ISA Journal of Business, Economics and Management (ISAJBEM)

Homepage: https://isapublisher.com/isajbem/

Volume 3, Issue 5, Sept-Oct, 2026 ISSN: 3049-1835

University Entrepreneurship as a Dynamic and Evolutionary Process: A Multiple-Case Study in Jordan[1]

Ngo Minh Trung

Institute of South Asian, West Asian and African studies

Accepted: 13.09.2026 | **Published:** 17.09.2026

***Corresponding Author:** Ngo Minh Trung

DOI: *10.5281/zenodo.22809883*

Abstract **Original Research Article**

Universities are increasingly expected to contribute to entrepreneurial ecosystems, yet existing models of the entrepreneurial university provide limited explanation of how entrepreneurial initiatives develop and evolve, particularly in resource-constrained developing-country contexts. This study examines university entrepreneurship as a dynamic and evolutionary process by integrating the dynamic capabilities perspective with evolutionary mechanisms of entrepreneurial ecosystems. Drawing on a multiple-case study of four universities in Jordan and 32 interviews, the study explores how universities develop and adapt entrepreneurial initiatives through interaction with their surrounding ecosystems. The findings show that university entrepreneurship evolves through interconnected processes of sensing, seizing, and transforming. Universities identify ecosystem needs and assess internal capabilities, select opportunities that fit their resources and strategic priorities, and reconfigure internal and external resources to implement entrepreneurial initiatives. These initiatives subsequently generate feedback, selection, and adaptation, leading universities to refine their activities and renew the sensing process. The study further shows that universities follow different entrepreneurial trajectories rather than converging toward a single entrepreneurial-university model. By integrating dynamic capabilities with an evolutionary ecosystem perspective, the study conceptualizes university entrepreneurship as an iterative and co-evolutionary process shaped by institutional capabilities and ecosystem interactions. The findings offer theoretical and practical implications for understanding university entrepreneurship in developing-country contexts.

Keywords: university entrepreneurship; entrepreneurial ecosystems; dynamic capabilities; evolutionary mechanisms; entrepreneurial university; Jordan.

1. Introduction

Universities are increasingly recognized as important actors in entrepreneurial ecosystems (EEs). Beyond their traditional missions of teaching and research, universities contribute to entrepreneurship through entrepreneurship education, knowledge transfer, incubation and acceleration, technology commercialization, and collaboration with industry,

[1]Bài viết này là sản phẩm của nhiệm vụ khoa học cấp cơ sở "Nghiên cứu hệ sinh thái khởi nghiệp tại Jordan" do ThS. Ngô Minh Trung làm chủ nhiệm, Viện nghiên cứu Nam Á, Tây Á và Châu Phi

government, investors, and other ecosystem actors (Etzkowitz et al., 2000; Rice et al., 2014; Hayter et al., 2018). Through these activities, universities can mobilize knowledge, human capital, infrastructure, and networks to support entrepreneurial activity and regional development.

However, much of the literature on entrepreneurial universities and university-based entrepreneurial ecosystems has been developed in advanced economies. Existing models often emphasize structures such as technology transfer offices, science parks, spin-offs, and commercialization activities. Universities in developing countries operate under different conditions, including resource limitations, regulatory constraints, weaker university–industry relationships, and less developed entrepreneurial support structures. In Jordan, for example, resource-intensive mechanisms such as technology transfer and university spin-offs remain relatively limited, while universities rely more extensively on entrepreneurship education, incubation, networking, and other forms of entrepreneurial support. Consequently, established entrepreneurial-university models may not fully explain how universities in such contexts actually develop their entrepreneurial roles.

A further limitation is that university entrepreneurship is frequently examined through relatively static organizational characteristics or predefined models, providing less explanation of how entrepreneurial initiatives emerge, change, and adapt over time. Yet entrepreneurial ecosystems are dynamic and interdependent systems in which universities continuously interact with entrepreneurs, firms, government, investors, and support organizations (Roundy, Bradshaw, & Brockman, 2018). Understanding university entrepreneurship therefore requires attention both to the internal processes through which universities develop initiatives and to the ecosystem mechanisms through which those initiatives subsequently evolve.

To address this gap, this study combines dynamic capabilities (Teece, 2007, 2018) with an evolutionary entrepreneurial ecosystem perspective (Kantis & Federico, 2020; Roundy et al., 2018). Dynamic capabilities—sensing, seizing, and transforming—explain how universities identify opportunities, commit resources, and reconfigure their activities, while feedback, selection, and adaptation explain how interaction with the ecosystem influences their subsequent development. Drawing on a multiple-case study of four universities in Jordan, this study asks: How do universities develop and adapt entrepreneurial initiatives through their interaction with the entrepreneurial ecosystem?

The study contributes by conceptualizing university entrepreneurship as a dynamic and evolutionary process rather than a fixed organizational state. It shows how universities develop different entrepreneurial trajectories according to their resources and capabilities and how ecosystem feedback subsequently stimulates learning and adaptation. In doing so, the study provides a process-based and context-sensitive explanation of university entrepreneurship that is particularly relevant to developing-country environments.

