

Understanding Innovation Ecosystems in Omani Higher Education: Perspectives from Faculty Staff

**Ahmed Al Rabaani¹, Houda Al-Housni², Adil Al-Busaidi³,
Mohammed Al-Rizeiqi⁴, Asma Bani-Orab⁵, Asim Al-Rabaani⁶**

¹ Omani Studies Center, Sultan Qaboos University, Muscat

² College of Education, Sultan Qaboos University, Muscat

³ Innovation and Technology Transfer Center, Sultan Qaboos University, Muscat

⁴ Innovation and Technology Transfer Center, Sultan Qaboos University, Muscat

⁵ Omani Studies Center, Sultan Qaboos University, Muscat

⁶DVC Academic Affairs and Community Service, Sultan Qaboos University, Muscat

Oman

Correspondencia: Ahmed Al Rabaani – Omani Studies Center - Sultan Qaboos University – Oman - P.O. Box 54 .P.C. 123 Al Khod -Muscat

© Universidad de Almería and Ilustre Colegio Oficial de la Psicología de Andalucía Oriental (Spain)

Abstract

Introduction. This study examines the innovation ecosystem in Omani higher education institutions from the perspectives of faculty and research staff.

Method. A 42-item questionnaire covering ten dimensions was administered to 309 faculty staff across public and private universities in Oman.

Results. These institutions have well-developed management systems, supportive learning environments, and a strong focus on fostering an innovation culture and collaboration with partners. However, support for developing individual innovation skills and diversifying innovation funding was moderate. Differences in perceptions were observed across participants' gender and experience.

Discussion and Conclusion. The study highlights the need to strengthen innovation ecosystems through enhanced funding, strategic partnerships, skill development, and a more conducive research environment to maximize the institutions' innovative potential.

Keywords: faculty, higher education institutions, innovation ecosystem, Oman, patents

Resumen

Introducción. Este estudio examina el ecosistema de innovación en las instituciones de educación superior de Omán desde la perspectiva del personal docente e investigador.

Método. Se administró un cuestionario de 42 preguntas que abarcaba diez dimensiones a 309 profesores de universidades públicas y privadas de Omán.

Resultados. Estas instituciones cuentan con sistemas de gestión bien desarrollados, entornos de aprendizaje propicios y un fuerte enfoque en el fomento de una cultura de innovación y la colaboración con socios. Sin embargo, el apoyo al desarrollo de habilidades individuales de innovación y la diversificación de la financiación para la innovación fue moderado. Se observaron diferencias en las percepciones según el género y la experiencia de los participantes.

Discusión y Conclusion: El estudio destaca la necesidad de fortalecer los ecosistemas de innovación a través de una mayor financiación, asociaciones estratégicas, desarrollo de habilidades y un entorno de investigación más propicio para maximizar el potencial innovador de las instituciones.

Palabras clave: Facultad, instituciones de educación superior, ecosistema de innovación, Omán, patentes

Introduction

Innovation is widely recognized as essential for sustainable development, yet its implementation within higher education institutions (HEIs) remains uneven. While HEIs are often portrayed as national innovation hubs, such claims frequently rely on abstract rankings and indicators, rather than coherent evidence of substantive impacts. Developing effective innovation ecosystems (Inv-Ecosystems) requires coordination among stakeholders, robust governance, funding, and a supportive research culture—dimensions often overlooked in conventional metrics like patent counts (Jackson, 1993; Reuters, 2018).

Inv-Ecosystems within Omani HEIs are increasingly recognized as pivotal for fostering a knowledge-based economy, aligning with the objectives set forth in *Oman Vision 2040* (Oman Vision 2040 Implementation Follow-up Unit, 2025). These ecosystems encompass a complex interplay of institutional resources, policies, and collaborative networks that facilitate the generation, transfer, and application of knowledge (Reichert, 2019). Furthermore, the Oman Research and Education Network (2025) provides a collaborative infrastructure that supports research and educational activities, contributing to the development of a sustainable national Inv-Ecosystems. Collectively, these efforts position Omani HEIs to build the capabilities of academics, researchers, and students, enhancing institutional reputation and contributing to socio-economic development (Audretsch et al., 2014; Guerrero & Lira, 2023).

