IDENTIFYING THE ENABLERS AND CHALLENGES IN PRACTICING KNOWLEDGE MANAGEMENT IN THE INDUSTRY-BASED PUBLIC UNIVERSITY IN CHINA: A CASE STUDY OF BAISE UNIVERSITY

IDENTIFYING THE ENABLERS AND CHALLENGES IN PRACTICING KNOWLEDGE MANAGEMENT IN THE INDUSTRY-BASED PUBLIC UNIVERSITY IN CHINA: A CASE STUDY OF BAISE UNIVERSITY

Kang Wang

This Independent Study Manuscript Presented to
The Graduate School of Bangkok University
in Partial Fulfillment
of the Requirements for the Degree
Master of Management in Business Innovation

Academic Year 2022

This manuscript has been approved by

The Graduate School

Bangkok University

Title**:** Identifying the enablers and challenges in practicing knowledge management in the industry-based public university in China : A case study of Baise University

Author: Kang Wang

Independent Study Committee:

Advisor Asst. Prof. Dr. Dongcheol Heo

Co-Advisor Dr. Luo Qiuxue

Field Specialist Dr. Sansanee Thebpanya

Wang, Kang. Master of Management (Business Innovation), December 2022, Graduate School, Bangkok University.
Identifying the Enablers and Challenges in Practicing Knowledge Management in the Industry-Based Public University in China: A Case Study of Baise University (99 pp.)
Advisor: Asst. Prof. Dongcheol Heo, Ph.D.
Co-advisor: Luo Qiuxue, Ph.D.

ABSTRACT

In accordance to the classification guidance scheme of China's higher education policy, Baise University is an industry based public university in China. As a typical knowledge-intensive organization, knowledge is the core resource of the University. Significantly, the development of the university lies in the application of knowledge and creation of innovation through R&D to meet the needs of the industries. Hence, introducing knowledge management (KM) is one of the key strategies to enhance the competitiveness of the Baise University. This qualitative in-depth interview research seeks the insight into the practical knowledge sharing, transfer and creation experiences among participants who have been purposively selected to answer 5 important research questions on (1) the common KM procedures in the university; (2) enablers of effective knowledge creation at Baise University; (3) challenges encountered in the implementation of KM practices; (4) improvement in terms of knowledge sharing and transfer to enhance university and industry performances and (5) recommendations for successfully implementation of KM at the industry-based Baise University. Using content analysis, the findings revealed a low readiness in KM practices particularly in terms of the acquisition and sharing of knowledge in the university. In addition, it indicated a lack of KM understanding as well as inadequate KM infrastructure within and beyond the university. Last but not least, a clear indication of a lack in top management commitment to the introduction and implementation of the KM system on institutional levels. These barriers adversely affected the development of critical knowledge which enablers' greater UI interactions and collaborations.to build competitive advantages for both the HEI and the industries. Importantly, this study recommended the management of the university

to develop clear KM policies to make the transformation feasible and gain the necessary supports for KM as a strategic change. Additionally, the study proposed the establishment of an integrated digital knowledge platform that is user friendly for the university and industry to enhance knowledge sharing and transfer purposes.

Lastly but not least, to propel the concept of UI interaction and collaboration to optimize the KM efforts to achieve higher development and innovation in a knowledge management and university-industry collaboration (KMUI) ecological environment. The efforts of this study is thus crucial to set new benchmark for the industry based Baise University.

Keywords: Knowledge Sharing and Transfer, Knowledge Creation, University-Industry Collaboration, Knowledge Management, KMUI Ecosystem.

ACKNOWLEDGEMENT

I would like to thank the following people for their support in this work, without whom this study could not have been completed to a professional standard. First of all, I would like to thank my beloved family for all the encouragement and support in my studies and work. To my daughter and son, whose innocent smiling faces gave me the confidence to complete my Independent Study.

To all my colleagues, this study would not have been possible without the insightful sharing of your perspectives and experiences on knowledge management at Baise University. Your sharing is crucial to the successful implementation of knowledge management at Baise University, and especially in promoting interaction and collaboration between Baise university and our local industries.

I would like to express my deep gratitude to my MBI supervisor Prof. Dongcheol Heo, who has inspired me to do this research. From the selection and revision of the research, he has given me great support and provided many valuable comments throughout the research process.

I would also like to thank Lim and Dr. Qiuxue Luo, who have assisted and provided needed guidance over challenging times. I am grateful for the constant encouragement I have received and enabling me to reach a new milestone in my journey of learning.

Finally, I would like to thank Dr. Xavier Parisot, IKI MBI former program director as well as staff members who have made my Master education an amazing journey.

Kang Wang

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

The high priority effort by the Chinese government to promote a more knowledge-based economy and society signifies the increasing importance of knowledge management (KM). The concept of knowledge management was first introduced in the field of business administration in the 1980s. It is an ideology of management based on the realization that “knowledge has its own value and can create value” The concept and its corresponding thought have been emphasized by the academic and industry circles since it spreads.

1.1 Background and Implications of China New Education Policy

The implementation of the Chinese Double First Class University Plan since 2016, has significant implications to the development of China’s higher education. It is an ongoing process in relation to the country and its international developments during the crucial stages of China progress (Zheng & Kapoor, 2021). It has accelerated the transformation of university with multiple disciplines into a world-class institution. As for the academic researchers, their focus is based on the strategies adopted by universities” management to build world class university (WCU). In line with the transformation, universities are supported with special funding for teaching and research in specific areas which accelerate the university’s world ranking. Significantly, the educational initiative goals to enhance the quality of institutional knowledge transfer in China.

Fundamentally, Chinese universities are categorized under academic based and industry based universities and colleges. The industry based university is a significant part of the national university system, and an integral part of the "double first-class" university concept. According to Woo (2022), the new policy can be seen as technical, managerial, and organizational issue. To assist Chinese universities to excel, education institutions are guided to make innovations in relevant fields and directions to achieve substantial breakthroughs. Chinese tertiary institutions are thus encouraged to undertake ground-breaking projects which are strategic and forward

looking. To achieve this, academics have to align their work with the economy to support an efficient and competitive education section. (Woo, 2022).

Crucially, academic leaders can challenge themselves and gain experience in these projects, which in turn improve the influences of some disciplines. In return, their achievements and new knowledge gained can expand the vision of undergraduate students to foster innovative thinking. Particularly for the industry-focused universities such as Basie University engaging in knowledge management to drive education dynamicity, efficiency, openness and conduciveness towards scientific and economic development. This not only tackles the skill gaps of the students but also enhance the competitiveness of the university for sustainable growth and development. Ultimately, the improvement in the quality of education will enhance domestic and global reputation with international accreditation of the university. It is in this environment that universities must become agile and respond to change in a seamless and continuous manner (Agarwal & Marouf, 2014).

