

Third International Symposium on Entrepreneurship and Technology  
**Responsible Innovation and Systematic Entrepreneurship**  
Metropolitan College, Boston University, 1010, Commonwealth Avenue  
BOSTON, MA, United States, March 20-21, 2026

### **Paper Abstracts by Technical Sessions**

#### **Technical Session I: Entrepreneurship Development and Finance Management**

##### **Rooted Resilience: Exploring Gendered Pathways to Rural Women's Entrepreneurship and Community Sustainability in Indonesia**

*Yosefiani D Tamatur, Marcus Goncalves and Elizabeth Rhyne*

This study examines how rural Indonesian women entrepreneurs navigate the gendered structures and institutional barriers that shape their entrepreneurial experiences. Grounded in the Gender and Development (GAD) framework, the research adopts a qualitative, interpretive design based on 22 semi-structured interviews with women entrepreneurs from diverse regions and sectors. Data were analyzed using reflexive thematic analysis to identify recurring patterns of constraint, agency, and transformation within women's narratives. Findings reveal that patriarchal norms and time poverty continue to restrict women's visibility and resource access. Yet they exercise negotiated agency through adaptive strategies such as front-stage/back-stage role division, emotional resilience, and collective peer support. Over time, these adaptive behaviors evolve into transformative practices, such as digital market-making, gender-conscious leadership, and intergenerational empowerment, that challenge structural inequalities from within. The study refines GAD theory by conceptualizing empowerment as cyclical and context-embedded, rather than linear or absolute. Policy implications emphasize reforms linking inclusion to transformation through childcare-linked training, collateral access, digital literacy, and institutional support for women's networks. Overall, entrepreneurship emerges as both a livelihood strategy and a transformative social practice redefining gender relations in Indonesia.

Keywords: Gender and Development (GAD), women entrepreneurship, reflexive thematic analysis, negotiated agency, empowerment, Indonesia

##### **Understanding Digital Secondhand Fashion through Literature and Entrepreneurial Practice**

*Nishita Chatradhi and Manisha Paliwal*

This study aims to consolidate current knowledge on digital secondhand fashion consumption and, examine how digital infrastructures shape behavior and business practice, and identify gaps where academic literature has yet to capture real-world entrepreneurial challenges and innovation. The research employs a qualitative-mixed-method design conducted in two phases. Phase 1 consisted of a systematic literature review using Scopus and Web of Science. The search conducted in November 2025 identified 196 studies, from which 88 peer-reviewed journal articles met inclusion criteria based on relevance, quality, and publication standards. Analysis involved bibliometric mapping using R, and VOSviewer, along with thematic synthesis based on the TCM-ADO framework to assess theoretical developments, research contexts, and methodological trends.

Across the literature and practitioner interviews, several themes emerged. Digital platforms enable visibility, personalization, and community-building, supporting adoption of circular fashion behaviors and new micro-entrepreneurship models. Consumers are primarily motivated by affordability, sustainability values, social identity, and the convenience of curated digital environments. Entrepreneurs highlighted additional challenges insufficiently addressed in scholarly literature: operational complexity, dependence on platform algorithms, barriers to building digital trust, logistics burden, and difficulties in communicating environmental impact credibly. Both data sources point to a lack of longitudinal measurement of environmental outcomes and limited inclusion of non-Western markets.

Keywords: secondhand fashion, digital entrepreneurship, sustainable consumption, entrepreneurship, online resale

### **Learning about entrepreneurship on the go: Using experiential learning to develop entrepreneurial knowledge**

*Manuel Sotelo Duarte*

This study aims to elucidate the effect of experiential learning on entrepreneurial education. A qualitative study was conducted, 15 in-depth interviews with students that took part in an entrepreneurial internship to develop their business ideas. Experiential learning applied to entrepreneurship increased business knowledge transmission by working on real experience. Uncertainty associated with the entrepreneurship process is decreased by mentors' participation. Milestones defined during the internship, and mentor close follow-up, assures progress of the business idea. This research provides evidence on how a real experiential learning model benefits entrepreneurs' business projects and learning process

Keywords: Entrepreneurial education, experiential learning, internship

### **Strategic Resilience and Sustainable Competitive Advantage in Agri Social Enterprises**

*Smita Kadam and Dr. Manisha Paliwal*

This study investigates how Agri-based social enterprises in Maharashtra particularly FPOs and FPCs develop sustainable competitive advantages through digital adoption, value chain innovation, and strategic organizational capabilities. It explores the degree to which these enterprises are transitioning from operational cooperatives into market shaping entities with long term adaptive capacity. The study employs a qualitative mixed approach anchored in an in-depth case of Purandar Highlands FPC. Semi structured interviews were conducted with sixteen respondents representing both primary beneficiaries and key stakeholders including member farmers, board leadership, operational staff, downstream buyers, logistics partners, and supporting agencies. Data analysis followed iterative coding and theme development to identify patterns of digital adoption, value chain shifts, organizational change, and farmer centric outcomes. Preliminary findings indicate that successful Agri-enterprises develop distinctive capabilities in product identity branding, packaging innovation, and value chain positioning. The Purandar Highlands case illustrates how GI provenance, digital traceability, export partnerships, and value-added product development can transform a fragile fruit crop into a premium international commodity. Internal factors such as leadership vision, trust building, and knowledge management

emerged as decisive, while external factors such as certification complexity and cold chain weaknesses remain constraints.

Keywords: Agri-Social Enterprises, Farmer Producer Organization, Strategic Resilience, Digital Adoption, Value Chain Innovation, Governance

### **Risk, Bias, and Opportunity: Understanding VC Decision-Making on Women Entrepreneurs in Kazakhstan**

*Marcus Goncalves, Gulnur Smagulova and Ayazhan Nurzhan*

This study examines the dynamics of venture capital (VC) investment in women-led enterprises in Kazakhstan, an emerging market marked by economic ambition yet persistent gender disparities. Using a mixed-methods design, the research combines survey data from VC investors with qualitative insights to explore attitudes, decision-making criteria, and institutional practices shaping funding allocations. Quantitative analyses—including Chi-square tests, ANOVA, ordinal logistic regression, and exploratory factor analysis—were employed to assess how organizational type, investor experience, and regional scope influence investment priorities. The results indicate that private sector investors emphasize scalability and innovation, whereas public and hybrid organizations prioritize social impact and teamwork. Factor analysis revealed two distinct evaluative logics: an impact-oriented and a market-driven approach. Experience and geographic scope also conditioned risk perceptions and monitoring practices, although not always significantly. While awareness of gender equity in investment is growing, the findings highlight misalignments between institutional investor priorities and the strategic positioning of women entrepreneurs. By addressing these tensions, the study contributes to the literature on gender and finance in under-researched geographies, underscoring the importance of aligning capital, policy, and entrepreneurial ecosystems to foster inclusive investment. Practical policy recommendations and avenues for future research are also identified.