2. Theoretical background

2.1. Universities in Entrepreneurial Ecosystems

Universities are increasingly recognized as central actors in entrepreneurial ecosystems (EEs). Beyond their traditional missions of teaching and research, universities contribute to entrepreneurship and regional development through knowledge creation and transfer, human capital development, entrepreneurship education, technology commercialization, and engagement with external stakeholders (Etzkowitz et al., 2000; Hayter et al., 2018; Rice et al., 2014). Accordingly, universities are not isolated institutions but interact with entrepreneurs, industry, government, investors, and support organizations within the broader ecosystem.

These interactions are facilitated through entrepreneurial initiatives such as entrepreneurship education, technology transfer offices, incubators and accelerators, science parks, and formal and informal networks (Sherwood, 2018; Prokop, 2022). Through these mechanisms, universities can connect entrepreneurs with investors, mentors, knowledge, and other resources while contributing to the development of entrepreneurial skills and support

structures.

However, existing models of entrepreneurial universities and university-based entrepreneurial ecosystems have largely been developed in advanced economies. Universities in developing countries often operate under resource, institutional, and regulatory constraints, limiting their ability to reproduce these models directly. Consequently, their entrepreneurial initiatives are better understood as context-dependent and adaptive, shaped by available resources, institutional capabilities, and interactions with the surrounding entrepreneurial ecosystem.

2.2. Dynamic Capabilities and University Entrepreneurship

Dynamic capabilities provide a useful perspective for understanding how universities develop entrepreneurial initiatives under changing and uncertain conditions. They refer to an organization's capacity to integrate and reconfigure internal and external competencies in response to environmental change (Teece et al., 1997; Teece, 2007, 2018). This perspective is particularly relevant to universities, which must respond to technological change, policy shifts, competition, and evolving ecosystem demands while working within their own resource and organizational constraints (Heaton et al., 2019; Leih & Teece, 2016).

Dynamic capabilities comprise three interrelated processes: sensing, seizing, and transforming. Sensing involves identifying environmental changes and opportunities while assessing internal resources and capabilities. Seizing concerns evaluating these opportunities and allocating resources to selected entrepreneurial initiatives. Transforming involves implementing organizational changes, reconfiguring resources, and fostering continuous learning and adaptation (Teece, 2007, 2018). In university entrepreneurship, these capabilities explain how institutions move from recognizing ecosystem needs to selecting and implementing initiatives that fit their particular capacities and contexts.

Thus, dynamic capabilities shift attention from what an entrepreneurial university should possess to how universities develop and adapt entrepreneurial initiatives over time, providing a process-oriented explanation particularly suited to resource-constrained and uncertain environments.

2.3. Entrepreneurial Ecosystems as Evolutionary Contexts

Entrepreneurial ecosystems are not static structures but complex, adaptive, and evolving systems characterized by interdependence among their actors (Cho et al., 2022; Roundy et al., 2018). From an evolutionary perspective, two mechanisms are particularly important: feedback loops and adaptation. Feedback loops capture the continuous exchange of information and resources among ecosystem actors, while adaptation reflects how actors adjust their activities in response to changing conditions and ecosystem needs.

For universities, these mechanisms create a reciprocal relationship with the entrepreneurial ecosystem. University initiatives influence ecosystem development, while feedback from entrepreneurs, industry, government, and other stakeholders shapes subsequent university actions. Through this interaction, universities learn from experience and adapt their programs, resources, and support mechanisms to changing ecosystem demands.

Combined with dynamic capabilities, this evolutionary perspective explains both how universities internally develop entrepreneurial initiatives and how these initiatives co-evolve with the surrounding ecosystem, providing a dynamic alternative to static models of entrepreneurial universities.

3. Method

3.1. Research Design and Case Selection

This study adopted a qualitative multiple-case study design to examine how universities develop and adapt entrepreneurial initiatives within an evolving entrepreneurial ecosystem. Jordan provides an appropriate empirical context because universities operate within a developing entrepreneurial

ecosystem characterized by resource constraints, institutional change, and interdependence among multiple ecosystem actors.

Four Jordanian universities were selected to capture variation in institutional characteristics and approaches to entrepreneurship: the University of Jordan (UJ), Jordan University of Science and Technology (JUST), Luminus Technical University College (LTUC), and Al Hussein Technical University (HTU). The sample included both traditional and specialized universities, enabling comparison across different organizational structures, resource configurations, and entrepreneurial orientations. The unit of analysis was the process through which universities develop and adapt entrepreneurial initiatives in interaction with the surrounding entrepreneurial ecosystem.

3.2.Data Collection

Data were collected through 32 semi-structured, in-depth interviews conducted over a 12-month period. Participants were purposively selected based on their direct involvement in university entrepreneurship or the Jordanian entrepreneurial ecosystem. The sample included university leaders and academics (13 interviews), individuals involved in university-based incubators and accelerators (10 interviews), and external ecosystem stakeholders (9 interviews), including government representatives, investors, support organizations, and student entrepreneurs.