1.2 University-Industry Collaboration (UI) in China

In their research on how Chinese UI collaborate, Chen, Yang and Park (2012) identified three common methods of UI collaboration in the field of technology and industrial. These channels include the followings:

1) Technology transfer between research institutions and firms
2) R&D in specific fields between universities and industries
3) University operated high-tech companies

It is common for universities to transfer knowledge-based research output to industries by license deals and particularly for university generated patents. With raising revenue from licensing, saw a surge in the demand for higher-quality and perceived values of university-generated technologies (Chen et al, 2012).

In terms of university-operated high technology firms, these enterprises are smaller in numbers when compared to other companies in the high-tech industrial zones. The assets and operations of these firms are generally dominative, according to Chen et al. (2012) worth noting is the economic return investment of the university-run business companies generally out-perform non-university companies. Based on Chen et al. (2012) findings, the innovation indicators of these companies tend to be

significantly more than the other hi-tech firms. For this reason, university-run high-tech companies become the key drivers in the regional and national innovation development in China

1.3 Objectives of the Study

As depicted in Figure 1.1 this study seeks to examine the knowledge management processes in a Chinese industry-based state university from a knowledge-based view. The findings are crucial (1) to explore the perceptions and insights of knowledge management in the industry-based university among the instructors and administrators. Through the understanding, the research (2) highlights the enablers for effective knowledge transfer and application in the university and (3) sheds light into the challenges in applying KM in the institution. Additionally, the study seeks to (4) present evidence based on the recommendations of the educators to improve knowledge transfer activities in the state university. In doing so, the research (5) enables the provision of practical, actionable advices to university leaders and administrators on how KM programs can be initiated at the university. This in depth understanding can further contribute to the literature on knowledge transfer activities in more complex organizational settings.

Figure 1.1: Research Objectives

1.4 Research Questions

The research focuses on the practical experiences of educators and how knowledge is transferred for learning and knowledge creation purposes. The research questions that this study seeks to answer are as follows:

1.4.1 What are the routine knowledge management procedures (knowledge sharing, transfer and creation) among educators in the industry based university?

1.4.2 What are the enablers for effective knowledge creation in an industry-based university?

1.4.3 What are the challenges educators encounter in the implementation of effective KM practices in the industry-based university?

1.4.4 How can educators improve knowledge sharing and transfer to enhance university and industry performances?

1.4.5 What are the recommendations for successful KM implementation in the industrial based university?

As indicated, the first 3 RQs focus on the internal factors of the university in the knowledge management process. The 4th and 5th RQs seek to explain how knowledge can be effectively transferred from the research institution to industry.

1.5 Significance of the Research

As observed by researchers such as Jormanainen·and Koveshnikov (2012), a majority of the present U-I related research stemmed from an industrial economy context and focused less on emerging market (EM) companies in countries such as China, India, or Latin America. This leaves other EM contexts under-researched. This has led to the issue of whether the existing theories and implicit assumptions from an European context be applied to firms in these emerging markets. This research based on the Chinese university context allows the researcher to obtain new understanding for the generalizability of existing theories (Beyhan & Cetindamar, 2011 and Liefner, 2013). Therefore, the study is essential and relevant to extend current knowledge towards explorative studies from EMs to comprehend diverse experiences on the basis of varying institutional contexts and varying economic structures (Cetindamar, Wasti, Ansal & Beyhan, 2009; Kruss & Visser, 2017). Additionally, the findings can be used to inform policy in respective economies

(Filippetti & Savona, 2017). Evidently, studies concerning obstacles to UICs are under-researched with minimal studies. In view of the limitation, this study is timely to explore the barriers to UICs for the Chinese industry-based university in China.

Equally important is that there are numerous research gaps in the process and application of KM in the public sector such as industry based state universities. Researchers such as Cong, Li and Stonehouse (2007) cited that the field of KM in Chinese university is still in its infancy stage. There are limited published literature about KM initiatives and practices in the public sector in China. In spite of its potential promise in business and science, effective KM also faces difficult obstacles. Irrespective of the improved stature of KM in higher education institutions, there is inadequate research into the inter-relationship of KM, knowledge worker productivity and organizational performance in the Chinese higher education (Sahibzada, Cai, Latif, Shafait, & Sahibzada, 2022).

It was also noted by researchers such as Vick and Robertson (2018) that the level of scientific and technological innovation level in China still lagged behind some developed countries. Based on the study of Miesing and Tang (2017), although existing studies conducted on new knowledge generation and transfer, majority of the studies failed to examine the processes of knowledge transfer and creation to other organizations for innovation and commercial purposes. Additionally, in the recent research by Zhang (2022), the researcher studied the relationship between authentic leadership and teachers" knowledge sharing in China, discovered that knowledge sharing among the Chinese teachers remained at a relatively low level. In the school context, it is therefore worth exploring ways to effectively encourage teachers to knowledge-sharing. Worth noting is that knowledge sharing (KS) that supports research collaboration by faculty members has yet been focused with no previous research on the impact of KM enablers that influence the sharing of knowledge among research university members.

To date, with the integration of knowledge transfer and social network, more study is needed to explain the use and influence of social networks in the Chinese university in the sharing, transfer and distribution of knowledge (Ye, De Moortel & Crispeels, 2020). In fact, scholars have increasingly questioned the dynamicity of social network, that concern how and why networks emerge and evolve (Ahuja, Soda

& Zaheer, 2012). Therefore, it is vital that this research be undertaken in China and the outcomes of the research not only help to narrow the research gaps of understanding KM in the context of industry based university, but also recognizing the enablers as well as obstacles experienced by educators. The findings will contribute to the implementation of effective KM initiatives in the Chinese educational institutions.

1.6 Operational Definitions

Nonaka and Takeushi (1995) define knowledge as the justified true beliefs. Davenport and Prusak (1998) suggested that knowledge is a more specific and governed organizational process to capture, organize, retain and sharing of knowledge to renews the individuals" background knowledge to foster organizational performance and improvement.

Described as a part of the knowledge flow, knowledge sharing embeds the basic exchange of ideas, information and knowledge. While sharing knowledge, agents participate in its generation, join with others and utilize it separately or together. As a result of knowledge sharing, knowledge gets reshaped or improved (Collins & Hitt 2006 and Ensign & Hébert, 2009). Knowledge sharing can be formal and informal, while knowledge transfer is formal by nature.

Knowledge transfer, on the other hand, describes a technical process of shifting knowledge from one location to another. In this study, the researcher adopts the definition by Bloedon and Stokes (1994, p. 44) that knowledge transfer is "the process whereby knowledge is concerned about the making or doing of useful things contained within one organized setting is brought into use within another organizational context". In other words, it includes every activity that are related to the transfer of knowledge and capabilities developed within the universities to a non-academic setting (Molas-Gallart & Sinclair 1999).

As for knowledge transfer practices, it is the activities that facilitate what is needed to apply knowledge in another organization' s context, such as, training, managing interactions and sharing data and technology.

