JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

# GENERATIVE AI AND ENTREPRENEURIAL COMPETENCE DEVELOPMENT IN HIGHER EDUCATION: A HUMAN CENTERED FRAMEWORK FOR EMERGING ECONOMIES

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## ABSTRACT

The emergence of GenAI is transforming the processes in which university students seek information, create alternatives, conduct market analysis, build prototypes, and communicate their entrepreneurial initiatives. However, enhanced speed and elegance of GenAI outputs should not be confused with deep learning of entrepreneurship. The objective of this paper is to design a human-centered framework that promotes responsible incorporation of GenAI into entrepreneurship education as a means of enhancing entrepreneurial capabilities rather than displacing cognitive work. Qualitative conceptual and narrative review methodology is applied. Data sources are the manuscript provided, peer reviewed literature on entrepreneurship education, as well as the most recent policy-related documents from Organization for Economic Cooperation and Development (OECD), UNESCO and World Economic Forum. Five mutually related components are defined: pedagogical purpose, human agency, AI literacy and ethics, entrepreneurial authenticity, and assessment by process. The framework maps GenAI capabilities such as ideation, scenario generation, market analysis, and feedback onto the competencies of opportunity recognition, experimentation, analytical thinking, creativity, and communication. Further, this paper suggests that universities in emerging economies need equal opportunities, faculty competency, governance and curriculum design to utilize GenAI. This paper offers an AI enabled experiential learning loop and a new assessment structure including problem framing, experimentation, validation, prototyping, oral defense and reflection.

**Key words**: Generative artificial intelligence, entrepreneurship education, entrepreneurial competence, AI literacy, experiential learning, higher education, emerging economies.

## I. INTRODUCTION

The digital transformation of entrepreneurship changed the concept from being a promising future to a common feature of business development. With the advent of such tools as artificial intelligence technology, cloud computing, data analytics, and digital marketplace, the way entrepreneurs detect opportunity, validate concepts, and communicate with customers changes. The paper offers the idea that entrepreneurship education has to adapt to this evolution because traditional programs lay emphasis on business planning while digital skills, sustainability, and inclusivity are regarded as complimentary. By putting forward this point, the manuscript describes one specific part of the wider argument the educational value of generative artificial intelligence and its influence on entrepreneurial skills and competencies.

The relevance of this issue gained importance with the rapid proliferation of GenAI technology. Unlike the past educational tools GenAI can generate texts, images, code, summaries, projects, and ideas through text interaction. Moreover, it can be used by students to unblock the influence of universities, which means that if it is adopted in a course it works outside the school. Therefore, the problem is not if the universities need to apply AI but how the educational process must be adjusted to the availability of AI. The World Economic Forum's Future of Jobs Report 2025 identifies technological change, including AI and big data, as a major driver of workforce transformation while emphasizing that creative thinking, resilience, flexibility and agility remain critical human capabilities. This combination of technological and human skills provides a strong rationale for competence centred entrepreneurship curricula.

### 1.1 Statement of the Research Problem

The central problem is that conventional entrepreneurship assignments can be completed with substantial AI assistance while giving educators limited evidence of what students themselves understand, decide or can defend. If the assessment rewards only

the final business plan or presentation, GenAI may increase the quality of the artefact without increasing opportunity recognition ability, experimentation skill or strategic judgement. A second problem is that emerging-economy institutions face uneven access to digital infrastructure, faculty readiness and capacity to governance. The third is the absence of a coherent framework connecting GenAI affordances with entrepreneurial learning outcomes and assessment.

### 1.2 Research Questions

RQ1. Which entrepreneurial skills can be strengthened through purposeful GenAI supported learning?
RQ2. How can instructors preserve human agency and critical judgement when students use general purpose GenAI?
RQ3. Which assessment practices can distinguish entrepreneurial learning from AI assisted task completion?
RQ4. What institutional abilities are required for responsible and scalable GenAI enabled entrepreneurship education in emerging economies?