Interviews lasted approximately 60–120 minutes and were conducted via Microsoft Teams. With participants' consent, interviews were video-recorded, translated, and transcribed verbatim. Several follow-up interviews were conducted to clarify and elaborate on emerging issues, and transcripts were shared with participants for verification.

Interview data were supplemented by documentary sources, including government entrepreneurial ecosystem strategies, university strategies and plans, organizational websites, and relevant news materials. These additional sources were used to contextualize and triangulate the interview evidence.

3.3.Data Analysis

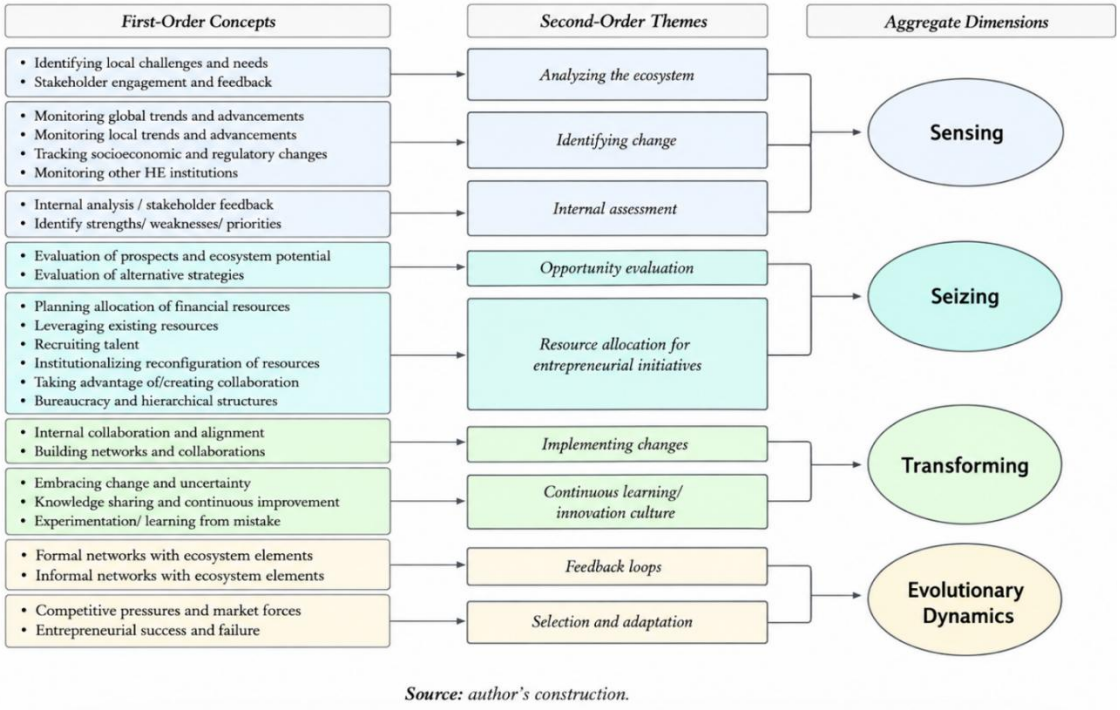
Data were analyzed following the Gioia methodology (Gioia et al., 2013). This approach was selected because it provides a systematic process for developing theoretical insights from qualitative data while maintaining a clear connection between participants' accounts and researcher interpretations. The analysis progressed through three stages: first-order concepts, second-order themes, and aggregate dimensions.

First, the interview data were coded using terms that remained close to participants' accounts. Similar concepts were then compared within and across cases and grouped into second-order themes representing broader organizational processes. Finally, these themes were consolidated into higher-order theoretical dimensions through iterative comparison between the empirical evidence and relevant literature.

The analysis identified three aggregate dimensions corresponding to the dynamic capabilities framework: sensing, seizing, and transforming (Teece, 2007). Sensing captured how universities identified and interpreted environmental and organizational changes; seizing concerned the evaluation of opportunities and mobilization of resources; and transforming captured organizational reconfiguration, implementation, and continuous learning.

Further analysis identified feedback loops and selection and adaptation as mechanisms through which entrepreneurial initiatives continued to evolve in interaction with the ecosystem. These mechanisms captured how ecosystem feedback informed subsequent evaluation, resource allocation, and adjustment of university entrepreneurial initiatives (Kantis & Federico, 2020; Roundy et al., 2018).

Figure 1. Gioia Data Structure



Source: *author's construction.*

3.4. Research Trustworthiness

Several procedures were used to enhance the trustworthiness of the study (Flint et al., 2002). First, evidence was triangulated across participants, university cases, and documentary sources. The sample also included participants from different organizational levels and external ecosystem stakeholders, allowing university accounts to be compared with perspectives from the wider entrepreneurial ecosystem.