Despite notable initiatives, the practical implementation of Inv-Ecosystems in Omani HEIs remains uneven and constrained by structural and operational limitations. Empirical evidence indicates that collaboration between academia and industry is limited, while infrastructural and resource deficiencies hinder the full potential of these ecosystems (Chryssou, 2020). Moreover, the development of interdisciplinary collaboration and the cultivation of innovation capabilities among faculty and researchers remain insufficiently addressed (Al-Maadeed et al., 2021). These findings underscore that the mere existence of policies and strategic frameworks does not guarantee effective innovation outcomes. A critical understanding of the current state of Inv-Ecosystems is therefore essential to identify institutional strengths, expose systemic gaps, and inform targeted interventions.

This study responds to this need by examining the Inv-Ecosystems in Omani HEIs from the perspectives of faculty and research staff. The study seeks to generate evidence-based insights to enhance innovation practices, foster collaboration, and strengthen both aca-

demic and national research performance by systematically evaluating institutional capacities, operational practices, and stakeholder experiences. This approach addresses gaps in existing knowledge and practice, and also provides a foundation for advancing Oman's higher education system within the global knowledge economy, ensuring that HEIs can fulfill their strategic mission in sustainable socio-economic development (Harrison & Seddon, 2013; Lehmann et al., 2018)

In Oman, *Vision 2040* positions innovation as a strategic priority, but the ways HEIs translate policy into practice remain poorly understood. Empirical insight into faculty and research staff perspectives is crucial to identify gaps, strengthen institutional capacities, and ensure that innovation initiatives meaningfully contribute to sustainable development. This study evaluates the Inv-Ecosystems in Omani higher education, emphasizing the critical need for evidence-based assessment to guide policy and practice.

Literature review

HEIs are increasingly expected to address complex societal, environmental, economic, and technological challenges, positioning innovation at the core of their mission. Yet, translating innovation into tangible outcomes remains contested, as HEIs are often assessed through rankings and indicators rather than the real-world impact of their knowledge creation and problem-solving capacities (Audretsch, 2014; Menter, 2023). Developing robust Inv-Ecosystems is therefore essential, as they enable universities to cultivate human capital, foster research excellence, and generate solutions that respond to global challenges, including sustainable development, economic crises, and public health emergencies (Guerrero & Lira, 2023; Guerrero & Pugh, 2022; Lehmann et al., 2018).

An Inv-Ecosystem is a complex system comprising institutional resources, internal and external actors, and structured processes that facilitate the generation, transfer, and application of knowledge (Cai & Liu, 2015; Moore, 1993). Effective ecosystems require strategic alignment, robust governance, adequate funding, and policies that incentivize and protect innovation (Damanpour & Aravind, 2012; Gyerrero & Lira, 2023). They must integrate learning environments that promote critical thinking, creativity, and problem-solving, thereby enhancing students' innovation capabilities, while simultaneously supporting faculty and researchers in building interdisciplinary collaboration and networks that amplify institutional

and national research impact (Al-Maadeed et al., 2021; Araya-Muñoz & Majano-Benavides, 2022; Chevalier et al., 2020).

Despite these imperatives, research outputs in Arab HEIs remain relatively low, reflecting a continued emphasis on traditional teaching over quality research and innovation (Abouchedid & Abdelnour, 2015; Almansour, 2016; El-Amine, 2016; Hammad et al., 2020). In Oman, *Vision 2040* explicitly prioritizes innovation as a means to enhance institutional reputation, achieve accreditation, and strengthen global competitiveness. However, empirical insights into how HEIs enact their Inv-Ecosystems strategies, and how faculty and researchers perceive and engage with these ecosystems, is limited. Evaluating these ecosystems is therefore critical to identify strengths, gaps, and opportunities, inform strategic planning, and ensure that HEIs effectively develop human and research capacities while contributing to sustainable socio-economic development.

Method

Research design

A descriptive research design was employed using a structured quantitative questionnaire to examine faculty staff perspectives on Inv-Ecosystems in Omani HEIs (Creswell & Creswell, 2017). The online survey, distributed via email and WhatsApp using publicly available contacts from January to April 2024, enabled data collection from a broad sample to generate generalizable insights on institutional practices, strengths, and gaps. This approach provides an evidence-based foundation for evaluating the current state of Inv-Ecosystems and informing strategies to enhance innovation capacity within Oman's HEIs.

Sample

The study population consisted faculty staff in Oman's public and private HEIs. The total number of respondents was 309 individuals, over a third of whom were male, while the remainder were female (Table 1).