## II. THEORETICAL FRAMEWORK

The paper combines four complementary perspectives. First, the digital entrepreneurial ecosystem views explain how digital affordances alter the cost, speed and characteristics of entrepreneurial action. Digital platforms can connect learners and nascent entrepreneurs to customers, mentors, data, finance and markets. Second, Kolb's experiential learning theory provides the pedagogical foundation: entrepreneurial knowledge develops through concrete experience, reflection, conceptualization and experimentation. Third, the human centered AI perspective places agency, accountability, ethics and critical judgement at the center of AI use. Fourth, the entrepreneurial competence perspective shifts attention from producing business documents to developing opportunity recognition, creativity, problem solving, experimentation, communication and decision making.

**Table 1. Theoretical perspectives underpinning the proposed framework**

| Perspective | Core proposition | Relevance to GenAI entrepreneurship education |
|---|---|---|
| Digital entrepreneurial ecosystem | Digital affordances reshape entrepreneurial activity. | Students learn to use AI as one resource within a wider entrepreneurial ecosystem. |
| Experiential learning | Experience and reflection transform action into learning. | AI use must be followed by testing, explanation, reflection and iteration. |
| Human-centred AI | Technology should augment rather than displace human agency. | Students remain accountable for decisions, evidence and ethical consequences. |
| Entrepreneurial competence | Entrepreneurship is demonstrated through action and judgement. | Assessment focuses on opportunity logic, experimentation, communication and defence. |

## III. RESEARCH METHODOLOGY

The study adopts a qualitative, conceptual and narrative review design. A narrative review is appropriate because the evidence base combines rapidly developing GenAI research, entrepreneurship-education scholarship, institutional practice and policy guidance. The purpose is not to estimate causal effect size but to synthesize concepts and derive an integrative framework that can guide curriculum and assessment design.

### 3.1 Sources of Evidence

The evidence base comprises three categories. The first consists of the supplied manuscript and its cited entrepreneurship-education literature on digital entrepreneurship, experiential learning, entrepreneurial ecosystems and sustainability. The second consists of institutional and multilateral sources, with particular attention to current OECD and UNESCO guidance on GenAI and education. The third consists of contemporary labour market evidence from the World Economic Forum. Foundational works such as Kolb (1984), Elkington (1997) and Nambisan (2017) are retained because they provide conceptual grounding rather than current trend evidence.

### 3.2 Analytical Procedure

- Find concepts that relate the use of GenAI with entrepreneurial learning.
- Group the features of GenAI by stages in entrepreneurship.
- Connect the features to competencies that learners develop and potential risks.
- Put together teaching and regulation conditions within a framework.
- Develop assessment implications and ideas for future research.

### 3.3 Scope and Limitation

The research does not present primary data from a student sample; thus, no measures of effect sizes or causal claims are being described. What is proposed is a set of conceptual relationships, the verification of which must be carried out using longitudinal, experimental, and comparative research methods.

## IV. LITERATURE REVIEW

### 4.1 Entrepreneurship Education and Competence Development

The concept of entrepreneurship education has changed its focus from the creation of a business plan to wider ideas like the principles of entrepreneurship, experiential learning, and creation of engaged citizens in the field of entrepreneurship. The present

article gives the readers information about the importance of the following points: creativity, opportunity recognition, incubation, industry interaction, innovation fairs, and project learning. This change is important because entrepreneurship involves making decisions in situations of uncertainty and not using already known solutions.

Kolb's four-phase model of experiential learning is the relevant theory for this situation. Entrepreneurial learning includes actions, observation of outcomes, reflection, and generalization. Thanks to modern technologies at each of these stages, the learning process can be both enriched and interrupted.

### 4.2 GenAI as a Cognitive Partner

GenAI can support entrepreneurship students in generating alternative customer problems, structuring market information, creating scenarios, drafting interview questions, developing prototypes and rehearsing pitches. Used appropriately, these functions can expand the range of alternatives considered by a learner. However, the same functions can create automation bias, fabricated evidence, overconfidence and reduced independent reasoning. OECD's 2026 synthesis specifically warns that general-purpose GenAI may enhance immediate task performance without producing equivalent learning gains when cognitive effort is outsourced.