Second, member checking was conducted by sharing interview transcripts and emerging findings with participants. Participants were subsequently presented with a summary of the analysis and conceptual model to assess whether the interpretations adequately reflected their experiences.

Third, two research colleagues acted as external auditors by reviewing the analysis and emerging interpretations. Their feedback was incorporated into subsequent analytical refinement. Together, member checking, triangulation, cross-case comparison, and external review strengthened the credibility, dependability, and confirmability of the study.

4. Findings

4.1. Descriptive Overview of the Cases

The four university cases vary in institutional profile, resource availability, organizational flexibility, and approaches to entrepreneurship. The two traditional universities are relatively larger and possess broader academic and research resources, but their entrepreneurial activities are embedded in more bureaucratic organizational structures. In contrast, the two specialized universities operate with comparatively constrained resources but exhibit greater flexibility in responding to emerging entrepreneurial opportunities. Table 2 provides a descriptive comparison of the four cases and illustrates the diversity of entrepreneurial initiatives across the sample.

Table 1. Descriptive Overview of the University Cases

Characteristics	Case A	Case B	Case C	Case D
University profile	Large, traditional	Large, traditional	Smaller, specialized	Smaller, specialized
Resource base	Relatively extensive	Relatively extensive	More constrained	More constrained
Organizational flexibility	Relatively low	Relatively low	Relatively high	Relatively high
Entrepreneurship education	x	x	x	x
Incubation/acceleration	x	x	x	x
Industry collaboration	x	x	x	x
Technology transfer	Limited	Limited	Limited	Limited
External networking	Extensive	Extensive	Targeted	Targeted
Interviewees (n)	8	8	8	8

4.2. Sensing: Recognizing Ecosystem Needs and Internal Capabilities

Across the four cases, entrepreneurial initiative development began with a sensing process through which universities interpreted changes in the external environment and assessed their internal capacity to respond. Three recurring activities were identified: recognizing local and global changes, analysing the local entrepreneurial ecosystem, and assessing internal resources and capabilities. This reflects sensing as the capacity to identify and interpret environmental changes and their strategic implications (Teece, 2007; Heaton, Lewin, & Teece, 2020; Leih & Teece, 2016).

Externally, universities monitored market and technological trends, government policies, industry developments, and emerging ecosystem needs. Such environmental scanning was particularly important in the Jordanian context, where resource limitations, regulatory conditions, and market uncertainty shaped the opportunities available to universities (Cao & Shi, 2021). At the same time, universities examined their own expertise, infrastructure, networks, and organizational resources before determining where they could contribute most effectively. As one interviewee explained:

> *"We look at the university and our strengths. We know that among public universities, our medical and engineering graduates have the highest employability. We also have some leading researchers in those fields. We have advanced infrastructure with workshops and technical staff. So, we have certain strengths to focus on rather than investing in initiatives that are more difficult to implement."*

This alignment between ecosystem opportunities and internal capabilities varied across the cases. Specialized universities tended to identify narrower opportunities aligned with their institutional expertise, whereas traditional public universities considered broader trajectories supported by larger budgets, research facilities, and faculty networks. Overall, sensing therefore involved matching ecosystem needs with university-specific strengths and constraints, creating the basis for deciding which entrepreneurial opportunities should subsequently be pursued.

4.3. Seizing: Evaluating Opportunities and Allocating Resources

Following sensing, universities moved from recognizing opportunities to evaluating alternative trajectories and committing resources to selected entrepreneurial initiatives. The cases show that universities did not attempt to address every ecosystem need. Instead, they evaluated opportunities against their strategic objectives, institutional expertise, available resources, and perceived ecosystem potential before selecting a feasible path (Heaton, Lewin, & Teece, 2020; Bedo, Erdos, & Pittaway, 2020; Stam & van de Ven, 2021).

Clear differences emerged between specialized and traditional universities. The two specialized universities pursued more focused trajectories: LTUC developed a manufacturing-oriented accelerator, while HTU concentrated its incubation and acceleration activities on technology-based start-ups. In contrast, the traditional public universities adopted broader approaches, including general incubation, entrepreneurship courses, mentoring, and technical support. One interviewee described the rationale for specialization:

> *"…we decided to focus our incubator on technology startups for two main reasons. First, we saw the potential of technology to drive the country's economic growth. Technology is easier to export and Jordan has very strong IT human capital. Second, specializing in technology startups fits the university's expertise…"*

Once a trajectory was selected, seizing involved committing and reconfiguring financial, human, physical, and relational resources. Resource allocation differed across the cases. HTU and LTUC invested substantially in specialized teams and non-financial support services, whereas JUST relied more heavily on existing facilities and faculty expertise while providing seed funding, patent support, and prototyping facilities. UJ implemented similar incubation activities but did not directly finance incubated ventures. Universities also leveraged external networks to complement resource limitations through partnerships with firms, investors, government agencies, and international actors (Leih & Teece, 2016; Roundy & Fayard, 2019).

