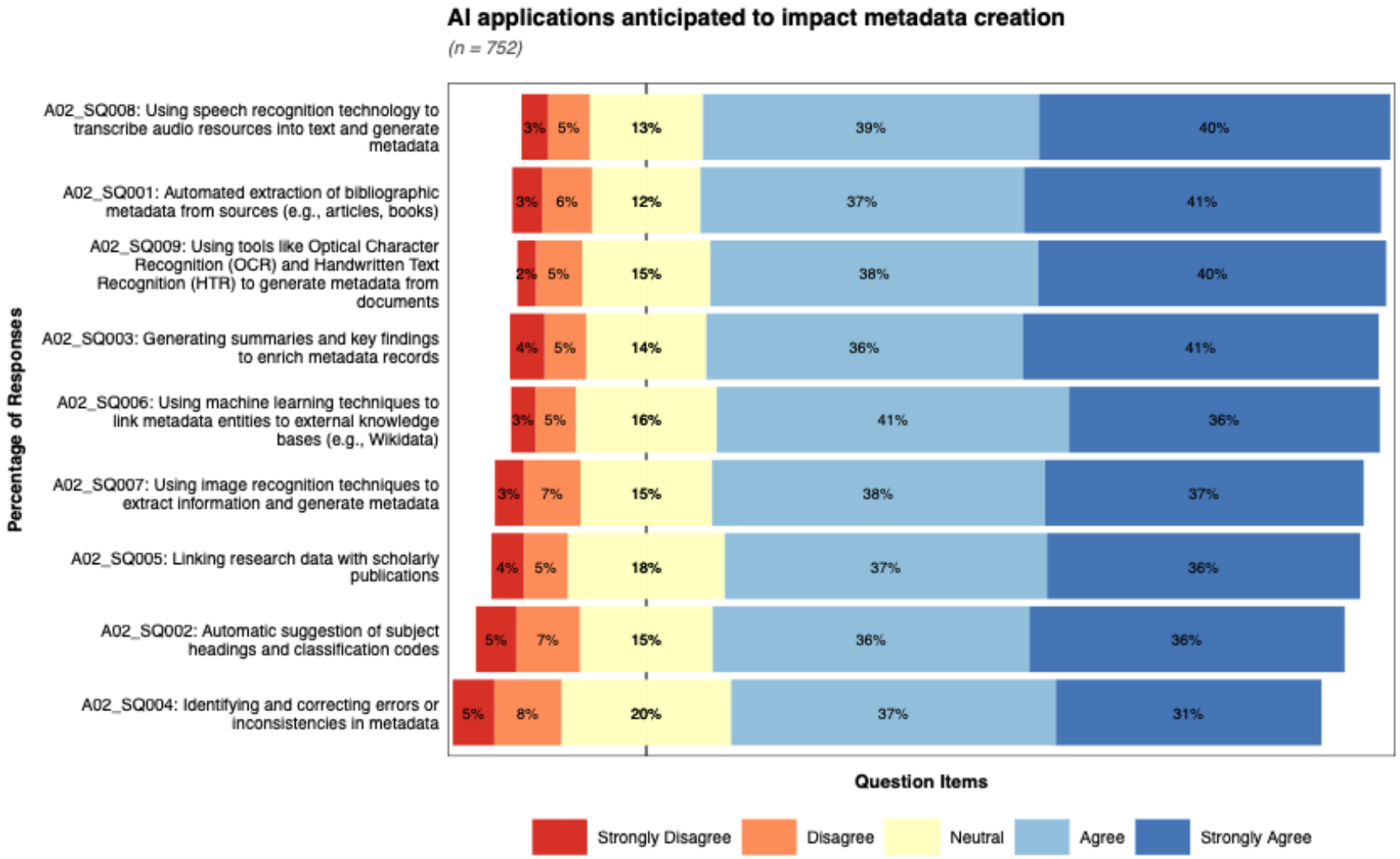
- **Group A** (A01: Impact on metadata tasks, A02: AI applications) generally positive responses
- **Group B**: B01: Benefits similar to Group A; B02: Challenges and B03: Concerns show greater variability
- **Group C**: High variability in C01 and C02 Beliefs about predictive AI and generative AI respectively; C03 Competencies generally positive
- **D02**: Confidence, a wide range of responses

A01: Metadata Tasks



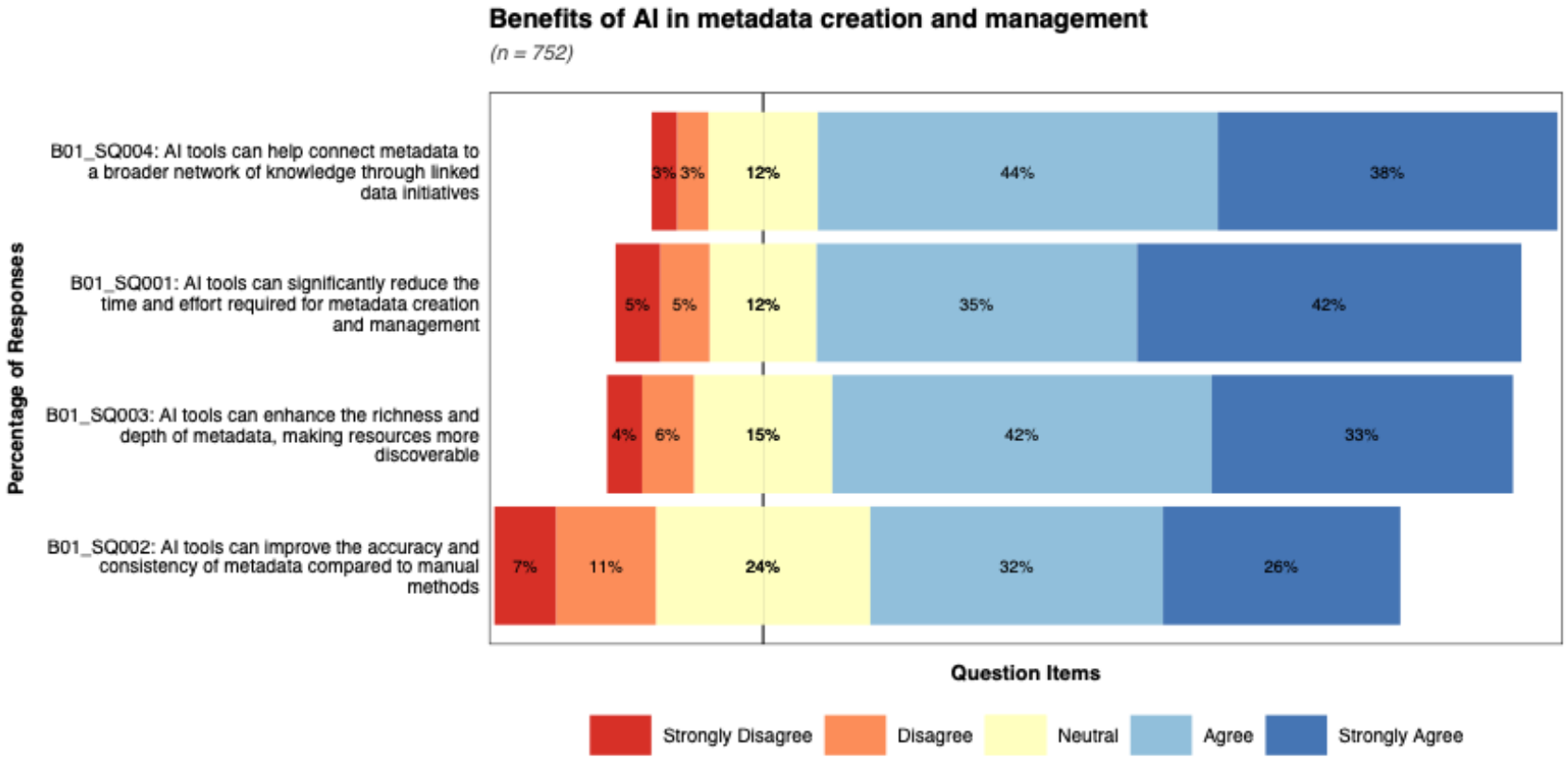
- Positive Impact: Most participants believe AI tools will positively impact metadata-related tasks
- High Agreement: Tasks like "Enriching metadata" and "Linking metadata schemas”
- Overall confidence in the benefits of AI for managing and improving metadata tasks