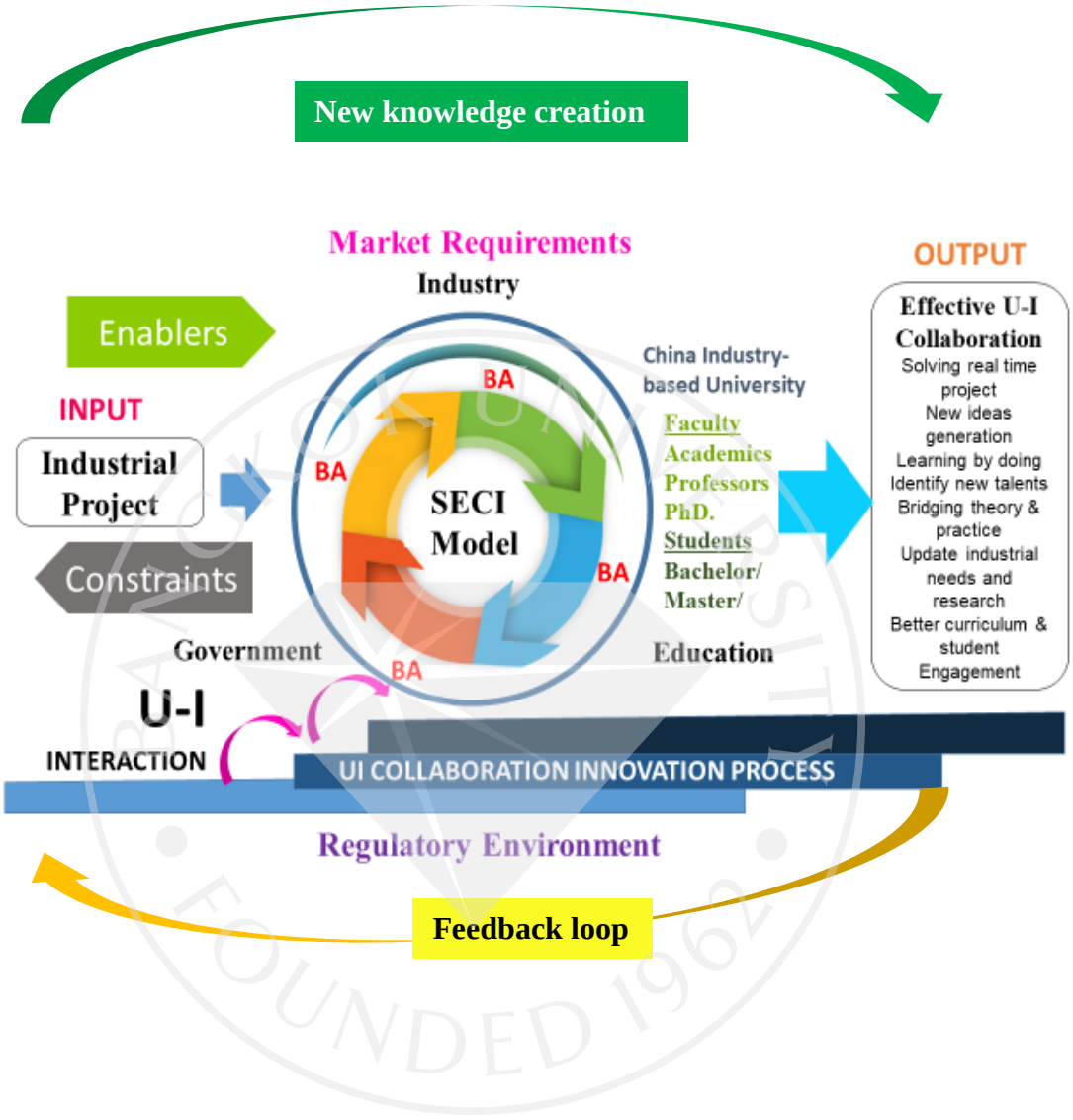
1.7 Scope of Study

This study examines only industry based university in China and their perception towards the enablers and barriers of U-I interaction and collaboration. Due to the limitation of time and resources, the study is conducted in only one institution– Baise University at Guangxi, China. It is accredited by the Chinese Education Department, Guangxi Autonomous Region. The Baise University is a small sized university with an enrollment rate of about 24000 students. It is one of the leading university in providing education in the areas of IT, chemical technology and regional studies.

1.8 Conceptual Framework

The conceptual framework is developed in accordance to the perspective of knowledge management with the support of two major theoretical concepts, namely the SECI model by Nonaka and Konno (1998), and the Triple Helix (Etzkowitz, 2008). To accelerate the new knowledge creation in the U-I collaboration innovation process, the researcher examines the enablers to drive industry project with scientific and academic support from the university with state funding. The process of interaction and collaboration can be observed through the working of the SECI activities in the working environment, which needs to meet market and regulatory requirements. Barriers are also important components to making changes and improvements for sustainable U-I development. The conceptual framework is presented on Figure 1.3, on the following page. To ensure that it is an open process, a feedback loop is also included in this model.

Figure 1.2: The Enablers and Barriers in Industrial-Based U-I Innovation Process



CHAPTER 2
LITERATURE REVIEW

In the last 4 decades, China undertook several important reforms to transform its national innovation system to comply with the Soviet innovation system (Fong, Chang & Chen, 2018). As early as 2000, the Chinese Ministry of Education allowing universities to retain ownership of research results obtained with governmental funding with the passing of the Chinese version of the Bayh-Dole Act. The new act lays the foundation for the protection and commercialization of university intellectual property (IP), thereby giving Chinese universities greater autonomy in managing their research activities, and interactions with industry were encouraged (Motohashi & Yun 2007). Hence, the university is seen as strong actor in economic development through incubators facilities or as scientific/technological pools for Industry (Worasinchai, 2009). It is important to understand where knowledge, a critical resource of a firm comes from, how it is retained and how it can be transferred, (Argote, Mcevily & Reagans, 2003). To understand the transfer and sharing of knowledge, it is necessary to understand the basic concepts of knowledge before analyzing the knowledge flow between university and industry. Additionally, comprehending the type of knowledge critical in U-I development is crucial. According to the study of Dhanaraj (2006), the findings indicated that strong relationships are required to facilitate the transfer of tacit knowledge. However, if the relationship is less strong, explicit knowledge can be transferred. Nevertheless, the researcher pointed out that the transfer of tacit knowledge was more valuable than the transfer of explicit knowledge.

2.1 Knowledge Management in Chinese University

Traditionally, the primary role of colleges and universities is imparting knowledge. These educational institutions are needed to prepare new graduates with the knowledge, skills, and ethical responsibility to meet the future workforce needs of the society and to integrate well in the new global economy. This adaptive role intensifies with the drive for institutional excellency. According to Abbas, Avdic, Barker and Peng (2018), one of the major roles of the Chinese universities and their research teams is to carry out research activities to create new knowledge for

commercialization of knowledge to take place, along with its primary education training. Such academic development is built on the basis of mutual benefits between the learning institution and the industry. University gains from the improvement in their infrastructure, techniques and reputation (Aldrich, 2012) with its development of innovative concepts, services and products. Industry, on the other hand, is the main user of external knowledge. Innovation is the major indicator of an organizational performance. This is due to their potential for creating competitive advantage, enhancing customer satisfaction, and value creation (Cohen & Levinthal, 1990). Nevertheless, limited resources, manpower and time can hinder the growth and development of new products. For these reasons, industries tend to rely on external resources (for example research services offered by universities) to obtain new knowledge to fulfill their requirements for innovation development or product improvement (Sherwood & Covin, 2008).