Thus, seizing was characterized by selective commitment rather than uniform expansion: universities pursued entrepreneurial initiatives that matched both ecosystem opportunities and their distinctive resource configurations.

4.4. Transforming: Implementing and Reconfiguring

Transforming concerned how universities implemented selected initiatives and reconfigured organizational arrangements to sustain them. Across the cases, implementation required stronger internal coordination, external collaboration, and continuous organizational learning (Heaton, Lewin, & Teece, 2020; Leih & Teece, 2016).

Internally, entrepreneurial initiatives required collaboration across university leadership, faculties, administrative units, and entrepreneurship centers. Such coordination enabled universities to combine expertise, facilities, training, mentoring, and other resources that were previously dispersed across the institution (Golgeci et al., 2019; Pinheiro & Stensaker, 2014). As one participant noted:

> *"Everyone was involved when the entrepreneurial initiatives started to be implemented, and that continues today. From the university president to us—the faculty members… Other faculties also coordinate with each other. We are all aligned and working toward a common goal."*

External networks were equally important. All four universities relied on relationships with businesses, government agencies, investors, community organizations, and other universities to obtain resources and expertise that could not always be developed internally. This dependence was particularly evident in incubation and acceleration activities:

> *"Networks? The accelerator could not operate without networks. Funding, experts, entrepreneurs and mentors, faculty and students, civil society organizations, our*

international networks…"

Transformation also involved continuous learning and adaptation. Universities reported experimenting with new approaches, sharing knowledge, accepting uncertainty, and learning from unsuccessful initiatives. The specialized universities appeared particularly willing to accept uncertainty and experiment with more complex entrepreneurial initiatives. As one interviewee reflected:

> *"The biggest mistake I ever made was investing in some projects… We keep moving forward and focus more on technology. We are still learning."*

Overall, transforming extended beyond the implementation of individual programs. It involved reconfiguring internal relationships, mobilizing external networks, and embedding continuous learning into entrepreneurial activities. These processes also generated new information and experiences from the ecosystem, creating the feedback and adaptation mechanisms examined in the following section

4.5. Feedback Loops and Adaptation

The findings indicate that university entrepreneurship did not end with the implementation of entrepreneurial initiatives. Rather, universities remained in continuous interaction with the entrepreneurial ecosystem, where feedback loops and selection and adaptation mechanisms shaped the subsequent development of their initiatives (Kantis & Federico, 2020; Roundy, Bradshaw, & Brockman, 2018). These mechanisms operated throughout sensing, seizing, and transforming, linking internal university processes to changes in the wider ecosystem.

Feedback occurred through both formal and informal networks involving entrepreneurs, industry, government, investors, mentors, and other support organizations. Formal partnerships provided structured channels for collaboration and knowledge exchange, while informal relationships enabled more flexible exchanges of experiences and emerging information (Daniel et al., 2022; Horak, 2022; Roundy, Bradshaw, & Brockman, 2018). Through these interactions, universities received information about changing entrepreneurial needs and used it to refine their programs and support mechanisms.

Adaptation was also driven by market conditions, competitive pressures, technological developments, and, importantly, the successes and failures of supported ventures. Universities observed these outcomes and adjusted their support accordingly. One interviewee illustrated how experience with both successful and unsuccessful ventures changed subsequent selection practices:

> *"…one of the things we learned from ones that succeed and ones that fail is to predict their success probability, and their ability to sustain a business. We predict that based on our analysis of the founding team! Now, we and mainly the investors have a condition that you must at least have two cofounders. One on the technical side and one on the business side."*

Similarly, unsuccessful investments could redirect the strategic focus of entrepreneurial initiatives:

> *"…the biggest mistake I've made is investing in [certain projects] and we found after that they're just not going to get anywhere soon. It wasn't a problem with the entrepreneurs. It was a problem with the ecosystem and the market.… We moved on and focused more on technology. We are still learning."*

Thus, entrepreneurial successes and failures were not merely outcomes; they became inputs for subsequent university adaptation. Feedback from the ecosystem informed learning, refinement, and renewed opportunity recognition, making university entrepreneurship an iterative rather than linear process.

