



USAID
FROM THE AMERICAN PEOPLE

HIGHER EDUCATION AND INNOVATION ECOSYSTEMS

A PRIMER



IN SUPPORT OF THE
USAID HIGHER
EDUCATION
LEARNING
AGENDA

APRIL 2022

PREPARED BY

This evidence primer was developed by Aubrey L. Anderson (The University of Texas at Dallas), Tiffany Tryon (Harvard University), and Carson Letot (Penn State University), graduate students participating in the 2021–2022 Virtual Student Federal Service internship program.

SUGGESTED CITATION

Anderson, A., Tryon, T. & Letot, C. 2022. “Higher Education and Innovation Ecosystems: A Primer.” United States Agency for International Development.

ACKNOWLEDGEMENTS

The authors would like to thank those who provided helpful feedback on this document: Samantha Alvis, Deborah Greebon, Richard LeSar, Maggie Linak, and Brent Wells.

COVER PHOTO

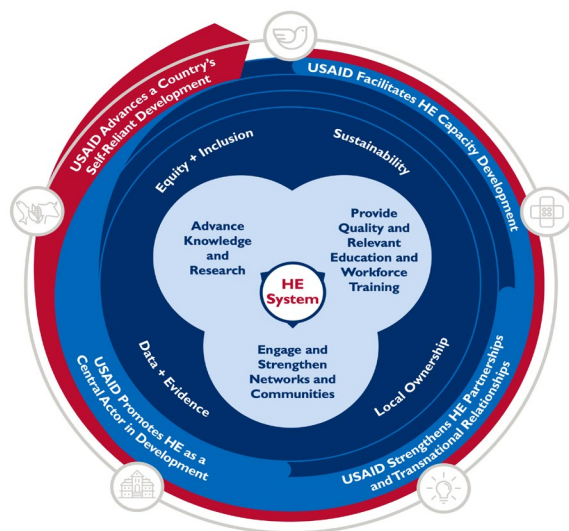
USAID Vietnam—Flickr Account [Education Album](#)

TABLE OF CONTENTS

1.	BACKGROUND	4
2.	INTRODUCTION	5
3.	THE RATIONALE FOR INNOVATION ECOSYSTEMS	6
4.	HIGHER EDUCATION AS CRITICAL ACTORS IN AN INNOVATION ECOSYSTEM	7
5.	A COMPOSITE FRAMEWORK FOR SUSTAINABLE INTERVENTION	10
6.	APPLYING THE COMBINED FRAMEWORK	14
7.	CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH	21

I. BACKGROUND

This document supports [USAID's Higher Education \(HE\) Learning Agenda](#) and the goals of [USAID's Higher Education \(HE\) Program Framework](#)¹ (Figure 1). This document aims to assist in the administration of evidence-based activities to aid implementing partners, USAID Missions, and other contributors in enabling, expanding, and sustaining the role of HE systems and higher education institutions (HEIs) as partners in innovation ecosystems. From the ten learning questions in the HE Learning Agenda (Table 1), **this document develops key aspects of question 6:**



“How can higher education systems and higher education institutions (HEIs) play a more active role in developing and strengthening national and regional innovation ecosystems?”

Figure 1. USAID's Higher Education (HE) Program Framework.

TABLE 1. USAID Higher Education Learning Agenda Questions

NO.	QUESTION
1.	How can higher education systems and institutions become more strategic in planning, implementing, and monitoring core activities (e.g., enrollment, academic programs, research, and outreach)?
2.	How can financing of higher education systems and institutions become more sustainable?
3.	How can the viability and effectiveness of online and other forms of distance education be improved?
4.	How can skills or competencies (e.g., technical and soft skills) for employability best be identified, analyzed, and incorporated into curricula, teaching, and learning?
5.	How can the practice and culture of teaching become more learner-centered?
6.	How can higher education systems and higher education institutions (HEIs) play a more active role in developing and strengthening national and regional innovation ecosystems?
7.	How can HEIs collaborate more effectively with the private sector to enhance the relevance and quality of teaching and learning, and research and innovation?
8.	How can USAID best partner with HEIs to make use of local knowledge and expertise?
9.	How can higher education access, retention, and completion rates be improved for underrepresented populations (e.g., women, indigenous and marginalized populations, and people with disabilities)?
10.	What institutional and behavioral changes are needed to improve gender awareness and gender equity?

¹ USAID Office of Education. “Higher Education as a Central Actor in Self-Reliant Development: A Program Framework,” 2020. https://www.edu-links.org/sites/default/files/media/file/Higher%20Education%20Framework_Oct%202020.pdf.

2. INTRODUCTION

As demonstrated in Figure 1, USAID pursues three goals to empower HEIs: facilitate HEI capacity development, strengthen HEI partnerships and transnational relationships, and promote HEIs as a central actor in development. HEIs, however, are not isolated entities detached from the environment; they are critical actors within a broader innovation ecosystem that links the location/environment, the people, and the resources required to facilitate, expand, and promote new ideas.² Consequently, efforts to accomplish the three USAID goals require adapting activities to national, regional, and local systems' circumstances and adjusting for complex interdependencies. This document explores the utility and foundation of higher education's role in an innovation ecosystem. It supplements the components of an innovation ecosystem found in [USAID's 5 Rs Framework](#) with the more precise components found in [MIT's D-Lab Local Innovation Ecosystems Model](#), overlaid by the components of Systems Practice and the [Local Systems Framework](#). Together, the combined framework provides a foundation for higher education's critical role in advancing innovation.

Key Terms

Innovation Ecosystem: The interconnected network of different actors, relationships, and resources centered around a shared set of technologies, knowledge, skills that work competitively and cooperatively to provide new products and services to sustainably transform societies.^{3,4}

Higher Education Institutions (HEI): An organization that provides educational opportunities that build on secondary education, providing learning activities in specialized fields, often resulting in a degree or diploma. Learning typically involves a high level of complexity and specialization. Higher/tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education. This may include public or private universities, colleges, community colleges, academically affiliated research institutes, and training institutes, including teacher training institutes.⁵

² Fuglsang, Lars, Anne V. Hansen, Ines Mergel, and Maria T. Røhnebæk. "Living Labs for Public Sector Innovation: An Integrative Literature Review," *Administrative Sciences*, 11, no. 2 (2021): 58. <https://www.mdpi.com/2076-3387/11/2/58>.

³ Adner, Ron. "Ecosystem as Structure: An Actionable Construct for Strategy." *Journal of Management* 43, no. 1 (January 2017): 39–58. <https://doi.org/10.1177/0149206316678451>.


⁴ Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. 2020. "Higher Education in Innovation Ecosystems" *Sustainability* 12, no. 11: 4376. <https://doi.org/10.3390/su12114376>.

⁵ USAID Office of Education. "The What, Why and How of USAID Higher Education Programs," September 2018. <https://www.edu-links.org/learning/what-why-and-how-usaid-higher-education-programs>

3. THE RATIONALE FOR INNOVATION ECOSYSTEMS

Innovation ecosystems serve both as a foundation and a driver for change. Their utility cuts across sectors and represents a variety of capabilities and situations, summarized in Table 2.