A02: AI Applications



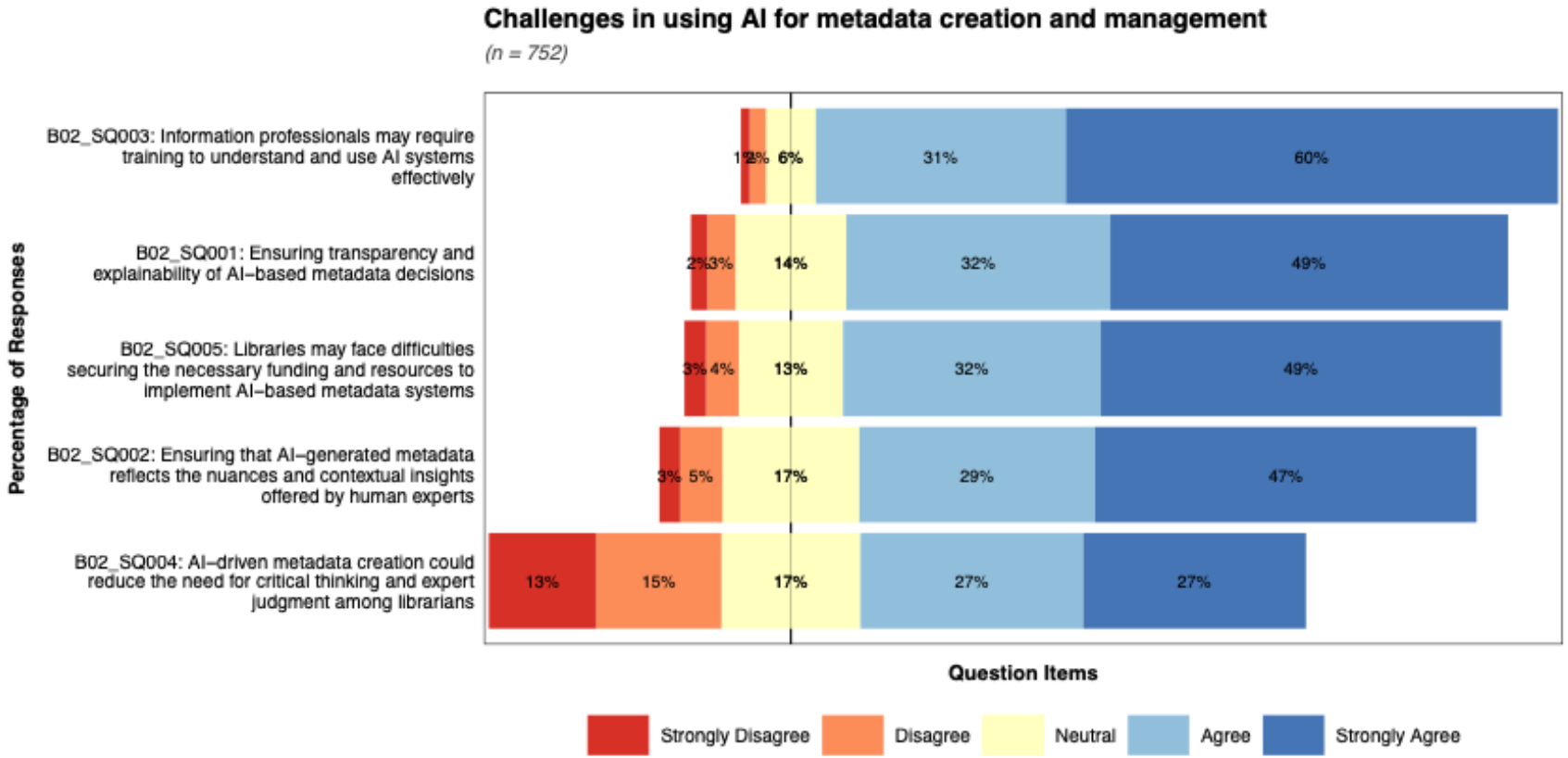
- Strong Anticipation in AI: Participants have high anticipation in AI's positive impact on metadata creation, such as speech recognition and metadata extraction
- Broad Support for AI Applications: Strong support for various AI applications, including transcription, metadata extraction, and linking metadata to external knowledge bases

B01: Benefits



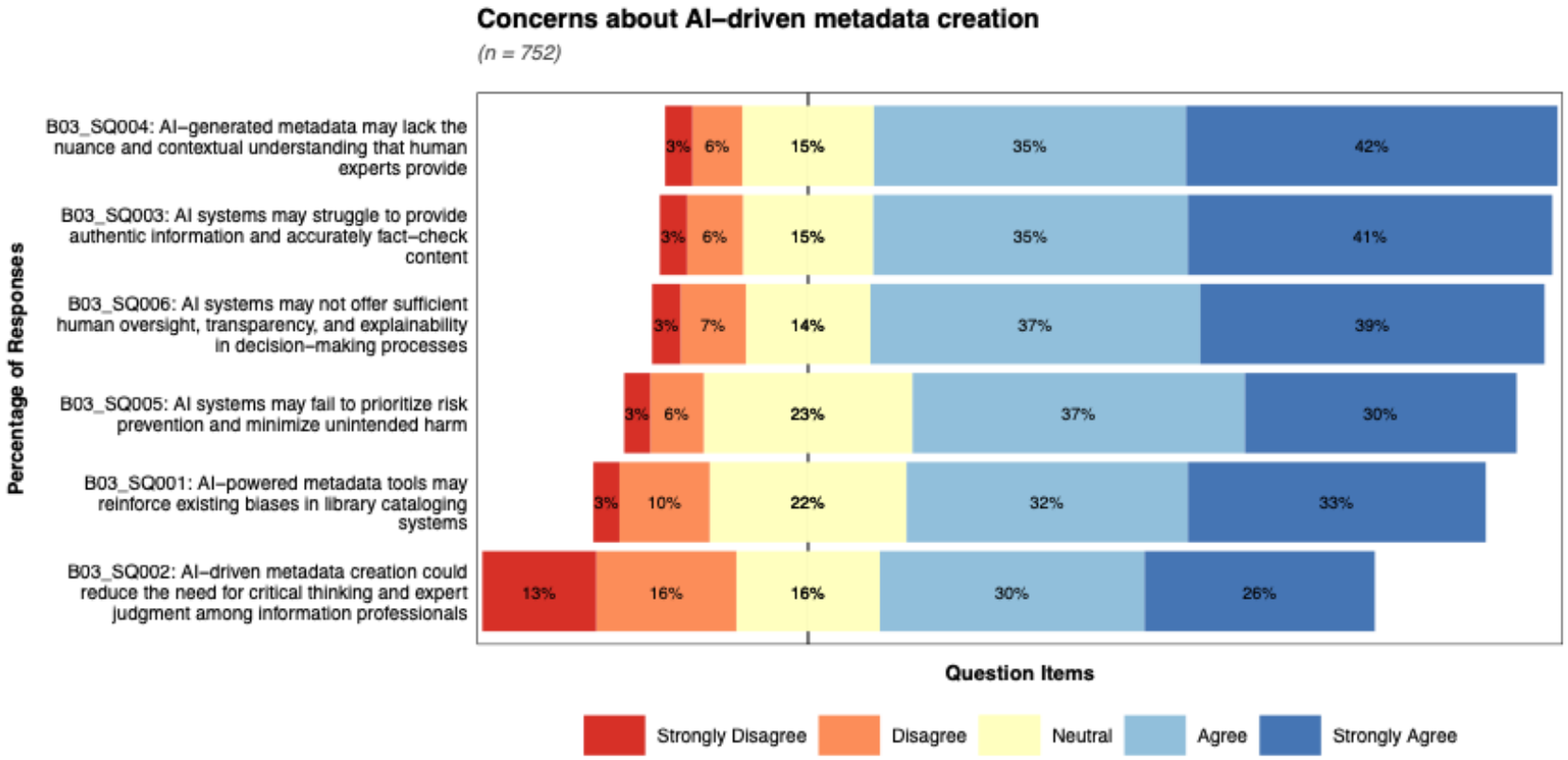
- High agreement on connecting metadata, reducing effort and enhancing metadata richness and discoverability
- Improving accuracy: While still positive, there's a slightly lower consensus on AI's impact on improving accuracy and consistency of metadata