Keywords: Venture Capital, Women Entrepreneurs, UN SDG 5, Emerging Markets, Gender and Finance, Investment Decision-Making, Kazakhstan

### **Trusting the algorithm: Institutional and experiential pathways to responsible AI-enabled digital financial services**

*Pilar Madrazo-Lemarroy, Jose Anselmo Perez Reyes and Emmanuel Fragniere*

While AI-driven financial technologies promise efficiency and inclusion, their responsible adoption ultimately depends on citizens' confidence in algorithmic decision-making. Building on behavioral trust theory, this research develops and validates a multidimensional construct of trust in AI that distinguishes between Initial Trust, rooted in institutional transparency, regulatory safeguards, and perceived integrity; and Continuous Trust, which evolves through user experience with reliability, security, and accessibility. Using secondary data, this study adopts a two-stage quantitative design that integrates Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to empirically validate a novel construct of trust in AI across the United States and Mexico. Findings confirm that public trust in AI-enabled digital financial services is not a monolithic phenomenon but rather a multidimensional construct composed of Initial Trust and Continuous Trust. This dual structure underscores that individuals' trust trajectories evolve over

time: early trust reflects predispositions shaped by institutional and contextual cues, while continuous trust consolidates through lived experiences with AI-driven financial systems. Moreover, the comparative analysis between the United States and Mexico revealed meaningful structural differences in how these trust dimensions interrelate. In the U.S., trust formation is tied to perceptions of technological efficacy and individual autonomy, aligning with a regulatory environment marked by higher maturity and digital penetration. Conversely, in Mexico, trust structure reflected a greater dependence on institutional credibility and collective assurances, consistent with differing levels of regulatory consolidation, digital inclusion, and cultural orientations toward authority and technology.

Keywords: Trust, Artificial Intelligence, Digital Financial Services, Cross-National Comparison  
Initial and continuous trust

### **Parental financial socialization, money scripts, self-efficacy, entrepreneurial intention**

*Jaime Beltran, Montserrat Reyna Miranda and Horacio Bautista Santos*

Entrepreneurial intention is a construct comprised of socialization, cognition, and perceived personal competence. This study analyzes the relationship between parental financial socialization, money scripts, cognitive biases, financial and entrepreneurial self-efficacy, and entrepreneurial intention, aiming to understand the mechanisms underlying the formation of this intention. A quantitative approach is adopted using a non-experimental, cross-sectional, and explanatory design, employing structural equation modeling to test the proposed theoretical model. The results show that parental financial socialization is significantly associated with the configuration of money scripts, which influence the presence of cognitive biases in financial decision-making. In turn, these biases are related to levels of financial and entrepreneurial self-efficacy, a construct that emerges as a key antecedent of entrepreneurial intention. The findings provide relevant empirical evidence and offer a foundation for designing educational interventions aimed at strengthening entrepreneurial self-efficacy.

Keywords: Parental financial socialization, money scripts, self-efficacy, entrepreneurial intention

## **Technical Session II: Enterprise Analytics System**

### **Governing the Neural Frontier: Neuromarketing, Data Ethics, and Trust in the Age of California's SB 1223**

*Marcus Goncalves and Debra Dangelo*

This study explores the intersection of neuromarketing, neural data governance, and consumer trust within California's evolving privacy landscape, particularly under Senate Bill 1223 (2024), which amends the CCPA/CPRA to explicitly define and regulate "neural data." Using a qualitative, multiple-case analysis of Coca-Cola, Frito-Lay, and Hyundai, the research examines how firms employing EEG, fMRI, eye-tracking, and biometric tools balance innovation with transparency, informed consent, and ethical accountability. The findings reveal a persistent gap between procedural compliance and substantive ethical practice: while organizations formally adhere to disclosure and consent requirements, consumer understanding and autonomy remain limited. By integrating stakeholder theory and regulatory pluralism, the study positions neuromarketing as a

governance-intensive capability situated at the nexus of technological innovation and consumer protection. It argues that compliance alone is insufficient to sustain legitimacy in the use of neural data and that firms must adopt proactive ethical leadership to transform regulation into strategic value creation. The paper contributes to theory by extending stakeholder perspectives into neuro-data governance and to practice by offering a framework for embedding responsible neuromarketing within organizational strategy. Ultimately, it contends that the future of neuromarketing depends on aligning scientific advancement with public trust, regulatory coherence, and the ethical imperatives of transparent consumer engagement.

Keywords: Neuromarketing, neural data, consumer privacy, CCPA/CPRA, stakeholder theory, regulatory pluralism, ethical marketing, SB 1223, brand trust

### **Brand Visibility in AI Search: What the Tea Industry Reveals**

*Valorie Luther*

This study addresses that gap through longitudinal, observational analysis of AI visibility metrics for six major U.S. tea brands across ChatGPT and Google AI Overviews over ten weeks from November 2025 through January 2026. Collected data captured two core metrics, mention rate and average position, at five measurement intervals across 120 data points using Whitebox, the generative engine intelligence platform. The analysis documents five patterns: platform divergence, extreme volatility, mention-position decoupling, leadership instability, and category positioning effects. ChatGPT produced systematically higher mention rates (grand mean of 40.7%) than Google AI Overviews (22.3%), with cross-platform correlations by brand ranging from  $r = -.445$  to  $r = .820$ . Coefficients of variation averaged 22.2% on ChatGPT and 33.9% on Google AI for mention rate, with individual brands experiencing swings exceeding 30 percentage points within two-week intervals. These patterns collectively demonstrate AI visibility operates as a competitive construct structurally distinct from traditional search visibility. The findings challenge the assumption that AI visibility functions as an extension of search engine optimization and indicate that effective management requires continuous monitoring, platform-specific strategies, and dual-metric optimization. This study provides the first longitudinal, cross-platform empirical analysis of AI visibility in a consumer-packaged goods category and establishes a replicable dual-metric, multi-platform measurement framework for future research.

