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Shared Collaborative Spaces Challenges in Inter-organisational Collaborative Projects

Research-in-Progress

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Abstract

This research in progress is based on a qualitative approach with multiple case studies using Nonaka's theory of knowledge creation and conceptualisation of a knowledge-creating place, Ba. It addresses the high-level need to make collaboration more effective between university and industry by exploring shared collaborative spaces in collaborative research projects. It uses semi-structured interviews, participant observation, and document analysis to look at the ways in which researchers and industry representatives with different culture within these partnerships create shared collaborative spaces to share information and knowledge. The study will propose a conceptual model explicating effective shared collaborative spaces in the university-industry collaboration (UIC) context according to the active actors (researchers and industry representatives) perspective. The model will be an original contribution to research in the area of knowledge management in UICs'. Finding effective shared collaborative spaces may be lead to more effective collaboration between university and industry.

Keywords*:* Shared collaborative spaces, University-Industry Collaboration, Information Technology Faculty, Knowledge creation theory, Ba

Introduction

Cooperation between university and industry is very important when it comes to productivity and economic growth. As far as the condition of the market is concerned, collaboration between universities and industry is important for the survival of universities and private employers and improving the potential innovation (Lakatos et al. 2015). Knowledge sharing plays an important role in strategic decision-making within this relationship, and knowledge is shared through different mechanisms and activities. Individuals in the context of University Industry Collaborations (UICs) share their knowledge using tools and techniques in shared collaborative spaces.

The level of collaboration between Australian researchers and industry is low when compared to international benchmarks. "Australia ranks 29th and 30th out of 30 OECD countries in the proportion of large businesses and SMEs collaborating with higher education and public research institutions on innovation" (Department of Education and Training 2014, p. 3). Australia has implemented strategies to increase knowledge transfer between universities and industry because it is there that Australia's performance is poorest. However, the literature addressing issues relating to the academic community in inter-organisational networks, and university–industry research partnerships in Australia is limited (Harman 2001; Zubielqui et al. 2015). Improving the effectiveness of shared collaborative spaces from an active actors (researchers and industry representatives) perspective may lead to an increase in knowledge sharing and so increase the value of collaborative projects. The current research addresses this high-level need by exploring effective shared collaborative spaces in collaborative research projects

and looking at the ways in which researchers and industry representatives within these partnerships share information and knowledge by using different tools and techniques.

This research uses Nonaka's theory of knowledge creation as a theoretical frame to explore shared collaborative spaces in collaborative projects. This theory consists of three elements: (i) the SECI process (four modes of knowledge conversion includes Socialisation, Externalisation, Combination, Internalisation); (ii) Ba; and (iii) knowledge assets (Nonaka 1994; Nonaka and Konno 1998; Nonaka et al. 2000). The current study focuses primarily on the concept of Ba, however Ba cannot be examined independently of the other two elements. It identifies how knowledge is created between individuals not only in intra-organisational contexts but also in inter-organisational contexts such as families and business (Brännback et al. 2008).

This research is conducted with the aim of providing university and industry a valuable guideline based on a conceptual framework through which they can discover new opportunities to facilitate knowledge sharing among active actors. That, in turn, not only should improve collaboration between university and industry, but also help them to succeed in their challenging endeavors in a competitive market.

Literature review

Recent studies of university–industry collaboration (UIC) have increasingly paid attention to identifying different channels/models of UIC and developing a typology of the characteristics of UIC (John et al. 2015; Melink et al. 2014; Perkmann and Walsh 2008). Part of the literature focuses on the implication of national policy approaches and National (or Regional) Innovation Systems in collaboration, drivers and barriers of UIC, and the impact of faculty quality on engagement in technology transfer (Ankrah et al. 2013; Kalar and Antoncic 2015; Melink et al. 2014). A second part of the literature highlights industry characteristics (such as size, absorptive capacity and technology openness), peer effects in university-industry collaboration, open data partnerships, factors that influence the formation of linkages between universities and firms, cultural characteristics in shaping UIC, and the forms and objectives of UIC in emergent and mature industries (Callaert et al. 2015; Freitas et al. 2013; Giuliani and Arza 2009). Other studies examine UIC from: a social capital perspective (Thune 2007); spin-off processes and characteristics (Soetanto and Jack 2016); the process of learning in university Technology Transfer Offices (TTOs) (Weckowska 2015); the nature and outcomes of university-industry relationships (González-Pernía et al. 2015); collaboration and modes of innovation (Lakatos et al. 2015); and characteristics of UIC by econometric models (Fontana et al. 2006). Finally, a number of studies explore: the impact of affiliation in knowledge exchange in the UIC context (Boardman 2008); the role of different types of intermediaries involved in knowledge transfer (Wright et al. 2008); and specific aspects of managing knowledge through collaboration (Numprasertchai and Igel 2005).