B02: Challenges



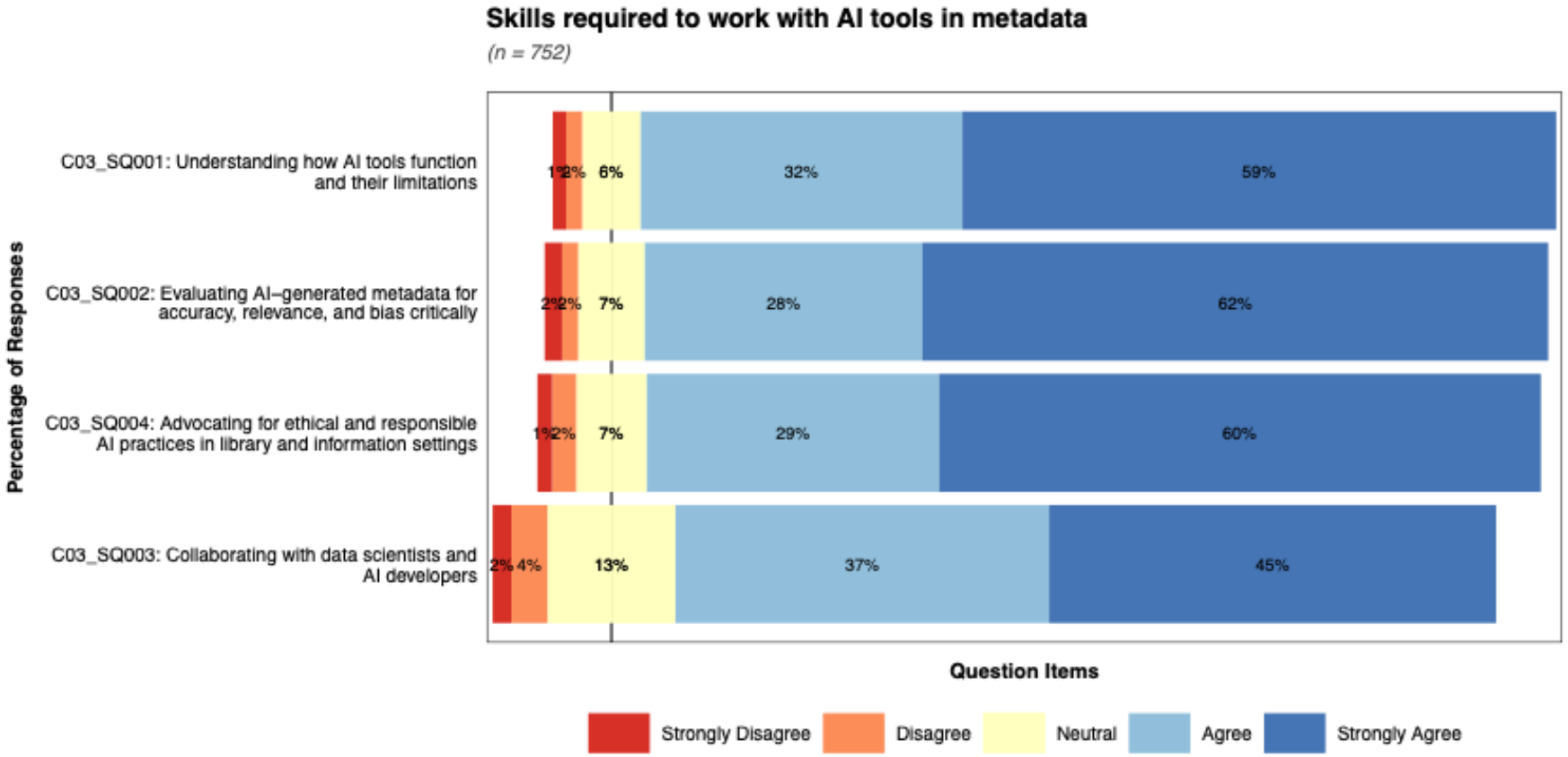
- Major challenges: training professionals, need for transparency, funding issues and integrating human expertise
- Reflect a cautious approach to integrating AI, emphasizing the need to strike a balance
- AI enhances efficiency and accuracy while still valuing human critical thinking and expertise

B03: Concerns



- Human Oversight: Crucial to maintain the quality and accuracy of AI-generated metadata
- Bias and Nuance: AI tools reinforcing existing biases and lacking the subtlety and nuance of human-generated metadata
- Training and Transparency: Effective training for professionals; ensuring transparency and explainability of AI decisions

C03: Competency and skills



- Skills (practical ability to…); competencies (knowledge and capacity to…)
- A strong agreement on the key skills of understanding AI tools, critically evaluating AI outputs, advocating for ethical practices, and collaborating effectively with AI developers

CFA (Confirmatory Factor Analysis)

Model	χ^2	*df*	χ^2/df	*p*	CFI	TLI	RMSEA [90% CI]	SRMR
1-factor	6,068.87	77	78.82	< .001***	.71	.66	.32 [.32, .33]	.23
2-factor (B01 + B02, B03)	2,277.14	76	29.96	< .001***	.90	.87	.20 [.19, .20]	.15
2-factor (B01 + B03, B02)	5,631.03	76	74.09	< .001***	.73	.68	.31 [.30, .32]	.23
2-factor (B02 + B03, B01)	1,628.29	76	21.43	< .001***	.93	.91	.17 [.16, .17]	.13
3-factor	359.21	74	4.85	< .001***	.99	.98	.07 [.06, .08]	.06
Common guidelines[a]	—	—	**< 2 or 3**	**> .05**	**≥ .95**	**≥ .95**	**< .05 [.00, .08]**	**≤ .08**

[a]Based on Schreiber (2017), Table 3.

Fit indices for factor models: 1-factor, three 2-factor (varied combinations), and 3-factor models. Metrics: χ^2, df, χ^2/df, p, CFI, TLI, RMSEA (90% CI), and SRMR. Results suggest the 3-factor model demonstrates superior fit based on these indices, guided by Schreiber (2017).

- The 3-factor model provides the best fit for the data
- Benefits (B01), challenges (B02), and concerns (B03) related to AI and metadata represent distinct theoretical constructs
- Both challenges and concerns involve difficulties; challenges: opportunities for growth; concerns: potential problems and risks

Research Questions

RQ1: How do information professionals perceive the impact of AI on metadata work?

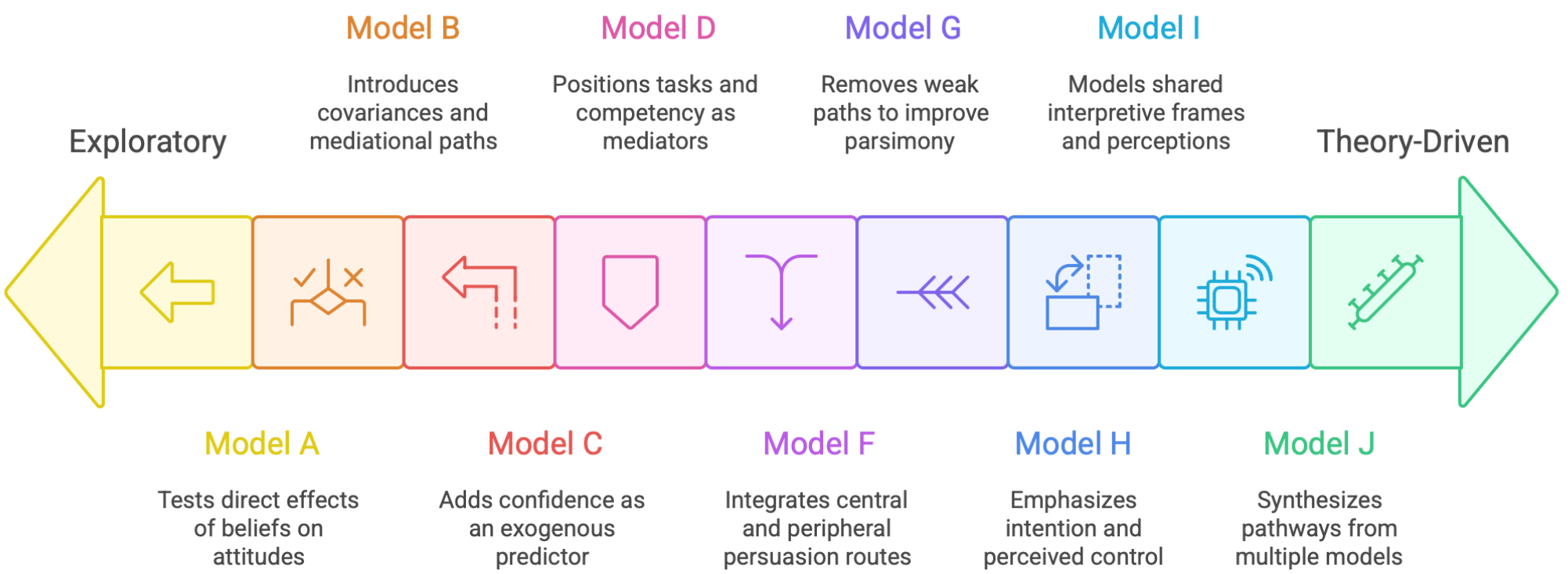
RQ2: How do information professionals' background and experience influence their perceptions of and willingness to adopt AI?

Research Hypotheses

- **H1**: Perceived benefits have a significant positive impact on attitudes and AI application adoption.
- **H2**: Perceived challenges drive the need for skill development.
- **H3**: Potential concerns have different impacts on attitudes and skill development.
- **H4**: Confidence in understanding AI enhances the intention of AI adoption.
- **H5**: Professional backgrounds moderate the relationship between perceived benefits and attitude toward AI.