TABLE 2. Utility of an Innovation Ecosystem

Innovation ecosystems can help 	Illustrate the ecological and evolutionary nature of knowledge creation and sharing. Similar to a natural ecosystem, innovation ecosystems contain countless components and evolve through adaptation to change. ⁶ Additionally, they contain an intricate web of interactions that enable the ecosystem to function, and the interdependency among actors strengthens over time. ^{7,8}
	Explore and exploit knowledge. In business ecosystems, actors work cooperatively and competitively to create customer value. In knowledge ecosystems, actors (such as HEIs) focus on knowledge and technology creation. An innovation ecosystem combines knowledge and technology creation to form an ecosystem that focuses on knowledge creation (exploration) and value creation (exploitation). ⁹
	Enable value co-creation. Individual organizations have limited resources and capabilities, and value creation is a dynamic and resource-intensive process. By involving more stakeholders and actors, value creation becomes a collective approach that integrates knowledge, ideas, and resources. ¹⁰
	Create an environment in which weak social ties can prosper. Indirect relationships, though less obvious, lead to the generation and exploration of new ideas. Thus, innovation is largely attributed to weak ties. For weak ties to prosper, there must be social capital, which an innovation ecosystem helps create. ¹¹
	Remove geographic restraints. Innovation and the flow of knowledge are not bound to a geographic location. ¹² Thus, an innovation ecosystem is not limited by geographic constraints.

⁶ Sotarauta, Markku, Tuomo Heinonen, Pasi Sorvisto, Jari Kolehmainen. "Innovation Ecosystems, Competencies and Leadership: Human Spare Parts and Venture Finance Ecosystems under Scrutiny," 2016. (Tekes).

⁷ Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. "Higher Education in Innovation Ecosystems" *Sustainability*, 12, no. 11 (2020): 4376. <https://doi.org/10.3390/su12114376>.

⁸ Organization for Economic Co-Operation and Development. "National Innovation Systems." OECD, 1997. <https://www.oecd.org/science/inno/2101733.pdf>.

⁹ Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. "Higher Education in Innovation Ecosystems" *Sustainability*, 12, no. 11 (2020): 4376. <https://doi.org/10.3390/su12114376>.

¹⁰ Kumari, Richa, Ki-Seok Kwon, Byeong-Hee Lee, and Kiseok Choi. "Co-Creation for Social Innovation in the Ecosystem Context: The Role of Higher Educational Institutions" *Sustainability* 12, no. 1 (2020): 307. <https://doi.org/10.3390/su12010307>.

¹¹ Cai, Yuzhuo, Borja Ramis Ferrer, and Jose Luis Martinez Lastra. "Building University-Industry Co-Innovation Networks in Transnational Innovation Ecosystems: Towards a Transdisciplinary Approach of Integrating Social Sciences and Artificial Intelligence" *Sustainability*, 11, no. 17 (2019): 4633. <https://doi.org/10.3390/su11174633>.

¹² Sotarauta, Markku, Tuomo Heinonen, Pasi Sorvisto, Jari Kolehmainen. "Innovation Ecosystems, Competencies and Leadership: Human Spare Parts and Venture Finance Ecosystems under Scrutiny," 2016. (Tekes).

4. HIGHER EDUCATION AS CRITICAL ACTORS IN AN INNOVATION ECOSYSTEM

The Triple Helix Model (Figure 2) illustrates the theory that three entities are important for a country's social and economic development: HEIs, the private sector, and government.¹³

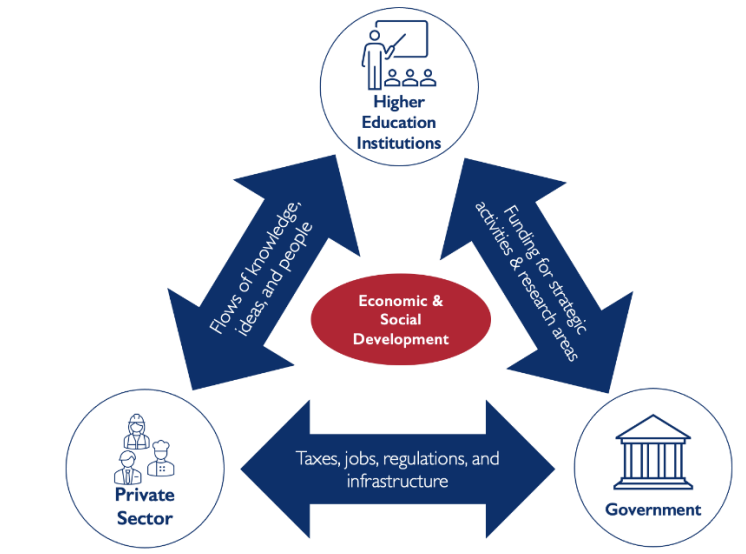


Figure 2. The Triple Helix Model.

[Higher Education and Industry Collaborations: A Primer](#) explains the common benefits and barriers to successful collaborations between these entities. HEIs, primarily universities and research institutions, are often at the center of a country's development and, therefore, its innovation ecosystem.¹⁴ HEIs draw attention and resources due to their potential to influence and drive technological innovations while governments establish enabling environments to foster the interaction and free flow of information among actors in the national system.^{15,16} HEIs in developing countries often conduct the majority of the research and development pursued by the country.¹⁷ Furthermore, HEIs drive the

¹³ Leydesdorff, Loet and Henry Etzkowitz. "The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations." *Research Policy*, 29 (2000):109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4).

¹⁴ Grobbelaar, S. "Developing a local innovation ecosystem through a university coordinated innovation platform: The University of Fort Hare." *Development Southern Africa*, 35 (2018): 657–672. <https://doi.org/10.1080/0376835X.2017.1421902>.

¹⁵ Ssebuwufu, John, Terallynn Ludwick, and Margaux Béland. "Strengthening University-Industry Linkages in Africa." Ghana: Association of African Universities (AAU), 2012. <http://www.heart-resources.org/wp-content/uploads/2015/09/strengtheninguniversity-industry-linkages-in-africa-report-2012.pdf?x30250>.

¹⁶ Organization for Economic Co-Operation and Development. "National Innovation Systems." OECD, 1997. <https://www.oecd.org/science/inno/2101733.pdf>.

¹⁷ Organization for Economic Co-Operation and Development. "National Innovation Systems." OECD, 1997. <https://www.oecd.org/science/inno/2101733.pdf>.

knowledge economy by supporting economic growth strategies and affecting poverty reduction by training a qualified and adaptable labor force.¹⁸

Research institutes and HEIs often generate both basic and applied research as a body of knowledge that often serves as a public good, used by industries, creating an infrastructure to support innovation. Private industries use the products of HEIs and increasingly invest in cross-sectoral collaborative research and development ventures.¹⁹ Scholars and policymakers have exhibited consistent effort to export technologies and practices to the nations and regions that need it most but have been met with mixed results. Local individuals, organizations, institutions, and businesses are naturally positioned to recognize local needs and problems, identify and implement solutions, and set priorities, justifying innovation ecosystems and HEIs' roles in them.²⁰

- **HEIs are anchors for community development through knowledge exchange.**²¹ HEIs provide the foundation for long-term investments in communities.²² Further, they facilitate community development and the exchange of knowledge that leads to the development of innovation ecosystems that foster positive community growth. The success of Silicon Valley has led to the creation of similar hubs in areas with robust higher education presences, such as Dubai Silicon Oasis, Silicon Savannah in Kenya, and Silicon Wadi in Israel.
- **HEIs assume an entrepreneurial role to drive economic and social development.** Initiatives involving knowledge transfer are becoming a standard tool for HEIs to incubate and accelerate ideas from students, faculty, and affiliates beyond the walls of the institutions. HEIs are change agents that mobilize resources and power to transform internal organization and structure, which improves HEI performance and regional innovation. Not only do HEIs initiate change, but they actively participate in it.²³
- **HEIs facilitate trust-building.** HEIs are trusted actors in society; therefore, they can create a safe place for different players with weak ties to easily build relationships and trust, which facilitates the exchange of useful knowledge and ideas.²⁴ In addition, they reduce conflict between actors by creating a culture of trust.²⁵

¹⁸ Peterson, Penelope, Eva Baker, Eva, and Barry McGaw. *International Encyclopedia of Education*. Elsevier, 2010.

