Reconstructing the Data-Driven Talent Development Chain in New Business Education: Competency Identification, Collaborative Incubation, and Outcome Optimization

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Abstract: This paper develops a conceptual framework for reconstructing the talent development chain in new business education through a data-driven approach. It treats talent training, project incubation, and venture development as one connected process rather than three separate activities. The framework centers on four linked tasks: competency identification, intelligent project recognition and targeted incubation, platform-based coordination, and multidimensional evaluation with iterative adjustment. The paper argues that effective reform depends on connecting capability development, resource matching, cross-actor collaboration, and long-term feedback within the same institutional system. It also stresses that educational data and AI should support human judgment rather than replace it. The study offers a practical framework for improving innovation and entrepreneurship talent development in new business education.

Keywords: New Business Education; Entrepreneurship Education; Data-Driven Governance; Business Incubation; Dynamic Capabilities; Learning Analytics; AI in Education

1. Introduction

New business education is being reshaped by digital transformation, the growing weight of entrepreneurship in economic renewal, and rising expectations that universities should contribute to innovation ecosystems. Under these conditions, a business school cannot rely on disciplinary teaching, isolated competitions, and end-point assessment alone. What matters is whether learning, project formation, incubation, and venture development are connected across time.

The literature offers useful foundations but still leaves the chain fragmented. Reviews show that entrepreneurship education often improves attitudes, self-efficacy, and related learning outcomes, yet much of the evidence remains short-cycle and self-reported (Nabi et al., 2017; Carpenter & Wilson, 2022). Other work has shown that entrepreneurship education creates outcomes at individual, institutional, and societal levels, which means that program design should not be reduced to start-up training alone (Wong & Chan, 2022). Competency frameworks such as EntreComp have widened the field further by treating entrepreneurship as a progressive competence rather than a narrow vocational skill (Bacigalupo et al., 2016).

Three disconnections remain common in practice. Many schools still lack a clear capability profile for new business talent. Teaching and incubation often run on separate tracks, so data generated during training are rarely used in later support. Evaluation is usually local and episodic, focusing on course satisfaction, competition awards, or start-up counts rather than on developmental continuity. This paper addresses these gaps by asking how new business education can reconstruct its talent development chain so that training, incubation, collaboration, and feedback operate within one coordinated system.

2. Literature Background and Analytical Gap

Research on entrepreneurship education has moved beyond the view that entrepreneurial ability is innate or reducible to business knowledge. The field now emphasizes learning, action, identity, and context. Nabi et al. (2017) and Carpenter and Wilson (2022) both show that the field has grown rapidly, while also noting uneven evidence on mechanisms and long-term effects. Wong and Chan (2022) similarly demonstrate that learning outcomes are layered and cannot be captured by a single indicator.

The competency perspective offers an important advance. EntreComp defines entrepreneurship as

the ability to act on opportunities and ideas to create value for others, and it organizes that competence around ideas and opportunities, resources, and action (Bacigalupo et al., 2016). For new business education, this framing is useful because it can absorb digital literacy, interdisciplinary coordination, value creation, and responsible judgment within the same developmental logic. Yet competence frameworks do not automatically solve the break between classrooms and incubators.

The incubation literature clarifies why this break matters. Venture teams require different combinations of space, mentoring, knowledge, legitimacy, and market connection. Technology-based ventures often need proof-of-concept support and specialized expertise, while creative or service-oriented ventures may require leaner financing and broader business guidance (Nicholls-Nixon et al., 2024). Incubators also create value through networking and cooperation rather than through physical resources alone (Bøllingtoft, 2012). Selection and support therefore need to be tied to more precise knowledge of team capability, project trajectory, and ecosystem fit.

Digitalization expands that possibility. Platform-based environments can support entrepreneurial learning while generating useful records of participation, iteration, and feedback (Tóth-Pajor et al., 2023). Once those records are linked with course outputs, mentoring interactions, and external validation, incubation can become more targeted. At the same time, educational data systems bring governance challenges involving privacy, accountability, transparency, and human oversight (Pardo & Siemens, 2014; Miao & Holmes, 2023). The unresolved issue is not a lack of separate studies on education, incubation, or data. It is the lack of an integrated framework that connects them.