Structural Equation Model (SEM) Analysis

Structural equation models range from exploratory to theory-driven.



SEM Model Fit Comparison

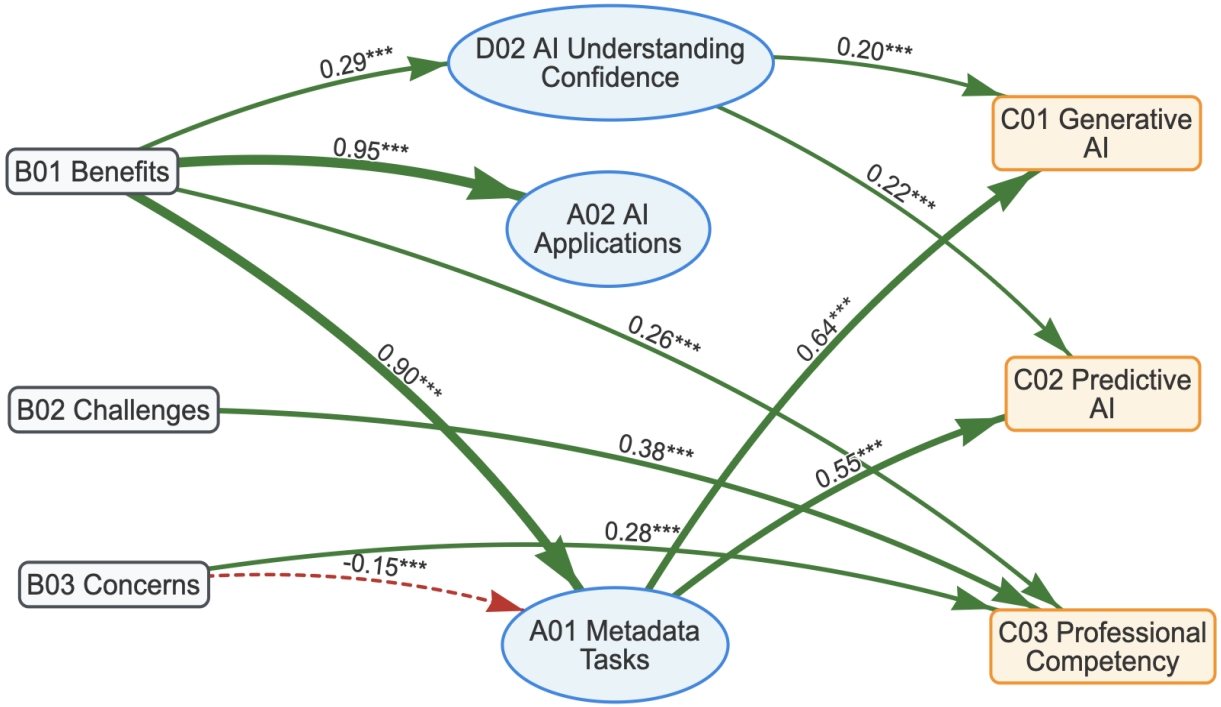
Comparative fit indices for Models A–J; Model F selected for theoretical clarity, despite C/D having marginally better fit.

Model	CFI	RMSEA	SRMR	χ^2 (df)	p-value
Model A	0.989	0.070	0.066	2,252.871 (480)	< .001
Model B	0.995	0.050	0.050	1,143.821 (395)	< .001
Model C	0.996	0.044	0.045	1,154.437 (471)	< .001
Model D	0.996	0.044	0.045	1,132.991 (468)	< .001
Model E	0.862	0.255	0.177	8,941.580 (182)	< .001
Model F	**0.993**	**0.057**	**0.055**	**1,622.731 (473)**	**< .001**
Model G	0.993	0.058	0.056	1,649.763 (477)	< .001
Model H	0.921	0.195	0.148	5,227.895 (180)	< .001
Model I	0.993	0.057	0.055	1,636.591 (477)	< .001
Model J	0.993	0.057	0.056	1,653.237 (481)	< .001

Note: CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual. Models C and D show the strongest empirical fit; **Model F** chosen for balance of statistical adequacy, parsimony, and theoretical grounding in the Elaboration Likelihood Model (ELM).

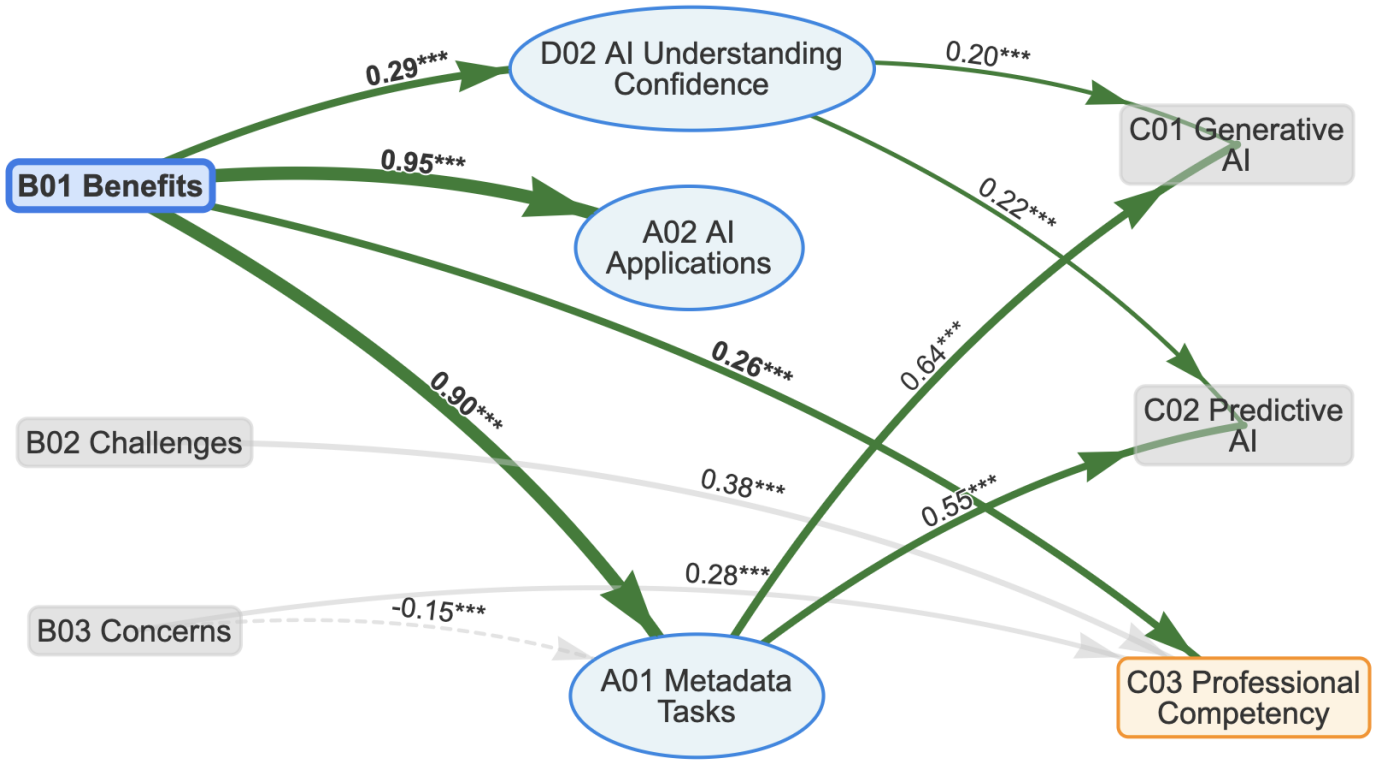
ELM-based Full Mediation Model

- Elaboration Likelihood Model (ELM) framework - Examines how information processing (central vs. peripheral pathways) shapes attitudes and behaviors toward AI (Petty & Caioppo, 1986)
- Central pathway dominates - Deep reflection on information content drives attitude formation more than surface cues
- Pattern of coefficients supports mediation pathways from beliefs → mediators (A01/A02/D02) → Pred. Gen. AI and professional competency



Petty, R.E., Cacioppo, J.T. (1986). The Elaboration Likelihood model of persuasion. In: *Communication and persuasion*. Springer, New York. https://doi.org/10.1007/978-1-4612-4964-1_1