[Insert Table 1 here]

Instrument

A five-point Likert-type questionnaire, developed by the researchers and informed by prior studies (Galati et al., 2020; Gyerrero & Lira, 2023), was used to examine stakeholders'

perspectives on the Inv-Ecosystems in Omani HEIs. The instrument comprised 42 items, spanning management systems (5 items), learning environment (5 items), development of academic innovation skills (5 items), research environment (4 items), innovation culture (4 items), collaboration with partners (3 items), funding (5 items), and mechanisms for enhancing Inv-Ecosystems (11 items). Content validity was established through review by eleven experts from Sultan Qaboos University, the Ministry of Higher Education, and Nizwa University, resulting in minor revisions and the consolidation of two items. The questionnaire was piloted with 27 faculty staff, yielding a high reliability (Cronbach's $\alpha = .973$). Responses were captured on a five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), enabling nuanced assessment of participants' perceptions.

Ethics and participant consent statement

The invitation emails and messages investing academics, researchers, and technicians to participate explained the nature of the study and its intended benefits. It emphasized the totally voluntary nature of participation, and that participants' professional and statutory rights would not be affected by participating, declining to participate, or subsequently withdrawing. Participants were assured that they could withdraw from the study at any time prior to submitting the completed questionnaire form, after which their form would be automatically anonymized. The researcher is blinded to the identity of individual participants, and no personally identifying information was gathered by the questionnaire of this study in general. Participants were assured that all data would be completely anonymous.

Results

How do faculty staff perceive the development and functioning of Inv-Ecosystems in Omani HEIs?

The findings (Table 2) suggest that Omani HEIs possess relatively well-structured "innovation management systems" ($M = 3.91$), underpinned by clear legal and regulatory frameworks ($M = 4.09$) and their accessibility ($M = 3.98$). However, the lower evaluations of operational dimensions such as service provision ($M = 3.83$) and consultancy ($M = 3.75$) expose a recurrent tension in Inv-Ecosystems: while policy frameworks appear robust, their translation into effective institutional practices remains partial. This indicates that regulatory clarity does not necessarily guarantee an enabling innovation environment without parallel investments in operational capacity and user-focused support mechanisms.

[Insert Table 2 here]

The “learning environment” ($M = 3.52$) and “academic skill development” ($M = 3.48$) similarly illustrate this gap. While students are motivated and rewarded for innovative engagement ($M = 3.70$), and faculty receive resources and training ($M = 3.59$ – 3.53), the integration of innovation into curricula ($M = 3.49$) and the adoption of innovative pedagogies ($M = 3.42$) remain modest. Likewise, training for commercialization, collaboration with external actors, and patent transformation ($M = 3.41$ – 3.47) is underdeveloped, reflecting a limited institutional capacity to extend innovation practices beyond the classroom and research laboratory.

Equally, the “research environment” ($M = 3.45$) demonstrates only moderate capacity to position research outputs within broader socio-economic agendas. While there is notable support for linking projects with local and global issues ($M = 3.56$), weak mechanisms for patent transformation ($M = 3.43$) and limited infrastructural resources ($M = 3.38$) constrain knowledge valorization. Enhancement of “innovation culture” ($M = 3.58$) and “partnerships” ($M = 3.59$) reflect stronger performance, with high encouragement for applications ($M = 4.08$) and established international collaborations ($M = 4.06$). However, the lack of academic awareness of these collaborations ($M = 3.31$) limits their systemic impact. Finally, “fund diversification” ($M = 3.38$) emerges as the most critical weakness, with universities heavily reliant on central budgets ($M = 3.33$) and facing minimal external or individual contributions ($M = 3.22$ – 3.25), thereby constraining long-term sustainability.

Overall, the data underscore a paradox: while Omani HEIs have established policy frameworks and visible innovation initiatives, they lack the structural depth, integration, and financial resilience required to consolidate an effective Inv-Ecosystems. This reinforces the need for a shift from policy rhetoric to practical alignment, ensuring that managerial systems, pedagogical practices, research environments, and funding mechanisms are interlinked in ways that genuinely empower faculty, researchers, and students to drive innovation.

What strategies and initiatives can be implemented to strengthen and enhance Inv-Ecosystems in Omani HEIs?

The findings shown in Table 3 ($M = 4.29$, $SD = .604$) reflect a strong institutional commitment to innovation, with highest emphasis on developing innovation systems ($M = 4.39$), promoting participation in conferences and exhibitions ($M = 4.37$), and organizing competitions ($M = 4.37$). Incentive structures and awareness campaigns through social media also rank highly, indicating an activity-oriented approach. By contrast, curricular integration through course development ($M = 4.20$) and compulsory innovation courses ($M = 4.13$) received lower ratings, suggesting that innovation remains less embedded in academic structures. Similarly, partnership development ($M = 4.25$) and diversification of funding sources ($M = 4.24$) are comparatively underprioritized, pointing to potential gaps in ensuring the long-term sustainability of innovation initiatives.