Hence, it is well acknowledged that universities are unique actors in the production and delivery of new know how to supports economic development (Salter & Martin, 2001). Significantly, the transfer of knowledge and technology from state universities to private sectors has gained the attention in academic research (Jiang, Zhao & Feng, 2022). However, to take a more contributive role in the economy, it is vital for new knowledge not only to be created at universities, but also to be transferred from universities to industries.

2.2 Channels for University and Industry Knowledge Sharing and Transfer

As engines of innovation, universities share and transfer knowledge through various approaches such as informal meetings, consulting, publications, patents, licensing, joint ventures, research contracts, personal exchanges, recruiting and scientist migration to private sectors (Agrawal, 2001). There are also other means in terms of licensing, collaborative research partnerships, and contract research, which firms can directly access university knowledge (Ferreira & Carayannis, 2019). As indicated by researchers such as Phelps, Heidl & Wadhwa (2012) and Borgatti & Foster, (2003), social networks are increasingly seen as influential in explaining the knowledge transfer process.

2.3 Enablers of Knowledge Transfer in University

KM enabler's factors are essential infrastructure to foster higher efficiency in terms of KM activities. As influencing factors, these enablers can facilitate knowledge management activities such as codifying and sharing knowledge assets among individuals (Chan & Chau, 2005). Enabling factors have the power to guide knowledge management in the organization. Laupase (2003) highlighted 3 major factors of organizational structure, culture and information technology as supporting variables of conversion of implicit to explicit knowledge process.

In this research, Laupase (2003) identified five important enabling factors encompassing organizational culture, technology, human sources, organizational structure, and political factors. The study emphasized communal culture, organizational communication system, information technology and transformational leadership as essential knowledge management enablers. Tan & Md. Noor (2013) studied the knowledge management enablers for knowledge sharing and research collaboration in universities investigated 11 critical KM enablers and found 6 significant relationships in terms of organizational rewards, trust, organizational culture, KM system quality, face-to-face interactive communication and openness in communication.

In this research, taking into consideration the unique characteristics of the industry based state university, the researcher will conduct an in-depth focus group as part of it research methodology to discuss and identify effective enablers as part of the contribution to the research in KM enablers for university in China.

2.4 Barriers and Challenges of Knowledge Transfer

Undoubtedly, this complex knowledge transfer processes come along with substantial challenges, according to Ferreira & Carayannis (2019), the UI relationship can be perceived as a general open innovation framework. According to O'Dwyer, Filieri and O'Malley (2022) U-I study, there has been a surge in terms of research on the innovation potential of in inter-organizational business networks with little attention given on the barriers and enablers to collaboration that emerge over time in UICs (Bruneel, D'Este & Salter, 2010; Plewa, Korf, Baaken & Macpherson, 2013). Deploying motivations to facilitate collaboration as a mean to improve overall

expertise and access unique resources such as technology, knowledge, and capabilities encompasses thoughtful management of barriers and optimal use of enablers. Dealing in a more complex environment, the knowledge transfer process is not without challenges.

The factors that hinder the knowledge transfer performance of industry-university-research institution collaboration in China as depicted in Figure 1.2 on the following page, have been broadly categorized into enterprise factors, learning willingness (Cohen & Levinthal, 1990), absorptive capacity (Jansen, Van Den Bosch, & Volberda, 2005) and university factors. Due to the limitation of time and resources, for this study, greater emphasis is placed on the university factor in the discussion section of the study.

Figure 2.1: Major Hindrance of Knowledge Transfer in Industry University Research Institution Collaboration

2.5 Tacit and Explicit Knowledge for U-I Interaction

Base on this basic understanding, the literature review first examines the nature and types of knowledge to facilitate U-I interaction and collaboration. In general, knowledge can be divided into two main types, namely tacit and explicit knowledge (Hubert, 1996). Tacit knowledge is the personal and context-specific

knowledge of a person that resides in the human mind, behavior and perception (Duffy, 2000). In terms of organization, tacit knowledge is multidimensional and context-specific. It is often part of the organizational routines and is highly practice-oriented (Jasimuddin, Klein & Connell, 2005)

Knowledge is a dynamic human resource which embeds individual concepts, skills, experiences as well as vision to provide the foundation for creating, evaluating and applying the information (Soltani & Navimipour, 2016). As such, it is an invisible asset whereby a person acquires the knowledge through complex cognitive processes of perception, learning, communication, association and reasoning (Epetimehin & Ekundayo, 2011).

According to Nonaka (1994), the quality of tacit knowledge on an individual level is influenced by the person experience in the chosen context. The researcher also noted that repetitiveness of unchanging work-related activities would affect the amount of tacit knowledge generated and delivered.

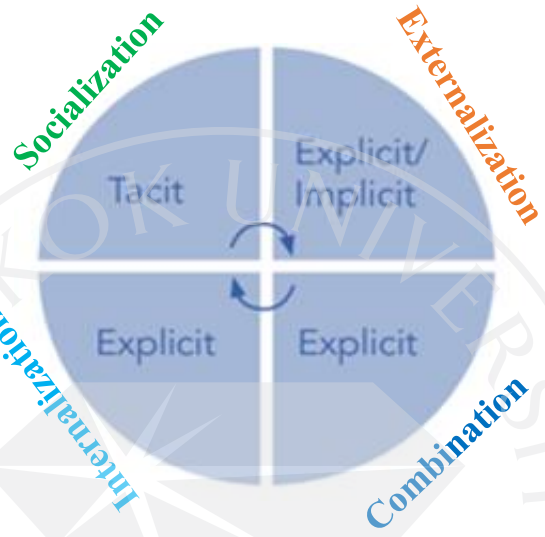
According to Nonaka and Konno (1998), knowledge is categorized into tacit and explicit. Explicit knowledge defined by Bennet and Bennet (2008).is the process of calling up information (patterns) and processes (patterns in time) from memory that can be described accurately in words and/or visuals (representations) such that another person can comprehend (understand, create meaning and anticipate the outcome of actions) the knowledge that is expressed through this exchange of information. In simple term, it is knowledge can be stored, explained and disseminated through information technologies and formal procedures (Choo et al., 2006, p. 493). Thus making it part of the individual' s knowledge base and then becomes a knowledge asset for the organization.