¹⁹ Organization for Economic Co-Operation and Development. "National Innovation Systems." OECD, 1997. <https://www.oecd.org/science/inno/2101733.pdf>.

²⁰ Lindow, Megan. *Weaving success: Voices of change in African higher education*. Institute of International Education, 2011. <https://www.iie.org/Research-and-Insights/Publications/Weaving-Success-PHEA>.

²¹ Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. "Higher Education in Innovation Ecosystems" *Sustainability*, 12, no. 11 (2020): 4376. <https://doi.org/10.3390/su12114376>.

²² Grobbelaar, S. "Developing a local innovation ecosystem through a university coordinated innovation platform: The University of Fort Hare." *Development Southern Africa*, 35 (2018): 657–672. <https://doi.org/10.1080/0376835X.2017.1421902>.

²³ Kumari, Richa, Ki-Seok Kwon, Byeong-Hee Lee, and Kiseok Choi. "Co-Creation for Social Innovation in the Ecosystem Context: The Role of Higher Educational Institutions" *Sustainability*, 12, no. 1 (2020): 307. <https://doi.org/10.3390/su12010307>.

²⁴ Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. "Higher Education in Innovation Ecosystems" *Sustainability*, 12, no. 11 (2020): 4376. <https://doi.org/10.3390/su12114376>.

²⁵ Kumari, Richa, Ki-Seok Kwon, Byeong-Hee Lee, and Kiseok Choi. "Co-Creation for Social Innovation in the Ecosystem Context: The Role of Higher Educational Institutions" *Sustainability*, 12, no. 1 (2020): 307. <https://doi.org/10.3390/su12010307>.

- **HEIs emphasize sustained economic effects on societies and local communities.**²⁶ More than ever before, HEIs are intimately woven into the social, environmental, and economic areas of life. The research conducted by HEIs often influences adaptations in curricula across the education continuum (i.e., influences what is being taught and how it is being taught).²⁷ HEIs' social engagement improves the quality of labor, shares technology with the private sector, and makes the environment more attractive for entrepreneurs.²⁸
- **HEIs drive iterative change.**²⁹ HEIs' historical role has been to generate and share knowledge through research and teaching. Now, HEIs advance a third mission, which includes leading regional development.³⁰ Leading regional development requires strengthening HEIs' capabilities to identify and capture opportunities for development as well as to mitigate risks. Further, it requires promoting iterative change and adaptation.

The Higher Education Solutions Network (HESN) Labs³¹

USAID's HESN Labs undertake a host of tasks surrounding innovation ecosystems that include identifying challenges and barriers, identifying actors and cataloging solutions, creating and evaluating novel approaches and tools, and supporting the development and testing of interventions. HESN's three objectives support this work and its successes so far³²:

1. Improved data quality, access, and analytics to advance evidence-based development decision-making through 258 data tools, technologies, and approaches with over 300 data sets;
2. Accelerated the creation, testing, and scaling-up of over 500 new and existing transformative innovations, technologies, and approaches, including 60 innovations that have been evaluated³³;
3. Catalyzed a global interdisciplinary ecosystem of over 2,000 individuals and institutions that shares knowledge, promotes learning, and builds mutual capacity.³⁴

²⁶ Thomas, Elisa, Kadigia Faccin, and Bjørn Terje Asheim. "Universities as orchestrators of the development of regional innovation ecosystems in emerging economies." *Growth and Change*, 52 (2021): 770–789. <https://doi.org/10.1111/grow.12442>.

²⁷ Grau, Francesc Xavier, John Goddard, Budd Hall, Ellen Hazelkorn, Rajesh Tandon, and others. "Higher education in the World 6. Towards a Socially Responsible University: Balancing the Global with the Local," 2017. <https://www.researchgate.net/publication/314840823>.

²⁸ Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. "Higher Education in Innovation Ecosystems" *Sustainability*, 12, no. 11 (2020): 4376. <https://doi.org/10.3390/su12114376>.

²⁹ Stolze, Audrey and Klaus Sailer. "Advancing HEIs' third-mission through dynamic capabilities: the role of leadership and agreement on vision and goals." *Journal of Technology Transfer*, 47 (2022), 580–604. <https://doi.org/10.1007/s10961-021-09850-9>.

³⁰ Jäger, Angelika & Johannes Kopper. "Third mission potential in higher education: Measuring the regional focus of different types of HEIs." *Review of Regional Research*, 34 (2014), 95–118. <https://doi.org/10.1007/s10037-014-0091-3>.

³¹ USAID Innovation, Technology, and Research. "Higher Education Solutions Network (HESN)." <https://www.usaid.gov/hesn>.

³² Amulya, Joy, James Chung, Stephanie Monschein, and Charu Vijayakumar. "Midterm Performance Evaluation of the Higher Education Solutions Network (HESN)." Report prepared for USAID. Washington, DC: Dexis Consulting Group, 2016. https://pdf.usaid.gov/pdf_docs/PA00M6MK.pdf.

³³ USAID Innovation, Technology, and Research. "Impact report for the Higher Education Solutions Network," 2016. <https://www.edu-links.org/sites/default/files/media/file/impact%20report%20for%20the%20HE%20solutions%20network.pdf>

³⁴ USAID Innovation, Technology, and Research. "Impact report for the Higher Education Solutions Network," 2016. <https://www.edu-links.org/sites/default/files/media/file/impact%20report%20for%20the%20HE%20solutions%20network.pdf>

5. A COMPOSITE FRAMEWORK FOR SUSTAINABLE INTERVENTION

Separate Frameworks

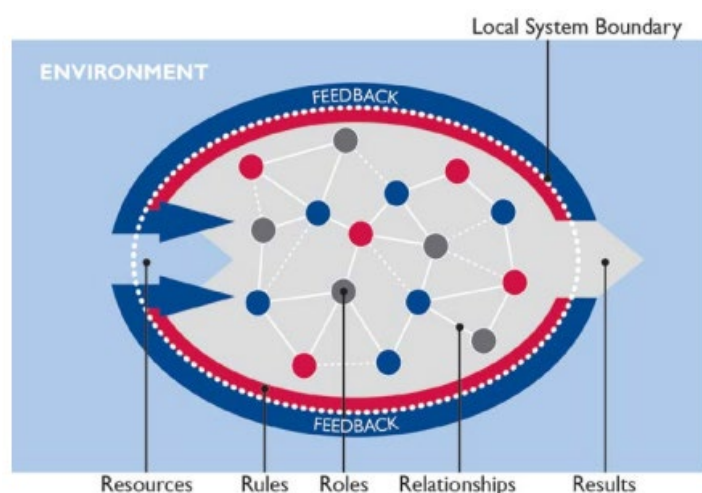


Figure 3. The 5Rs: Key Elements of a Local System.

The composite framework in Figure 3 combines elements from three existing frameworks—the USAID 5Rs Framework (Figure 5), the MIT-D Lab Innovation Ecosystem Model (Figure 6), and Systems Practice (Figure 7)—to integrate the components that constitute an innovation ecosystem and provide a systematic approach for an intervention.

