The Role of Innovation Intermediaries in Bridging the AI Talent Gap

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Artificial intelligence (AI) adoption is growing rapidly, yet talent shortages threaten implementation. This study explores how innovation intermediaries facilitated an AI talent development program in Taiwan. AIGO Team for Mid-Senior Level Talent, the three-stage talent development program leveraged course training, AI program prototype, and performance validation to build practical AI capabilities and ready organizations for adoption through partnerships with industry experts and practitioners. The study employed a qualitative research approach and adopted a semi-structured interview with a focus group format as an instrument to better understand how innovation intermediaries are operating and evolving in the context of AI talent. Coding identified the workflow of program process and five valuable innovation intermediary roles in AI talent program and AI project success: trustworthy databases, consultation and observation, stakeholder management, flexibility toward innovation, and logistic arrangement. Intermediaries empowered exploratory, customized learning aligned with the program's knowledge-sharing mission. By leveraging connections and adaptability, they catalyzed talent growth and organizational change. The paper provides an overlook of innovation intermediary best practices for bridging talent gaps critical to emerging technology deployment. As rapid AI evolution necessitates lifelong learning, intermediaries can play a vital role in revitalizing a sustainable talent ecosystem.

Keywords: AI Talent, Innovation Intermediaries, Talent Ecosystem.

1. Introduction

Urgent demands for artificial intelligence (AI) have been growing in recent years. According to Mckinsey's state of AI in 2023 and 2022, AI adoption has more than doubled. In 2017, 20 percent of respondents reported adopting AI in at least one business area, whereas today, that figure stands at 50 percent [1]. The results show that these leaders are making larger investments in AI, engaging in increasingly advanced practices known to enable scale and faster AI development. Furthermore, CIO Taiwan shared its survey of 2022 enterprise AI Trends when examining the difficulties in AI adoption, the lack of talent (64.2%) ranked as the main challenge, followed by difficult propositions (45.6%) in second place and unclear

return on investment (37%) in third. Other major difficulties identified include problems with data collection (36.5%) and corporate culture (35%) [2].

Unfortunately, the AI talent shortage shows no sign of easing, which threatens to slow the overall AI transformation. Looking ahead to the next three years, experts predict that the adoption of AI will reshape many roles in the workforce [3]. Hiring is hard. Reskilling and upskilling are common alternatives to hiring. Finding a best practice to assist the industry in upskilling internal AI talent would be crucial work for the adoption of AI by all companies across countries.

Innovation intermediaries

In the scale-up and commercialization of emerging technologies, such as AI, innovation intermediaries play a critical role in bridging research translation, fostering knowledge and resource sharing, supporting technology transfer, and building innovation capabilities and ecosystems [4],[5]. Innovative intermediaries act as a catalyst for innovation to address these changes and challenges.

To better frame the role of innovation intermediaries [6], this study positioned innovation intermediaries as problem solvers. Innovation intermediaries support firms that lack the specialized skills or knowledge needed to solve specific issues or develop innovations. This is done by connecting companies with external experts or providing our own expertise. Innovation intermediaries also improve innovation capabilities by directly providing training or knowledge services or facilitating competence-building services [7],[8]. This support can be particularly valuable for organizations attempting AI adoption for the first time that cannot locate essential resources to initiate projects. It also helps more established, yet internally focused, organizations open to external collaboration.

However, the actors in the innovation ecosystem have considerable diversity, raising questions about the roles and positions of specific players, such as innovation intermediaries. To improve this and bridge science and academic-industry gaps, proximity has proven essential for inter-organizational interaction [9]. Despite their importance, substantial research on how intermediary roles create value [10], especially in the development of talents, is lacking. This study explores the role of innovation intermediaries in an AI talent development program in Taiwan, exploring how they assisted talents and organizations in improving personal competencies and organizational readiness for AI adoption.