4.6. Cross-Case Process Model

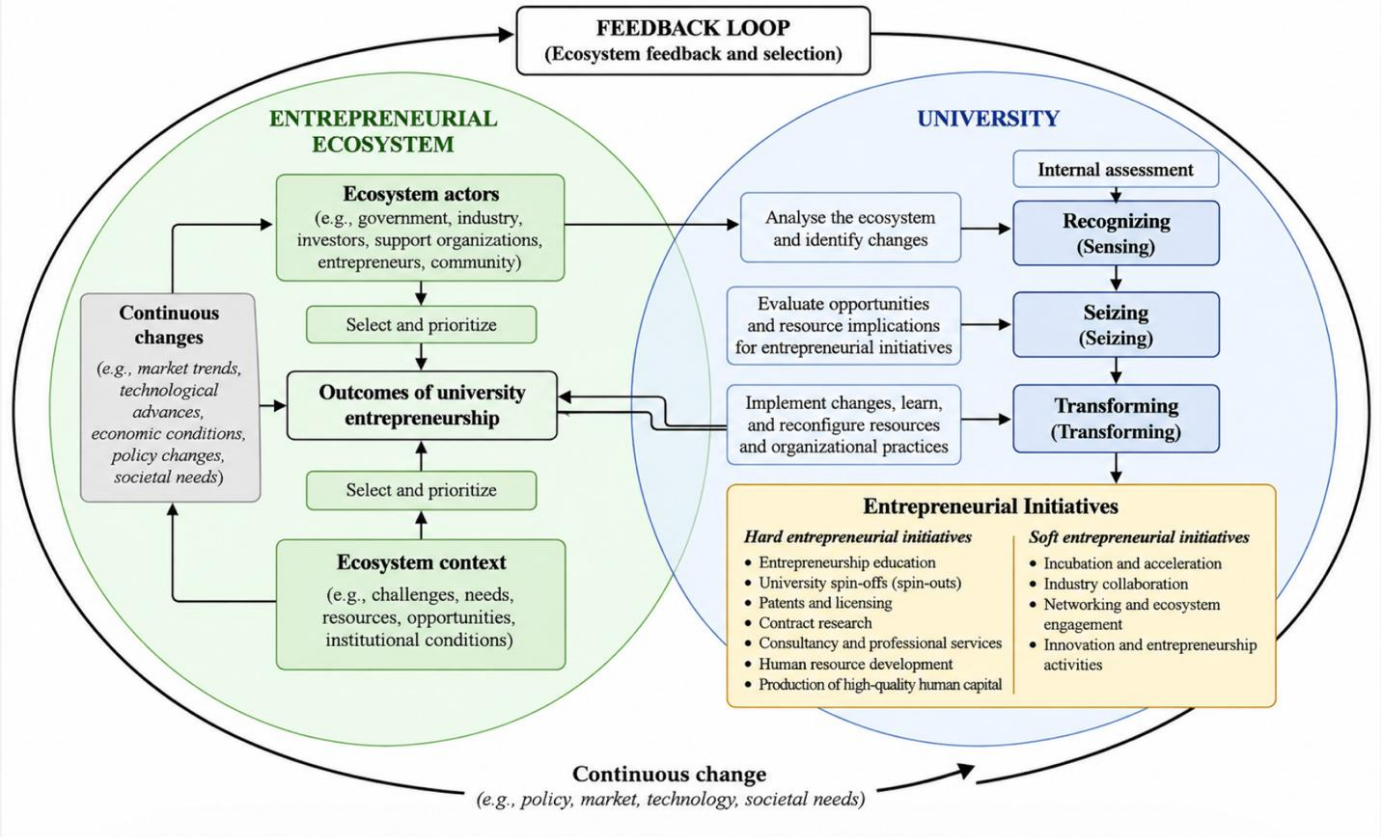
The four cases reveal a common process through which universities developed entrepreneurial initiatives while following different institutional trajectories. The process began with sensing, as universities interpreted ecosystem changes and assessed their internal capabilities. Through seizing,

they evaluated alternative opportunities and committed resources to initiatives that aligned with their institutional strengths. Transforming then involved implementing these initiatives, coordinating internal resources, mobilizing external networks, and developing organizational learning capabilities. The analysis therefore suggests that dynamic capabilities explain the internal processes through which universities develop entrepreneurial initiatives.

However, the process was not sequential in a strictly linear sense. Once initiatives interacted with the entrepreneurial ecosystem, formal and informal feedback, market forces, competition, and entrepreneurial successes and failures generated new information. Universities interpreted this information and adapted their programs, resource commitments, and strategic priorities, which could trigger renewed sensing and subsequent rounds of seizing and transforming.

This model suggests that university entrepreneurship in developing-country contexts is best understood as a dynamic and evolutionary process rather than the implementation of a predetermined entrepreneurial-university model. Dynamic capabilities explain how universities internally recognize, select, and implement entrepreneurial opportunities, whereas evolutionary mechanisms explain how universities and their surrounding ecosystems continually influence and adapt to one another. This interpretation is consistent with the dissertation's cross-case finding that no single entrepreneurial-university archetype emerged; instead, universities followed distinct trajectories involving discovery, commitment, adaptation, and transformation.

Figure 2. Dynamic and Evolutionary Process of University Entrepreneurship



5. Discussion

The findings show that university entrepreneurship is a dynamic and evolutionary process rather than the adoption of a predefined entrepreneurial-university model. Across the four cases, entrepreneurial initiatives developed through sensing, seizing, and transforming, supporting the relevance of dynamic capabilities for explaining how universities recognize opportunities, allocate resources, and reconfigure their activities (Teece, 2007, 2018; Leih & Teece, 2016; Heaton, Lewin, & Teece, 2020). However, universities followed different trajectories according to their resources, expertise, networks, and organizational characteristics, reinforcing the absence of a single entrepreneurial-university archetype.