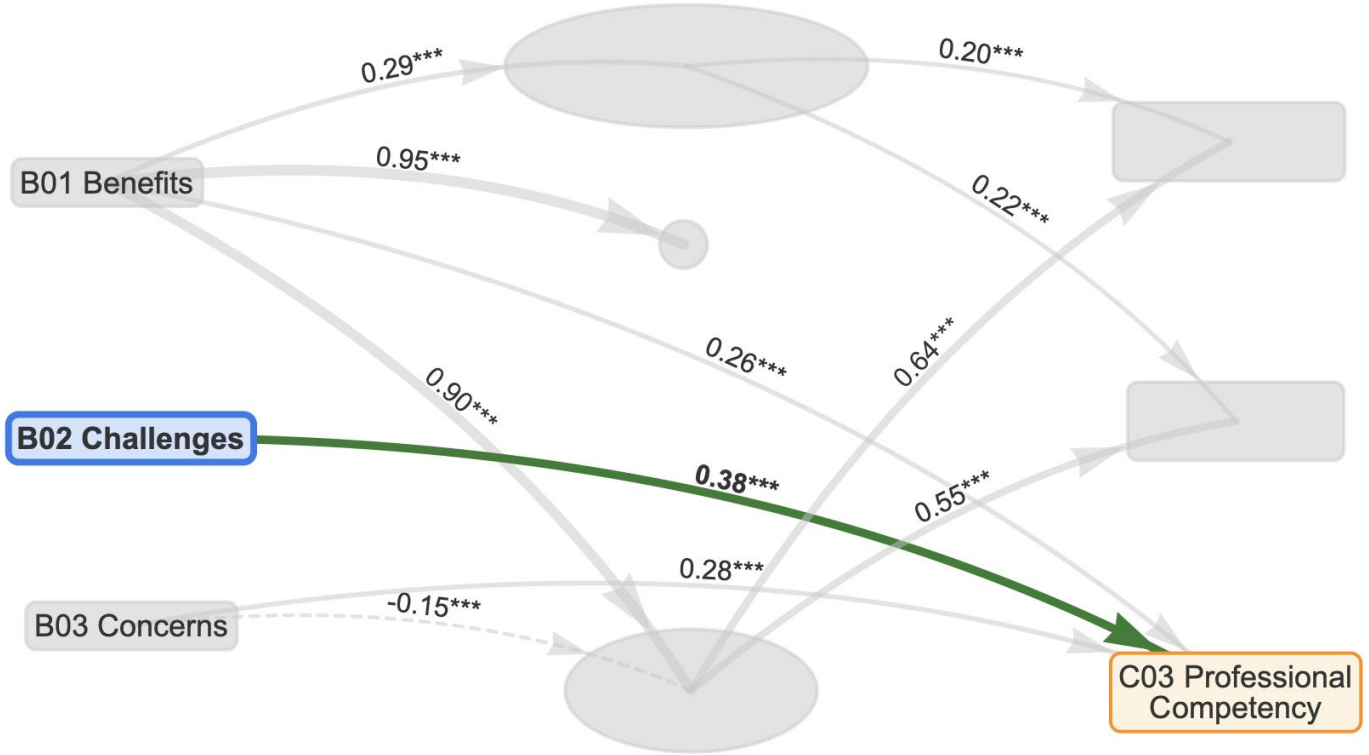
B01 Benefits



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- B01 Benefits is the strongest predictor contributing to AI understanding confidence (D02), AI applications (A02), and metadata tasks (A01)
- The mediators (A01, D02) strongly link to Generative (C01) and Predictive AI (C02)
- Perceived benefits contribute to need of Professional Competency (C03)

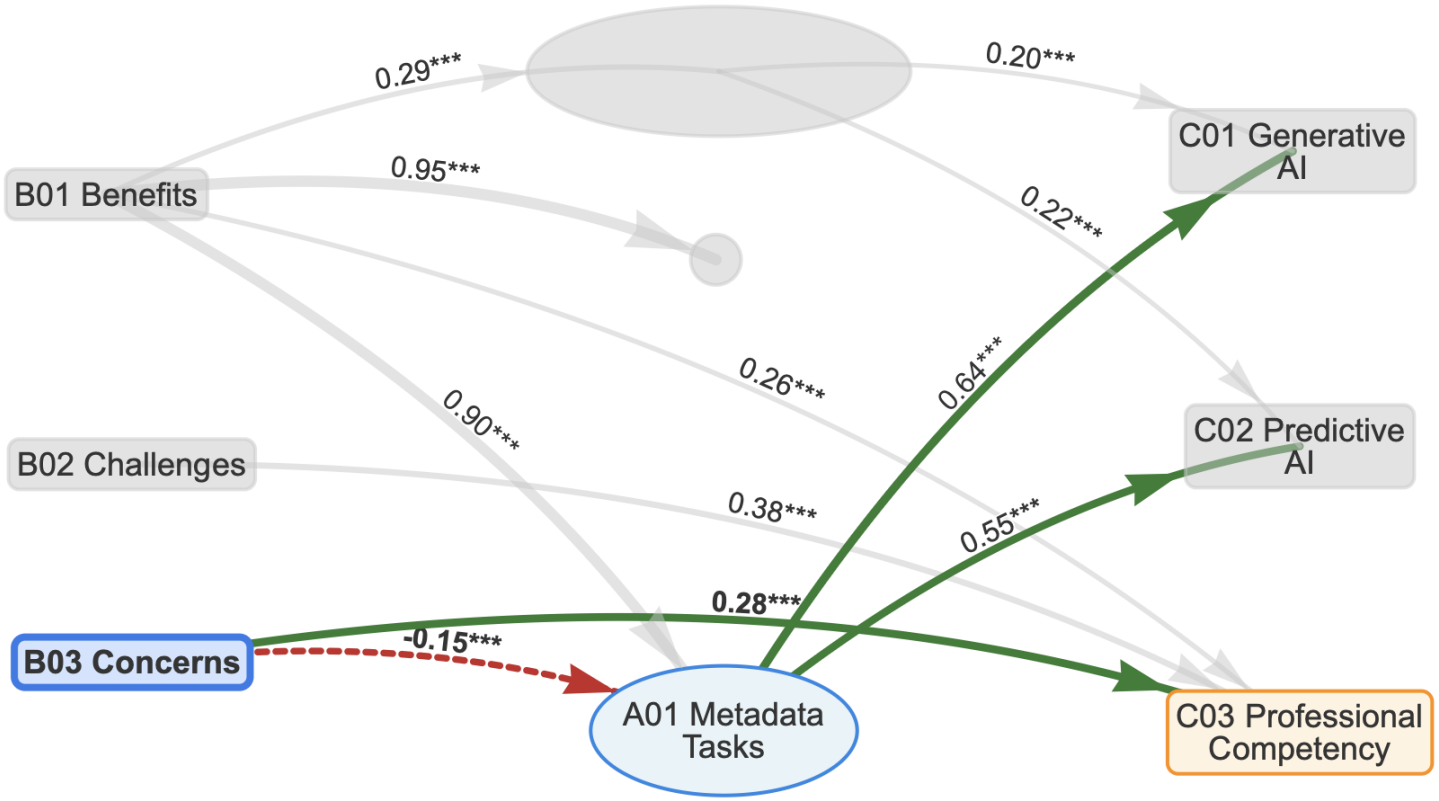
B02 Challenges



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- B02 has a significant positive impact on C03, with a standardized path coefficient of 0.38
- Controlling for other variables, an increase in B02 is associated with an increase in C03
- C03, as the outcome variable, may represent a secondary attitude, reaction, or intention dimension in the model