### 4.3 AI Literacy and Ethical Competence

AI literacy for entrepreneurship extends beyond prompt engineering. Students need to understand limitations of generated content, evaluate evidence, recognize hallucinations, protect personal data, identify bias, respect intellectual-property considerations and disclose material AI assistance. UNESCO's framework identifies human-centered mindset and ethics alongside technical knowledge, and emphasizes critical judgement, transparency, privacy, accountability and inclusive and sustainable AI design.

### 4.4 Faculty Readiness

The teacher's role also changes. Faculty members increasingly become designers of learning environments in which AI is deliberately constrained, challenged or used as a feedback partner. UNESCO's AI Competency Framework for Teachers includes AI pedagogy and professional learning in addition to human centered and ethical competencies. This supports the argument that faculty readiness is an institutional condition rather than an optional professional development activity.

## V. PROPOSED HUMAN-CENTRED GENAI FRAMEWORK

The proposed framework treats GenAI as an enabling layer and entrepreneurial competence as the principal educational outcome. It combines five mechanisms: GenAI affordances, pedagogical design, human agency, authentic practice and process-based assessment. The framework responds directly to the concern that AI can produce high-quality outputs without equivalent learning.

**Figure 1. Human-centred GenAI-enabled entrepreneurial learning framework**

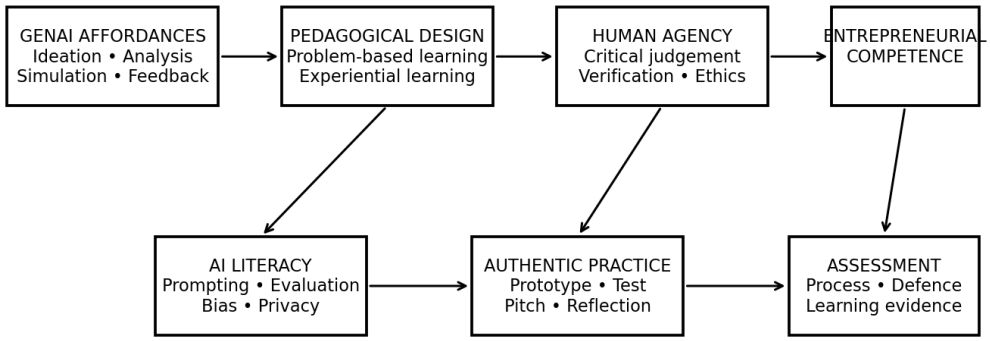


*Figure 1. Human centred GenAI-enabled entrepreneurial learning framework*

The framework begins with GenAI affordances such as ideation, analysis, simulation and feedback. These affordances become educationally valuable only when embedded in purposeful pedagogical design. Human agency functions as a boundary condition: learners must question outputs, verify evidence and retain responsibility for decisions. Authentic practice then converts AI-supported possibilities into prototypes, customer tests, pitches and reflections. Finally, process-based assessment makes learning visible.

**Table 2. Mapping GenAI affordances to entrepreneurial competence**

| GenAI affordance | Entrepreneurial use | Competence developed | Control required |
|---|---|---|---|
| Ideation | Generate alternative problems and value propositions | Creativity; opportunity recognition | Select and justify alternatives |
| Analysis | Structure market/competitor information | Analytical judgement | Verify sources and assumptions |
| Simulation | Model scenarios and customer objections | Adaptability; decision making | Explain assumptions and consequences |

| | | | |
|---|---|---|---|
| Prototype support | Assist text, image or code creation | Experimentation; execution | Maintain iteration/change log |
| Feedback | Challenge arguments and rehearse pitches | Communication; reflection | Defend final position independently |

### 5.1 AI Mediated Experiential Learning Cycle

The model suggests a cycle comprised of four phases: Frame, Augment, Verify and Reflect. During the first stage of Frame, students identify a real-life problem and gather original evidence on their own without using AI solutions. In the second stage of Augment, students employ AI to broaden their options or envision new scenarios. In the third stage of Verify, they compare outputs against primary sources, reliable texts and domain knowledge. Finally, at the last stage of Reflect, students note any changes or obstacles due to AI usage.