2.6 Nonaka's SECI Model

The SECI model as illustrated in Figure 2.2, for knowledge creation is based on four quadrants of knowledge transfer namely Socialization, Externalization, Combination and Internalization (SECI). According to Nonaka and Takeuchi (1996), socialization involves sharing knowledge in direct or face-face interaction; Externalization happens when tacit knowledge is converted into implicit knowledge.

Combination involves tacit knowledge transferred into explicit knowledge and explicit knowledge to explicit knowledge is internalization. The cycle then continues.

Figure 2.2: SECI Model for Knowledge Creation



Sources: Nonaka, I., & Takeuchi, H. (1996). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. Oxford, UK: Oxford University.

Theoretically, during socialization, academicians and students spent time with the industrial participant (e.g., production managers and lean practitioners) to observe and understand existing practices and related issues to be solved. At this stage, knowledge can be shared through lecturing, learning by doing, know-how, and skills of individuals sharing experience. The mental model and technical skills among the parties can create and develop individual tacit knowledge. At this phase, researchers seek to understand the product, process and its problems involved in the current scenario as in a factory or place of operation. This shared mental process foster common understanding. Interestingly, this point of interaction is brought about when people get to meet and discuss face-to-face. This concept is known as *Ba* "in the SECI framework. Ba as explained by Nonaka and Konno (1998), roughly means

"place" (abstractly unites physical, virtual & mental place), where information is interpreted to become knowledge. According to Tyagi, Cai, Yang and Chambers (2015), knowledge creation can only occur in a place and time; it depends on the method of participation and the individuals who participate. Noticeably, "Ba" provides a base for SECI modes for sharing among individuals and a group in physical and virtual space (Vijayan, Mork & Hansen, 2018).

In the externalization stage, interaction takes place collectively on a face-to-face basis. The researchers will begin to collect data, report idea, view, understanding, and suggestion. While discussing, the participating parties can communicate using computer-aided design (CAD model), sketches, languages, and symbols to comprehend the problem (Vijayan et al., 2018). Then, they can try to create hypotheses and concepts to solve the problems. The knowledge created can be influenced by the competency and education levels of the individuals involved in the U-I interaction. Looking at the situation from a different perspective and knowhow allow a mixed group of competence have the potential to recognize more problem and bring up solution. In externalization, tacit knowledge of the researchers will then be converted into explicit knowledge through documentation and allowing it to be shared. When this occurs, the group can learn from each other and improve their methods of operation. This specific process needs high involvement and engagement from qualified professionals, academician, and even students to complete the project.

For combination, it takes place when the explicit knowledge of individuals is combined through various media for systemizing or simply a combination of the explicit knowledge. At this phase, tacit knowledge is transferred into explicit knowledge. The parties involve can now search for more details which they can retrieved from published literature, project report, thesis, and dissertation for similar problems from other industries and then prepares a final presentation of linking those theories with practice with valid evidence, proof for their views and suggestions (Vijayan et al., 2018). At this stage, the researchers can suggest innovative ideas for further development. The Ba space can be physical or virtual where communication take place. Additionally, virtual tools for organizing knowledge using blackboard, internet library and the intranet. These digital tools serve as a well-integrated information management system, accessible for researchers to deliver reports, have a

discussion, etc. The presentation of the solutions can also be documented in the structured report, which can be stored into organized explicit knowledge in both industry and university. The knowledge assets include systemized documentation, manuals, specifications, database, patents, and licenses. This act as the knowledge repository for both the university and organization, which forms the knowledge platform for the spiral of SECI mode.

As for internalization, it is a phase whereby knowledge conversion happens when codified knowledge is internalized within oneself. Academic researchers embody the created explicit knowledge (explicit knowledge to explicit knowledge), further socialize during other courses, project, Independent Study, and in coming years, thus starting a new spiral of knowledge creation. It has also been suggested that explicit knowledge information can be shared on internet platforms such as blogs, wikis, different chat forums where students are more engaged and are seen very active in sharing and receiving knowledge to and from one another (Faith & Seeam, 2018). Students being engaged on these platforms could suggest that social networking tools can be effective knowledge management tools for sharing knowledge (Chikoore & Ragsdell, 2013) on the other hand, industrial participant shares result with the development team, across the department, and create a routine within the organization for improvements. The “Ba” is the virtual tools, which includes collaborative knowledge networks, and databases. The knowledge assets are the organizational culture, routines, and the expertise.

2.7 Motivation for Academic Institutions to Share Knowledge

University and Industry have different motives that enable them to develop this collaboration (Dang, Jasovska, Gulzar Rammal, & Schlenker, 2019). In their research examining knowledge sharing in academia, Faith and Seeam (2018) suggested that academic institutions use knowledge management to share knowledge and realize growth benefits. These institutions are also motivated to apply knowledge sharing for reputation and recognition by their individual nations; continuous publication of research; and the need to improve and accentuate the needs of the environmental/ community demands (Nassuora, 2011). Also, these institutions have new improved knowledge and information. They can count on the readiness of the

students to accept the knowledge transferred to them as well as the eagerness of the tutors to exchange and transfer knowledge and these make academic institutions a great environment for disseminating knowledge (Ranjan & Khalil, 2007).

2.8 Why University-Industry interaction and collaboration (U-I) is important?

It has been highlighted by Grunwald (2004). This "intangible asset" promotes sustainable development and continuous innovation in various organizations. Hence, how to continuously acquire new knowledge and effectively applying the knowledge by scientific research teams has become important. According to Fagerberg, Lundvall and Srholec (2018) a company does not innovate alone. The growing demand for innovation and increasingly complex products and services requires companies to seek new sources of information and knowledge, such as universities (Garcia, Rapini & Cario, 2018). The joint effort of universities, development agencies, the state, government laboratories and research institutes are necessary to advance the path of the technological trajectory.

It has also been pointed out by Paranhos and Perin (2018) that the innovation system is a set of institutions that contribute to the development of the capacity for innovation and learning of a country, region and sector. In other words, University–Industry interaction and collaboration (U–I) have positive impacts for the generation of innovative strategies (Albats, Fiegenbaum & Cunningham, 2018). Academic research, then, appears in this analysis because it proves to be a source of new knowledge and a potential for promoting development.