[Insert Table 3 here]

To what extent do faculty and research staff perceptions of Inv-Ecosystems in HEIs differ based on gender and professional experience?

As shown in Table 4, Male faculty ($M = 4.01$) report significantly more positive perceptions of the “innovation management system” than female faculty ($M = 3.76$; $p = .002$), suggesting potential disparities in access to or engagement with institutional governance. Although no significant gender differences were observed in other domains, this finding highlights the importance of “establishing inclusive and equitable mechanisms” to ensure effective participation across all stakeholders within Inv-Ecosystems.

[Insert Table 4 here]

Table 5 shows that experience significantly affects perceptions of HEI innovation across nine domains, except for mechanisms supporting the innovation environment. Post hoc analysis reveals that those with over 20 years’ experience view their institutions’ contributions more positively, suggesting that prolonged exposure may shape stronger confidence in institutional innovation efforts.

[Insert Table 5 here]

Discussion and conclusion

Despite measurable progress in establishing Inv-Ecosystems, Omani HEIs continue to exhibit structural and operational weaknesses that may impede their ability to achieve top Global Innovation Index rankings by 2040. While formal mechanisms—such as innovation laws, consultancy services, and digital tools—exist, their limited effectiveness suggests that policy frameworks remain largely procedural, failing to translate into transformative outcomes; this affirms literature analyzing other national contexts. In this regard, such studies identified that a lack of regulatory clarity and insufficient operational support commonly constitute a persistent policy-practice gap (Damanpour & Aravind, 2012; Kudryakov & Fedetova, 2024). Meaningful innovation requires deliberate investment in institutional capacity, user-centered support, and operational mechanisms (Guerrero et al., 2015). Without strategic integration, HEIs risk formal compliance without substantive impact, challenging Vision 2040's knowledge-based economy objectives.

Learning environments reward innovative students, link projects to innovation, and provide awareness programs, indicating awareness of the importance of cultivating an innovation culture. However, moderate integration of innovation into curricula and teaching methods reveals a disconnect between institutional strategy and classroom practice, suggesting that institutional rhetoric does not consistently translate into practical skill development (Araya-Muñoz & Majano-Benavides, 2022; Penttilä, 2016). Similarly, while provision of materials, equipment, and training is perceived positively, support for stakeholder collaboration, innovation management, and commercialization remains moderate, threatening the translation of research outputs into societal or economic value (Cavallini et al., 2016; D'Este & Perkmann, 2011; Galati et al., 2020).

Patent submissions and related policy incentives demonstrate institutional commitment to innovation outputs. However, insufficient attention to rewarding researchers, aligning projects with societal needs, and supporting commercialization reflects a reactive, output-focused approach that limits broader innovation impact (Audretsch et al., 2019; Etzkowitz & Zhou, 2018; Blanken et al., 2022). Stakeholder collaborations are largely formal rather than strategic, implying limited operational effectiveness and underutilized external networks for societal benefit (Fuad et al., 2022; Jan et al., 2015; Roffeei et al., 2018). Funding constraints further exacerbate Inv-Ecosystems limitations, as reliance on narrow financial sources threatens

sustainability and widens institutional disparities, underscoring the need for strategic resource mobilization (Chevalier et al., 2020; Demirhan & Babacan, 2016; van der Pol, 2024).

Participants recognized the potential of mechanisms such as conferences, competitive events, incentives, and linkages, but the success of these initiatives depends on coordination and sustainability; isolated efforts risk short-term visibility without building long-term innovation capacity (Acar et al., 2018; Cerver-Romero et al., 2021; Toivonen & Friederici, 2015). Differences in perceptions by sex, job position, and experience highlight reliance on individual expertise, indicating uneven participation and the need for targeted mentoring and professional development to institutionalize innovation culture broadly (Bello et al., 2021; Eldor & Harpaz, 2015; Hosseini & Shirazi, 2021).

Collectively, the findings suggest that while Omani HEIs are advancing toward innovation-oriented objectives, current efforts are fragmented, reactive, and insufficiently integrated. Strengthening strategic governance, curriculum integration, practical skill development, stakeholder engagement, funding mechanisms, and institutionalized support is critical to establishing sustainable, globally competitive Inv-Ecosystems capable of generating social, economic, and knowledge-based impact.