Keywords: AI visibility, generative engine optimization, brand visibility, large language models share of shelf, ChatGPT, Google AI Overviews, cross-platform measurement, consumer packaged goods, tea industry

### **Generative AI and the Erosion of Consumer Trust: Behavioral, Emotional, and Neural Evidence**

*Anna Morse and Marcus Goncalves*

As generative artificial intelligence becomes increasingly embedded in marketing workflows, organizations, especially startups and digital-first enterprises, are rapidly shifting from human-produced content to AI-generated advertising. While this shift reduces production costs and accelerates content delivery, it raises critical questions about consumer trust, perceived authenticity, and responsible innovation. Despite the widespread adoption of generative AI tools,

empirical evidence on how consumers emotionally, behaviorally, and neurologically respond to AI-created marketing content remains limited. This study examines how consumers interpret and react to AI-generated versus human-generated advertising using a mixed-methods neuromarketing design. Participants were exposed to paired advertisement sets, with their emotional and neural responses captured via biometric and neurophysiological measures, followed by qualitative interviews and a structured post-exposure survey. Preliminary analyses suggest that AI-generated content elicits lower engagement, weaker emotional resonance, and reduced brand trust compared to human-generated alternatives. Moreover, exposure to AI-Generated marketing materials appear to negatively influence consumers' perceptions of organizational authenticity and integrity. These findings highlight important implications for responsible technological adoption within entrepreneurial and corporate settings. Over-reliance on generative AI for customer-facing communication may unintentionally erode consumer trust, undermining one of the core pillars of sustainable and ethical innovation. The study contributes to the body of knowledge by offering early evidence on the psychological and behavioral risks of AI-mediated marketing and by outlining pathways for more transparent, ethical, and human-centered deployment of generative AI tools in business practice.

Keywords: Generative artificial intelligence, consumer trust, responsible innovation, neuromarketing, digital marketing, human-ai interaction

### **Auditable AI for Genomic Equity: A Compliance-as-a-Service (CaaS) Model for Responsible innovation**

*Julian Borges*

Artificial Intelligence (AI) holds transformative promise in cancer diagnostics and genomic medicine. However, in high-stakes applications such as breast cancer subtyping, AI models are prone to shortcut learning, where predictions are driven by non-causal, confounding signals rather than true biological features. This failure mode poses substantial risks for misclassification, bias amplification, and erosion of model trustworthiness—especially when deployed in low-resource environments or among underrepresented populations. To address these challenges, we present a novel audit framework designed to detect shortcut learning, support compliance, and operationalize Responsible Innovation (RI) through Systematic Entrepreneurship (SE). Originally validated in a peer-reviewed study (Borges, 2025), the framework has been extended into a Compliance-as-a-Service (CaaS) platform that generates explainable, regulatory-aligned audit reports. Implemented in Stata for accessibility and reproducibility, the system enables equity-aware validation, visualization of feature reliance, and flagging of institutional confounders. Here we outline the conceptual, technical, and commercial architecture of a globally scalable audit tool designed for health AI startups, regulators, and clinical institutions. Aligned with frameworks such as the FDA's AI/ML SaMD Action Plan, NIST AI RMF, and ONC transparency guidelines, the platform enables responsible deployment of AI in genomic medicine. By embedding fairness, safety, and auditability into the clinical AI lifecycle, this initiative offers a replicable model for aligning innovation with public health priorities, supporting improved patient outcomes, regulatory readiness, and global equity in precision oncology.

Keywords: Responsible AI, shortcut learning, health equity, breast cancer, explainable AI

## **Impact of Technology on Consumer Behavior and Strategy Development**

*Rajagopal and Ananya Rajagopal*

This research study explores the effects on cognitive stimulants and technology devices like AR and VR on the in-store buying behavior of consumers. The vital psycho-social information on technology adaptation and in-store buying decisions have been categorically analyzed based on empirical data collected in major departmental stores in Mexico City. Analyzing the data, this study also discusses the neuro-behavioral modulation among consumers during the in-store buying process. The study is founded on the theory of behavioral stimulation, theories of planned behavior and reasoned action, theory of decision making, and technology acceptance model. The study reveals that technology-driven in-store brand promotion significantly stimulate the consumer buying intention on unplanned buying agenda. Study suggests that companies promoting brands in the segments of consumer electronics, fashion accessories, and gaming need to expand technology-based promotion also to the supermarkets to attract consumers of lower socio-economic segments as there is an increasing trend of Generation Z consumers to visit supermarkets in premium locations.

Keywords: In-store stimulation, technology impact, AR and VR tools, decision-making, buying behavior

## **Perceived Authenticity Gaps and Customer Incivility in Ethnic Dining Experiences**

*Nolla Haidar, Elif Celik, and Moiz Deshmukh*

Authenticity is increasingly stressed by restaurants in their marketing narratives, traditional food presentations, themed environments, and culturally symbolic service practices. This research fills this existing gap by exploring the impact of perceived authenticity gaps in ethnic restaurants. Authenticity gaps are conceptualized here as the gap that emerges when there is incongruity between the restaurant's authenticity statement and the customers experience. On the premises of the expectancy-disconfirmation theory and existing literature on service failure impact, this research proposes that authenticity marketing impacts customer expectations of food and service, which contributes, in turn, to the development of negative emotions that impact customer behavior. The study used a qualitative research approach based on detailed data gathered from an authentic Lebanese restaurant in London to close this gap and because of its capacity to investigate authenticity perceptions from a firsthand perspective and to precisely capture the subjective and socially mediated process of authenticity perceptions. The empirical findings show how much highlighted authenticity claims build increased consumer expectations for food, service delivery, and cultural representation, and how perceived deviations from these standards cause negative emotional reactions like disappointment, frustration, and anger may surface when these expectations are not fulfilled, which raises the possibility of customers acting rudely toward service staff.