AIGO Team for Mid-Senior Level Talent

AIGO is a platform that invites all AI practitioners to solve real-world industrial problems since 2016 [11, 12]. The platform is currently hosted by the Administration for Digital Industries(ADI), Ministry of Digital Affairs in Taiwan, and is managed by the Digital Education Institute, Institute for Information Industry. To ease the urgent need of lack of practical talent for AI innovation and AI adaption in the industry, the “AIGO Team for Mid-Senior Level Talent” was proposed in 2021. The program is fully sponsored by ADI. The following are the learning objectives at the program level:

1. Knowledge: Learners will identify and acquire the core technical skills needed to develop AI solutions, such as programming languages, data analysis, and machine learning algorithms.

2. Comprehension: Learners will explain and practice key soft skills, such as communication, creativity, and adaptability that enable effective collaboration on AI projects.

3. Application: Learners will demonstrate innovation by designing an AI prototype solution for an organizational challenge using new techniques or approaches.

4. Analysis: Learners will compare and contrast the roles of different functions in the development and implementation of AI solutions to build cross-functional fluency.

5. Synthesis: Learners will engage with leadership for involvement to enable effective AI governance and oversight of support for AI project success.

6. Evaluation: Learners will assess the current organizational culture and recommend changes to values, norms, and practices that could enhance the adoption of AI solutions.

Based on the designed learning objectives, the rubric to determine the learner's competencies, as shown in Table 1.:

Table 1: Rubric to assess the learners in the AIGO Team for Mid-Senior Level Talent.

Developing Competence	Competent	Mastery
Knowledge		
Has an opportunity to further develop understanding of programming languages, data analysis, and machine learning algorithms.	Identifies and acquires essential technical skills needed for AI solutions.	Demonstrates advanced expertise in technical skills, constantly exploring new frontiers.
Comprehension		
Can improve communication effectiveness, creativity, and adaptability.	Explains and practices key soft skills, enabling collaboration on AI projects.	Exemplifies exceptional soft skills, fostering a highly collaborative and innovative environment for AI projects.
Application		
Requires more experience in designing AI prototype solutions and applying new techniques/approaches.	Demonstrates innovation by designing an AI prototype solution for an organizational challenge using new techniques or approaches.	Develops groundbreaking AI prototype solutions that redefine industry standards and push the boundaries of innovation.
Analysis		
Would benefit from	Compares and contrasts	Exhibits a

better understanding of different functions in AI development and implementation.	the roles of different functions in the development and implementation of AI solutions, building cross-functional fluency.	comprehensive and nuanced understanding of cross-functional roles, enabling seamless integration and optimization of AI development and implementation processes.
Synthesis		
Can work on engaging with leadership and understanding the importance of AI governance and oversight.	Engages with leadership for involvement to enable effective AI governance and oversight of support for AI project success.	Champions AI governance and oversight, collaborating closely with leadership to establish a robust and comprehensive framework that sets industry standards.
Evaluation		
Has room to improve in assessing organizational culture and recommending changes for AI adoption.	Assesses the current organizational culture and recommends changes to values, norms, and practices that could enhance the adoption of AI solutions.	Conducts an in-depth, multi-faceted assessment of organizational culture and provides visionary recommendations that catalyze transformative change, paving the way for seamless AI adoption and sustained success.

The program adapted the innovative 6P-4C model to develop ICT talent from across domains [13]. The purpose was to incubate the internal AI consulting team and practical AI professionals through course training, AI project prototype, and performance validation with the involvement of innovation intermediaries to achieve the designed learning objectives, as shown in Figure 1.

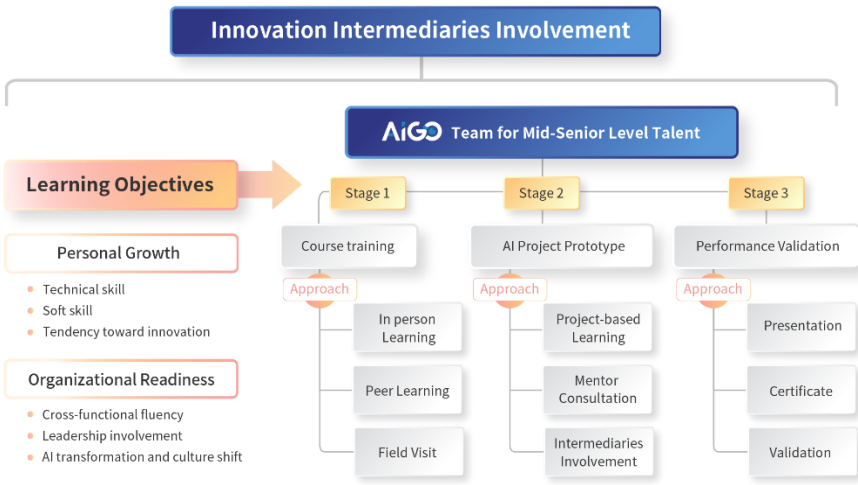

Fig. 1. Learning objectives and structure of the AIGO Team for Mid-Senior Level Talent.