## VI. AI ENABLED PEDAGOGICAL APPLICATIONS

**Table 3. GenAI supported entrepreneurship learning activities**

| Learning activity | Purposeful AI role | Student-owned evidence | Principal risk |
|---|---|---|---|
| Customer discovery | Generate interview questions and themes | Interview records and interpretation | AI replacing primary research |
| Opportunity analysis | Generate alternatives and scenarios | Opportunity rationale | Generic opportunities |
| Market analysis | Organise datasets and compare assumptions | Source trail and calculations | False precision |
| Business model design | Suggest alternative models | Chosen model and justification | Uncritical adoption |
| Prototype sprint | Assist design, copy or code | Iterations and user tests | Copying without understanding |
| Pitch preparation | Challenge claims and simulate objections | Live defence and reflection | Polished but shallow pitch |

### 6.1 Customer Discovery and Opportunity Recognition

The process of customer discovery must stay rooted in genuine interactions. Although GenAI can aid student learning in writing interview questions, organizing notes or recognizing conflicting themes, it must not be perceived as an alternative to actual customer interactions. Students will have to specify which findings are based on empirical data and which arise from the use of AI. The latter enables students to achieve evidence-based opportunity identification, thus minimizing the chances of designing a venture based on fictitious customer demand.

### 6.2 Data-Driven Venture Analysis

Data literacy is becoming increasingly vital among students of entrepreneurship. AI may assist with cleaning and analyzing data as well as designing scenarios, but students must be able to explain the assumptions and limitations of their work. An effective classroom assignment may involve inviting students to conduct an analysis on their own without assistance from AI, compare the results of this analysis with the one produced with the help of AI and find the reasons for discrepancies.

### 6.3 Simulation and Scenario Learning

The strengths of simulation methodologies correspond to those of GenAI because such AI technologies are capable of generating shifts in the market, reactions from competitors, customer complaints and supply difficulties. Thus, students can make informed decisions and receive feedback. This extends the experiential learning emphasis in the supplied manuscript, which identifies simulations, hackathons, incubators and immersive learning as important contemporary pedagogies.

### 6.4 Prototype and Pitch Development

Low-fidelity prototyping can be sped up by AI as these artificial intelligence technologies assist learners with creating visuals, copy and ideas for interface or code. Nevertheless, the effectiveness of the prototypes has to be verified through the process of iteration and user feedback. The assessment of the pitch shall include a live Q&A session enabling the learners to prove their ownership of the assumptions and the decision making behind the AI-based creation.

## VII. ASSESSMENT REDESIGN IN THE GEN AI ERA

Assessment is the primary practical implication of the framework. If universities only assess final products, they may be able to provide recognition for effective AI use without ensuring any actual entrepreneurial learning occurred. The answer is not to ban GenAI. Instead, the task of assessment can be redesigned to make reasoning, experimentation, and reflection visible.

**Table 4. Proposed process oriented assessment architecture**

| Assessment component | Weight | Evidence expected |
|---|---|---|
| Problem framing and evidence | 15% | Customer/problem evidence and opportunity logic |
| Experimentation | 20% | Hypotheses, tests, failures and iterations |
| AI use and verification | 15% | AI-use log, source checking, rejected outputs |
| Prototype or venture artefact | 20% | Testable solution and user feedback |
| Pitch and oral defence | 15% | Live explanation and response to challenge |
| Individual reflection | 15% | What was learned, changed or rejected |

### 7.1 AI Disclosure and Verification Log

Learners should keep a brief record of their use of AI including the kind of tool used, reason for use, major prompts or interaction, accepted outputs and rejected outputs. The idea is not surveillance, but rather to make the student aware of his/her thinking process.

### 7.2 Oral Defence

A short personal oral defence can determine if a student knows and accepts the final project proposal. Questions can deal with customer proof, assumptions, unit economics, ethical risks, alternative options, and arguments for important choices. This means of measuring understanding plays an important role when written work may be mostly written with AI help.