Keywords: Authenticity, marketing, ethnic restaurants, customer expectations, incivility service, hospitality

## Technical Session III: The New Reality: Technology and AI

### **Strategic Alliances in the Age of AI: Extension of Production Networks or a Distinct Layer of Inter-Firm Coordination?**

*Julio E. Elias and Marcus Goncalves V.*

This study investigates whether AI-era strategic alliances represent extensions of traditional production networks or constitute a distinct data-driven coordination layer. Building research in platform economics, network analysis, and strategic management, we develop a multilayer empirical framework that overlays physical input-output ties with digital platform affiliations and data partnerships. Using U.S. firm and industry level data, we construct alliance, supply chain, and platform networks to test three key propositions: (1) AI-era alliances amplify or bypass supply-chain dependencies; (2) platform-centric alliances intensify competition, where firms collaborate on data infrastructure while competing in downstream markets; and (3) performance effects arise from cross-layer complementarities between physical and digital networks. The empirical strategy leverages event studies and identification strategies based on staggered cloud-region rollouts, API policy changes, and state-level data regulations to estimate causal effects on innovation, resilience, and productivity. We aim to develop new metrics for alliance intensity in the AI economy. This research advances understanding of business partnership lifecycles by revealing how digital transformation creates nonlinear evolutionary patterns, in which traditional formation, development, and maturity stages are disrupted by algorithmic mediation.

Keywords: Strategic alliance, multilayer networks, competition, partnership lifecycles, algorithm mediation

### **Novel Retrieval Techniques for Enhanced Retrieval-Augmented Generation: A Comparative Analysis of Hybrid Search, Query Expansion, and Contextual Reranking**

*Sarthak Pattnaik and Eugene Pinsky*

This study presents a comprehensive evaluation framework for advanced Retrieval-Augmented Generation (RAG) pipelines, comparing four distinct retrieval strategies to optimize information retrieval and answer generation quality. We implement and analyze (1) Naive RAG utilizing dense vector embeddings with FAISS indexing, (2) Reciprocal Rank Fusion (RRF) employing multi-query expansion for enhanced recall, (3) Ensemble Retrieval combining semantic vector search with lexical BM25 scoring, and (4) Cohere Contextual Compression leveraging neural reranking models. Our implementation integrates *LangChain* orchestration with OpenAI's text-embedding-3-large model and GPT-4o-mini for generation. Experimental results demonstrate that hybrid approaches significantly outperform single-method retrieval in both grounding accuracy and semantic relevance. The RRF technique exhibits superior performance in handling ambiguous queries through query diversification, while cohere reranking achieves optimal precision-latency trade-offs. This comparative analysis provides quantitative metrics including retrieval overlap, answer similarity, grounding percentages, and end-to-end latency, offering insights for selecting appropriate RAG architectures based on application requirements.

Keywords: Retrieval-Augmented Generation, RAG, Hybrid Search, Reciprocal Rank Fusion, Vector Embeddings, Query Expansion, Contextual Reranking, Semantic Search, LangChain

## **Human-in-the-Loop Models for General-Purpose AI Systems: Dissecting Leadership for Navigating Workforce and Technological Challenges**

*Ananya Rajagopal and José Anselmo Pérez Reyes*

The rapid diffusion of artificial intelligence as a general-purpose technology is fundamentally reshaping organizational structures, leadership roles, and workforce capabilities. Despite growing interest in AI-driven transformation, limited research integrates human-centered design perspectives with strategic capability development to explain how organizations adapt to Human–AI collaboration. This study addresses the gap by reviewing and conceptually integrating Sociotechnical Systems Theory and Dynamic Capabilities Theory to examine the role of Human-in-the-Loop mechanisms in organizational transformation. Data has been collected using structured pre-coded research instrument from 15 senior executives (5 senior executives from each industry) and 148 mid-level employees during April 2025–September 2025. This study contributes to existing literature by analyzing the effectiveness of human-in-the-loop security models in the organizations in the context of leadership skills, employee engagement, and ethical challenges in implementing AI tools within day-to-day activities.

Keywords: Gaps in skill development, Human-in-the-loop model, Leadership, Workforce transformation, Human-AI intervention

## **Playing with fire: Evaluating the impact of data privacy in AR-driven technology enhancements**

*Dora Galvez-Cruz*

This research aims to examine consumers' perceptions of privacy in relation to innovative wearable technologies through a hypothetical augmented reality (AR)-enhanced pair of glasses used as an exploratory scenario. The conceptual device is described as scanning a user's face and displaying selected information drawn from the observed individual's social network to provide a brief contextual profile. Within this exploratory framework, the study examines individuals' willingness to use such technology, perceived adoption potential, and anticipated psycho-social implications.

Keywords: Augmented reality glasses, privacy-awareness, innovation, technology adoption and acceptance, entrepreneurial opportunities, psycho-social impact, wearable technology

### **Technical Session IV: Enterprise Management**

## **Mapping Gender Inequality in China's Financial Sector: Insights for Responsible Innovation and Inclusive Entrepreneurship**

*Yunhao He and Marcus Goncalves*

Despite growing global concern, the gender pay gap (GPG) within China's financial sector remains under-explored through systematic, data-driven approaches. This study presents one of the few, if not the only, systematic literature review (SLRs) and bibliometric analyses focused on GPG in this context, aiming to map the intellectual landscape, thematic evolution, and policy relevance of the field. Peer-reviewed English-language articles published between 1975 and 2025 were retrieved

from the Web of Science Core Collection, enabling international benchmarking and citation mapping. A three-tiered screening protocol narrowed 209 initial records to 64 eligible studies. Bibliometric tools, including VOSviewer and R Bibliometrix, were applied to visualize co-authorship and co-citation networks. The analysis revealed three dominant research clusters—salary transparency, organizational barriers, and leadership gaps—while identifying emerging intersections with FinTech, ESG, and intersectionality frameworks. Despite these trends, findings indicate limited citation influence, thematic fragmentation, and weak scholarly integration. While the exclusion of Chinese-language literature is a limitation, it is justified for comparative consistency. Overall, this study demonstrates how combining bibliometrics with policy analysis uncovers underexplored “invisible metrics” that sustain gender disparities. It provides a foundational evidence base for future academic inquiry and actionable reforms aligned with SDG 5 and ESG mandates.

Keywords: Gender pay gap, financial sector, China, bibliometric analysis, pay transparency, organizational barriers, fintech, UN SDGs

### **Performance of Circular Entrepreneurship: Analysis of Social Dynamics in Developing Economies**

*Rajagopal and Ananya Rajagopal*

This paper aims at exploring the entrepreneurial business modelling process considering the social and stakeholder value perceptions within the circular economy attributes. The study has been conducted selecting 72 circular economy-based small and medium enterprises within the metropolitan area of Mexico City. Circular entrepreneurship (outgrown from circular economy attributes) in Latin America in general and Mexico in particular is an unexplored research area. This study contributes to the value dimensions of circular economy-based enterprises, which fall under the bracket of small and medium industrial segments. The recyclability trends combined with the low-cost technologies help circular enterprises to achieve social values and entrepreneurial performance in line with the social trends. The study reveals that circular economy-based enterprises are sensitive to the cost and risk factors despite being stimulated by the interactions on social networks and the co-creation of recyclable product designs.