The prerequisites are that the company must fill out and submit the designated proposal, providing the following description. To join the program, the company will describe its existing pain points and initial ideas about how to transform their pain points into an executable AI solution, including the qualitative and quantitative effectiveness. Each company will form a team consisting of three participants. The team composition must meet the following conditions: The team leader should be an AI project manager or an enterprise middle or senior-level project manager. The team members should have technical experience in AI technology and domain knowledge. Furthermore, this program aims to introduce the teams into the empirical field to solve the actual problems of the enterprise and promote AI transformation and cultural diffusion within the enterprise.

The AIGO Team for Mid-Senior Level Talent program consisted of three stages: course training, AI project prototype, and performance validation. First, the 32-hour structured, formal, and standardized course training was led by 9 AI experts covering topics such as applications, consulting skills, project management, and cultural transformation in AI. Participants refined their original project scope and datasets to align with organizational needs. The courses allowed teams to anticipate obstacles around collaboration, resources, and leadership support.

The AI prototype stage focused on mentor consultations. With the informal and unstructured mentoring methods, mentors with specialized research and deployment experience helped teams develop valuable, actionable AI projects. Each team had a customized mentor who shared domain knowledge, improved planning and execution, and facilitated deployment. This approach promotes higher engagement as participants related to real tasks and enhances team dynamics and collaboration among coworkers. Each team also had an innovation intermediary that guided timelines and connected resources throughout the process.

Finally, the stage of performance validation involved presenting projects for evaluation and certification. The judges assessed quantitative and qualitative optimization and future

deployment plans. The most valuable project and the potential company were recognized. This enabled peer learning and expert feedback beyond assigned mentors. This three-stage AI talent development program leveraged training, mentorship, and validation to build practical AI capabilities and ready organizations for adoption.

The program is situated between on and off-the job training [14]. The stage of course training lean toward off-the-job training. The stage of AI project prototype lean toward on-the-job training. Participants are performing their job duties but outside the workplace. The whole program has fixed start and end dates, but the mentoring duration, depending on the complexity of the project.

The program runs annually, with a duration of 6 months. In 2021-2022, it recruited 18 talents from 6 companies. In 2022-2023, it recruited 42 talents from 14 companies. It cultivated 60 mid-senior talents in total within 20 companies across various industries as shown in Table 2. In the 2022-2023 cohort, the program received 75.86% overall program satisfaction rate, 72.41% believed that it is beneficial to increase personal growth and organizational readiness, and 77.24% suggested that the involvement of innovation intermediaries took a strong part of their AI project success.

Table 2: Industry category of companies

Industrial field	Number of companies
Manufacturing	
Automotive Industry	1
Aerospace Industry	1
Machine Tool	1
Steel Industry	1
Plastic Manufacturing	2
Petrochemical Industry	3
Electronic and Optical Products	5
Service Industry	
Consultation Service	1
Transportation	1
Healthcare	2
Information Service Activities	2
Total	20

2. METHOD

The core research question addressed in this study: How are innovation intermediaries

operating and evolving in the context of AI talent development? To understand the current situation and the role of innovation intermediaries. The study employed a qualitative research approach and adopted a semi-structured interview with a focus group format as an instrument to better understand the role of innovation intermediaries in managing the AIGO talent program and engaging with participants toward the success of AI projects. Innovation intermediaries (N=5) were interviewed in person together for 120 minutes. Those who accepted to participate the interview one was male, four were female. The mean number of years in the current position was 6.2.