USAID’s 5 Rs framework “serve[s] as a lens for assessing local systems and a guide for identifying and monitoring interventions designed to strengthen them.”³⁵

The 5 Rs Framework defines key aspects of a system that are critical in understanding how the system functions and identifying points for implementing change. The five “Rs” are results, roles, relationships, rules, and resources.

Supported by USAID, the MIT D-Lab has developed a conceptual framework model for understanding local innovation ecosystems (Figure 4).³⁶ This model identifies the precise elements of four main components—actors, their roles, the enabling environment, and resources—and keeps the purpose (or desired results) as the focus.

Though usually broken into separate phases, systems practice is a tool for seeing, analyzing, and acting in systems.

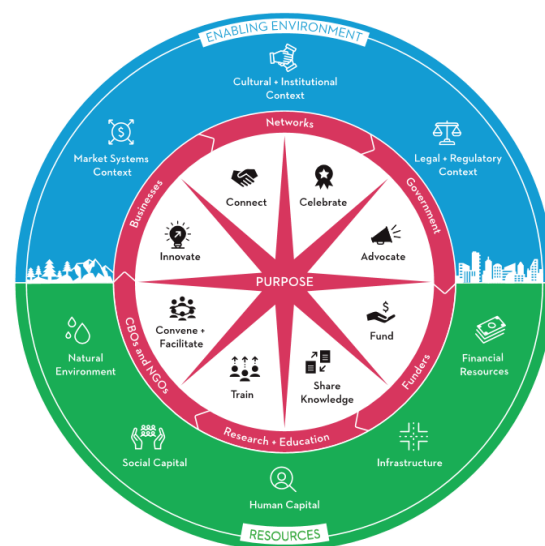


Figure 4. MIT-D Lab Innovation Ecosystem Model.

³⁵ USAID Bureau for Policy Planning and Learning. “The 5Rs framework in the program cycle,” 2016. https://usaidlearninglab.org/sites/default/files/resource/files/5rs_techncial_note_ver_2_1_final.pdf.

³⁶ Hoffecker, Elizabeth & Molly Wenig Rubenstein. MIT D-Lab. “Understanding innovation ecosystems: A Framework for joint analysis and action,” (2019). https://d-lab.mit.edu/sites/default/files/inline-files/Understanding_Innovation_Ecosystems_FINAL_JULY2019.pdf.

Combined Framework

Through these three existing frameworks, it becomes clear that interventions in an innovation ecosystem are bounded by the local system, itself contained within an enabling environment. The actors, with their roles and relationships, pursue results using the resources and rules that exist within the local system. Interventions impact the system and its components through a feedback mechanism. With such complex relationships between components, implementers and partners must systematically engage with an innovation ecosystem by understanding what it looks like before an intervention, what it could or what it does look like after, and how future interventions can be modified to create the most sustainable benefit. Increasingly, HEIs are central players and anchors in innovation ecosystems as they broker trust and drive development, making them integral to accessing entry points into any given innovation ecosystem.

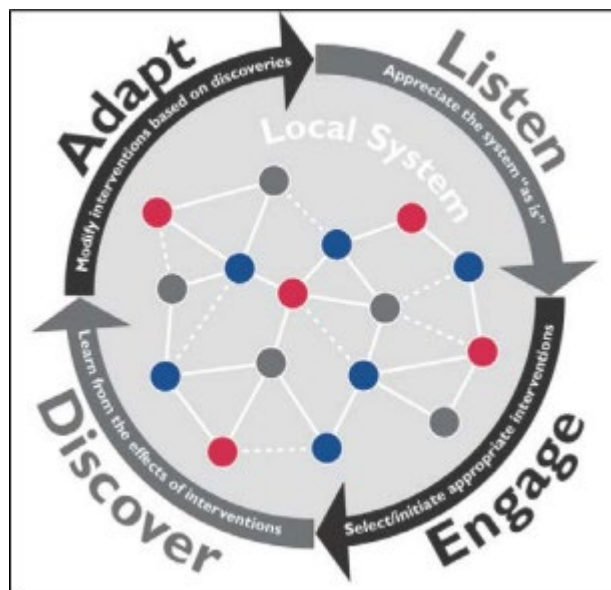


Figure 5. Systems Practice: identifying four phases of ongoing process.

Figure 5 shows the enabling environment that contains a bounded local system. Arrows along the local system boundary border represent the feedback loop that results from interventions.

In the center are the many components of an innovation ecosystem and a brief explanation for each family of components. In Figure 6, these components are then incorporated into the phases of the Systems Practice. Each box represents a separate phase, and the many components, to which implementors and partners must orient their intervention.