The results revealed that Oman's HEIs contribute to raise Oman's ranking within the Global Innovation Index due to their innovation management systems, supportive learning environment, and collaboration. However, the levels of their contribution are still not commensurate to achieve Oman's ambitious target of being among the top 20 countries as per OV40, and its current ranking is 69 (Global Innovation Index, 2023). Huge efforts are still needed for practitioners to promote Inv-Ecosystems within these institutions in term of funds, effective partnerships, enhancements of academic's innovation skills, and the research environment. Additionally, collaborations must be established to build a comprehensive Inv-Ecosystems that takes into consideration all internal and external factors could positively or negatively affect productivity.

Funding

This work was supported by the Sultan Qaboos University under a research contract with grant number IG/DVC/OSCI/23/01 ("The Role of Higher Education Institutions in Rais-

ing the Position of the Sultanate of Oman in the Global Innovation Index: Reality and Aspirations in Light of Oman's Vision 2040").

Limitations

The main limitation of this study is that it relied on self-reported data, and may therefore be subject to social desirability bias.

Declaration of data accessibility and availability

The data in this study are original and have been curated to achieve the objectives and findings of this research. All relevant materials are accessible within the manuscript.

Acknowledgements

We would like to thank the Sultan Qaboos University for its financial support of this study and all HEIs who allowed us to apply the questionnaire of the project to academic and students.

References

- Abouchedid, K., & Abdelnour, G. (2015). Faculty research productivity in six Arab countries. *International Review of Education*, 61(5), 673–690. <http://dx.doi.org/10.1007/s11159-015-9518-5>
- Acar, O. A., Tarakci, M., & van Knippenberg, D. (2018). Creativity and innovation under constraints: A crossdisciplinary integrative review. *Journal of Management*, 45(1), 96–121. <https://doi.org/10.1177/0149206318805832>
- Al-Maadeed, M., Hussain, S., Al-Salem, M., & Bouras, A. (2021). Service-based framework of research projects in higher education institutions. *Journal of Modern Project Management*, 9(1), 6–15. <https://doi.org/10.19255/JMPM02601>
- Almansour, S. (2016). The crisis of research and global recognition in Arab universities. *Near and Middle Eastern Journal of Research in Education*, 1, 1–13. <http://dx.doi.org/10.5339/nmejre.2016.1>
- Araya-Muñoz, I., & Majano-Benavides, J. (2022). Didáctica universitaria en entornos virtuales: Experiencia en ciencias sociales [University teaching in virtual environments:

- Experience in social sciences]. *Revista Electrónica Educare*, 26(3), 511–529.
<http://dx.doi.org/10.15359/ree.26-3.28>
- Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *Journal of Technology Transfer*, 39(3), 313–321.
<http://dx.doi.org/10.1007/s10961-012-9288-1>
- Audretsch, D. B., Lehmann, E. E., & Link, A. N. (Eds.). (2019). *A research agenda for entrepreneurship and innovation*. London: Edward Elgar Publishing.
- Bello, A., Blowers, T., Schneegans, S., & Straza, T. (2021). *To be smart, the digital revolution will need to be inclusive: Excerpt from the UNESCO science report*. United Nations Educational, Scientific and Cultural Organization.
<https://doi.org/10.18356/9789210058575c012>
- Cai, Y., & Liu, C. (2015). The roles of universities in fostering knowledge-intensive clusters in Chinese regional innovation systems. *Science and Public Policy*, 42(1), 15–29.
<http://dx.doi.org/10.1093/scipol/scu018>
- Cavallini, S., Soldi, R., Friedl, J., & Volpe, M. (2016). *Using the quadruple helix approach to accelerate the transfer of research and innovation results to regional growth*. Publications Office of the European Union. <http://dx.doi.org/10.2863/408040>
- Cerver-Romero, E., Ferreira, J. J., & Fernandes, C. I. (2021). The multiple faces of the entrepreneurial university: A review of the prevailing theoretical approaches. *Journal of Technology Transfer*, 46(4), 1173–1195. <https://doi.org/10.1007/s10961-020-09815-4>
- Chevalier, G., Chomienne, C., Jeanrenaud, N. G., Lane, J., & Ross, M. (2020). A new approach for estimating research impact: An application to French cancer research. *Quantitative Science Studies*, 1(4), 1586–1600. http://dx.doi.org/10.1162/qss_a_00087
- Chryssou, C. E. (2020). University–industry interactions in the Sultanate of Oman: Challenges and opportunities. *Industry and Higher Education*, 34(5), 342–357.
<http://dx.doi.org/10.1177/0950422219896748>
- Costantiello, A., Laureti, L., & Leogrande, A. (2022). The determinants of lifelong learning in Europe. *SSRN*, Article 4183935. <http://dx.doi.org/10.2139/ssrn.4183935>
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Thousand Oaks, CA: SAGE Publications.
- D’Este, P., & Perkmann, M. (2011). Why do academics engage with industry? The entrepreneurial university and individual motivations. *Journal of Technology Transfer*, 36(3), 316–339. <http://dx.doi.org/10.1007/s10961-010-9153-z>