However, there is little research as to how knowledge is shared in UICs (Jin and Yaqi 2011; Thune 2007). The existing literature focuses on the full range of channels through which university researchers interact with industry and analyses them as mechanisms of knowledge exchange. Most of these studies focus on academic patenting behaviour and publications (D'Este and Patel 2007; Hermans and Castiaux 2007). The review of the literature found that a few studies, by (Brännback 2003; Hermans and Castiaux 2007; Hermans and Castiaux 2017) focused on a single mechanism of knowledge sharing activities, examining knowledge flows with academic/industry researchers as the unit of analysis.

Reviewing the literature on knowledge creation reveals that knowledge sharing is an important but complex process in university-industry engagement (Alavi and Leidner 2001). From a knowledge generation perspective, current knowledge sharing in university-industry engagement is problematic for three main reasons:

a) Characteristics of the university: researchers in universities are using more complex and grandiloquent language and businesses subsequently ignore them because of the perceived impracticality of the research

b) Characteristics of the industries that have different organisational culture and innovation assimilation capacity. Industries not only ignore academic sources of information but also they consider academic sources as having low credibility; and

c) Socio-cultural differences between university and industry including discrepancies as to the nature of research, different work styles, different approaches in the development of the research, discrepancies on intellectual property rights, and different values (Pineda et al. 2009).

As a result, knowledge is not shared effectively between university and industry. In response to this gap, the current research will explore how knowledge is shared in shared collaborative spaces within ongoing

collaborative projects in UICs from the active actors' (researchers and industry representatives) perspective. Finding effective knowledge sharing flows from an active actor's perspective may help university and industry to reflect on their own characteristics of collaboration and to create more flexible solutions. In addition, by showing effective knowledge sharing flows that consider socio-cultural differences between university and industry, the conceptual model will assist university and industry to understand differences between partners better. Furthermore, the research findings will help industry and university by providing guidelines based on a conceptual framework through which they can discover new opportunities to facilitate knowledge sharing among active actors. That, in turn, should improve collaboration between university and industry in the information systems discipline.

Research questions

In this research, we address the gaps in knowledge mentioned above through the following Research questions:

1. How do participants create shared collaborative spaces for knowledge sharing in university-industry collaborative projects of IT- related faculties in Australia?
2. What kind of shared collaborative spaces are most effective in supporting knowledge sharing in university-industry collaborative projects in IT- related faculties in Australia?
3. What are the conditions required to develop shared collaborative spaces between participants in university-industry collaborative projects in IT-related faculties in Australia?

Research methodology

The current study is exploratory research within the interpretive paradigm. Because we want to explore full knowledge sharing flows include explicit and tacit knowledge. To capture fully knowledge flows in shared collaborative spaces, we use participants' opinions and perspectives about how do participants create shared collaborative spaces in collaborative projects. The current study uses multiple case studies to explore the question of how participants create shared collaborative spaces for knowledge sharing in one type of university-industry collaboration, collaborative projects. We want to explore knowledge flows in shared collaborative spaces in collaborative projects in-depth via a variety of data collection methods including interviews, participant observation and document analysis over a sustained period of time.

The characteristics mentioned above suggests that the multiple case study method is an appropriate choice for the current research because it allows a focus on in-depth understandings of knowledge sharing process in shared collaborative spaces in diverse settings. It also allows an investigation into 'how knowledge is shared in collaborative spaces' based on experiential knowledge of participants and their beliefs, to find effective shared collaborative spaces in the collaborative projects, in order to suggest effective knowledge sharing flows.