Keywords: Circular entrepreneurship, social dynamics, co-creation, performance, sustainability, recycling

### **Responsible Innovation in Livestream Commerce: Understanding the Persuasive Capabilities of AI Hosts**

*Ming Xue*

This study investigates how AI-powered livestream agents influence consumer appraisal, emotion, and action compared to human presenters in bottom-of-funnel purchasing environments such as livestream commerce. Through using the Expectation-Confirmation Theory and the Persuasion Knowledge Model, the research examines how consumers evaluate performance, authenticity, and persuasive intent when the “entrepreneurial actor” is a non-human AI agent. This study employs a mixed-methods design by combining a U.S.-based consumer survey with qualitative case analyses of AI livestream experiments. Prior studies suggest AI hosts may enhance efficiency and

consistency, yet raise concerns related to authenticity and transparency. As the world learns to integrate AI, critical issues for responsible, system-level digital entrepreneurship arise and require consideration for the future.

Keywords: Livestream commerce, digital entrepreneurship, AI livestreaming, bottom-of-funnel, AI ethics, TikTok commerce

### **Entrepreneurial Leadership and Enterprise at the Nexus of Automation, Institutional Fragility, and Influence Architectures: Toward a Theory of Synchronization Capability and Innovation Governance**

*Sarthak Pattnaik, Kathleen Park and Eugene Pinsky*

The contemporary entrepreneurial organization finds itself at the confluence of two dialectically intertwined revolutionary forces—the emergence of agentic artificial intelligence and the fundamental reconfiguration of labor architecture—thereby engendering novel exigencies in governance, unprecedented business model morphologies, and hitherto unanticipated sociotechnical hazards. This scholarly synthesis elucidates how autonomous "digital colleagues," endowed with situational cognizance, volitional capacity, and operational efficacy, are transmuting from mere instrumental utilities into quasi-collegial entities that permeate domains spanning customer relations, human capital management, talent acquisition, and operational infrastructure. Such transformations precipitate a thoroughgoing reconceptualization of task allocation protocols and reliability imperatives within the firm, fundamentally altering the visible hand of management coordination that Chandler identified as constitutive of modern enterprise.

Keywords: Techno-entrepreneurship, agentic artificial intelligence, digital colleagues, remote and hybrid work modalities, psychological safety architectures, organizational governance, synchronization capability, automation and identity formation

### **Systematic Entrepreneurship and Responsible Innovation in Education: A Retrospective Case Study of Khan Academy Kyrgyz localization project**

*Nurzhamal Yrysbekova*

This paper examines how responsible innovation and systematic entrepreneurship can be applied in education to design scalable and socially grounded learning systems in resource-constrained contexts. Using a retrospective qualitative case study of Khan Academy Kyrgyz, an educational localization initiative implemented in Kyrgyzstan during 2020–2021, the study explores how global open educational resources can be adapted to local language and institutional settings beyond simple content translation. The study draws on archival project documentation, internal planning materials, content localization milestones and reflective insights from direct involvement in the initiative's coordination and implementation. Rather than assessing learning outcomes quantitatively, the analysis focuses on how the initiative was structured, governed and realized as an entrepreneurial system. At the same time, theoretical framing combines responsible innovation with systematic entrepreneurship, which views innovation as a structured and repeatable process rather than a one-time intervention. The findings show that responsible innovation was operationalized through language localization, engagement with teacher ambassadors nationwide and giving adaptive responses to challenges. Together, these approaches enabled the initiative to

move beyond a pilot project toward a relevant educational project that helped to improve the human development in rural areas of Kyrgyzstan. The research contributes to entrepreneurship education by demonstrating how technology-enabled learning systems can support human capital development and learning equity when embedded within participatory governance structures and local educational systems. The findings offer practical and conceptual insights for educators, policymakers and educational entrepreneurs seeking to implement responsible, system-level innovation in developing-country contexts.

Keywords: Responsible innovation, systematic entrepreneurship, entrepreneurship education educational localization, technology-enabled learning systems, developing-country contexts

## **Technical Session V Enterprise Modeling**

### **Mobile Broadband Technology and Entrepreneurial Churn: A Causal Mediation Analysis of Broadband Transitions and Their Effects on Entrepreneurship**

*Irena Vodenska and Maruška Vizek*

This research examines the intricate relationship between successive generations of mobile broadband technologies and firm demographics across a global panel of countries. Using a causal mediation fixed-effects analysis framework, the study identifies the specific mechanisms through which introducing 3G and 4G technologies to a country (modeled as a treatment) influences the creation and closure of business entities. Central to this analysis is the role of mobile data affordability, modeled as a mediator to determine the extent to which technological advancements drive entrepreneurial activity through cost reductions versus direct technological utility. Two entrepreneurial outcomes are examined: the creation of new LLC firms and the closure of existing LLC firms per capita, while controlling for critical macroeconomic and institutional factors, including GDP per capita, regulatory quality, financial development, labor force education, research and development expenditures, and income inequality. The findings reveal a significant evolution in the economic role of mobile broadband as it transitioned from 3G to 4G, characterized by shifting weights between direct technological utility and indirect affordability channels. For 3G technology, the impact on new firm creation is remarkably high, with the introduction of 3G permanently increasing the number of new firms per capita by 3.2 percent, almost entirely mediated by improvements in data affordability. With 97.7 percent of the effect mediated, the results suggest that the primary contribution of 3G to entrepreneurship was the democratization of data access. During this era, the economic value was derived predominantly from making mobile connectivity affordable for a broad segment of the population, thereby lowering barriers to entry for early-stage entrepreneurs.

