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Challenges and Solutions for Fostering Entrepreneurial Universities and Collaborative Innovation

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Nurturing Collaboration? A Skill Set for University-Industry Collaboration Champions

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Abstract

Project-based industry placement program is an important form of university-industry engagement. They provide opportunities to immerse students and researchers from university in the industrial working environment to collaborate on a specific project. A successful industry placement project brings benefits to both parties. Students and researchers from university can better understand business needs as well as the process of knowledge application in the workplace, enable practice of specific skills relevant to the subject domain, and generating insights for future research with a larger practical impact. At the same time, this collaboration promotes knowledge and technology transfer, bringing fresh momentum to industrial innovation and upskilling. Notwithstanding the potential benefits, the collaboration between academia and industry is not easy but complex, successful industry placement engagement requires champions from both sides as the driving force. The skills and competencies required to drive successful university-industry collaboration are important yet rarely studied. Therefore, this study elaborates the capability requirements of university-industry collaboration champions.

Semi-structured interviews were designed and conducted with both researchers from university and practitioners from industry partners. Based on the data collected from interviews, supports and barriers were identified that are important to project-based industry placement programs. A skill set was further developed for university-industry collaboration champions with six skill requirements categorized under four types: foundation skill, transformational skill, network skill and integration skill. The skill set provides guidance and support for champions in their proactive initiatives for deepening university and industry symbiotic collaboration. As more benefits and deeper impact follow from greater collaboration and partnerships between academia and industry, this study highlights the need for constant investment in the skills and capabilities for the future of university-industry engagement.

Keywords

University-Industry collaboration champions, Project-based industry placement program, Skills, Interview.

1 Introduction

The importance of university-industry engagement has been widely reported by previous studies as it brings great mutual benefits to the both sides. For industry organisations, the application and implementation of transferred knowledge and collaborative research outputs from academia could bring great driving force and momentum for the innovation journey (Ambos et al. 2008; Ankrah et al. 2013). While for universities, interaction with industry exposes researchers to real-life challenges, current working practice and training opportunities to gain practical techniques and feedback (Jong, 2008; Arvanitis et al.

2008). Project-based industry placement program is an important form of university-industry engagement. They provide opportunities to immerse students and researchers from university in the industrial working environment to collaborate on a specific project (Thompson, 2017). Notwithstanding the potential benefits, the collaboration between academia and industry is not easy but complex (Bruneel et al. 2010). Successful industry placement engagement requires champions from both sides as the driving force (Liew et al. 2012; Bstieler et al. 2015).

However, the skills and competencies required to drive successful university-industry collaboration are important yet rarely studied. Therefore, this study seeks to understand the capability requirements of university-industry collaboration champions. Understanding the skill requirements for the collaboration champions can guide strategic planning regarding the capability building for the future of university and industry collaboration. Semi-structured interviews were designed and conducted. We interviewed five senior university researchers with an average of 10 years' experience with university-industry engagement and five industry practitioners who had been actively participated in the collaboration with universities. The barriers and supports for successful project-based industry placement programs were investigated based on the past experience of the interviewees. The interviews took generally up to 40 minutes each with a semi-structured guideline. Interviews were transcribed and thematically analysed in an anonymous manner.

2 Challenges for project-based industry placement programs

The topic of university-industry interaction is not new, many studies have been reported identifying the challenges for university-industry collaboration (Liew et al. 2012; Jonbekova et al. 2020). Among these, two challenges in the project-based industry placement programs were highlighted by the interviewees in this study.