3. The Logic of Chain Reconstruction

The framework proposed here rests on three linked assumptions. Entrepreneurial capability develops through repeated movement between learning and action rather than through one-off exposure. Universities in innovation ecosystems must coordinate internal and external resources instead of acting as teaching providers only. Data are valuable when they improve interpretation and intervention, not when they become a substitute for judgment.

From this perspective, the talent development chain contains four connected parts. Capability identification clarifies what students and teams can do and where their developmental potential lies. Project recognition and targeted incubation determine which projects should move forward and what kind of support they need. Platform coordination links teaching, incubation, and external collaboration. Outcome evaluation identifies where the chain is producing value and where adjustment is needed.

This is not a rigid sequence. Students move back and forth across stages. Course assignments become project prototypes. Incubation feedback exposes missing competencies. External collaboration reshapes both teaching content and venture direction. The chain is therefore better understood as a circulation system than as a straight line.

The dynamic capabilities perspective helps explain this circulation. Teece, Pisano, and Shuen (1997) argue that organizations must sense opportunities, seize them, and reconfigure resources as conditions change. Heaton, Siegel, and Teece (2019) apply this logic to universities in innovation ecosystems. For new business education, the implication is that a university must coordinate knowledge, mentoring, infrastructure, and external relationships over time. The chain becomes the organizational form through which this coordination occurs.

4. Capability Profiling and Targeted Incubation

A workable chain begins with a dynamic capability portrait. This is not a personality label or a single score. It is a structured view of what a learner or team can currently do, where the gaps lie, and what kinds of project environments or support arrangements are most suitable.

For new business education, the portrait should include opportunity recognition, problem framing, user and market insight, digital and data literacy, business model design, resource orchestration, collaborative execution, and ethical responsibility. No single course or competition can capture all of these. Relevant evidence may come from course work, project proposals, reflective writing, peer collaboration, mentor comments, internship feedback, and platform traces.

The value of profiling lies in pattern recognition. One student may be strong in market sensitivity but weak in execution. Another may appear average in class yet learn rapidly in a live project.

A team may have creativity without coordination, or strong technical ability without external communication. Incubation decisions are more reliable when based on these configurations rather than on undifferentiated rankings.

Project recognition should therefore ask not whether a project is simply "good," but whether it is viable under a particular support arrangement. A targeted mechanism needs to examine problem significance, team complementarity, learning agility, resource readiness, and ecosystem fit. Some projects need legal and financial scaffolding, some need customer discovery and prototype testing, and some need technical validation before any serious market push. AI can assist by comparing trajectories across past projects and recommending support bundles, but interpretation and final decisions should remain reviewable by faculty and mentors.

5. Platform Coordination and Resource Configuration

A reconstructed chain needs an infrastructure capable of carrying information and coordinating action across teaching, incubation, and venture development. Here the platform is not just a dashboard. It is an institutional arrangement linking actors, data, and decisions.

This arrangement can be understood through four layers. The data layer integrates learning records, project documents, mentoring interactions, partner information, and longitudinal outcomes. The analytics layer supports capability profiling, project recognition, matching, and diagnosis. The service layer connects students and teams with courses, incubator services, mentors, enterprises, competitions, and funding channels. The governance layer defines permissions, accountability, and ethical limits.

The value of the platform lies in coupling. Course outputs should feed directly into incubation review. Mentor feedback should reshape training content. Alumni venture trajectories should help schools understand which competencies matter later. Without this circulation, institutions only digitize fragmentation.

Resource configuration is the practical core of this platform logic. New business education depends on heterogeneous resources: faculty expertise, mentoring time, incubation space, alumni networks, enterprise problems, policy information, and financial support. These resources create value only when combined around project needs and developmental timing. The same mentor or funding opportunity may help one project and hinder another, depending on when and how it is introduced. Targeted incubation therefore requires a relational and time-sensitive configuration logic rather than fixed packages.