Keywords: Entrepreneurial churn, mobile broadband infrastructure, mobile data affordability causal mediation

## **AI-Driven Predictive Modeling: Exploring Entrepreneurial Intentions, AI Use, and Self-Efficacy South**

*Naila Aaijaz, Sathy Srithar, and Hamid Peikari*

This study investigates how artificial intelligence (AI) shapes entrepreneurial intentions through its effects on self-efficacy and risk perceptions among aspiring entrepreneurs, using a mixed-methods design, survey data from 240 respondents across diverse socio-economic and cultural backgrounds (July 2024-February 2025) were analyzed alongside AI-driven predictive modeling with Altair AI Studio and Microsoft Azure Machine Learning. Findings show that AI exposure enhances entrepreneurial self-efficacy and increases entrepreneurial intentions, while concerns about job displacement and ethical issues remain barriers to adoption that combines a cross-sectional with AI-enabled predictive analytics (Altair AI Studio; Azure ML). The work extends ongoing conversations at the intersection of AI and entrepreneurship by situating AI adoption within intention-based models and digital venturing contexts, while recognizing cultural and contextual contingencies that may moderate effects.

Keywords: Artificial Intelligence, predictive modeling, entrepreneurial intentions, AI use, self-efficacy

## **When Necessity is the Only Opportunity: Reconceptualizing Necessity Entrepreneurship Through Process Theory**

*Esteban D. Lopez Meneses*

Guided by the principles of Grounded Theory, this study aims to theorize the reasons for decoupling necessity from opportunity entrepreneurship. It will illuminate how entrepreneurs navigate the morph process, including the references they use in decision-making, context, strategies, and their outcomes. This understanding may help entrepreneurs in developing countries not only to survive but also to create opportunities for wealth growth. By collecting primary data through semi-structured interviews conducted in emerging markets and utilizing the principles of sense-making theory to analyze how these entrepreneurs interpret their business experiences, the aim is to reconceptualize necessity entrepreneurship. Furthermore, the study will identify potential stages of development, illustrating how entrepreneurs evolve their ventures until they reach the status of a well-established business.

Keywords: Necessity entrepreneurship, opportunity entrepreneurship, developing countries, developed countries, institutional voids

## **Automated Data Engineering for Explainable and Responsible Investment Analytics**

*Deepak Saxena*

This paper presents an automated data engineering framework for explainable investment analytics that embeds transparency and traceability directly into the analytics lifecycle. Rather than treating explainability as a post-hoc capability, the proposed framework integrates explainability at the data, feature, and metric layers, enabling end-to-end auditability of analytical results. The framework is designed to support enterprise-scale investment analytics systems where automation, governance, and interpretability are equally critical. The framework is guided by four core

principles: automation, modularity, traceability, and explainability. Automation enables systematic ingestion, transformation, and analytics computation through event-driven or scheduled pipelines, reducing operational overhead. Modularity allows domain-specific analytics logic to be expressed as reusable, configuration-driven components. Traceability is achieved through systematic capture of metadata, schema evolution, and transformation lineage. Explainability is realized by decomposing analytical metrics into interpretable components that link final outputs to underlying data sources and transformations.

Keywords: Automated data engineering, explainable analytics, data lineage, investment analytics, analytics systems, data governance, metric explainability

## **Technical Session VI: Entrepreneurship Education**

### **Do Innovative Sustainability Teaching Practices Spark Students' Social Entrepreneurial Intention? Insights from French Business Schools**

*Meriam Razgallaha, Sufia Mohand Amarb and Chiraz Aouina-Mejria*

Despite the increasing number of studies addressing the effectiveness of ethics and sustainability courses, little is known about their impact on fostering students' social entrepreneurial intentions. The current study examines how exposure to sustainability and ethics courses and the teaching practices used influence the sustainability orientation and the social entrepreneurial intention of students. Structural Equations Modelling with SMART- PLS is conducted with 134 national and international students based in France and enrolled in management and business programs, in private French business schools and Public universities. This study shows that teaching practices about sustainability positively affect the sustainability orientation of students, but it has no significant effect on social entrepreneurial intention. On the other hand, sustainable orientation positively influences entrepreneurial self-efficacy of the students; however, this entrepreneurial self-efficacy negatively affects their social entrepreneurial intention.

Keywords: Sustainability ethics, social entrepreneurial intention, quantitative teaching practices

### **Mapping Global Scholarship on Women's Higher Education in LMICs: A Bibliometric Analysis with a Focus on Central Asia (2000–2024)**

*Dana Adilkhankyzy*

This study conducts a bibliometric analysis of global scholarship on women's access, participation, persistence, and leadership in higher education across low- and middle-income countries (LMICs), with a regional focus on Kazakhstan, Uzbekistan, and Kyrgyzstan. Using data from the Web of Science Core Collection (2000–2024), the analysis integrates citation, co-citation, and co-word methods with altmetric indicators to assess scholarly impact and evolving intellectual structures. Visualization and network-mapping through VOSviewer reveal several dominant themes in the literature, including structural barriers to access, rural and socioeconomic disparities, institutional support mechanisms, and gendered leadership pathways. Although research aligned with SDG 4: Quality Education has expanded considerably over the past two decades, Central Asia remains markedly underrepresented within global scholarship. Early clustering further indicates limited

attention to intersectionality, student persistence, and sense of belonging—domains that remain insufficiently explored in both global LMIC research and regional studies of Kazakhstan, Uzbekistan, and Kyrgyzstan.

Keywords: Women's higher education, bibliometric analysis, persistence, leadership, women's higher education, bibliometric analysis, Central Asia

### **Business Case for the Pharmaceutical Commercial Data Certificate (PCDC) at Boston University: Addressing Talent Gaps in Pharmaceutical Analytics Education**

*Scott Hull*

The pharmaceutical industry confronts severe talent shortages in commercial data analytics amid patent cliffs risking \$200-\$400 billion in revenue through 2030, Inflation Reduction Act (IRA) price negotiations effective January 1, 2026, and AI adoption at 88% in life sciences, impeded by 49% talent barriers. A review of accredited U.S. university programs confirms no equivalent certificate exists, with alternatives focusing on clinical trials, manufacturing, or broad healthcare analytics. This paper proposes the 16-credit Pharmaceutical Commercial Data Certificate (PCDC) at Boston University, an asynchronous online graduate program rooted in adult learning principles, emphasizing nine proprietary datasets through pre-learning modules, recorded lectures, quizzes, discussions, and capstones. Industry feedback from leaders like the Director of Analytics at Gilead Pharmaceuticals underscores the need, citing reduced onboarding from months to weeks. Industry leaders, including ZS Associates (60% of pharma data foundations not AI-ready), Microsoft (AI agents require domain-fluent humans), and Anthropic's Dario Amodei (warning of AI failures without data literacy), highlight foundational data priority before AI. The U.S. addressable market encompasses 135,000 professionals, with base-case 0.25% penetration yielding \$16.752 million cumulative gross revenue over five years. The PCDC meets an unmet need, establishing Boston University as a pioneer with strong industry support.