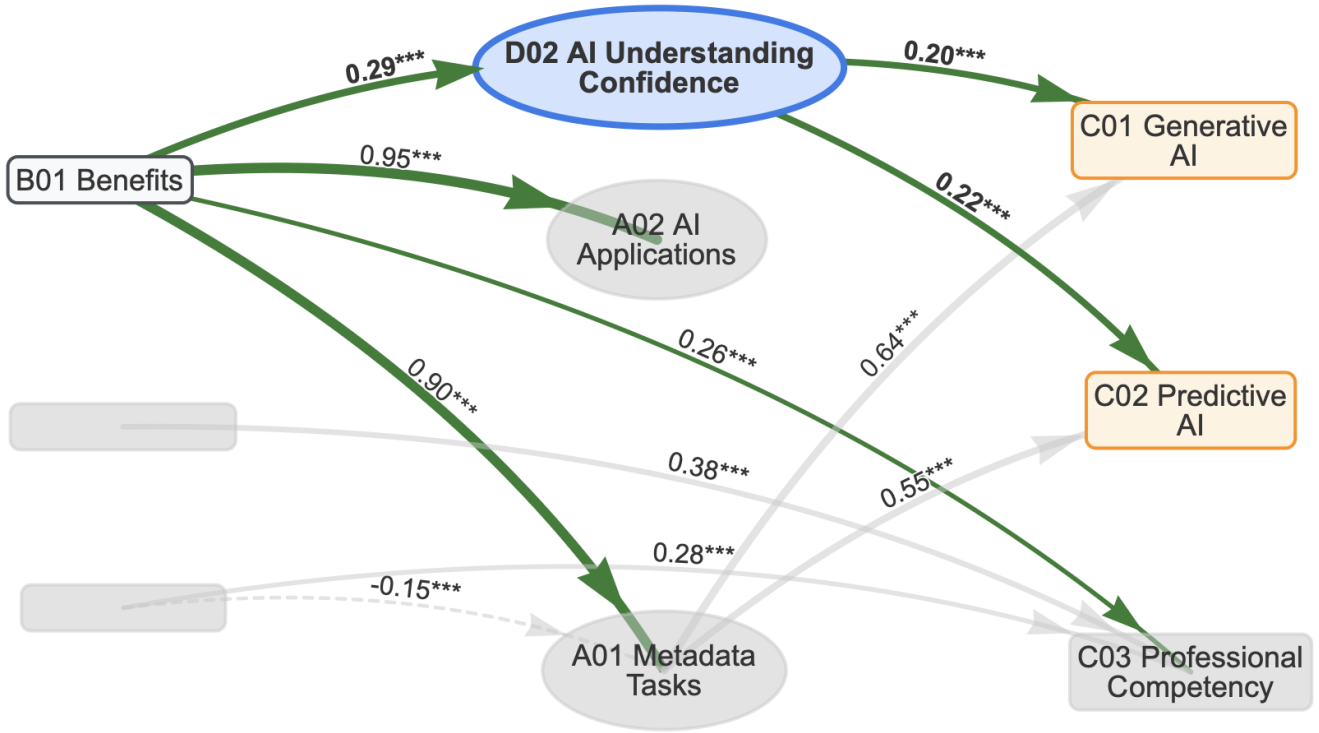
B03 Concerns



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- B03 (Concerns) show a negative but significant effect on Metadata Tasks (A01) (β = −0.15)
- B03 (Concerns) has a statistically significant positive effect on C03 (Professional Competency) (β = 0.28)
- Concerns play a dual role: motivates professional competency but hinders metadata tasks

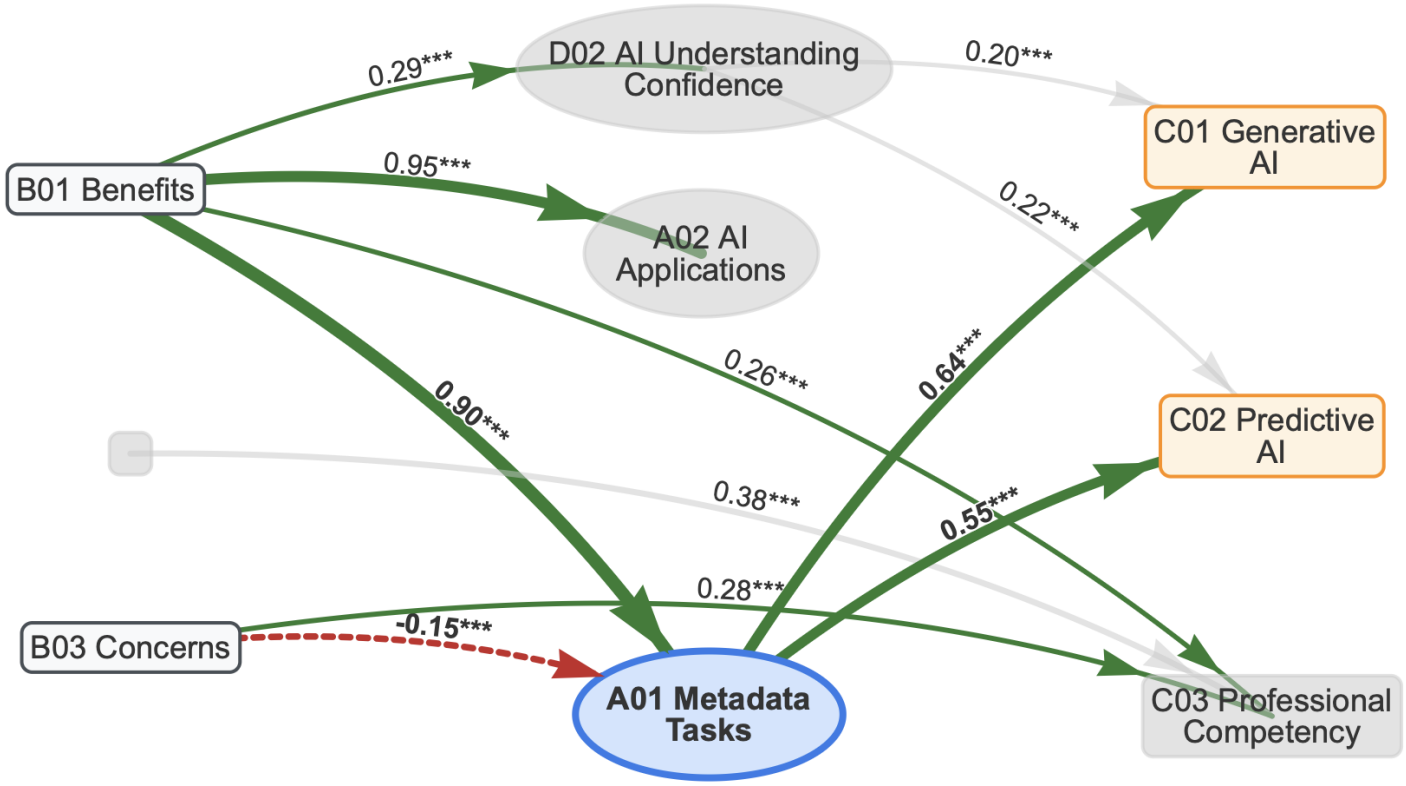
D02 AI Understanding Confidence



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- Confidence in understanding AI as a key bridge between their general beliefs about AI (B01) and their acceptance of specific AI technologies (C01, C02)
- To facilitate positive perceptions of specific AI tools, it's crucial to build users' confidence in understanding AI concepts

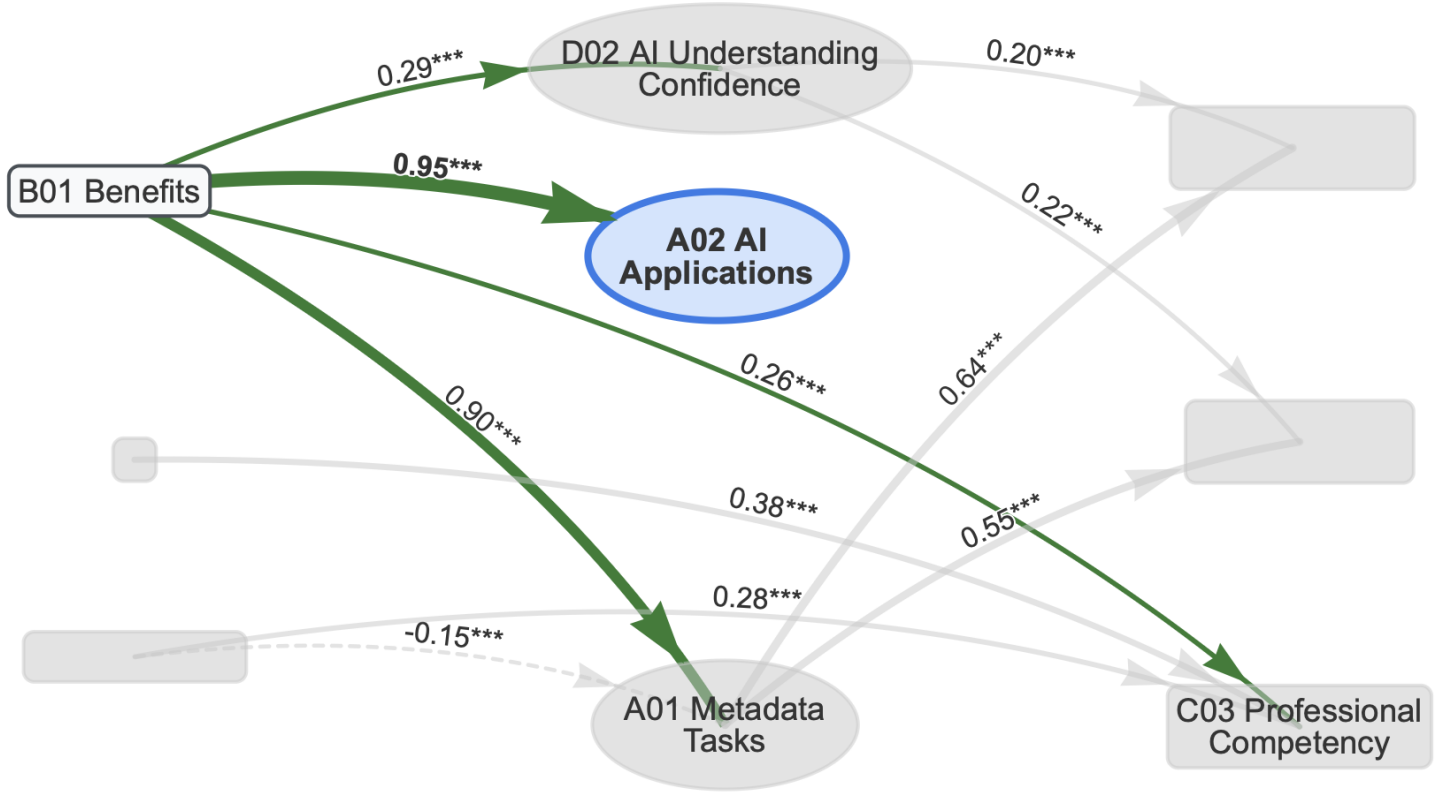
A01 Metadata Tasks



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- Believing AI is beneficial is the most powerful reason people engage in metadata tasks (β=0.90)
- Engaging in metadata tasks strongly improves acceptance of both Generative AI (β=0.64) and Predictive AI (β=0.55)