6. Outcome Evaluation and Governance Boundaries

A chain-based model requires broader evaluation than course grades, competition awards, incubator entry, or firm registration. Those indicators capture single moments rather than the quality of the chain itself. Evaluation should follow students and projects across stages.

At the learning level, schools should assess changes in entrepreneurial competence, interdisciplinary problem solving, digital judgment, and reflective learning. At the incubation level, useful signals include the quality of mentor response, the speed and direction of project revision, and the fit between resources and needs. At the venture level, more appropriate indicators include prototype progress, customer validation, partnership formation, and movement through developmental milestones. At the ecosystem level, universities should examine whether the chain strengthens external collaboration and produces cumulative innovation effects.

The aim of evaluation is diagnosis rather than premature elimination. A project that fails commercially may still carry substantial educational value. A student who does not found a venture during university may later become an entrepreneurial manager or innovator. Long-cycle tracking is therefore essential.

The limits of AI-enabled talent development must also be stated clearly. Not everything that matters in entrepreneurship can be captured by digital traces. Judgment, resilience, credibility, and timing remain partly situational. Overreliance on observable behavior may privilege visible activity over meaningful learning. Institutions must also justify the data they collect, explain how those data are used, and provide channels through which students can question algorithmic inferences (Pardo & Siemens, 2014; Miao & Holmes, 2023). Digital tools can strengthen coordination, but they cannot substitute for institutional agreement on

roles, standards, and feedback responsibilities.

The challenge facing new business education is not simply to add more entrepreneurship courses or expand incubator services. It is to reorganize the full chain through which capability is formed, projects are recognized, resources are configured, and outcomes are assessed. Existing research already provides the key ingredients: entrepreneurship can be cultivated as a competence; incubation works best when support is differentiated; universities need dynamic capabilities within innovation ecosystems; and educational data systems require ethical limits. What remains difficult is connecting these insights within a workable institutional model.

The framework developed here addresses that difficulty by treating capability profiling, targeted incubation, platform coordination, and multidimensional evaluation as mutually dependent parts of the same system. Its central claim is straightforward. Data and AI can improve entrepreneurial talent development only when they are embedded in a human-centered and developmentally informed institutional structure. The more consequential reform, then, is not the adoption of a single tool. It is the reconstruction of the chain itself.

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References

[1]Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). EntreComp: The entrepreneurship competence framework. Publications Office of the European Union. https://joint-research-centre.ec.europa.eu/entrecomp-entrepreneurship-competence-framework_en

[2]Bøllingtoft, A. (2012). The bottom-up business incubator: Leverage to networking and cooperation practices in a self-generated, entrepreneurial-enabled environment. Technovation, 32(5), 304-315.

[3]Carpenter, A., & Wilson, R. (2022). A systematic review looking at the effect of entrepreneurship education on higher education student. The International Journal of Management Education, 20(2), 100541.

[4]Heaton, S., Siegel, D. S., & Teece, D. J. (2019). Universities and innovation ecosystems: a dynamic capabilities perspective. Industrial and Corporate Change, 28(4), 921-939.

[5]Miao, F., & Holmes, W. (2023). Guidance for generative AI in education and research. UNESCO. https://www.unesco.org/en/articles/guidance-generative-ai-education-and-research

[6]Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. Academy of management learning & education, 16(2), 277-299.

[7]Nicholls-Nixon, C. L., Singh, R. M., Hassannezhad Chavoushi, Z., & Valliere, D. (2024). How university business incubation supports entrepreneurs in technology-based and creative industries: A comparative study. Journal of Small Business Management, 62(2), 591-627.

[8]Pardo, A., & Siemens, G. (2014). Ethical and privacy principles for learning analytics. British journal of educational technology, 45(3), 438-450.

[9]Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic management journal, 18(7), 509-533.

[10]Tóth-Pajor, Á., Bedő, Z., & Csapi, V. (2023). Digitalization in entrepreneurship education and its effect on entrepreneurial capacity building. Cogent Business & Management, 10(2), 2210891.

[11]Wong, H. Y., & Chan, C. K. (2022). A systematic review on the learning outcomes in entrepreneurship education within higher education settings. Assessment & Evaluation in Higher Education, 47(8), 1213-1230.