2.1 Misalignment of interest

Great differences in the interests of the academia and its industrial partners have been found in the interviews. As universities and industry organizations have different missions, researchers from universities were found more interested in projects with opportunities to deliver long-term value and benefits to the body of knowledge and innovation journey of industry sector (Ankrah et al. 2013). While during the collaboration of project-based projects, industry partners tend to assign more priority on the short-term projects requiring quick-fix solutions to achieve a fast return of investment (Kauppila et al., 2015). This conflict of interests brought challenges as perceived by both parties in the midst of the project-based industry placement programs. As one researcher from university stated that:

I think the barrier is that working with industry is in fact slowing down the production of the article papers production of theoretical research outputs. And especially it's difficult to publish on the industry work because they are normally very specific problems. They have confidentiality issue and the academic journal audience don't look for specific problems very much, thus it's difficult to publish on industry collaboration…

Similarly, as one industry practitioner commented:

The biggest thing I said before is that I think academics in all the university in general needs to be able to not just take any project type, they need to be able to understand that there is room in that sense for that there is obviously some freedom and flexibility in those project for long-term innovation…we have to deliver on projects a lot quicker with tight deadlines, because we have clients waiting, but what I see from their side (universities), there is not as much time pressure as we do…

2.2 Education system

Notwithstanding that the duties of university teacher should include three pillars: teaching, research, and professional service (Chen, 2015). The current education system focuses more on the research function of the universities, in many cases, research outputs were found valued over industry engagement, professional service to society and even teaching in high education (Walker et al. 2008). As one of the professors pointed out in the interview:

If you look in the Australian education system, there's exceptions but typically you either put into an academic pathway or you put into an industry pathway. And universities typically aren't open minded enough to say, well someone's been working in industry for a large number of years, they may not have a lot of academic publications but there's a lot of valuable industry experience they can bring into the classroom and they can help researchers to frame their research around real world challenges…Likewise industry will not maybe appreciate the expertise within academia either, so they do tend to be quite disjointed but you know there's examples like in Europe where a lot of people in the industry will be an adjunct at a university going there for a day a week...

3 Championship

During the interviews in this study, perceived support and barriers by the researchers from university and practitioners from industry in completing successful project-based industry placement programs were investigated. The importance and impact for a champion role from both university and industry were highly acknowledged by the interviewees. Due to the differences in culture, interests and professional backgrounds, the process of collaboration is not without hurdles. Therefore, champion roles from the both sides to

drive, promote and inject new momentum to the collaboration are critical (Hanid et al. 2019). These champion roles are boundary spanning roles as they have knowledge from both sides and understand the working process. Their rich experience and proactive attitudes will impact the collaboration motivation and willingness in their team (Tartaria et al. 2014). From the side of university researchers, a collaboration champion who has previous experience working with industry brings precise understanding of the business problem and business priority, as well as the importance of research in solving the business problems. As commented by one researcher from university:

> *…he (the champion role) is an expert in dashboard building and got excellent coding skills, his previous working experience with the industry helps us better understand the business problem and what do they (industry) want to achieve, also the culture and working style of the industry…he has been really keen in leveraging new knowledge and techniques in solving the problems and challenges in operation…*

A champion role from industry is helpful in driving the collaboration internally. This champion is fully aware of their needs and problems need to be solved and has a clear picture of what they want to achieve through collaboration. Thus he is the driving force of this collaboration and he is enthusiastic in seeking the support from university to solve the problem they did not have a solution on their own. Especially for the adoption of new techniques and methods that might involve changes to the old working styles. It is important that a champion role from the local team could be the advocate and be passionate in promoting the use and changes at the workplace, as one researcher mentioned from his past experience,

> *A champion for the new technologies is absolutely necessary. If you identify the champion in the business, then it's very simple to get project successful because they're internally motivated to the projects. We were lucky to have that individual with the organization we were collaborating with. And this person is really excited by new innovation. He had global influence in the field and he understood people in the field, the connection emotionally… he knew there was a problem, so we were not the people coming in and telling them they needed something, instead we were identifying opportunities and then enabling the individual to execute, then take it to another level with them. So that's probably the biggest factor of success…*

Notwithstanding the potential benefits, the skills and competencies required for collaboration champions to drive successful university-industry engagement are important yet rarely studied. Therefore, this study elaborates the capability requirements of university-industry collaboration champions. A conceptual framework is presented in Figure 1.