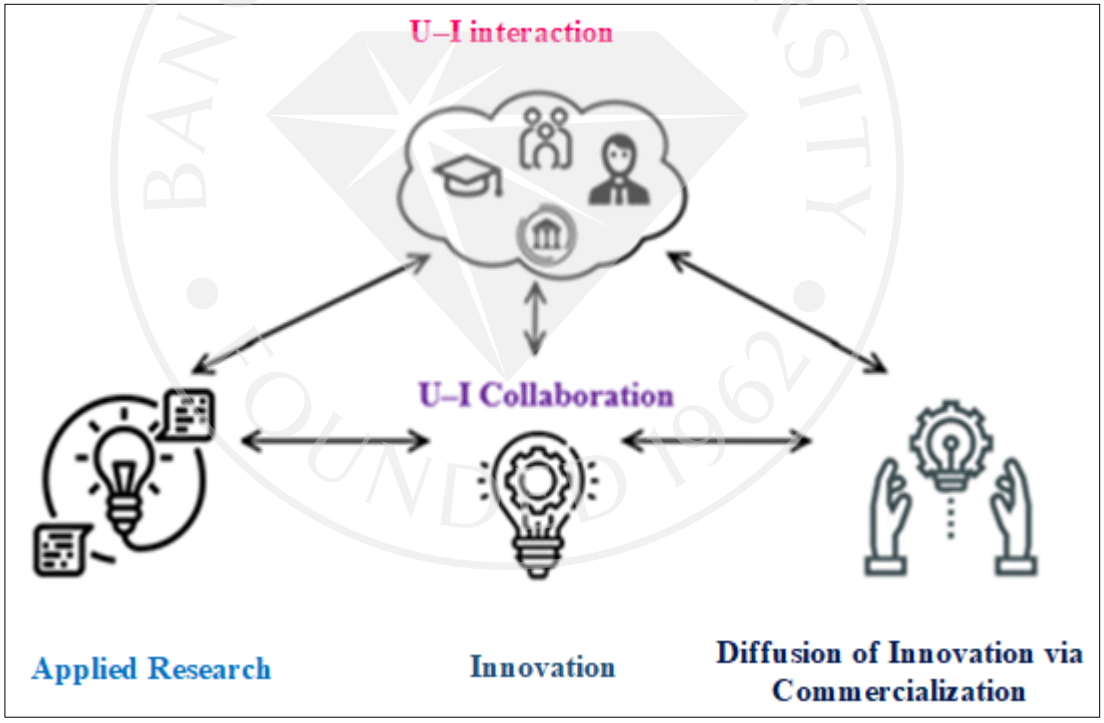
2.9 Definition of U–I Interaction and Collaboration

Like many countries, China has implemented policies to strengthen interactions between universities and firms to achieve better economic performance supported by academic research (Tartari & Breschi, 2012). U–I interaction is set in a learning process, both by the university and the firm, whose relations are established within a logic that involves the sharing of knowledge, mutual trust, and the transfer of personnel between the two actors (Albuquerque, Suzigan, Kruss, & Lee (2015). The forms of interaction between universities and firms can be through mechanisms

(Meyer-Kramer & Schmoch, 1998), channels (Dutrénit & Arza, 2010), or links (Ahrweiler, Pyka, & Gilbert, 2011).

On the other hand, university-industry collaboration (UIC) refers to the interaction between any parts of the higher educational system and industry aiming mainly to encourage knowledge and technology exchange (Bekkers & Bodas Freitas, 2008). The collaboration process has also been explained as the interactions between university and industry scientists who are working to translate academic science with commercial potential towards market applications (Oliver, Montgomery & Barda, 2019, p.758).

Figure 2.3: The Non-linear Model of Innovation for U-I Interaction and Collaboration



Noticeably, there has been a considerable increase in U-I collaborations in several nations including the United States (e.g. Lehrer, Nell & Garber, 2009), Japan (e.g. Woolgar, 2007), Singapore (e.g. Lee & Win, 2004), and European Union Countries (e.g. Protogerou, Caloghirou & Vonortas, 2017). The majority of the literature available in the field of success factors in collaboration management

examined only collaborations between companies, i.e. industry-industry collaborations. Evidently, many of these findings on the generic "success" factors comes from the studies of technological collaborations in the biotechnology, pharmaceuticals, electronics, telecommunications, information technology, automotive engineering, aerospace, and oil-exploration (Barnes, 2000). Similar trend prevails in China. Lei et al. (2011) performed a co-patent analysis for China and found that the collaboration between university and industry is the strongest and most intensified in recent years, but other forms of collaboration between the UIG have been weak.

2.10 Benefits of U-I Interaction Improvement for Universities

In analyzing how to strengthening the bridge between academic and the industry through academia-Industry Collaboration, Ahmed, Fattani, Ali and Enam (2022) clearly indicated that there are many ways in which universities can benefit from the U-I interaction with the industry. These researchers cited that academicians need to have a practical problem to which they can apply their knowledge. Only when the educational institutions are linked with the industry, then can they comprehend the practical issues which demand applicable solutions.

Additionally, being connected to the industrial sector, universities will receive authentic source of data which or else will not be accessible due to confidentiality and business security. Another major gain via U-I interaction is that universities can also revamp their curriculum in light of their interaction with the industry. In doing so, universities increase the employability of their graduates. Last but not least, the linkage between universities and the industry facilitate the advancement of knowledge with the modern practices in the business and operational environment. When problems are approached in a collaborative manner, the chance of a new startup increases exponentially.

Other research by Sandberg, Holmström, Napier, and Levén (2015), indicated that improved university-industry communication gave companies access to knowledge often out of reach within internal resources and capabilities, reduction of costs and improved time to market. Kopczynska and Ferreira. (2017).conducted a review of 8 U-I related research papers (Fields, 2006; Korzhenevskaya, 2014;

Grimaldi & Grandi, 2005; Lockett, Kerr & Robinson, 2008; Rad, Seyedesfahani & Jalilvand, 2015; Sandberg et al., 2014 and Sheen, 1995) between 1995 to 2014 to study on how universities and industry can improve communication for open innovation, highlighted the benefits universities would gain. These benefits are listed as below:

1) Increase patents with Intellectual Property Rights (IPR)
2) Enhancing tacit knowledge
3) Better negotiating or regional position/ brand/reputation
4) Spread entrepreneurial culture
5) Academic acceptance for commercialization of research
6) Application skills of academics
7) New scientific information, instruments and methodologies improved skills of graduates improved productivity of staff
8) Cost reduction
9) Financial benefits through funding
10) Contribution to economic growth
11) Access or acquisition of equipment
12) Improvement in internal interactions

As highlighted, communicating with industries enable universities to gain not only new scientific information, instruments and methodologies, but, more importantly, help to build up and strengthen tacit knowledge and skills of faculty and graduates and improve university reputation. That gives universities stronger negotiation position as a knowledge and research provider. It increases university contribution into regional development, allows generation of additional financial and knowledge resources and access or acquisition of new equipment required to remain in the leadership of science.

2.11 Improve U-I Interaction for Industries

Kopczynska and Ferreira. (2017) further examine the benefits for the industry from U-I interaction. Based on the research by Grimaldi and Grandi (2005), Lockett et al. (2008) and Sandberg, et al. (2014), industry gains access to research networks; improve reputation with the U-I connections, obtaining specialized knowledge,

enhance understanding of knowledge needs and applicability; optimal use of resources out of internal capacities; reduction of R&D costs; improved time-to-market; and obtaining solutions to problems. As a region, industries are able to retain graduates, develop new companies and propel economic growth.

2.12 Barriers to University Industry Communication

Despite the obvious benefits for both industry and university, success is not guaranteed, and many University–Industry Collaborations (UICs) experience tensions that impede successful collaboration, leading to less effective technological diffusion (e.g. Siegel, Waldman & Link, 2003).