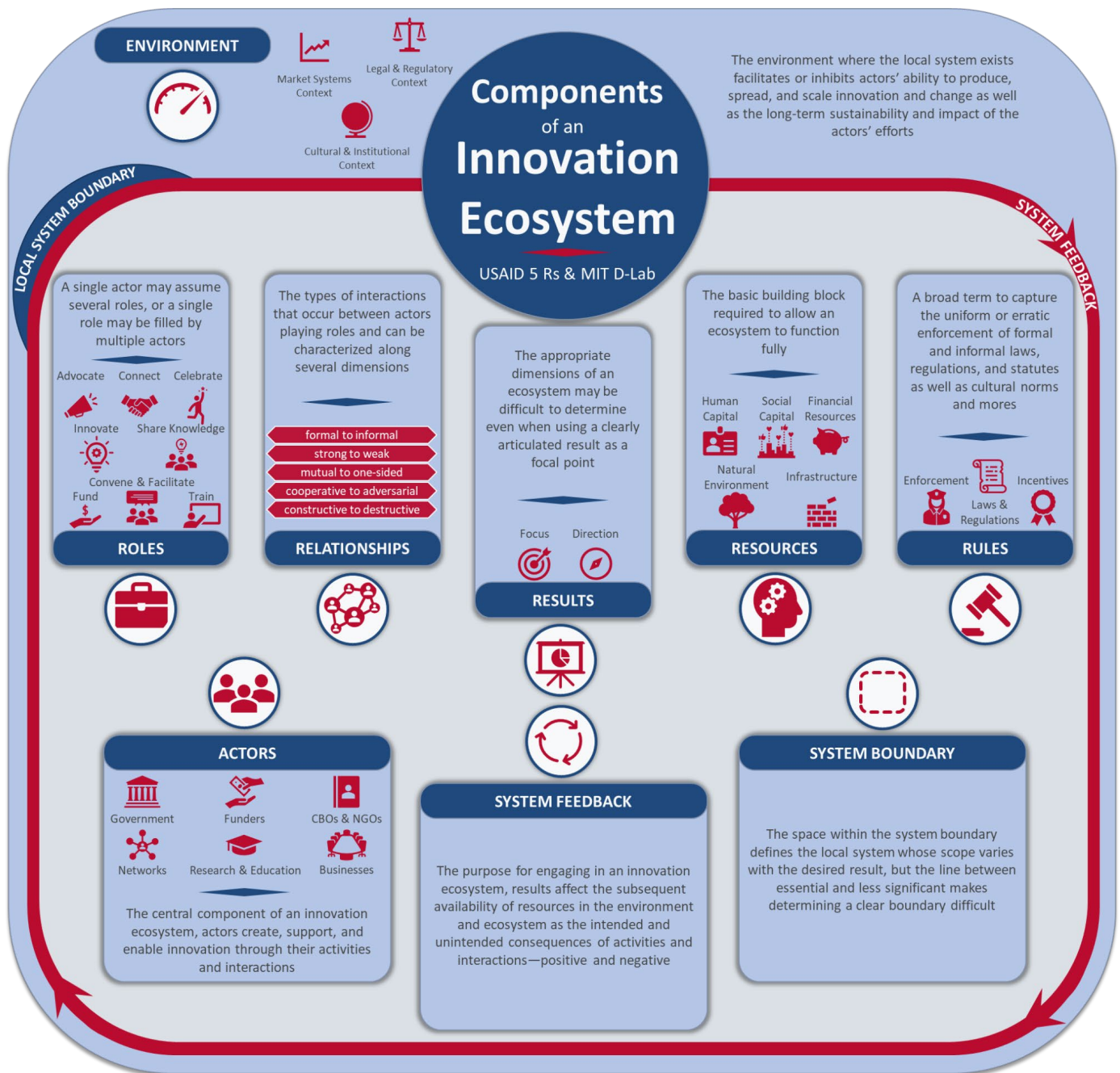


Figure 6. Components of an Innovation Ecosystem.

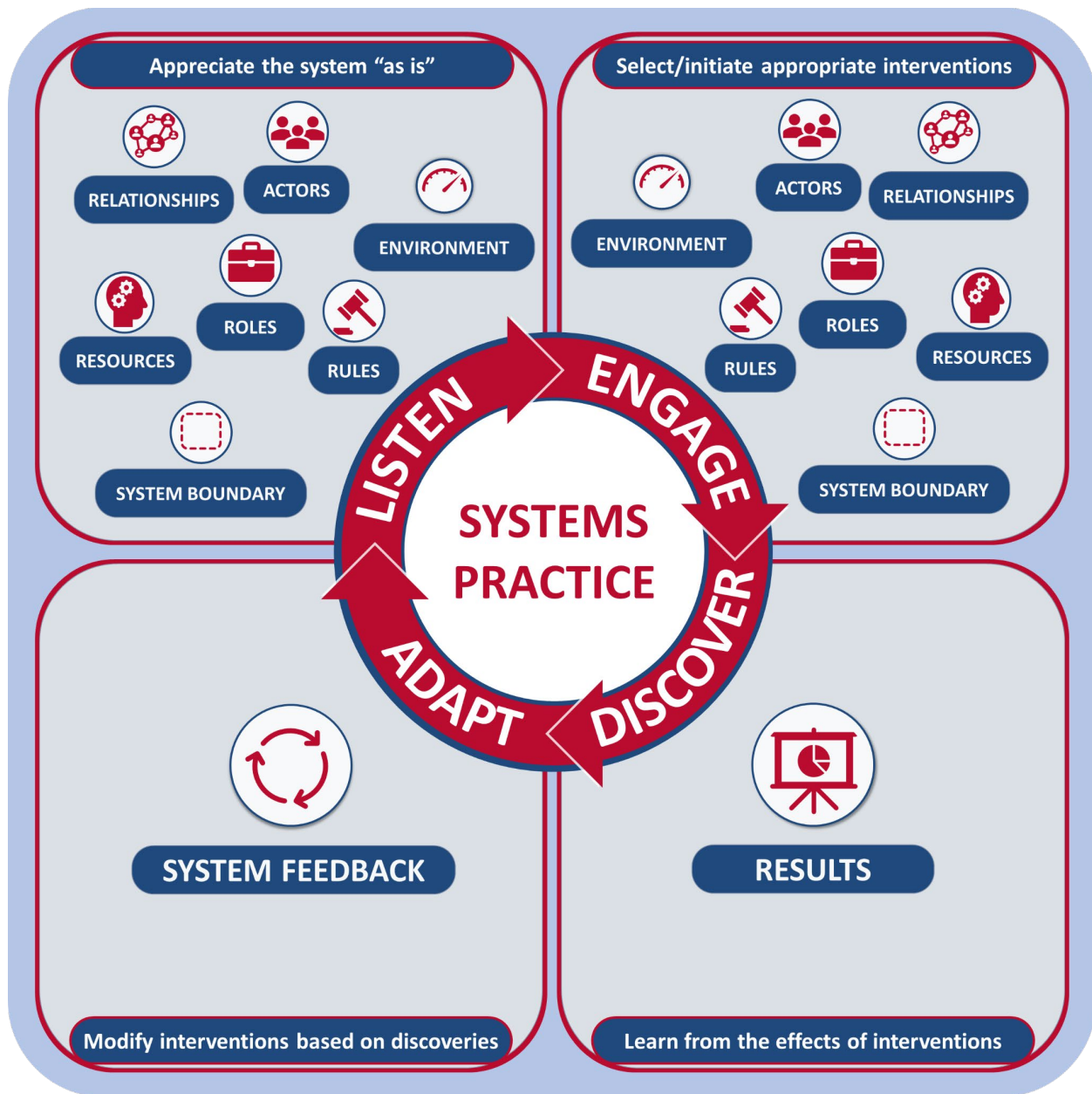


Figure 7. Systems Practice.

6. APPLYING THE COMBINED FRAMEWORK

In line with the USAID Higher Education Program Framework, USAID programming can apply this combined framework to support interventions that strengthen higher education's role (through the system and/or through HEIs), in collaboration with government and the private sector, to strengthen the national innovation ecosystem.

The following section details the steps for informing activity design and implementation in this space, based on the combined framework.

Listen

The first stage of the combined framework—**listen**—encourages active and potential participants in the ecosystem to understand the components and functions of the local system: the actors and their roles

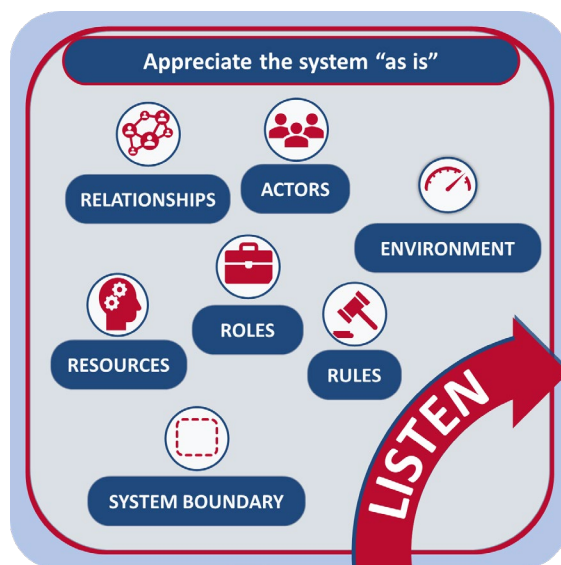


Figure 8. The Listen Stage.

and relationships, the rules that bind those actors, the resources they must enlist to engage successfully, the environment and local boundaries in which they operate, as well as the limitations of the desired results. Listening to the system as it currently exists enables potential participants to investigate what is known about the particulars of the ecosystem as well as unearth aspects of the ecosystem that are more difficult to discern or identify. HEIs provide a foundation for long-term investments in ecosystems. By leveraging local HEIs, active and potential participants in an innovation ecosystem can tap into the local knowledge and social networks that HEIs already maintain. The **listen** stage (Figure 8) requires local and non-local actors to investigate the ecosystem and to establish a foundation of knowledge to which participants in later stages can add. This may include

mapping the system and gathering enough information to ensure that the intervention is designed holistically. Often, the non-local actors are the focus for listening considering that they may be less familiar with the ecosystem components, but all parties should be listening and creating a common knowledge base.