Since the nature of ICT is so diverse, care needed to be taken in selecting specific projects as case studies. Some exploratory investigations were undertaken during the primary data collection phase to categorise different types of university-industry partnerships, for example exploring information of ACS accredited courses in different universities across Australia based on their web sites and consulting with the key stakeholders such as research service and business development managers. Based on exploratory investigation, Higher Education Research Data Collection (HERDC) was considered as a criterion for research case selection. HERDC is the annual collection of research output and income from Australian universities. Data is submitted by universities each year. Department of Education and Training is responsible for administering HERDC (Department of Education and Training 2017b). Data is collected based on research publications, as well as research income across a number of categories (Department of Education and Training 2017a). It should be added that the HERDC wants to identify where the research funding is coming from. It has four categories including Category 1: Australian competitive grants; Category 2: Other public sector research income; Category 3: Industry and other research income; Category 4: Cooperative Research Centre (CRC) research income.

Taking samples from each categories can be problematic because achieving saturation would be difficult at the end. Since we were looking for examples of best practice, the most successful collaborative projects according to the key stakeholder's interview were mentioned under category 3. So we decided to select case studies form this category.

The research design involves the use of multiple case studies, with each case being a collaborative research project conducted in the context of the UICs in IT-related faculties across Australian universities in Victoria. Each collaborative project which is classified under Australian category 3 of HERDC considered as a suitable case study. All successful collaborative projects named by the key stakeholders in the interviews which are listed under the category 3 were considered as potential case studies. After selecting the case studies, people were approached from university and industry within case studies based on their role and involvement in collaborative projects. As a base requirement, there had to be at least two persons from each collaborative project, one academic researcher and one industry representative. As a result of exploratory investigations, the general criteria for selecting the collaborative projects in the IT-related faculties which run ACS accredited courses was based on on-going projects that are about to commence or have just commenced from last five years (2012-). Since the best practice can come from both short and long term collaboration based on key stakeholder's interview, a mix of short term and long term projects were selected in order to understand any differences between them.

Table 1. Criteria for selecting research sites and participants

No.	Criteria	Selected
1	Geographical location	Victoria
2	Universities	All universities which run ACS accredited courses
3	Faculty	Faculties which run ACS accredited courses
4	Collaborative project type	On-going project which is categorised under Category 3 (Industry and other research income) of HERDC.
5	Number of collaborative projects	Two from each university (16)
6	Year of commencement	2012-
7	Participants for interview	Purposive sampling
8	Numbers of Participants	Two persons from each collaborative project(32)

Semi-structured interview, document analysis, and participant observation were adopted as the data collection method.

Data analysis

Thematic Analysis was selected because it can be used within most theoretical frameworks. It is theoretically independent-and flexible-approach and it suits potential for an experiential or critical orientation to qualitative research (Terry et al. 2017).

Thematic analysis is a common exploratory approach for analysing qualitative data of interviews and unstructured observation (Williamson et al. 2013). In this approach, sections of a text, for example, a transcript, field notes, and documents are coded in order to create themes according to whether they appear in the context (Schwandt 2007). Based on the research design and methodology, thematic analysis is an appropriate analysis method because this research seeks to explore and identify emerging concepts in regards to the research questions. The collected data is analysed to identify shared collaborative spaces in collaborative projects according to the researchers and industry representative's experiences and perspectives.

There are two basic approaches to Thematic Analysis. One approach is that themes are determined in advance by existing theory and reflected in interview questions (theory-driven) (Terry et al. 2017); another approach is a flexible approach to coding and theme development. That is, the codes emerge from the data (data-driven) and exact words used by participants (in-vivo codes) (Creswell 2013; Terry et al. 2017).