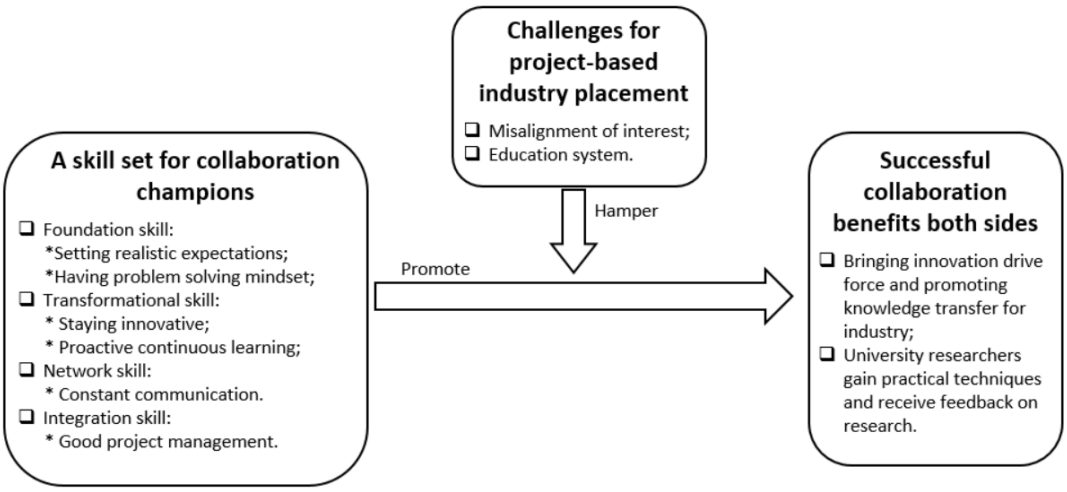

Fig.1 Conceptual framework.

4 A skill set for university-industry collaboration champions

Collaboration champions from both sides are ultimate important as they are the ones who initiated the collaboration, setting the tone of realistic expectation, fostering continuous communication and making good plans for placement project management. Thus, the skills and competencies of the university-industry collaboration champions are critical in ensuring the success of collaboration. The following skills were identified from our interviews with university researchers and industry practitioners based on their observations in their project-based industry placement experience. A skill framework raised by Griffin et al. (2019) was used, where four types of work skill for the future were proposed, namely: 1) foundation skill: the ability to perform core tasks with a high level of proficiency; 2) transformational skill: making adaptive and proactive responses to the fast-changing environment; 3) network skill: capabilities to support individuals to achieve greater results in team networks; 4) integration skill: promoting high performance by integrating different skills and abilities.

4.1 Realistic expectations

It is important that before the commencement of the placement project, both of the parties have realistic expectations towards the outcome of the project. Thus, having realistic expectations is a foundation skill of the collaboration champions. Industry practitioners should realize and be aware of the potential value of collaboration with university and benefits of this knowledge transferring process (Barnes et al. 2002). The trust and understanding of what could be achieved through this collaboration is very important to ensure that the industry practitioners are willing to share their information and provide

necessary cooperation in promoting the success of the collaboration project (Bruneel et al. 2010). As one industry practitioner commented that:

> *We see university as a powerhouse of knowledge, with the latest technology, with the latest knowledge, we have data scientists working for us for past five, six years, but they may not have that level of time and experience to know the newer things…So we come to university for very special needs, say for instance, statistics.*

There is this common misconception in academia as mentioned by one of the interviewee that, "from the academic side there's this perception that doing industry work is like secondary research and you know you want to be focusing on your academic publications first and foremost". This preconception of doing industry projects will hamper the proactivity of university researchers to commit their time and energy in this collaboration. Only if the researchers from the university could adjust their mind-set and motive, treasure industry experience as valuable assets to be brought into the classroom and help researchers to frame their research around real world challenges, they would be more passionate about the collaboration and the business problems to be solved and be more committed to a mutually beneficial relationship. One of the researchers from university expressed her attitudes working with industry companies:

> *We're really passionate about the work we do, we don't want to just get a grant, we really want to make sure the industry partner gets benefits from it. And we have a mutually beneficial relationship… also the problems that industries bring to you were quite interesting as they were not standard routine problems, but they were more challenging with no solutions yet. As an academic, I enjoyed working on those problems.*