Spotlight on Listen³⁷



A new research study by the University of Notre Dame (UND), under the Supporting Holistic & Actionable Research in Education (SHARE) umbrella, is focused on producing strategies to strengthen HEIs' engagement in innovation ecosystems within USAID partner countries. It is a multi-country study, focusing initially on innovation ecosystems in Indonesia, Kenya, and the Philippines.

The UND approach is based on the MIT D-Lab conceptual framework previously described. A three-phase research approach is being taken: 1) desk study, 2) meetings with local actors, and 3) full study. In phase 2, listening to the actors within the local innovation ecosystems in each country will be critical to determine how the full studies in each country will be carried out. Specifically, this approach will enable UND to examine the quality of the roles and relationships, the enabling environment, and the resources in each of our partner countries, thereby helping to identify cross-cutting lessons and transferable best practices.

Table 3 accompanies the 5Rs Framework and identifies questions to consider and answer to determine the current state of a system, allowing active and potential participants to identify needs specific to that innovation ecosystem. The categories and questions are in no particular order because the **listening** stage is not a linear process. Rather, an inspection of the system may take multiple disjointed iterations through the questions in Table 3 and inspire questions not currently included. If done thoroughly and holistically, participants in an innovation ecosystem can anticipate potential restrictions and impediments, and they can understand the readiness for change in the ecosystem.

TABLE 3. Guiding Questions for Listening to an Existing System

Questions to guide investigation into the contribution of each of the 5Rs to the functioning of the “as is” system	
Results	<ul style="list-style-type: none"> • What is the target result around which the local system is defined? • Are there trends (increasing, decreasing) or patterns in the target result over time? • How is the target result evaluated by local actors? Is it valued? • How is that valuation expressed to actors inside and outside the local system? • What other results (positive/negative) do actors note about the local system? • How adaptive, resilient, or self-sustainable does the local system seem to be?
Roles	<ul style="list-style-type: none"> • What roles are actors currently performing? • Are some actors performing multiple roles? • Are some roles being played by different types of actors, such as both government and the private sector providing primary education? • Are donors or other third parties playing prominent roles? • How effectively are actors fulfilling the roles they have taken on? • Are there issues of legitimacy or appropriateness surrounding the choice of roles that particular actors might take on? • Are there any roles that seem to be absent? Why?

³⁷ USAID Center for Education. “Cultivating innovation during COVID-19: Malawian higher education and solutions in crisis response,” 2020. https://www.edu-links.org/sites/default/files/media/file/Malawi%20MUST-ISP%20Case%20Study_Final_Dec20.pdf.

Relationship	<ul style="list-style-type: none"> • What types of relationships exist between role-players (formal/informal, contractual/hierarchical/reciprocal)? • How strong are these relationships? How valued are these relationships? Are they collaborative? Mutually beneficial? Conflictual? Predatory? • Does the strength of the relationship vary depending on the actors involved? • Are there relationships identified as missing, weak, unnecessary, or illegitimate?
Rules	<ul style="list-style-type: none"> • What rules affect the way the local system functions? • Are the relevant rules formal (laws) or informal (norms)? • Are relevant rules enforced? • How well? Effectively? Equitably? • Are actors in the local system able to modify the rules that affect them?
Resources	<ul style="list-style-type: none"> • What resources are currently being used by the local system in producing the target result? • Are there needed resource inflows that are missing or insufficient? • Are there trends (increasing, decreasing) or patterns (cyclical) in resource inflows? What are the sources of those resources? Are they reliable and secure? • How well are the results that the local system is producing being translated, through feedback loops, into sustained resource inflows?

Engage

The second step of the combined framework—**engage**—integrates the knowledge gained from the first step with new knowledge gained from looking ahead at what the system could look like. The **listening** stage focuses on what is while the **engagement** stage focuses on what could be. In the **engagement** stage (Figure 9), active and potential participants must imagine the possible futures and be able to envision paths to get there. Furthermore, this stage includes the actual intervention. Partnering with HEIs for this stage is critical. HEIs can help to create a culture of trust because they are long-standing members of communities and innovation ecosystems. Active and potential participants in an innovation ecosystem can capitalize on HEIs' role as trust-builders to use weak ties to exchange information or create partnerships. HEIs are particularly situated to connect actors, creating new relationships and shaping roles of old and new actors within the system.

Table 4 provides a similar set of questions to clarify the “as is” ecosystem from the **listening** phase but prompts participants to look forward to what the ecosystem could be in the future. Together, listening and engaging in an innovation ecosystem maximize the impact of activities and interventions by identifying the needs of the ecosystem—the gap between how the system currently is and how actors envision the system.

A holistic approach to investigating the questions and their answers will provide interested participants with the proper tools to engage methodically; it will guide the subsequent steps to adjust the approach or the desired results to match the needs and limitations of the ecosystem.

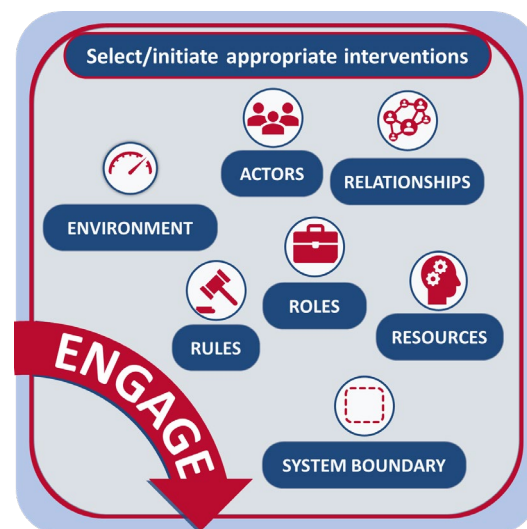


Figure 9. The Engage Stage.

Spotlight on Engage^{38,39}



Despite rapid economic growth, the Philippines lagged behind regional peers on science, technology, and innovation (STI) indices. USAID/Philippines Science, Technology, Research and Innovation for Development (STRIDE) is a five-year, \$32 million higher education program (2013–2018) to increase university capacity for research and innovation in collaboration with industry partners, supporting the Philippines' progress toward an innovation-led economy.

The innovation ecosystem pre-assessment highlighted two preconditions for the environment to be conducive to industry collaboration: building social capital and a supportive environment. Thus, STRIDE created a decentralized, voluntary, and market-led model to foster collaboration between the different actors. This model supported STRIDE's guiding principle of “Make Friends, Build Trust,” which addressed the shortcomings of the enabling environment.

Across its three program aims, STRIDE instituted a suite of activities to accomplish its objectives. After launch, the program did not take off as expected, and STRIDE ceased many of the activities in favor of focusing on the few that were effectively closing the gap between the current system and what STRIDE intended to accomplish. Participants in the STRIDE program were selected based on revealed interest, which created a diverse and motivated set of partners.