Keywords: Pharmaceutical analytics, curriculum design, real world data, career development

### **Career Compass Market Analytics: Visualization Architecture for Career Planning**

*Dinara Zhorabek, Bindiya Dugersuren, Tanya Zlateva, Vladimir Zlatev, Sree Kumar Valath Bhuan Das and Nakul Padalkar*

This project presents an updated interactive web application designed to support data-driven career exploration using labor-market data. The system is built on a layered architecture in which unstructured Lightcast Excel reports are cleaned, processed, and transformed into structured Django models within a dedicated processing layer, improving performance, scalability, and data reuse. These models serve as the backend for dynamic, web-based visualizations. The visualization layer was redesigned following a systematic evaluation of existing charts for relevance, clarity, and usefulness. Core visualizations were refined or newly implemented to highlight key labor-market insights, including skill demand patterns, job postings by industry and occupation, geographic distributions of opportunities, and advertised salary trends and distributions. Visualization concepts were further categorized based on feasibility and analytical value, establishing a structured roadmap for future enhancements as richer data and advanced processing become available. Overall, the updated application improves interpretability, usability,

and analytical depth for students and faculty engaged in labor-market exploration and career planning.

Keywords: Data visualization, labor-market analytics, job posting analysis, web application, interactive dashboards, skill demand analysis, salary trend analysis, data-driven career planning

### **Wearable Technology as an Enabler of Evidence-based Collaboration in Entrepreneurial Education**

*Itzel Cruz Martínez, Alma Catalina Carmona Vega, José Eduardo Mallén Lomas, Sergio Noé Torres Rodríguez, and Jessica Alejandra Ruiz Ramirez*

Entrepreneurship education increasingly relies on collaborative learning environments where students construct entrepreneurial competence through social interaction and shared decision-making. However, little empirical evidence has captured how teamwork quality relates to students' emotional activation during authentic entrepreneurial tasks. This study explores the relationship between communication equality and physiological regulation using wearable technology as part of a multimodal learning analytics (MMLA) approach. A quasi-experimental pre–post design was implemented with 33 undergraduate entrepreneurship students working in self-organized teams. During both sessions, physiological signals including electrodermal activity, heart rate and heart rate variability were recorded using Embrace Plus wearable devices, while conversational analytics were employed to compute a communication equality index. Students also completed perceptual surveys on teamwork experience. The results show that balanced participation is associated with smoother and more stable physiological activation, whereas dominance-driven communication corresponds to heightened arousal and reduced regulatory stability. From PRE to POST, the pedagogical intervention promoting shared leadership and dialogic reflection led to more distributed participation, increased physiological regulation, and improved perceptions of collaboration and creativity. These findings indicate that entrepreneurial teamwork entails not only cognitive coordination but also shared emotional regulation, and that communication equality operates as a psychosocial mechanism for distributing regulatory effort within teams. The study demonstrates the value of wearable-enabled analytics for advancing evidence-based entrepreneurship education, offering a multimodal lens to understand how interaction quality, learning experience, and embodied regulation converge during collaborative innovation processes.

Keywords: Entrepreneurial education, wearable technology, multimodal learning analytics, communication equality, physiological monitoring, collaborative work

### **AI Career Assistance Agent for Students**

*Binderiya Dugersuren, Dinara Zhorabek, Tanya Zlateva, Vladimir Zlatev, Sree Kumar Valath Bhuan Das and Nakul Padalkar*

This paper investigates the design and evaluation of an AI-driven document parsing pipeline implemented using the LangChain framework within Career Compass, a career guidance platform developed for students at Boston University Metropolitan College. The study focuses on assessing the suitability of different LLMs for structured information extraction tasks that support personalized career advising and labor market analytics. The pipeline is designed to extract key background, skill, and preference information from student intake documents and populate

structured fields required for downstream analysis using the Lightcast Analyst platform. A prioritization framework is introduced to distinguish between fields that should be inferred by the model and those that should be sourced directly from structured inputs, reducing unnecessary inference and improving reliability. Prompt engineering was conducted iteratively to address variability and inconsistency in early outputs, resulting in a constrained prompt structure with explicit system-level rules governing output schema and formatting. Multiple LLMs, including GPT-based, Gemini, LLaMA-based, and Haiku models were evaluated under identical pipeline configurations to isolate model-level differences. Model outputs were compared based on completeness, consistency, and adherence to the defined extraction schema. The findings highlight significant trade-offs between model families in terms of output reliability, structure adherence, and practical usability. The paper contributes to technology-enabled entrepreneurship and business practice by offering empirically grounded insights into designing scalable, trustworthy AI agents for document-intensive professional services.

Keywords: AI agents, Large language models, Career advising systems, Applied AI, Information retrieval

## **Technical Session VII Enterprise Architecture**

### **Entrepreneurial Challenges in Lithium-Ion Battery Recycling**

*Hriday Shankar, Tanishka Nandakumar, Swayam Sampurna Panigrahi, Rajesh Katiyar and Debasish Mishra*

This study focuses on identifying and analyzing the barriers that hinder entrepreneurs from entering the lithium-ion battery recycling ecosystem in India. This research aims to contribute to responsible innovation and systematic entrepreneurship discourse, offering policy-relevant and practice-oriented insights to strengthen India's battery recycling ecosystem and support sustainable industrial development. As India advances toward its net-zero emission goals, lithium-ion battery recycling requires focused entrepreneurial engagement to strengthen resource security, mitigate environmental risks associated with improper disposal, and advance circular economy objectives. However, preliminary observations indicate that entrepreneurs seeking to enter this emerging ecosystem are likely to encounter multiple barriers, including financial uncertainty, technological complexity, regulatory ambiguity, supply chain opacity, safety risks, environmental concerns, and knowledge gaps related to battery handling, screening, and second-life applications. China continues to dominate most post-mining stages of the lithium-ion battery value chain, particularly cathode manufacturing and cell processing. India is ranked seventh in holding one of the world's largest lithium reserves. The Indian government has adopted certain measures like the Production Linked Incentives for Advanced Chemistry Cells, critical mineral recycling incentives, and investments in domestic battery manufacturing and storage. Despite these efforts, India remains significantly dependent on imports for battery cells and materials. Although policy intent and public investments have strengthened in recent years, entrepreneurial participation in lithium-ion battery recycling remains limited.