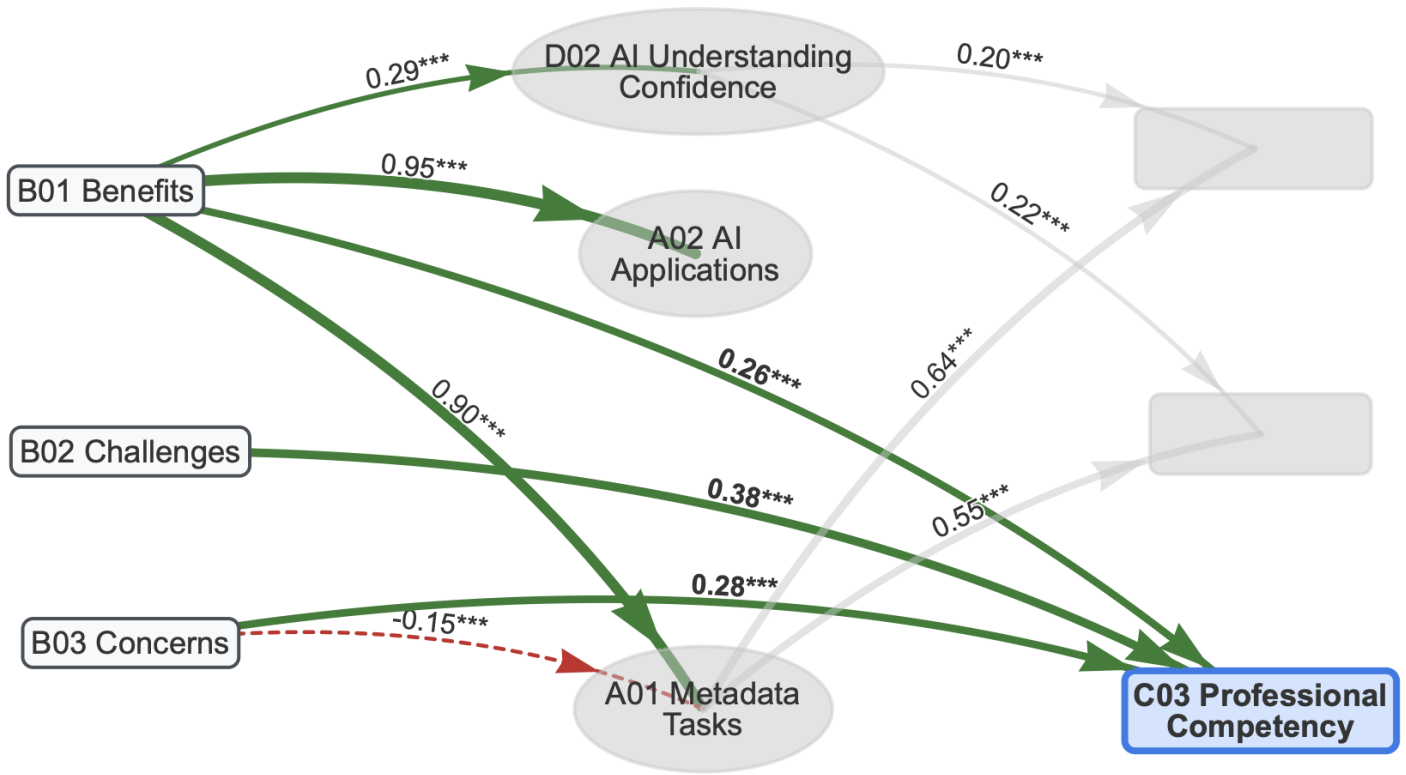
A02 AI Applications



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- Perception of AI Applications (A02) overwhelmingly influenced by one key factor: B01 Benefits (β = 0.95)
- Perception of AI applications is almost entirely determined by whether an individual believes AI is beneficial

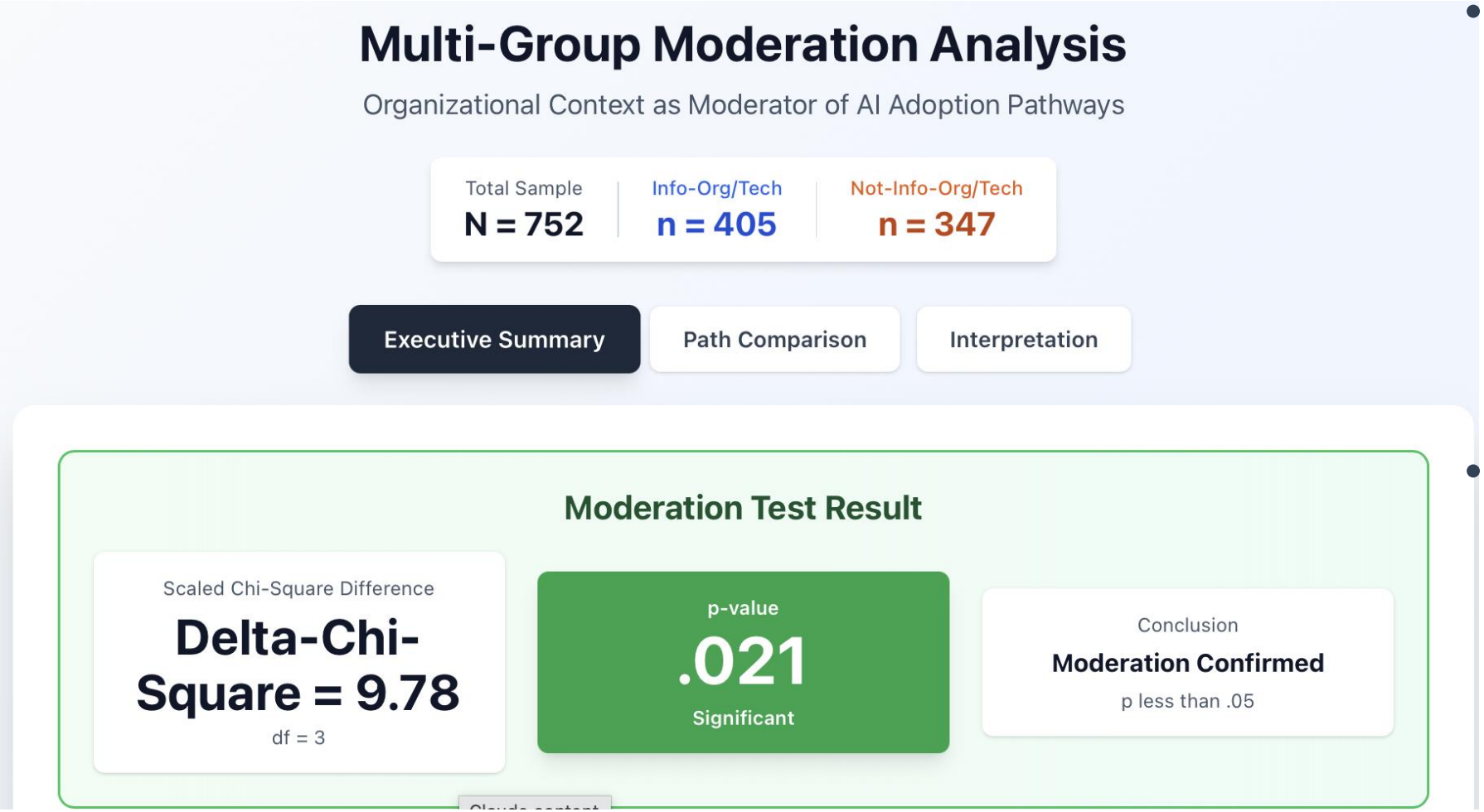
C03 Professional Competency



The Structural Equation Model (SEM) of AI engagement in metadata contexts. Solid arrows indicate statistically significant positive paths (*p < .05, **p < .01, ***p < .001); higher coefficients reflect stronger associations.