TABLE 4. Guiding Questions for Envisioning a Future System

Questions to guide investigation into the contribution of each of the 5Rs to the functioning of the “to be” system	
Results	<p>What is the target result around which the local system is defined?</p> <p>Is the target result valued by local actors? Which ones?</p> <p>How will that valuation be expressed to actors inside and outside the local system?</p> <p>How will resilience and adaptability be built into the system?</p> <p>What other positive results should the “to be” system produce?</p>
Roles	<p>What roles will local actors need to perform? Are these existing or new roles? For new roles, who will play them?</p> <p>What roles will donors or other third parties play? How can those roles be phased out over time?</p> <p>Are there issues of legitimacy or appropriateness surrounding the choice of roles that particular actors might take on?</p>
Relationship	<p>What types of relationships will need to exist between role-players (formal/informal, contractual/hierarchical/reciprocal)?</p> <p>Are these new or existing relationships? How can these relationships be constructed to be mutually beneficial?</p>

³⁸ USAID Office of Education. “Global Education Learning Series: Building Industry and Higher Ed Engagement for Economic Growth,” 2020. <https://www.edu-links.org/events/building-industry-higher-ed-engagement-economic-growth>.

³⁹ USAID Office of Education. “Building Higher Education for Growth and Innovation in the Asia-Pacific Region,” 2020. <https://www.edu-links.org/resources/building-higher-education-growth-and-innovation-asia-pacific-region>.

Rules	What rules will be needed to enable the local system to function well? What is needed to ensure rules are enforced efficiently and equitably? How much rule flexibility will be required to provide the local system with changes in its environment?
Resources	What continuing inflow of resources will be needed by the local system to produce the target result? How can this flow of resources be made reliable and secure? How can improving target results be leveraged, through feedback loops, into improving sufficient and reliable resource inflows?

Discover

The **discover** stage focuses on evaluating the results, the realized impact of an intervention, rather than the intended impact outlined in the **engage** stage. Assessing the impact allows reflection on the intervention—for instance, whether it is strengthening the ecosystem or only injecting short-lived resources. Using the questions from Table 5 can highlight the true impact of the intervention through updated answers.

Assessing the impact of the intervention creates another path for discovering the dynamics of the target innovation ecosystem—in addition to the **listen** stage. To ensure this, participants must develop methods to monitor the changes due to the intervention throughout the course of the intervention at the project level and at the system level. HEIs can support the **discover** effort through their role to drive iterative change (Figure 10). HEIs consistently produce inputs and outputs for the innovation ecosystem, enabling the system to adapt to shifting needs and circumstances.

For USAID Activities, one can think of this stage of the combined framework within the practice of collaboration, learning, and adapting (CLA), focusing on learning.⁴⁰ The next stage in the combined framework, **adapt**, also aligns with applying CLA practices to USAID activities.



Figure 10. The Discover Stage.

⁴⁰ USAID Center for Education. CLA Toolkit. <https://usaidlearninglab.org/qrg/understanding-cla-0>.

TABLE 5. Guiding Questions for Listening to an Existing System

Questions to guide investigation into the contribution of each of the 5Rs to the functioning of the “now is” system	
Results	<ul style="list-style-type: none"> • What was the target result around which the local system was defined? • Were there trends (increasing, decreasing) or patterns in the target result over time? • How was the target result evaluated by local actors? Was it valued? • How was that valuation expressed to actors inside and outside the local system? • What other results (positive/negative) did actors note about the local system? • How adaptive, resilient, or self-sustainable did the local system prove to be?
Roles	<ul style="list-style-type: none"> • What roles are actors now performing? • How have roles changed? • How effectively are actors fulfilling the roles they took on? • Are there issues of legitimacy or appropriateness surrounding the choice of roles that particular actors took on? • Did some actors exit the system? Were the roles that they filled taken up by other actors? • Are there any roles that still seem to be absent? Why?
Relationship	<ul style="list-style-type: none"> • What types of relationships exist between role-players (formal/informal, contractual/hierarchical/reciprocal) now? • How strong are these relationships? How valued are these relationships? Are they collaborative? Mutually beneficial? Conflictual? Predatory? • Does the strength of the relationship vary depending on the actors involved? • What new actors are involved and how do they relate to other actors? • Did some actors exit the system? Was the severing of relationships amicable? Hostile? • Are there now relationships identified as missing, weak, unnecessary or illegitimate?
Rules	<ul style="list-style-type: none"> • What rules affected the way the local system functions? • Were the relevant rules formal (laws) or informal (norms)? • Were relevant rules enforced? • How well? Effectively? Equitably? • Were actors in the local system able to modify the rules that affect them?
Resources	<ul style="list-style-type: none"> • What resources are now being used by the local system in producing the target result? • Were there needed resource inflows that are missing or insufficient? • Were there trends (increasing, decreasing) or patterns (cyclical) in resource inflows? What are the sources of those resources? Are they reliable and secure? • How well are the results that the local system is producing being translated, through feedback loops, into sustained resource inflows?

Adapt

The final stage of the cyclical combined framework—**adapt**—focuses on using information from the **discovery** stage to identify and iterate interventions that yield desired results (Figure 11). Ideally, the results of an intervention align with the intended goals and promote further intervention by expanding the components of the ecosystem.

An ecosystem's stability and sustainability rely on the inflow of new or renewed components, and an intervention that is not carefully considered and executed may impede that inflow. Cases may include interventions whose results were not locally valued or failed to materialize. Consequently, subsequent interventions may have fewer resources and greater obstacles in accomplishing their desired results.

Whether investigated or not, the feedback loop component of the combined framework has a marked impact on an innovation ecosystem. In order to truly strengthen an innovation ecosystem, participants in an intervention must account for feedback loops and how the ecosystem responds to the intervention. Successful interventions develop and strengthen the target ecosystem and provide, create, or empower components of the ecosystem to explore more, better, or reproducible opportunities for sustainable change. HEIs are uniquely positioned to embed the findings of research or the results of an intervention into the local ecosystem. They may accomplish this through incorporating recommendations into education, partnering with private entities, impacting policy with public entities, or even promoting the virtue of the research through their role as trust-builders.

By using the systematic approach of the combined framework—**listen, engage, discover, adapt**—participants can compound the expanding role of HEIs as well as be more likely to identify and accomplish the desired result of a given intervention, ensuring those benefits fuel future interventions.

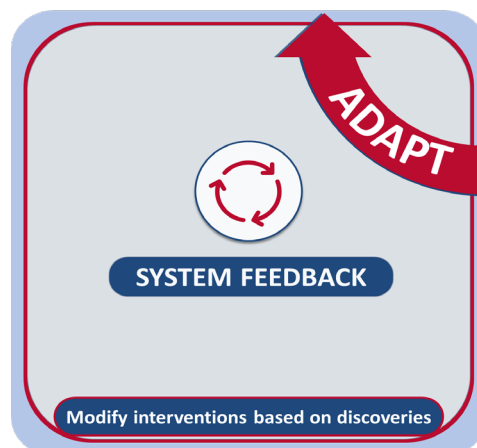


Figure 11. The Adapt Stage.

7. CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

USAID will continue to explore and support the role higher education plays in developing and strengthening national and regional innovation ecosystems. As good practices in implementation continue to garner attention, consideration for the framework gaps and future work to address or refine Q6 should be at the forefront. Interdisciplinary collaboration, accelerated innovation channels, and access to data will all play a crucial role in determining the sustained impact of innovation ecosystems, but attention to inclusivity and equitable access to actors across systems should be placed at the beginning of any development process.