The data-driven approach was used to see what emerged from the data. The transcriptions were initially coded without considering literature and conceptual framework, or the research questions. Data was coded with exact words used by participants rather than pre-existing codes. After initial coding, the codes were reviewed to modify and remove duplicate codes. But in emerging the themes we consulted the literature, conceptual framework, and research questions. It means that codes and themes are determined by a mix of data-driven, based on familiarisation with the data, and theory-driven, based on literature, conceptual framework, and research questions.

Initial findings

This paper presents the initial findings of one case study. PROTIC (Participatory Research and Ownership with Technology, Information, and Change) is a 5-year collaborative project between Monash University, Oxfam Australia, and Oxfam in Bangladesh (Sarrica et al. 2017). It was launched on June 7, 2015. One hundred smartphones and phone credit are given to the women farmers in each of two villages in Bangladesh. Then they are trained how they can use it. It provides benefits for women farmers in numbers of ways. Trained women are able to interact with agricultural information via smartphones concerned to crop, rice cultivation, fisheries, livestock, poultry, and general horticulture. This information is provided throughout commercial telecommunications companies which are developed by the local community. Women have access to SMS services and phone call if they need to get some information. This project is investigating information system design and socio-technical questions related to the adoption and adaptation of new technologies. PROTIC is a Participatory Action Research (PAR) project, and the outcomes are expected to include recommendations on managing PAR projects and documentation on developing information management systems for resilient farming in Bangladesh.

The PROTIC research team is split between Australia and Bangladesh. Monash University, located in Melbourne Australia, is responsible for the governance of the project and designing and undertaking research. Three academics are involved with the project, as well as two part-time post-doctoral researchers and five doctoral students. There is also a research associate from the Faculty of Communications Science, Sapienza University of Rome engaged in the project. The researchers do not speak Bengali, however four of the PhD students are Bangladeshi. Oxfam Australia is responsible for administrative aspects of the project, including contract management. There are two staff involved. Oxfam Bangladesh is responsible for field implementation. It manages and gives direction to the implementation of the project in Bangladesh. In particular, it works with a number of partners, including three local non-government organisations, a commercial telecommunications company, and a number of Bangladeshi Universities.

Shared collaborative spaces for knowledge creation within PROTIC

Since the "knowledge-creating process is necessarily context-specific in terms of who participates and how they participate, knowledge needs a context to be created" (Nonaka et al. 2000, p. 14). Researchers and industry representatives within PROTIC have different background and expertise. So the initial findings show the importance of cultural understanding within this project. Cultural differences affect the context for knowledge creation within PROTIC. Individuals in organization interact in different shared spaces or Ba. This space can be "physical; virtual; mental; or any combination of them" (Nonaka and Konno 1998, p. 40). Within PROTIC, Researchers and industry representatives create shared collaborative spaces but scattered structure of the project, cultural differences, language differences influence the way of creating these spaces and sometimes change the nature of the four types of Ba (Originating Ba, Interacting/ Dialoguing Ba; Cyber Ba/ Systemising, Exercising Ba) which are emerged in intra-organisational context.

Originating shared collaborative space: Sharing information and knowledge mostly happen in the design stage of the project like designing a new survey instrument or a new set of questions or understanding the characteristics of Bangladesh through the interaction of the academics and industry representatives in the shared collaborative spaces. The place or time they first started to talk each other and interact can be seen as a primary shared space in which they begin to share and create knowledge. Physical and face-to-face meetings are important for members of the project at this stage. They are trying to have regular meetings with the associate researcher in Italy and industry representatives in Bangladesh. There are two pre-established meeting that everyone must attend. One is the steering committee meeting that is run about once a month and the other is the Governance committee that takes place every six months but the scattered structure of the project does not allow them to run these meeting face to face more. So some project members socialize in this stage through online communications technology such as Skype. It can be said that the socialization stage of the project can be done through face to face meeting or online communications technology. Sometimes, it brings some problem in

mutual understanding of the research problem because of the connection difficulty. Therefore, the originating shared collaborative space in this project can be considered as a context for knowledge conversions among individuals. It happens through either face-to- face or virtual meeting. Since this shared space can be structured or less structured, one of the academics has regular visits in Bangladesh and Italy to lessen the misunderstanding.