Keywords: Lithium-Ion Battery Recycling, Entrepreneurial Barriers, Responsible Innovation Ecosystem

## **“Diversity marks the spot”: The effect of CSR and social media diversity branding consumer 5.0 in a polarized world**

*Andree Marie Lopez Fernandez*

In a global context characterized by multiculturalism, hyperconnectivity, polarization, as well as social and environmental challenges, diversity has become a defining feature in society and organizational behavior. It seems that people are growing more polarized and that the ubiquitousness of social media is actually more alienating than connecting. The polarized mindset limits individuals' willingness to reassess beliefs even when confronted with credible opposing information which, in turn, hinders progress and development. This study argues that diversity branding, derived from corporate social responsibility engagement, can mitigate polarized thinking, as well as resonate with consumers 5.0, positively impacting social and business growth and development.

Keywords: Diversity, Corporate social responsibility, Branding, Polarized mind, Social media, Consumer 5.0

## **Revisiting customer satisfaction in quick commerce using NCA: A structured abstract**

*Pável Reyes-Mercado*

This abstract proposes a necessity conceptual model to analyze the degree to which four attributes of Q-commerce mobile applications can lead to specific levels of customer satisfaction. Given the rapid growth of Q-commerce, there is a need to revisit customer satisfaction through alternative approaches to identify more nuanced insights beyond size effects, allowing managers to implement timely marketing mixes that focus on customer perceptions. Specifically, the conceptual model incorporates the key conditions of mobile Q-commerce applications, including informative content, aesthetic design, perceived ease of use, and service delivery experience. Using Necessary Condition Analysis and a sample of Q-commerce users, it is expected to identify the degree to which each of the conditions contributes to customer satisfaction. Data collection is underway.

Keywords: Q-commerce, Necessary Condition Analysis, NCA, Customer Satisfaction, Mobile Applications.

## **Technical Session VIII: Meta Entrepreneurship**

### **Enhancing Digital Advertising Effectiveness: A Quantitative Analysis of Personalization, Trust, and Engagement in Amazon's Marketing Strategy**

*Redemta Bunga and Megan Balani*

This research examines Amazon's digital advertising framework and addresses this inquiry: In what ways can advertisement personalization enhance customer interaction and conversion results by leveraging psychological principles? A mixed quantitative research design was employed to enhance analytical robustness. Primary data were collected through an online survey of Amazon users, capturing perceptions of ad personalization, trust, relevance, and engagement. To complement self-reported measures, secondary data analysis was conducted using a large corpus of Amazon product reviews, enabling sentiment-based assessment of consumer emotional

responses. Correlational analyses were employed to investigate connections among primary variables in both datasets. Results from the initial analysis show a strong positive association between confidence in personalized ads and consumer engagement. Further sentiment analysis confirms these findings, with more positive sentiment regarding emotions associated with better engagement outcomes. In sum, the findings confirm the mediating role of "trust" and "perceived relevance" between the variable of personalization and engagement/purchase intentions, thereby supporting the S-O-R model in the digital advertising context. This study advances understanding of digital marketing and customer behavior by distinguishing engagement generated by psychological aspects rather than direct effects. It combines the findings from the survey study with those from the sentiment analysis study, providing a comprehensive outlook on the effectiveness of customized marketing and a significant view of engagement behavior across different platforms.

Keywords: Digital Advertising, Personalization, Consumer Trust, Engagement, Amazon, S-O-R Framework, Sentiment Analysis, Market Research, Quantitative Analysis, Purchase Intention

### **Designing an AI-Augmented Career Services Information System**

*Sree Kumar Valath Bhuan Das, Bindiya Dugersuren, Dinara Zhorabek, Kuat Otarbayev, Tanya Zlateva, Vladimir Zlatev and Nakul Padalkar*

This paper presents the design and implementation of Career Compass, an AI-augmented career services information system developed for graduate programs at Boston University Metropolitan College. The platform is designed as an integrated information system grounded in a normalized, data-centric architecture that supports analytics, visualization, and intelligent automation within a unified framework. At its core is a scalable PostgreSQL data model that separates stable user-centric entities from dynamic external labor market and economic data, enabling extensibility and longitudinal analysis without disruptive schema changes. Career Compass integrates structured intake workflows, interactive labor market analytics, and AI-enabled automation to reduce manual effort while improving data quality and personalization. Large language models are embedded within an agent-oriented pipeline to extract structured information from semi-structured documents and map it directly into the relational schema, ensuring consistency and governance across system components. The platform supports multiple stakeholder perspectives, including students, advisors, faculty, and administrators, through shared data and role-specific analytical views. The paper demonstrates how treating career services platforms as integrated information systems enables scalable, AI-augmented professional services. The architectural principles and design patterns presented contribute to entrepreneurship, technology, and business practice by offering a practical blueprint for building sustainable, data-driven advisory platforms.

Keywords: Employability services, Information systems architecture, Labor market analytics, Data modeling, Workforce education

### **Preparation for Pilot Applications of AI Teaching Assistant Agents**

*Kuat Otarbayev, Vladimir Zlatev and Sree Kumar Valath Bhuan Das*

This paper proposes the development and pilot training of an artificial intelligence-based Teaching assistant (AI TA Agent) to support student learning in data-intensive master's degree programs.

The system is designed to enhance academic support for Applied Business Intelligence (ABA) courses by providing real-time assistance in key technical areas such as Python, SQL, R, and machine learning. Developed using multi-level modularity, the system combines structured ABA course content, natural language processing, and a logical inference engine to provide interactive, context-dependent responses to student queries. The AI TA Agent is designed using a modular architecture consisting of a course knowledge base, a logical core, and a user interaction interface. He learns based on specially designed educational content, including lecture slides, lab work, and assignments. He can explain technical concepts, interpret statistical data, debug code snippets, and offer practical exercises—all without replacing human work. Assessment indicators focus on student engagement, increased efficiency, learning outcomes, and system reliability. In the spring of 2026, at the pilot stage, AI TA Agent will be implemented in four graduate courses, which will be attended by more than 300 students. The system aims to increase the scalability and quality of academic support while reducing the repetitive workload on teachers. As artificial intelligence tools become central to education, this work highlights responsible implementation methods and provides a reproducible foundation for scalable, ethically validated academic artificial intelligence systems.

Keywords: AI agent, Educational technology, Academic support, Machine learning, NLP, Graduate education