4.2 Constant communication

Collaboration champions were widely identified as boundary spanners in this interaction and they are expected to have rich experience, knowledge and exposure from the both sides (Takanashi et al. 2019). They are the key personnel and driving force of the collaboration. Good communication skills are network skills that are essential for collaboration champions to use the right language when talking to audiences from different backgrounds, so as to understand and fulfil different needs. Lack of knowledge on the other side could create barriers for smooth communication, as confirmed by one of the university researchers, "I think communication is the biggest challenge for our collaboration as the unfamiliarity to industry language created great barriers". A good understanding on the culture, working style and priorities of the both sides could form a firm foundation for the good communication between the collaboration parties. As mentioned by an industry practitioner:

> *We really need people to have good communication skills with their data and techniques, a story-telling skill to explain the logic and benefits of their model to non-technical audience…to explain in a language which is easier for us to*

understand how their solutions could be helpful to solve our problem on site… we need these researchers teaching the business the efficacy of what they're building, and be able to speak the language of the customer and turn it into a story that we could resonate.

Increased communication helps university researchers to understand the essence of the problem that the industry is struggling with as well as their business objectives. Only if the researchers fully understanding the business priority and the current status of situation, they can work on with the best solutions. As "one of the biggest risks with research done in a university is that we designed something that they didn't really want, besides quite often a company will say what they want in very broad terms" being mentioned by interviewees, it is essential for the good continuous communication to start at an early stage and create a firm common ground of understanding, so as to avoid the waste of time and resources. As suggested by one of the interviewee:

In my experience, we mathematicians don't know the problem, don't know what for example, the mining engineers need. So we need to work together very well and be sort of embedded and rely a lot on them to actually help us understand what the solution should achieve…If you give them a report on how to do something, so follow the way they might read it. But it'll probably never get implemented. It's far better to put someone who from the university team in the company, to work with them and show them how it works, and to work with a champion in the company as well. And if you've got someone actually in the company, then they can make sure it's used properly and efficiently. And spread the words when they around during coffee time.

Constant communication is also necessary and essential for building trust in this collaboration relationship (Hanid et al. 2019). As mentioned by one of the interviewee, the situation of "There's always a reluctance in industry to tell the university researcher everything and provide all the necessary access to data and resources" could be a challenge. Thus, spending enough time and working together with the industry practitioners are good practices for trust building.

That's really critical for the researchers to really go down and spend some time and show our sincerity. Showing that we sincerely want to solve their problems and help them work better. You really need to spend more time with them and that will make a big difference.

Moreover, by constantly involving the industry practitioners in this designing journey, industry practitioners will gain more understanding on the logic of solutions and would be easier for them to adopt the project solution after project completion. As stated by one of the university researcher from their successful experience:

So whenever we were testing something, we were validating it based on their knowledge of the system. And we were staying in constant communication with them. So throughout the entire process of building the tool, there was never a point where they didn't know what we were doing. So going from a

point of like giving them something, they weren't surprised at what it was, because we were essentially just, I guess, the conduit that was doing the technology work, but they were the subject matter experts or just facilitating their knowledge through programs.

A collaboration champion in the industry company bridges the communication between the university researchers and the industry operation team. Based on their good understanding of the value and potential of research results and new techniques, they can clearly articulate their business needs to the researchers. They are the translator and advocate in their local team to promote and explain the benefits of this new solutions to other team members to improve their participation and engagement (Gertner et al. 2011). As one university researcher commented on the importance of a champion in this communication chain:

We need someone from their company as a translator and advocate of our research, he should have good understand of what we are doing and what we can achieve, and then he can help us spread the words and explain to other team members to win their support and involvement…he bridges the gap of our communication with the operation teams… he is really keen to push the application of our solutions into practice…

4.3 Problem-solving mindset

The mindset of problem-solving was identified in our interviews as a key skill required for university-industry champions. It is a foundation skill to support the completion of daily tasks at a high level of proficiency. The problem-solving mindset begins with clear problem identification, meaning that the collaboration champion should have a clear picture of what is the problem and what is their expected outcome, as mentioned by a researcher from university commenting on the collaboration champion from the industry partner:

At the time he came to us, he was very clear about their problem and difficulties, and what they want to achieve with this collaboration with us. So he came with a clear problem identification and statement and he was very helpful in steering the process of collaboration with a good understanding of what success should look like.