Likewise, in the Chinese industry-based universities, the interaction between university and industry still faces many constraints as parties struggle to align their objectives. Nevertheless, effectively communicate is critical to establish fruitful collaboration (Etzkowitz & Leydesdorff, 2000). Kopczynska and Ferreira. (2017) studied 11 prominent U-I related research (Buser, 2013; Butcher & Jeffrey, 2005; Cassanelli, Fernandez-Sanchez & Guiridlian, 2017; Davis & Eisenhardt, 2011; Teubner, 2007; Lockett et al., 2008; Pablo-Hernando, 2015; Ranga, Miedema & Jorna, 2008; Sandberg et al., 2015; Van Den Berghe & Guild, 2008) pinpointed a list of potential barriers that hinder U-I communication.

The literature review by Kopczynska and Ferreira (2017) further indicated that present studies acknowledged differences in culture between U-I as well as purpose and procedures towards the collaboration as the most common barriers to the communication in UI. The researchers also pinpointed a list of other challenges such as cultural barriers relating to organizational image and differences in attitude, language used and cognition level were other barriers between university and industry (Alshehri et al., 2016). Other researchers such as Ranga et al. (2008) and Pablo-Hernando (2015). Highlighted more challenges in their U-I related research. These obstacle elements are as follows:

1) Different in time horizon

2) Problems with the types of language used

3) Varying priorities make it difficult for businesses, especially smaller enterprises to establish connections with universities

4) High level of reluctance to engage in commercialization activities

5) Lack of recognition of companies as valid research partners

6) Lack of clear contact channels

7) Information on competencies of the expertise

8) Possible services offered by universities in the context of open innovation

Furthermore, the lack of recognition for university as the 3rd mission and enhancing it publication-based incentive system also pose serious challenges to attain advance research for industrial partners (Sandberg et al. 2015). Significantly, there are concerns about different priorities of universities put companies looking to partner with universities to develop new technology at risk of leaking information through publications or disclosing. Based on a number of studies such as Agrawal (2001); Davenport, Davies & Grimes (1999); Hofer (2005); Johnson and Johnston, 2004) and Worasinchai, Ribiere and Arntzen (2008) Main listed the identified factors affecting successful/effective U-I collaborations as depicted in Table 2.1 as shown on the following page.

Table 2.1: Significant Factors Influencing Success of U-I Collaborations

Type of research involved **(**basic vs**.,** applied **–** technical/ Non-technical)	Vary in organizational structures	Difference time horizons between university and industry
Availability of staff resources	Varying objectives **–** Aligning technical and business goals	Institutional reward structures
Brand of university	Previous or present project with company competitors	Inadequate collaborative structure
Prior industrial relationships	Lack of motivation	Handling conflicts of interests and commitment

(Continued)

Table 2.1 (Continued): Significant factors influencing success of U-I collaborations

Type of research involved **(**basic vs**.,** applied **–** technical/ Non-technical**)**	Vary in organizational structures	Difference time horizons between university and industry
Not familiar with each others	Low qualifications	Preserving academic freedom
Not being allowed to work with each others	Lack of trust**(**s**)**	Maintaining intellectual property and confidentiality
Unwilling to work with each others	Different cultures	Dealing with financial challenges
Unable to work with each others	Lack of understanding on how the counterpart organization **(**I or U**)** operates	Absorptive capacity

Sources: Worasinchai, L., Ribière, V. M., & Aurélie Bechina Arntzen, A. (2008). Working knowledge, the university-industry linkage in Thailand: Concepts and issues. *VINE, 38*(4), 507-524.

2.12 U-I Collaboration Enablers & Barriers

In the recent study by O' Dwyer, et al. (2022) relating to U-I Collaboration barriers and enablers, these researchers remarked that barriers occur at different points in time. The Table 2.2 as presented on the following page indicates the barriers and Table 2.3 illustrates the enables highlighted by these researchers.

Table 2.2: Barriers to U-I Collaboration

Barriers to U-I Collaboration	
Institutional barriers	Bruneel, D' Este & Salter, (2010)
Cultural differences	Bjerregaard (2010)
(Transaction costs	Sampson (2004)
Project management skills	Barnes, Pashby & Gibbons, (2002).
Trust	
Commitment	
Continuity	
Capacity to flexibly	
Adapt to changes in strategy or project direction	
Appropriate balance between academic objectives and industrial priorities	Barnes, Pashby & Gibbons, (2002).
Geographical distance	D'Este, Guy & Iammarino (2013).
Risk of free riding, opportunism, misappropriation of technological and strategic knowledge	Al-Tabbaa & Ankrah (2016) Bstieler, Hemmert, & Barczak (2015).

Sources: O' Dwyer, M., Filieri, R., & O'Malley, L. (2022). Establishing successful university–industry collaborations: Barriers and enablers deconstructed. *The Journal of Technology Transfer*, 1-32.

Table 2.3: Significant factors influencing success of U-I collaborations

Enablers	
Contractual arrangements	Lee (2011)
Organizational commitments	
Specialized coordination specialized coordination, and formal evaluation procedures	
Competence	Bäck and Kohtamäki (2015)
Social capital	Al-Tabbaa & Ankrah (2016)
UIC formal management mechanisms (moderated by innovative climate)	Villani, Rasmussen & Grimaldi (2017)
Intermediaries	
UIC regulation implementation	Huang & Chen, 2017

Sources: Worasinchai, L., Ribière, V. M., & Aurélie Bechina Arntzen, A. (2008). Working knowledge, the university-industry linkage in Thailand: Concepts and issues. *VINE, 38*(4), 507-524.

2.13 A Chinese Perspective - Obstacles Preventing Cooperation Between UI in China

In their UNESCO Project Report on University Industry Partnership in China: Present Scenario and Future Strategy, Jianzhong & De Graeve (2005) indicated several barriers that prevail in the Chinese context.

2.13.1 Mentality and Conception

According to Jianzhong & De Graeve (2005) indicated that the Chinese society as a whole lacks basic ideas and knowledge of the importance and necessity of U-I cooperation. The Chinese society needs to view U-I cooperation at higher level and considers it as an essential condition for building harmonious society. Therefore, the society should reconsider school's responsibility to just cultivating talents. U-I Cooperation should be perceived as an unavoidable way of cultivating engineering talents with true skill and genuine knowledge.

2.13.2 Legal Aspect

University-Industry Cooperation involves economy, intellectual property, labor protection, taxation, personnel affair and so on. Although the government has drawn up policies concerning University-Industry Cooperation, there is still a long way to go to set up a complete system in terms of this.

2.13.3 System and Mechanism

According to Jianzhong & De Graeve (2005), the Chinese government plays a particularly important leading role in guiding and promoting this partnership. Only by benefiting all participators including college students, institutions, enterprises and the society and creating multi-win situation, can University-Industry Cooperation in China be sustained.