The interviewers are the first and second author of the paper, who have research background and constantly ask follow-up questions and secure detailed responses to better understand how the innovation intermediaries involvement in the AIGO Team for Mid-Senior Level Talent. All open questions explore how innovation intermediaries engage with participants and turn industry challenges into concrete AI solutions, from talent program design, preparation, implementation, challenges, and suggestions to achieving learning objectives. The designed questions that carried out during the interview:

1. Role

- Could you describe your role as an innovation intermediary in the AI talent development program?
- What specific assistance do you provide to the participants of these programs to help them achieve their defined learning goals?

2. Workflow/Timeline

- Can you share the established workflow and key steps in designing and executing an AI talent development program?
- After the program starts, what are some tasks or items you need to assist with to ensure the smooth operation of the program?

3. Conclusion

- From your experience, which workflow elements in the AIGO enterprise program are most critical for participants to adopt AI?
- What kind of support do you expect your organization to provide to enhance your innovation intermediary services?
- What advice would you give to organizations just starting to build internal AI capabilities? Regarding how an innovation intermediary can provide assistance?

3. RESULT AND DISCUSSION

Based on the coding scheme, two topics emerged: how the innovation intermediaries (the "interviewees") designed and implemented the AIGO Team for Mid-Senior Level Talent, and their points of success. The author considered the interviews effective due to the depth of interviewee responses, the rapport and openness established, and accurate transcription

and coding that captured relevant themes.

Innovation Intermediaries Workflow

The PDCA cycle, plan–do–check–act, is a non-negotiable process employed by interviewees to exercise complete control over their processes and products while ensuring continuous improvement. This model is widely recognized as the definitive problem-solving solution for quality management [15]. Furthermore, the problem-solving process model consists of several critical stages, including problem definition, in-depth problem analysis, solution generation and selection, rigorous testing and evaluation, and the development of new routines, as shown in Figure 2.

Fig. 2. Innovation Intermediaries used PDCA cycle for the AIGO program.

A problem or challenge is identified and analyzed during the planning phase. Interviewees mapped out what they were going to do to solve a problem. Then, develop pilot program for what the underlying issues or causes are, and decide on one pilot to test first. To navigating the dilemmas of the convergence of AI, Interviewees acknowledged the importance of develop the AIGO innovative talent development program through the two lens: desirability and feasibility. The pilot program was implemented during the doing phase. Smaller, incremental changes help improve processes with minimal disruption. In 2021-2022, interviewee tested the talent program with a small-scale project for only 6 teams with 18 participants.

The checking phase is to review and evaluate the pilot results. It allows interviewees to evaluate the solution and revise the plans as necessary. By thinking about the following questions: Did the plan actually work in terms of effectiveness and efficiency? If so, were there any hiccups in the process? What steps could be improved or need to be eliminated from future iterations based on participant's suggestion? The evaluation at this stage will guide the decisions in the next step. New routines are developed in the acting phase. The new process now becomes the baseline for future PDCA iterations. In 2022-2023, interviewee executed the talent program for larger scale, 14 teams with 42 participants, served as the first iteration of innovative talent development program for AI adoption.

Innovation Intermediaries Importance

Coding identified five points of success from innovation intermediary roles in AI talent development: (1) trustworthy databases; (2) consultation and observation; (3) stakeholder management; (4) flexibility toward innovation; and (5) logistic arrangement.

Trustworthy Databases: The most valuable element of the AIGO talent program is inviting esteemed experts to share wisdom and assist talents. Our continually expanding database contains intermediary and talent feedback, expert qualifications, involvement, performance, and learner satisfaction of each expert. By tapping esteemed advisors to share wisdom and assist talents based on needs, each team receives customized guidance to make complex AI projects actionable, as evidenced by the diverse range of projects shown in Table 3. The expanding database catalogs experiential insights across industries to connect teams with ideal mentors suited to their unique industry workflows and challenges. Without this trustworthy intermediary-facilitated network, locating the right mentor-project fit may prove impossible. This exemplifies intermediaries' role leveraging connections and resources to empower talent development and organizational success. Accelerating learnings and best practice sharing across teams could further enhance its impact.