## VIII. INSTITUTIONAL READINESS IN EMERGING ECONOMIES

Institutional preparedness is more than just getting an AI subscription. Universities need to make sure they have fast internet, equal access, trained teachers, coordinated curriculum, technical support, privacy protection, and academic integrity rules in place. The OECD's 2026 recommendations stress the need for equal access and efforts to give teachers autonomy.

**Table 5. Institutional willingness for components**

| Readiness dimension | Minimum capability | Possible indicator |
|---|---|---|
| Infrastructure | Connectivity and device access | Availability across learner groups |
| Faculty | AI pedagogy and assessment capability | Training and redesigned courses |
| Curriculum | Mapped AI and entrepreneurial competencies | Course-level curriculum map |
| Governance | Privacy, transparency and integrity rules | Published policy and reporting route |
| Equity | Alternatives where access gaps exist | Institutional tool access / low-bandwidth options |
| Ecosystem | Industry and incubator partnerships | Mentors, live projects and venture pathways |

## IX. CONCEPTUAL PROPOSITIONS AND DISCUSSION

P1: GenAI enhances entrepreneurial aptitude when it obtains its significance in experiential tasks calling for learner-driven choices.

P2: Higher quality performance in tasks involving general-purpose GenAI does not automatically imply the same level of learning unless students validate, justify, and contemplate what the AI output does.

P3: Process-based evaluation results will prove more useful than product-based evaluation in demonstrating the entrepreneurial competence in a GenAI-laden learning environment.

P4: Faculty readiness to use AI approaches in their pedagogical work will have a positive moderating effect on the link between GenAI use and the quality of learning outcomes.

P5: The rules of institutional governance related to access, confidentiality, transparency, and academic honesty will determine the viability of GenAI adoption in practice.

### 9.1 Discussion

The main contribution of the given study is moving toward the application of competence rather than technology-oriented approach to the use of AI in entrepreneurship education. GenAI should not be perceived either as the result of the education process or as a magic cure for problems of teaching entrepreneurship. Its value for education relies not on the technology itself but on the interplay of the technology, task design, human agency and assessment.

The framework is also relevant with regard to the developing economic situation. Educational institutions may not be able to use some AI technologies due to their limited access to paid tools, Internet connection, data and faculty knowledge. Thus, a responsible application of AI in education implies taking care of access by educational institutions, seeking cheap alternative solutions that will include low-speed Internet connection, case study examples in various languages and with regard to local context, personnel training system, and recommendations concerning privacy and academic integrity.

## X. IMPLICATIONS.

**10.1 Implications for Educators:** Teachers must restructure tasks focusing on real-world issues, raw evidence, experimentation, and self-reflection. AI must be given a clear duty such as challenger, simulator, creativity partner, or feedback assistant instead of treating it as an unlimited answer machine.

**10.2 Implications for Institutions and Policymakers:** Institutional heads should put together AI readiness plans that take into consideration aspects such as infrastructure, proficiency of faculty, evaluation protocol, governance and student services.
Policy makers must add training opportunities to tech purchases and ensure that innovations are accessible to everyone. The evidence presented by the World Economic Forum that both tech skills and human competencies will continue to be essential affirms the necessity to ensure that curricula are balanced, allowing AI fluency to coexist with creativity, resilience and analytical thinking ability.

## XI. FUTURE RESEARCH

- Longitudinal studies comparing AI-assisted and non-AI-assisted entrepreneurial learning.
- Experimental testing of process-based assessment and oral defence.
- Cross-institutional studies of GenAI readiness in emerging economies.
- Research on multilingual and low-bandwidth AI-enabled entrepreneurship education.
- Studies linking AI literacy to opportunity recognition, experimentation and venture outcomes.

## XII. CONCLUSION

GenAI creates a significant opportunity to redesign entrepreneurship education around experimentation, evidence, reflection and human judgement. Its benefits are conditional rather than automatic. When students outsource cognitive work, high-quality outputs may conceal weak learning. When AI is deliberately embedded in problem framing, augmentation, verification, authentic practice and reflection, it can become a powerful learning partner. The proposed human-centred framework therefore places entrepreneurial competence, learner agency and responsible judgement at the centre while treating technology as an enabling layer.

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