- Damanpour, F., & Aravind, D. (2012). Managerial innovation in organizations: Conceptions, processes and antecedents. *Management and Organization Review*, 8(2), 423–454. <http://dx.doi.org/10.1111/j.1740-8784.2011.00233.x>
- Demirhan, D., & Babacan, Ö. (2016). The role of financing in innovation ecosystems: A panel data analysis. *Ege Stratejik Araştırmalar Dergisi*, 7(93), 93–104. <http://dx.doi.org/10.18354/esam.71906>
- El-Amine, A. (2016). Educational research concerns in Arab universities. *Educational Research*, 26, 1–22.
- Eldor, L., & Harpaz, I. (2015). A process model of employee engagement: The learning climate and its relationship with extra-role performance behaviors. *Journal of Organizational Behavior*, 37(2), 213–235. <http://dx.doi.org/10.1002/job.2037>
- Etzkowitz, H., & Zhou, C. (2018). *The triple helix: University – industry – government innovation and entrepreneurship*. London: Routledge.
- Fuad, D. R. S. M., Musa, K., & Hashim, Z. (2022). Innovation culture in education: A systematic review of the literature. *Management in Education*, 36(3), 135–149. <http://dx.doi.org/10.1177/0892020620959760>
- Galati, F., Bigliardi, B., Passaro, R., & Quinto, I. (2020). Why do academics become entrepreneurs? How do their motivations evolve? Results from an empirical study. *International Journal of Entrepreneurial Behavior & Research*, 26(7), 1477–1503. <http://dx.doi.org/10.1108/IJEBr-11-2019-0619>
- Global Innovation Index. (2023). *Oman ranking in the Global Innovation Index 2023*. World Intellectual Property Office. <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2023/om.pdf>
- Guerrero, M., & Lira, M. (2023). Entrepreneurial university ecosystem's engagement with SDGs: Looking into a Latin American university. *Community Development*, 54(3), 337–352. <http://dx.doi.org/10.1080/15575330.2022.2163411>
- Guerrero, M., & Pugh, R. (2022). Entrepreneurial universities' metamorphosis: Encountering technological and emotional disruptions in the COVID-19 era. *Technovation*, 118, Article 102584. <https://doi.org/10.1016/j.technovation.2022.102584>
- Guerrero, M., Cunningham, J. A., & Urbano, D. (2015). Economic impact of entrepreneurial universities' activities: An exploratory study of the United Kingdom. *Research Policy*, 44(3), 748–764. <http://dx.doi.org/10.1016/j.respol.2014.10.008>
- Hammad, W., Samier, E. A., & Mohammed, A. (2020). Mapping the field of educational leadership and management in the Arabian Gulf region: A systematic review of Arabic