To better leverage all the resources, the project-based industry program should be driven by the aim to find the most convenient solution to the business problem. This is on the basis of the right understanding of the business problem by the collaboration champions from university. It also requires that the researchers from the university understand the priority of their industry partner, as they are expected to "take up and solve the problem" rather than "coming up with the fanciest algorithms", as highlighted by one industry practitioner during the interview. Besides, empathy of the university collaboration champions of "understanding their pain point", could motivates them to find better

solutions to make the practitioners' life earlier. As mentioned by one collaboration champion from university sector:

> *We really keen to see the application of research to solve the pain points of the frontline workers, which is trawling through information, continuously updating, getting hundreds of spreadsheets or you know, all this disparate data… with the new solution designed to help them, they don't have to do any of that work anymore. It kind of takes out the guesswork because we've encoded the information in there for them, what they need to do is go to a web page and get any information…So we're removing this pain point for them, which is getting information, wrangling the information, making their own conclusions, by doing it for them automatically, kind of taking that cognitive load off of them.*

4.4 Stay innovative

As pinpointed by the interviewees, the innovativeness of collaboration champions and key personnel such as team leaders, have significant impact on the attitudes towards collaboration of the team. Staying innovative is one type of transformational skill, focusing on the proactivity and adaptivity of the collaboration champions. Successful collaboration needs the promotion and support of those in the organization who could identify the current problem and passionate about the great potential of research from universities to help solve the problem. As commented by one researcher from university:

> *We need some leaders on the side of the industry who actually can see the problem, be passionate about innovative ways to solve the problems and improve productivity, and have faith in the universities for the great potential in advanced knowledge and techniques…we need these leaders to be innovative enough to drive the process.*

Collaboration champions' personal innovativeness and openness to new ways of working are influential to the attitudes of other team members, especially when the collaboration champions have certain decision making authority in the team (Liew et al. 2012). Studies have been reported that the innovativeness and openness of leaders were found positively contributing to the team level decisions of adopting new technologies and extending external collaborations (Liu et al. 2011). Consistent findings were found from the results of the interviews in this study, as mentioned by one industry practitioner,

> *Our supervisor is really keen to new technologies and innovative new ways of working, he has great passion in improving our current working methods, therefore he is really pushing collaboration with external parties, and his attitudes actually affected the decisions and attitudes of the team in dealing with this collaboration with university researchers and adopting new technologies in our work.*

Moreover, this openness to new knowledge and external collaboration was found related to the education and training background of the individuals. Most of the time, these

collaboration champions were reported having high level of technology capacity through previous education and training experience, as pinpointed by one of the interviewees:

> *He (the collaboration champion in the industry organisation) can understand what is behind the model, he was a well-educated and trained engineer and the level of education background made him curious and innovative about this new technical solution, he was keen to promote the usage within his team.*

4.5 Proactively continuous learning

As we have mentioned before, it is important for collaboration champions to have boundary spanning skills and be familiar with the knowledge from the both collaboration sides of university and industry. Good collaboration champions are always keeping abreast of the emerging technologies and techniques, looking for new ways of working to improve the overall effectiveness of processes or procedures with the organisation (Sessa and London, 2015). Collaboration champions should stay proactive and motivated to continuously learn new skills to adjust to organisational changes. With this type of transformational skill of proactively continuous learning, the collaboration champions stay in tune with the newest market trend and search for long term opportunities as well as threats for the company. As mentioned by one of the industry interviewees:

> *The world is changing fast, the content of job is changing as well, so the skills people needed are different comparing to several years ago, so we need to always learn new things and be aware of the trends of changes, although I am a principal data scientist in the company, I still read research articles on data analysis techniques. Once a month, I try and build something new.*