The findings further show that university entrepreneurship cannot be explained solely through internal organizational capabilities. Universities continuously interact with entrepreneurs, industry, government, investors, and other ecosystem actors. These interactions create feedback loops through which information, knowledge, and experience influence the subsequent development of entrepreneurial initiatives (Kantis & Federico, 2020; Roundy, Bradshaw, & Brockman, 2018). Market changes and entrepreneurial successes and failures further generate selection and adaptation, encouraging universities to refine their programs, resource commitments, and strategic priorities.

Overall, the study suggests a co-evolutionary relationship between universities and entrepreneurial ecosystems. Dynamic capabilities explain how universities internally develop entrepreneurial initiatives, while evolutionary mechanisms explain how these initiatives are continuously influenced by and adapted to the surrounding ecosystem. University entrepreneurship is therefore better understood as an iterative cycle of sensing, seizing, transforming, feedback, and adaptation, particularly in resource-constrained developing-country contexts.

6. Implication and Conclusion

This study contributes to the literature on university entrepreneurship by conceptualizing it as a dynamic and evolutionary process rather than a fixed organizational model. Theoretically, the study integrates dynamic capabilities with an evolutionary entrepreneurial ecosystem perspective. Dynamic capabilities explain how universities sense ecosystem needs and internal strengths, seize selected opportunities through resource commitment, and transform organizational arrangements to implement entrepreneurial initiatives (Teece, 2007, 2018; Leih & Teece, 2016; Heaton, Lewin, & Teece, 2020). Evolutionary mechanisms complement this perspective by explaining how feedback, selection, and adaptation continuously influence these internal processes. Together, these perspectives connect organizational change within universities with the evolution of the surrounding entrepreneurial ecosystem.

The findings also challenge the assumption that universities should converge toward a single entrepreneurial-university model. Across the four cases, universities developed different entrepreneurial trajectories according to their resources, expertise, organizational structures, networks, and ecosystem opportunities. This suggests that university entrepreneurship, particularly in resource-constrained environments, is better understood as a process of contextual alignment and continuous adaptation than as the replication of models developed in more advanced entrepreneurial ecosystems.

From a practical perspective, university leaders should therefore avoid pursuing every entrepreneurial opportunity or simply imitating successful models from other institutions. Instead, universities should systematically assess ecosystem needs, identify their distinctive capabilities, and selectively invest in initiatives that fit their institutional strengths. External networks are particularly important because relationships with industry, government, investors, entrepreneurs, and support organizations provide access to complementary resources, knowledge, and market

information. Policymakers should similarly support not only individual university programs but also the networks and collaborative mechanisms that enable universities to interact effectively with other ecosystem actors.

The findings further imply that entrepreneurial initiatives should remain adaptable rather than fixed. Feedback from ecosystem actors and the successes and failures of supported ventures provide universities with information for refining programs, reallocating resources, and reconsidering strategic priorities. Institutionalizing mechanisms for feedback and learning may therefore be particularly valuable in developing-country environments characterized by resource constraints and uncertainty.

The study nevertheless has limitations. The empirical analysis is based on four universities within the Jordanian entrepreneurial ecosystem, including both traditional and specialized institutions. The findings are therefore context-dependent and should not be assumed to apply directly to universities operating under different institutional, economic, and regulatory conditions. Future research could conduct comparative studies across countries and university types to examine whether similar processes of sensing, seizing, transforming, feedback, and adaptation emerge in other contexts. Longitudinal research would also be valuable for tracing how entrepreneurial initiatives and university capabilities evolve over time and for assessing their longer-term outcomes.

Future research could further examine the multi-level and recursive nature of university–ecosystem relationships. Entrepreneurial ecosystems involve universities, entrepreneurs, investors, firms, government agencies, and support organizations whose interactions generate both formal and informal feedback. Further studies could investigate when feedback promotes or constrains university adaptation, how entrepreneurial successes and failures influence subsequent resource allocation, and how repeated cycles of sensing, seizing, and transforming contribute to the longer-term co-evolution of universities and entrepreneurial ecosystems.

In conclusion, this study shows that university entrepreneurship develops through recurring interactions between internal dynamic capabilities and external evolutionary mechanisms. Universities sense changes, seize selected opportunities, and transform their organizations to implement entrepreneurial initiatives; these initiatives then interact with the ecosystem, generating feedback and selection pressures that stimulate adaptation and renewed sensing. Rather than representing a fixed organizational state or an endpoint, university entrepreneurship is therefore best understood as an ongoing, context-dependent, and co-evolutionary process of sensing, seizing, transforming, feedback, and adaptation within an evolving entrepreneurial ecosystem.