- Perceived **benefits** of AI enhances professionals' sense of professional competency (β = 0.26)
- Awareness and recognition of AI-related **challenges** and **concerns** are strongly associated with higher sense of professional competency (β = 0.38 and β = 0.28 respectively)

Nested Model Analysis and Moderation



- Multi-Group: **Info-Org/Tech** (information organization and access OR digital and technology services) vs. **Not-Info-Org/Tech**
- Professional backgrounds meaningfully moderates the structural relationships in the model

Nested Model Analysis and Moderation

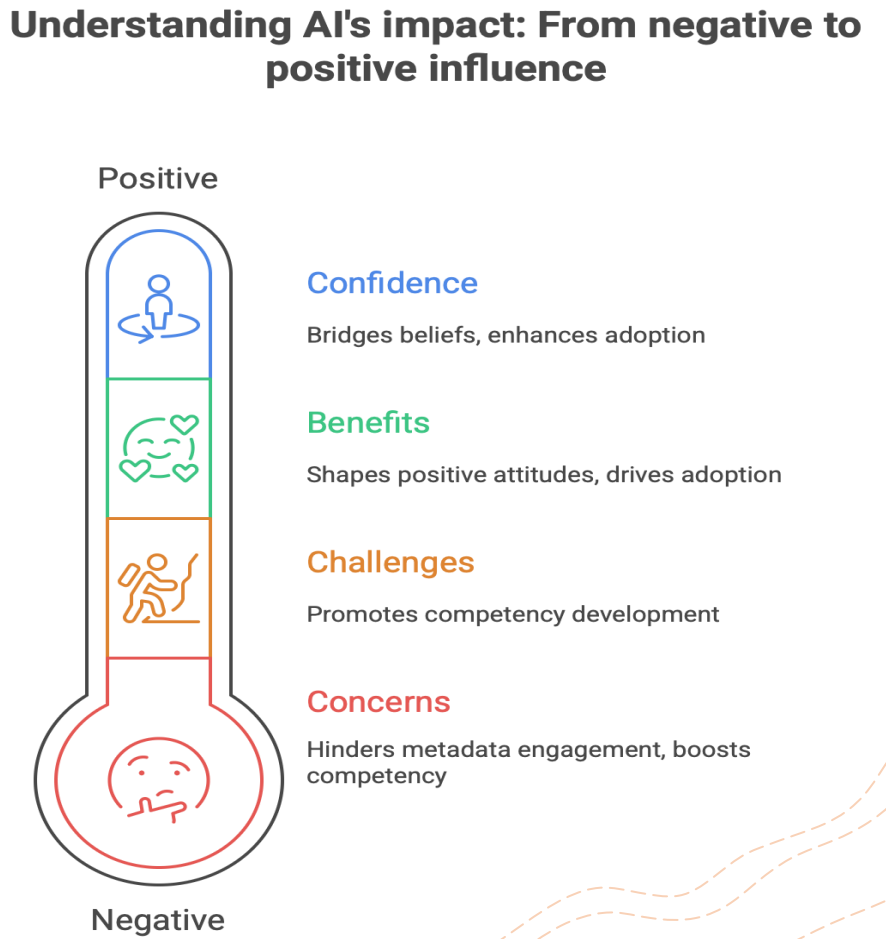
- **Challenges → Metadata Tasks:** Significant only in Not-Info-Org/tech group ($\beta = 0.125$, $p = .034$)
- **Metadata Tasks → Predictive AI:** Consistently stronger effects in Not-Info-Org/Tech group
- **AI Confidence → Predictive AI:** Significantly stronger for Info-Org/Tech group ($\beta = 0.329$) compared to Not-Info-Org/Tech group ($\beta = 0.109$)

Revisit Research Hypotheses

Hypothesis	Key Finding
H1: Perceived benefits have a significant positive impact on attitudes and AI application adoption.	**Benefits** significantly shape positive attitudes toward AI and are the strongest predictor of adoption intentions.
H2: Perceived challenges drive the need for skill development.	Challenges —including transparency and funding— positively influence the **need for developing professional competency**. (cf. Benefits & Concerns)
H3: Potential concerns have different impacts on attitudes and skill development.	Concerns play a **dual role**. Concerns negatively affect engagement in Metadata Tasks, while positively contributing to professional competency.
H4: Confidence in understanding AI enhances the intention of AI adoption.	Confidence bridges beliefs and adoption. **Confidence in Understanding AI mediates** the relationship between perceived benefits and adoption of Generative AI and Predictive AI.
H5: Professional backgrounds moderate the relationship between perceived benefits and attitude toward AI.	Effect of perceived benefits on attitudes toward AI varies across **professional backgrounds**.

Summary of Findings

- RQ1: Information professionals exhibit strong **optimism** regarding the utility of AI in metadata tasks and applications, and its perceived benefits
- RQ2: The **organizational context** (whether professionals focus on Information Organization/Technology or not) meaningfully moderates the relationships between key factors in the AI adoption model
- **Limitations** of the study



Key Competencies for Information Professionals

- **AI Fundamentals & Ethics**
  - Understanding AI tools, algorithms, and limitations
  - Emphasis on AI ethics, bias detection, and climate concerns
  - Advocating for responsible AI practices
- **Technical & Data Skills**
  - Need for programing, scripting, and library management skills
  - Core data handling: data mining, indexing, quality assessment, cleaning
  - Data management & interoperability: **Standards** and system integration
- **Evaluation & Quality Assurance**

  Assessing AI-generated metadata for accuracy and bias

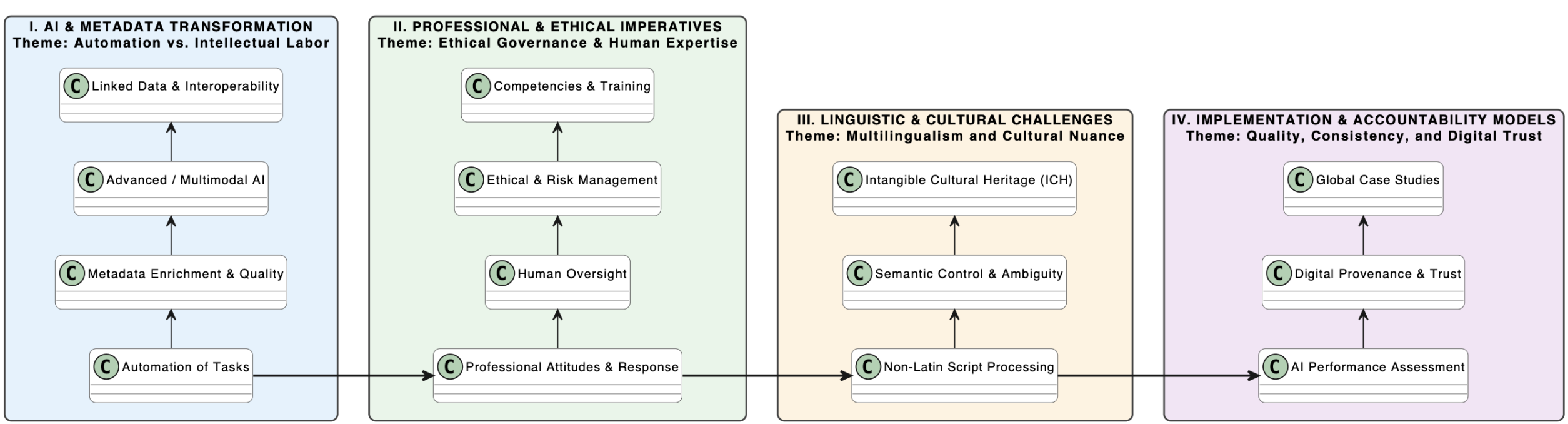
  Ensuring human verification for quality control

Metadata Task and AI-Related Tools

Metadata Task	AI and Related Tools
Metadata **Creation & Generation**	ChatGPT, AI MD-editor, OCR, AI for metadata from spreadsheets, images, voice, Small language models
Metadata **Extraction**	Grobid, OCR + NLTK, ABBYY FineReader, Transkribus, AI-powered NLP
Metadata **Summarization**	ChatGPT, Library Robot
Metadata **Classification & Tagging**	Google Cloud Vision, Clarifai, AI for subject indexing & classification
Metadata **Standardization & Enrichment**	DeepL, Google Translate, AI for schema reconciliation, spell-checking
Metadata **Interoperability & Linking**	Semantic retrieval discovery systems, Linked data environment, Annif tool
Metadata Quality Control	AI-driven quality checks, deduplication, disambiguation, Primo by Ex Libris, Tableau + AI plugins
Library Management Systems	OCLC's AI metadata tools, Alma primo, Automated scripts & workflows

Main Themes of Book Chapters

Liu, Y.-H., Zeng, M. L., & MacDonald, A. (Eds.). (Forthcoming). *AI and the Transformation of Metadata Research and Practices – Global and Regional Perspectives*. Cambridge University Press & Assessment.



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