Therefore, the proactive and continuous learning attitudes of the collaboration champions could help them to identify more opportunities for external collaboration and partnership. They look forward to opportunities to apply the latest techniques, technologies and working methods to their workplace, as the industry interviewee continued:

> *Constantly, I am following and reading the latest knowledge and research outputs from researchers and universities. I am keen to look for potential collaboration opportunities for us the apply the new techniques to improve the productivity and efficiency of our work, I really enjoy this learning and mental stimulation…and I think all our team members and all the employees in the organisation should have this mind-set of continuous learning, more workshops and trainings should be provided to our employees to increase their understanding, awareness and stay updated to the newest techniques and enhance their skills required for the changing nature of work.*

4.6 Good project management

Well-organized and structured project management plan is instrumental for successful collaboration, as it ensures the optimized usage of resources from both parties (Salleh and Omar, 2013). Interviewees from university have reported both good and poor experience

of their perceived management of placement project. Well-structured project management also ensures the constant communication among different stakeholders and contributes to this trust-building partnership. As stated by one of the university researcher:

> *We have regular meetings and progress update with the operation teams and other stakeholders from the industry, we had the people that using the tool and other decision makers in the room to make the decision. We showed them the logic behind research and tear it apart. Regular progress meetings ensure that the operations and all the stakeholders are involved in the loop and their opinions were taken into consideration when develop the solutions for the business problem, thus at the milestones delivery stage, everyone was in agreement.*

Poor structured placement projects are those lack strategic planning and proper assignment of responsibility, thus it could lead to sub-optimized leverage of resources from both sides. Besides, pool structured collaboration projects also devastate the collaboration experience and attitudes of the parties, resulting in demotivation. As mentioned by one of the interviewees:

> *Working on site oftentimes for me, at least, it was kind of wasted time, in a sense...I'm not sure whether my being there would actually change anything. There were times I went to the industry company, they were like really busy during those periods, and they were going chaotic, frantic. Everyone was running around trying to deal with what's wrong. And you basically were not going to get anything done, you were not going to be able to talk to anyone for a long period of time for a few days. So there was no point…*

Although important, interviewees from industry companies mentioned that they don't have enough experience in conducting efficient collaboration with university, and they have insufficient knowledge about the ways to structure project-based industry placement programs. As commented by one of the industry practitioners:

> *Although we have the good intention to do so, we actually do not have enough understanding and knowledge of the best way to collaborate with universities….*

To ensure the success of collaboration between university and industry as well as the further implementation of project results, it is essential that collaboration champions have good project management competency. Project management skill is an integration skill comprising different other skills, such as making good planning from the concept of idea to implementation, setting milestones and timelines for project completion and delivery, identifying, troubleshooting and predicting problems and potential risks, communicating with different stakeholders, environment scanning, making evidence-based decisions to achieve set outcomes and so on. Great value could be delivered if the collaboration project was well arranged and structured, which could also lead to satisfaction and motivation of the collaboration parties from both sides. As commented by one of the interviewees from university describing her collaboration placement project experience:

I really enjoyed the whole collaboration process, at the very beginning of my placement project, the project sponsor officially introduced me to many people in his team, although people had different on-going projects they were focusing on at that moment. Still he organised the meeting and use it as an opportunity to gather everyone together and explore potential collaboration directions. We also have regular progress meetings, update meetings, so everyone was on track.

5 Conclusions

Project-based industry placement program is an important form of university-industry engagement as they could bring benefits to both parties. Successful industry placement engagement requires champions from both sides as the driving force. The skills and competencies required to drive successful university-industry collaboration are important yet rarely studied. Therefore, this study elaborates the capability requirements of university-industry collaboration champions.

A skill set was raised in this study to support collaboration champions in their engagement of university-industry collaboration, more specially for project-based industry placement projects. The skill set includes: 1) setting realistic expectations; 2) having a problem-solving mindset; 3) developing good communication techniques; 4) staying innovative; 5) proactively continuous learning; and 6) good project management competency. As collaboration champions have instrumental impact on the success of project-based industry placement programs, understanding the skill requirements can guide strategic planning regarding the capability building for the future of university and industry collaboration.

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