Various areas for further research remain:

- Using the United Nations Sustainable Development Goals (SDGs) as a guide, future research could consider the role HEIs play in the sustainable development of innovation ecosystems and in the impact of interventions in a particular innovation ecosystem. For example, climate change is at the forefront of many conversations and research could consider the long-term effects of interventions in innovation ecosystems through the lens of climate change and environmental responsibility.
- There is still a need to determine the success of strategies to promote diversity and inclusivity impact while also adhering to recognized best practices. Work in the space of the impact of innovation ecosystem development on social justice or vice versa could also reveal critical areas of growth potential. Research should incorporate social justice best practices to ensure that populations in the target innovation ecosystem are not marginalized by or excluded from interventions' benefits. HEIs sustain economic effects through their impact on the labor force. Thus, they are key to driving progress for previously marginalized groups and empowering youth, including in greater numbers those previously cut off from an expanding innovation ecosystem.
- This framework can benefit the ways that HEIs are currently engaging in their respective ecosystems. HEIs can begin mapping their system to facilitate future interventions and encourage targeted academic interventions, such as thesis or dissertation research. Sharing this tool with HEIs will further entrench the evolving role of HEIs as anchors, trust-builders, and primary stakeholders in an innovation ecosystem. Further, HEIs can proactively drive intervention goals by making information about ecosystem needs available to governments, donor agencies, and private sector actors.

For more information on USAID support of higher education and innovation ecosystems, please visit <https://www.edu-links.org/>. To contribute to or learn more about the USAID Higher Education Learning Agenda, please contact us at helearning@usaid.gov.

BIBLIOGRAPHY

Adner, Ron. "Ecosystem as Structure: An Actionable Construct for Strategy." *Journal of Management*, 43, no. 1 (2017): 39–58. <https://doi.org/10.1177/0149206316678451>.

Amulya, Joy, James Chung, Stephanie Monschein, and Charu Vijayakumar. "Midterm Performance Evaluation of the Higher Education Solutions Network (HESN)." Report prepared for USAID. Washington, DC: Dexis Consulting Group, 2016.

Cai, Yuzhuo, Borja Ramis Ferrer, and Jose Luis Martinez Lastra. "Building University-Industry Co-Innovation Networks in Transnational Innovation Ecosystems: Towards a Transdisciplinary Approach of Integrating Social Sciences and Artificial Intelligence." *Sustainability*, 11, no. 17 (2019): 4633. <https://doi.org/10.3390/su11174633>.

Cai, Yuzhuo, Jinyuan Ma, and Qiongqiong Chen. "Higher Education in Innovation Ecosystems." *Sustainability*, 12, no. 11 (2020): 4376. <https://doi.org/10.3390/su12114376>.

Fuglsang, L., A.V. Hansen, I. Mergel, and M.T. Røhnebæk. "Living Labs for Public Sector Innovation: An Integrative Literature Review." *Administrative Sciences*, 11 (2021): 58. <https://doi.org/10.3390/admsci11020058>.

Grau, Francesc Xavier, John Goddard, Budd Hall, Ellen Hazelkorn, Rajesh Tandon, and others. Higher education in the World 6. Towards a Socially Responsible University: Balancing the Global with the Local, 2017. <https://www.researchgate.net/publication/314840823>.

Grobbelaar, S. "Developing a local innovation ecosystem through a university coordinated innovation platform: The University of Fort Hare." *Development Southern Africa*, 35 (2018): 657–672. <https://doi.org/10.1080/0376835X.2017.1421902>.

Hoffecker, Elizabeth and Molly Wenig Rubenstein. MIT D-Lab. "Understanding innovation ecosystems: A Framework for joint analysis and action." 2019. https://d-lab.mit.edu/sites/default/files/inline-files/Understanding_Innovation_Ecosystems_FINAL_JULY2019.pdf.

Jäger, Angelika and Johannes Kopper. "Third mission potential in higher education: Measuring the regional focus of different types of HEIs." *Review of Regional Research*, 34 (2014): 95–118. <https://doi.org/10.1007/s10037-014-0091-3>.

Kumari, Richa, Ki-Seok Kwon, Byeong-Hee Lee, and Kiseok Choi. "Co-Creation for Social Innovation in the Ecosystem Context: The Role of Higher Educational Institutions" *Sustainability*, 12, no. 1 (2020): 307. <https://doi.org/10.3390/su12010307>.

Leydesdorff, Loet, and Henry Etzkowitz. "The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations." *Research Policy*, 29 (2000): 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4).

Lindow, Megan. "Weaving success: Voices of change in African higher education." *Institute of International Education*, 2011. <https://www.iie.org/Research-and-Insights/Publications/Weaving-Success-PHEA>.

Organization for Economic Co-Operation and Development. "National Innovation Systems." OECD, 1997. <https://www.oecd.org/science/inno/2101733.pdf>.

Peterson, Penelope, Eva Baker, and Barry McGaw. *International Encyclopedia of Education*. Elsevier, 2010.

Sotarauta, Markku, Tuomo Heinonen, Pasi Sorvisto, and Jari Kolehmainen. "Innovation Ecosystems, Competencies and Leadership: Human Spare Parts and Venture Finance Ecosystems under Scrutiny," 2016. (Tekes).

Ssebuwufu, John, Teralynn Ludwick, and Margaux Béland. "Strengthening University-Industry Linkages in Africa." Ghana: Association of African Universities (AAU), 2012. <http://www.heart-resources.org/wp-content/uploads/2015/09/strengthening-university-industry-linkages-in-africa-report-2012.pdf>.

Stolze, Audrey and Klaus Sailer. "Advancing HEIs' third-mission through dynamic capabilities: the role of leadership and agreement on vision and goals." *Journal of Technology Transfer*, 47 (2022), 580–604. <https://doi.org/10.1007/s10961-021-09850-9>.

Thomas, Elise, Kadigia Faccin, Bjørn Terje Asheim. "Universities as orchestrators of the development of regional innovation ecosystems in emerging economies." *Growth and Change*, 52 (2021): 770–789. <https://doi.org/10.1111/grow.12442>.

USAID Bureau for Policy Planning and Learning. "The 5Rs framework in the program cycle," 2016. https://usaidlearninglab.org/sites/default/files/resource/files/5rs_techncial_note_ver_2_1_final.pdf.

USAID Innovation, Technology, and Research. "Higher Education Solutions Network (HESN)." <https://www.usaid.gov/research/hesn>.

———. "Impact report for the Higher Education Solutions Network." 2016. <https://www.edu-links.org/resources/impact-report-higher-education-solutions-network>.

USAID Office of Education. "Building Higher Education for Growth and Innovation in the Asia-Pacific Region," 2020. <https://www.edu-links.org/resources/building-higher-education-growth-and-innovation-asia-pacific-region>.

———. CLA Toolkit. <https://usaidlearninglab.org/qrg/understanding-cla-0>.

———. "Cultivating innovation during COVID-19: Malawian higher education and solutions in crisis response," 2020. https://www.edu-links.org/sites/default/files/media/file/Malawi%20MUST-ISP%20Case%20Study_Final_Dec20.pdf.

———. "Global Education Learning Series: Building Industry and Higher Ed Engagement for Economic Growth," 2020. <https://www.edu-links.org/events/building-industry-higher-ed-engagement-economic-growth>

———. "Higher Education as a Central Actor in Self-Reliant Development: A Program Framework," 2020. https://www.edu-links.org/sites/default/files/media/file/Higher%20Education%20Framework_Oct%202020.pdf.



USAID
FROM THE AMERICAN PEOPLE

U.S. Agency for International Development
Ronald Reagan Building
1300 Pennsylvania Ave. NW
Washington, D.C. 20523-1000

[usaid.gov](https://www.usaid.gov)
education@usaid.gov