Table 3. AI Project Categories in AIGO Team for Mid-Senior Level Talent

AI Project Categories	Number of projects
Natural Language Processing	2
Computer Vision	5
Machine Learning	13
Total	20

Consultation and Observation: Interviewees accompany talents through the entire learning journey, from submitting their initial application to final validation. Close observation provides insights into talent learning behaviors and company dynamics. Understanding challenges allows flexible and suitable resource deployment. Furthermore, interviewees act as a buffer in communication between mentors and talents. Innovation intermediaries also bring various industrial AI insights into the consultation, enriching perspectives under consideration. This one-on-one guidance builds trust-based relationships where talents feel their needs are considered, increasing devotion. Intermediaries provide emotional support and ensure aligned mentor-talent dialogues, and smooth miscommunications for successful project delivery. By cultivating open communication channels, an exploratory environment for capability-building, and purposeful coordination, intermediaries empower talents to apply learning to deliver organizational impact. This consistent, holistic support provides the foundation for transformation within companies and individuals. Furthermore, through close observation in this study revealed that learning through indirect participation can also be valuable. Interviewees indicated that when learning new skills, it is not always necessary to work directly with the technology in order to learn about it at work. There were instances where AIGO's talents learned about technology by hearing about it or watching their cohort use it. This aligns with Bandura's notion of vicarious learning [16]. The findings suggest that

in the workplace, indirect learning opportunities, such as observing or listening to co-workers, can supplement hands-on training and practice. Managers may want to leverage both direct training and indirect learning to build employees' skills efficiently.

Stakeholder Management: The interviewee is involved in systematically identifying stakeholders; analyzing their needs and expectations; and planning and implementing various tasks to engage with them. There are heterogeneous stakeholder perceptions about what the definition of AI project success and what responsibility lies for ensuring AI talent program success. Various actors within the talent program attribute responsibility to other actors. For instance, as shown in Figure 3, interviewees tend to solicit guidance and resources from sponsors or clients. Talents, on the other hand, tend to attribute responsibility to their employer. AI experts appointed by interviewees and provided consultation to talents. However, the interviewee highlighted that achieving the program success requires collective effort and mutual goal toward AI adoption, and emphasized community norms as a means to establish and reinforce mutual understanding and responsible practices.

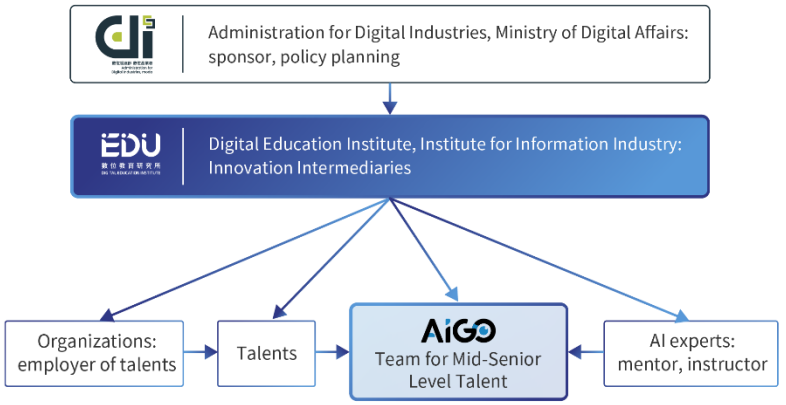

Fig. 3. Innovation Intermediaries used PDCA cycle for the AIGO program

Flexibility toward Innovation: Each team faced unique needs stemming from their diverse AI projects. While the program structure remained standardized, customization occurred during the stage of prototyping and validation to adapt to each team. Ongoing monitoring allowed intermediaries to dynamically adjust scope and deliverables as additional needs surfaced. Interviewees promoted a trial-and-error mindset focused on the creative process over final outputs. As government-affiliated intermediaries, interviewees benefited from neutrality compared to private funding sources. Interviewees indicated their talent programs were perceived as more unrestricted and exploratory than internal human resources-led initiatives, which may prioritize prescribed skill-building. Learners have more autonomy to try and learn that is safer to be innovative. By embracing flexibility and organic learning, intermediaries empowered innovative solutions tailored to teams' distinct circumstances. This adaptive approach aligned with their public mission orientation toward collaborative knowledge-sharing rather than mandated results.