- research literature. *Educational Management Administration & Leadership*, 50(12), Article 174114322093730. <http://dx.doi.org/10.1177/1741143220937308>
- Harrison, N., & Seddon, T. (2013). Living in a 2.2 world: From mapping to strategic capacity building for Australian educational research. *Australian Educational Researcher*, 40(4), 403–413. <http://dx.doi.org/10.1007/s13384-013-0101-4>
- Hosseini, S., & Shirazi, Z. R. H. (2021). Towards teacher innovative work behavior: A conceptual model. *Cogent Education*, 8(1), Article 1869364. <http://dx.doi.org/10.1080/2331186X.2020.1869364>
- Jackson, D. (1993). *What is an innovation ecosystem?*. Washington, DC: National Science Foundation.
- Jan, M. A., Shah, S. M. A., & Khan, K. U. (2015). The impact of culture on innovation: The moderating role of human capital. *International Journal of Accounting and Financial Reporting*, 4(2), 607–627. <http://dx.doi.org/10.5296/ijafr.v4i2.6871>
- Kudryakov, R. I., & Fedetova, G. V. (2024). Innovation ecosystem as a factor in sustainable development of the regional economy. *Proceedings of the Southwest State University Series Economics Sociology and Management*, 14(1), 48–62. <http://dx.doi.org/10.21869/2223-1552-2024-14-1-48-62>
- Lehmann, E. E., Meoli, M., Paleari, S., & Stockinger, S. A. (2018). Approaching effects of the economic crisis on university efficiency: A comparative study of Germany and Italy. *Eurasian Business Review*, 8, 37–54. <http://dx.doi.org/10.1007/s40821-017-0091-7>
- Menter, M. (2023). From technological to social innovation: Toward a mission-reorientation of entrepreneurial universities. *Journal of Technology Transfer*, 49(11), 1–15. <https://doi.org/10.1007/s10961-023-10002-4>
- Moore, J. F. (1993). Predators and prey: A new ecology of competition. *Harvard Business Review*, 71(3), 75–86.
- Oman Research and Education Network. (2025). *Towards new horizons for the benefit of our community*. <https://www.omren.om/?lang=en>
- Oman Vision 2040 Implementation Follow-up Unit. (2025). *Oman Vision 2040 pillars*. <https://www.oman2040.om/?lang=en>
- Penttilä, T. (2016). Developing educational organizations with innovation pedagogy. *International E-Journal of Advances in Education*, 2(5), 259–267. <http://dx.doi.org/10.18768/ijaedu.15956>

- Reichert, S. (2019). *The role of universities in regional innovation ecosystems*. European University Association.
<https://www.eua.eu/downloads/publications/eua%20innovation%20ecosystem%20report.pdf>
- Reuters. (2018). *Top 100: the world's most innovative universities*.
<https://www.reuters.com/article/us-amers-reuters-rankinginnovative-univ/reuters-top-100-the-worlds-most-innovativeuniversities-2018-idUSKCN1ML0AZ>
- Roffeei, S. H. M., Yusop, F. D., & Kamarulzaman, Y., (2018). Determinants of innovation culture amongst higher education students. *Turkish Online Journal of Educational Technology*, 17(1), 37–50.
- Toivonen, T., & Friederici, N. (2015, April 7). Time to define what a “hub” really is. *Stanford Social Innovation Review*.
https://ssir.org/articles/entry/time_to_define_what_a_hub_really_is
- van der Pol, J. (2024). The impact of funding on the 5G innovation ecosystem. *Scientometrics*, 129(4), 2037–2056. <http://dx.doi.org/10.1007/s11192-024-04954-z>

TablesTable 1. *Distribution of sample according to sex*

	N	%
Female	193	62.5
Male	116	37.5
Total	309	100.0

Table 1. *Mean and SD – Perceptions of development and functioning of IES in Omani HEIs*

Items	Mean	SD
Management System		
Current innovation-related laws and regulations are suitable for IES development	4.09	.810
All laws and regulations are available on our university website	3.98	.839
The managerial innovation system considers the IES and personal safety enhancement	3.95	.714
All innovation services are available on the university website	3.83	.848
The managerial system provides free consultancy for academics, researchers, and students	3.75	.834
<i>Average</i>	<i>3.91</i>	<i>.672</i>
Learning Environment		
Innovative students are motivated, supported, and rewarded at the levels of courses, departments, and colleges	3.70	1.16
Students are encouraged to link their projects and theses to come up with innovative ideas	3.52	1.31
Special innovation programs are provided for students to develop their awareness' of innovation and mechanisms for registering patents	3.50	1.26
University courses put promoting of innovation among students as priority	3.49	1.29
Academic use innovative teaching strategies in their courses	3.42	1.31
<i>Average</i>	<i>3.52</i>	<i>.777</i>
Developing Academic Innovation Skills		
Academics are provided with all need material and equipment to enhance innovation skills among students	3.59	1.26
Academics receive training to build their innovation capability	3.53	1.26
Academics receive training to build their skills in establishment of collaboration with different local and global innovation actors	3.47	1.26
Academics receive training in innovation management and marketing of innovation	3.41	1.30
Academics receive training in transforming patents into products	3.41	1.28
<i>Average</i>	<i>3.48</i>	<i>1.07</i>
Research Environment		
The university supports linking research projects with local and global issues	3.56	1.26
The university provides workshops to build skills of researchers to link their projects with local and global issues and sustainable development	3.43	1.31
The university provides workshops to enable researchers to transform their research results into patents	3.43	1.36
The university provides all necessary material, equipment, and support to make the research environment an innovation incubator	3.38	1.29
<i>Average</i>	<i>3.45</i>	<i>1.15</i>
Innovation Culture		
The university encourages researchers to submit applications for innovation	4.08	.821
The university rewards those are highly concern about connecting their research projects with local and global issues	3.48	1.30