Reference

1. Bedő, Z., Erdős, K., & Pittaway, L. (2020). University-centred entrepreneurial ecosystems in resource-constrained contexts. Journal of Small Business and Enterprise Development.
2. Cao, Z., & Shi, X. (2021). A systematic literature review of entrepreneurial ecosystems in advanced and emerging economies. Small Business Economics, 57, 75–110.
3. Cho, D. S., Ryan, P., & Buciuni, G. (2022). Evolutionary entrepreneurial ecosystems: A research pathway. Small Business Economics, 58, 1865–1883.
4. Christensen, C. M. (2013). The innovator's dilemma: When new technologies cause great firms to fail. Harvard Business Review Press.
5. Daniel, A. D., Costa, R. A., Pita, M., & Costa, C. (2022). Tourism education: What about entrepreneurial skills? Journal of Hospitality and Tourism Management.
6. Etzkowitz, H. (1998). The norms of entrepreneurial science: Cognitive effects of the new university–industry linkages. Research Policy, 27(8), 823–833.
7. Etzkowitz, H., & Leydesdorff, L. (1995). The Triple Helix—University-industry-

government relations: A laboratory for knowledge based economic development. EASST Review, 14(1), 14–19.
8. Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. (2000). The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. Research Policy, 29(2), 313–330.
9. Fernandes, A. J., & Ferreira, J. J. (2021). Entrepreneurial ecosystems and networks: A literature review and research agenda. Review of Managerial Science.
10. Flint, D. J., Woodruff, R. B., & Gardial, S. F. (2002). Exploring the phenomenon of customers' desired value change in a business-to-business context. Journal of Marketing, 66(4), 102–117.
11. Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. Organizational Research Methods, 16(1), 15–31.
12. Golgeci, I., Gligor, D. M., Tatoglu, E., & Arda, O. A. (2019). A relational view of environmental performance: What role do environmental collaboration and cross-functional alignment play? Journal of Business Research, 96, 35–46.
13. Hayter, C. S., Nelson, A. J., Zayed, S., & O'Connor, A. C. (2018). Conceptualizing academic entrepreneurship ecosystems: A review, analysis and extension of the literature. The Journal of Technology Transfer, 43, 1039–1082.
14. Heaton, S., Lewin, D., & Teece, D. J. (2020). Managing campus entrepreneurship: Dynamic capabilities and university leadership. Managerial and Decision Economics, 41(6), 1126–1140.
15. 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.
16. Horak, S. (2022). Informal networks, informal institutions, and social exclusion in the workplace: Insights from subsidiaries of multinational corporations in Korea. Journal of Business Ethics.
17. Kantis, H. D., & Federico, J. S. (2020). A dynamic model of entrepreneurial ecosystems evolution. Journal of Evolutionary Studies in Business, 5(1), 182–220. https://doi.org/10.1344/jesb2020.1.j072
18. Kaur, V. (2019). Knowledge-based dynamic capabilities: The road ahead in gaining organizational competitiveness. Springer.
19. Leih, S., & Teece, D. J. (2016). Campus leadership and the entrepreneurial university: A dynamic capabilities perspective. Academy of Management Perspectives, 30(2), 182–210.
20. Linde, L., Sjödin, D., Parida, V., & Wincent, J. (2021). Dynamic capabilities for ecosystem orchestration: A capability-based framework for smart city innovation initiatives. Technological Forecasting and Social Change, 166, 120614.
21. Pinheiro, R., & Stensaker, B. (2014). Designing the entrepreneurial university: The interpretation of a global idea. Public Organization Review, 14, 497–516.
22. Prokop, D. (2022). University entrepreneurial ecosystems and spinoff companies: Configurations, developments and outcomes. Technovation, 107, 102286.
23. Rice, M. P., Fetters, M. L., & Greene, P. G. (2014). University-based entrepreneurship ecosystems: A global study of six educational institutions. International Journal of Entrepreneurship and Innovation Management, 18(5/6), 481–501.
24. Robertson, J., Caruana, A., & Ferreira, C. (2023). Innovation performance: The effect of knowledge-based dynamic capabilities in cross-country innovation ecosystems. International Business Review.
25. Roundy, P. T., Bradshaw, M., & Brockman, B. K. (2018). The emergence of entrepreneurial ecosystems: A complex adaptive systems approach. Journal of Business Research, 86, 1–10.
26. Roundy, P. T., & Fayard, D. (2019). Dynamic capabilities and entrepreneurial ecosystems: The micro-foundations of

regional entrepreneurship. The Journal of Entrepreneurship, 28(1), 94–120.
27. Sherwood, A. L. (2018). Universities and the entrepreneurship ecosystem. In M. L. Fetters, P. G. Greene, M. P. Rice, & J. S. Butler (Eds.), The development of university-based entrepreneurship ecosystems: Global practices (pp. 81–96). Edward Elgar Publishing.
28. Stam, E., & van de Ven, A. (2021). Entrepreneurial ecosystem elements. Small Business Economics, 56, 809–832.
29. Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319–1350.
30. Teece, D. J. (2018). Business models and dynamic capabilities. Long Range Planning, 51(1), 40–49.
31. Teece, D. J., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. California Management Review, 58(4), 13–35.
32. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), 509–533.