Logistics Arrangement: Interviewees handled time-consuming yet rewarding logistical tasks including classroom management, catering, and venue booking. Ensuring seamless program

delivery and participant satisfaction also tests intermediaries' emotional intelligence to balance the expectations and needs of various stakeholders. Beyond coordinating facilities and meals, intermediaries must adapt to last-minute changes, troubleshoot issues, and proactively identify talent's pain points around scheduling or access. Strong communication skills enable intermediaries to gather ongoing feedback and convey key program updates to keep talents focused on learning objectives rather than logistics. Additionally, relationship building with external vendors and partners ensures programs have the highest quality resources. By handling the intricate behind-the-scenes logistics smoothly, intermediaries allow talents to fully immerse in the learning experience.

However, there are few research limitations that need to consider. First, the sampling plan for this case study is not effective enough for its findings to be generalizable to the broader population. The sample consisted solely of innovation intermediaries from one institute in Taiwan. Further research surveying intermediaries across various industries could provide more insight into how this role advances innovation management. Second, the limited number of interviewees, while suitable for an in-depth qualitative study, restricts broad applicability. However, this talent development program values delicate support for talent growth. Securing more data would require increased funding to recruit suitable mentors and participants. We encourage professionals dedicated to talent development to join in advancing the industrialization of AI.

Finally, cultural context should be considered since this study occurred in Taiwan. However, Taiwan has a robust technology supply chain in semiconductors and manufacturing, making it a unique ecosystem. Still, these findings offer value for third-party talent developers and human resource professionals looking to evaluate and refine their programs. Therefore, the intermediary best practices uncovered have potential for replication and impact beyond Taiwan, though localized adaptation may be prudent. Further multi-region research could better isolate cultural factors from universal human capital processes for advancing AI.

3. Conclusion

This study explored the role of innovation intermediaries in an AI talent development program in Taiwan. The three-stage program of training, prototyping, and validation helped build AI capabilities and readiness in companies new to adoption. Our findings highlight five key innovation intermediary roles: maintaining trustworthy databases, providing ongoing consultation and observation, managing diverse stakeholders, embracing flexibility for innovation, and smoothly handling logistics.

By leveraging their neutrality and connections, intermediaries can empower exploratory, capability-building talent development programs tailored to emerging needs in AI adoption. AIGO Team for Mid-Senior Level Talent, this adaptive, trust-based approach centers talents' growth within a mission of collaborative knowledge sharing for AI advancement.

While further research across various contexts is warranted, these results provide initial best practices for intermediaries as change agents growing talent for new technologies. Our study highlights the intermediary's role in aligning diverse stakeholders toward a shared vision of transformative impact.

To further expand impact, we propose continually establishing a reliable database to source and cultivate the best experts for AI project success. Based on the principle of digital trust, the Institute for Information Industry is currently committed to establishing a "Trustworthy Befitting Talent Database" and cultivating talent through programs like AIGO. The training records and demonstrated skills from these programs will serve as verified proof of participants' capabilities. As innovation intermediaries focused on problem-solving talent shortages, this database will enable us to continually connect qualified talent with enterprise needs in the future. By maintaining verified information on program participants' expertise and achievements, the talent database aims to align the most suitable individuals with industry demand, strengthening the pipeline of AI talent over time.

We also recommend strengthening communities of practice [17] where cohorts continue collaborating and learning beyond the program timeline. This facilitates ongoing peer exchange and collective growth. While technical skills are crucial for AI adoption, organizations must also align values, norms, and governance to enable transformation. AI adoption success depends on employers, employee, innovation intermediaries, and sponsor co-producing a partnership through which an appropriate balance is negotiated between the on and off-the-job training [18]. Our talent program seeded multi-disciplinary teams immersed in real-world problem solving. However, viewing talents as partners in a broader community of practice, rather than isolated temporary teams, could further unite efforts toward AI advancement.

Human resources professionals and talent developers should consider innovation intermediaries as change agents empowering technology deployment. This study provides an overview of innovation intermediary best practices in bridging talent gaps for emerging technologies. As AI continues rapidly evolving, lifelong learning and adaptation become imperative. Intermediaries can play a vital role in future-proofing both individual and organizational capabilities. A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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