***Dialoguing shared collaborative space*:** Within PROTIC, academics and industry representatives talk more about their mental models and skills, knowledge about the theoretical framework, knowledge about PAR, and social and cultural knowledge of Bangladesh. Therefore they communicate frequently via physical meeting or online communications technology such as Skype, email, and phone to share their tacit knowledge. Academics at Monash University mostly visit each other's office to talk about knowledge about theoretical frameworks, mental models and skills and the knowledge the academic gained through a visit to Bangladesh and Italy or industry representatives talk with academics in Bangladesh explaining the social and cultural characteristics of the fields. After talking, they start to write their discussion and make their tacit knowledge explicit. Then they send an email with the attached file of written format to collect others feedback. It can be said that dialoguing shared collaborative space can happen through talking and converting into common terms and concepts via physical meetings and communications technologies.

Cyber shared collaborative space: Virtual shared collaborative space plays an important role in the PROTIC. Because of the scattered nature of the project and distance, project members use communications technology such as Skype for a regular meeting and email for sharing documents and files. Explicit knowledge which is created in the dialoguing space can be disseminated to others members and can be converted into other explicit knowledge by applying individuals feedback. They supposed to use the university communications technology, Zoom, but because of the difficulty in connection with Bangladesh through Zoom, they prefer to use Skype. Communication with other project members and community through social media especially Facebook can be considered as another form of cyber shared collaborative space within PROTIC. There are two formal Facebook pages. One is a page which set up by Oxfam Bangladesh in order to promote the project, another one is a Facebook page for women in which women from the community are a member of this page and they share their information through this page. Knowledge sharing through the Facebook during this project for community members is so important. For example in cold weather, women are able to show the photograph of their plants, animals in the community and ask their opinion about problems. Academic use the Facebook individually and they use it as a one way of communicating what project is doing with people outside the project. Industry representatives prefer to use online communication tools such as Facebook messenger for communicating with the community because they found that Facebook messenger is better than other online communication tools in Bangladesh. One of the academic thinks that Facebook page helps in publicity of the project but it is not an effective way of sharing knowledge among project members. Finding sufficient time to use social media was mentioned by the academics as one of the major barriers to engaging effectively in sharing knowledge through social media.

Exercising shared collaborative space: Within PROTIC, project members discussed survey questions, interview questions, journal papers, theoretical framework, and methodology process. Based on the discussion, they make decisions about the research project. In other words, action and practice are results of the discussion. Learning and training are fundamental in this process. It can happen through shared space like in workshop or it can happen through reading and discussing on journal paper. In this space, individual absorb explicit knowledge which is created in previous spaces and then convert it to tacit knowledge. It helps to internalise of new knowledge through reports, journal papers, and workshops in project members mind.

Discussion

The knowledge creation process consists of three components: SECI, Ba, and knowledge assets. These components act dynamically together. But each component shows a different process of knowledge sharing. The SECI process forms the basis of how knowledge is shared; The Ba forms the basis of where and when (space and time) knowledge is shared; and the knowledge assets are the basis of what

knowledge is shared. The current research focuses primarily on shared collaborative spaces which include the elements of space and time. In collaborative projects, as in Nonaka's model, four types of shared spaces are included: Originating shared collaborative space, Dialoguing shared collaborative space, Cyber shared collaborative space, and Exercising shared collaborative space. Knowledge is created in each space based on its characteristics and shared by members of collaborative projects.

Conclusion

The purpose of this paper in progress was to show how academics and industry representatives create shared collaborative spaces to share knowledge in inter-organisational collaborative projects. The preliminary findings of one case study by using Nonaka's theory of knowledge creation showed that different shared collaborative contexts can emerge within collaborative projects based on participants who have different experiences, ideas, skills, passions, and tensions and cultural condition of the partners. Since the findings presented are preliminary, further data analysis and data collection from other cases will be needed in order to response research questions and validate findings. We acknowledge the need for future research in some areas such as: evaluating current existing knowledge sharing platform for sharing different kinds of knowledge in collaborative projects, examining effective factors for knowledge sharing in different spaces, and examining cultural context of each space in which the knowledge sharing process takes place.

Acknowledgement

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