Items	Mean	SD
The university establishes specialist programs for linking research activities with public and private sectors	3.41	1.3
The university provides all facilities and support to increase number of used innovations, achieved and converted into products	3.38	1.38
Average	3.58	1.03
Collaboration with Partners		
The university has various innovation partnerships with local, regional, and global institutions	4.06	.838
The current university local and global partnership and collaboration supports innovation activities	3.41	1.39
Academic are aware of all local and international collaboration agreements	3.31	1.38
Average	3.59	1.02
Funds		
Laws and regulations support researchers to access funding from diverse institutions and countries	3.72	1.30
The university provides all official support for researchers to access local and external funds	3.39	1.30
The university allocates a reasonable amount of fund from its central budgets	3.33	1.33
We receive some funding from local, regional, and global institutions	3.25	1.18
We receive funding for innovation come from individuals	3.22	1.22
Average	3.38	.778

Table 2. *Mean and SD – mechanisms of supporting innovation environment*

Items	Mean	SD
Developing innovation system in the university	4.39	.643
Increase number of academics and students' participation in local, regional and global innovation conferences and exhibitions	4.37	.725
Organizing innovation competitions and events	4.37	.669
Providing incentives prizes for students and academics	4.36	.676
Developing an effective program to link research projects of academics and students with local and global issues to promote innovation	4.33	.685
Using social media networks and media to spread awareness culture of innovation	4.32	.697
Providing innovation consulting services for students and academics	4.32	.733
Introduce effective strategies to strengthen partnership with different stakeholders and actors	4.25	.702
Creating new sources for funding innovation activities	4.24	.782
Developing course content and teaching strategies based on innovation requirement	4.20	.739
Introducing innovation course for all university students as university requirement	4.13	.829
Average	4.29	.604

Table 3. *T-test for sex*

Domains	Sex	Mean	SD	t	df	Sig
Management system	M	4.01	.590	3.172	307	.002
	F	3.76	.768	2.974	196.335	.003
Learning environment	M	3.54	.770	.501	307	.617
	F	3.49	.791	.497	237.302	.619
Developing academic innovation skills	M	3.50	1.081	.408	307	.684
	F	3.45	1.067	.409	244.890	.683
Research environment	M	3.45	1.163	.022	307	.983
	F	3.45	1.153	.022	244.130	.983
Innovation culture	M	3.60	1.058	.366	307	.715
	F	3.56	1.000	.371	253.270	.711
Collaboration with partners	M	3.57	1.026	.354	307	.723
	F	3.61	1.022	-.355	243.143	.723
Funds	M	3.35	.807	-.868	307	.386
	F	3.43	.727	-.891	262.368	.374
Mechanisms of supporting innovation environment	M	4.34	.578	1.559	307	.120
	F	4.22	.642	1.519	222.734	.130

Note. M: male, F: female.

Table 4. *One-way ANOVA – experience*

Domain		Sum of Squares	df	Mean Square	F	Sig.
Management system	BG	22.380	2	11.190	29.309	.000
	WG	116.829	306	.382		
	Total	139.210	308			
Learning environment	BG	16.782	2	8.391	15.167	.000
	WG	169.285	306	.553		
	Total	186.067	308			
Developing academic innovation skills	BG	32.968	2	16.484	15.621	.000
	WG	322.904	306	1.055		
	Total	355.872	308			
Research environment	BG	14.375	2	7.188	5.518	.004
	WG	398.608	306	1.303		
	Total	412.983	308			
Innovation culture	BG	11.564	2	5.782	5.547	.004
	WG	318.971	306	1.042		
	Total	330.534	308			
Collaboration with partners	BG	26.944	2	13.472	13.929	.000
	WG	295.961	306	.967		
	Total	322.905	308			
Funds	BG	5.267	2	2.633	4.447	.012
	WG	181.206	306	.592		
	Total	186.472	308			
Mechanisms of supporting innovation environment	BG	1.567	2	.784	2.160	.117
	WG	111.003	306	.363		
	Total	112.570	308			

Note. BG: between groups, WG: within groups.