2.13.4 Funds for University-Industry Cooperation

Regarding research collaboration in China, governments are the main source of funding for universities; they also control academia through a government-initiated Triple Helix (TH) model (Zhou & Peng, 2008). In university-government collaboration, government is a key player as it provides financial support to the universities. The majority of Chinese universities are public institutions. Therefore, without government financial support and involvement, it is very hard for universities to take initiative in any research project (Zhao, Cacciolatti, Lee & Song, 2015).

Jianzhong and De Graeve (2005) cited that educational funds for higher engineering education in China is rather limited, sometimes even not enough for funding students to travel to enterprises where they do field work. University-Industry Cooperation should therefore be financially supported by the government as well as enterprises-after they benefit from the cooperation.

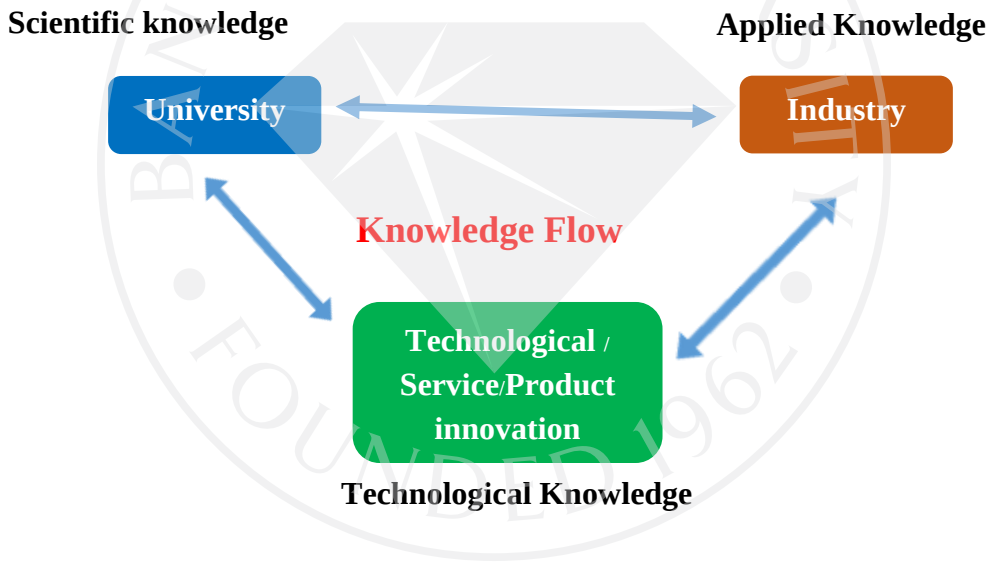
2.14 U-I Knowledge Flow

Studying U-I knowledge flow is important to determine universities" contributions to regional innovative capacity. These vital contributions have been narrowly conceived in much of the literature, which tends to focus on knowledge spillovers. There is therefore a need for a more detailed understanding of knowledge flows between universities and firms. In this LR, the researcher first examines the

different types of knowledge flows, how knowledge flows occur and conditions that encourage such flows.

According to the study by Zawislak and Dalmarco (2011), there are different knowledge transfer channels that stimulate and support certain knowledge flow between university and industries. In order to enhance knowledge in both institutions, it is necessary to establish a knowledge flow between them, based on a dynamic transfer of scientific and applied knowledge. The knowledge flow as depicted in Figure 2.3 on the following page is defined by the difference on the levels of knowledge between institutions (Wang & Lu, 2007).

Figure 2.4: Knowledge Flow between the University and Industry



When analyzing the knowledge flow, Zawislak and Dalmarco (2011) suggested that it has to be based on factors which comprise of the actors, U-I channels, direction and content.

2.15 U–I interaction Process

The process to generate innovations is complex. It relies on elements related to knowledge that translate into new products and processes, which are embedded in an environment characterized by feedback mechanisms and interactions involving science, technology, learning, production, policy, and demand (Edquist, 1997).

Although most innovations happen inside innovative firms, other institutions such as universities, government laboratories, and coordinating and financing agencies of the government play a key role in the creation of new technologies (Niosi, Bellon, Saviotti & Crow, 1992).

2.16 U-I Interaction Channels

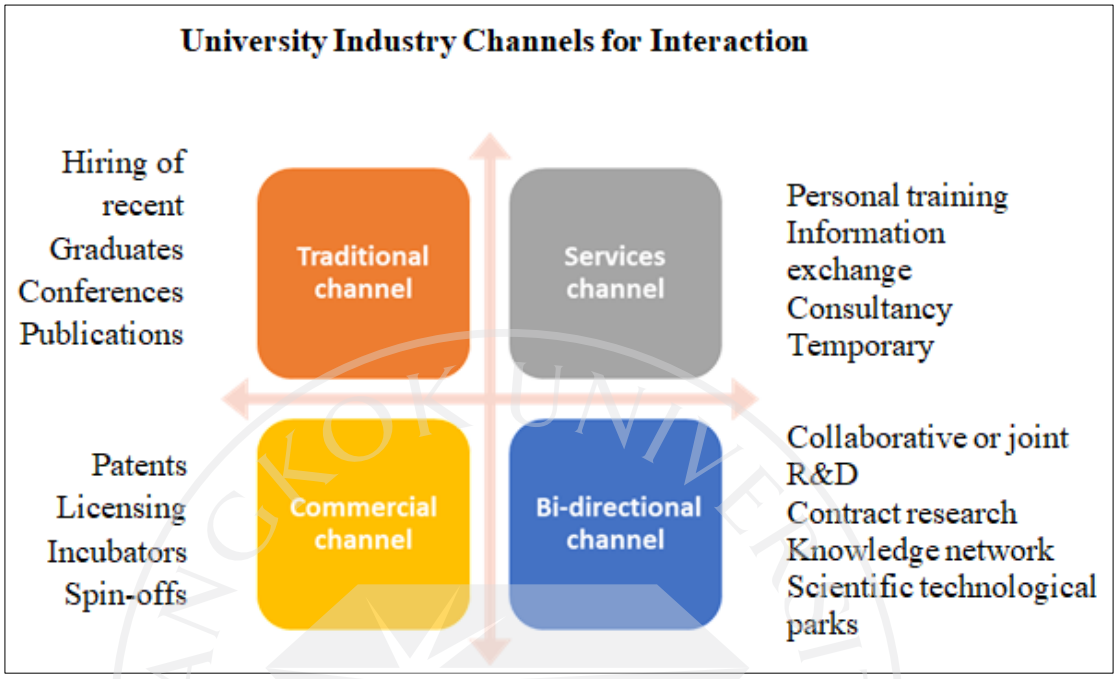
The U-I interaction can take place in the following ways:

1) Conferences and workshops
2) Informal meetings, talks, communications
3) University graduates as employees
4) Licensing of university patents
5) Joint publications
6) Lectures/training
7) Contract research and consulting
8) New firm formation by university members
9) Joint R&D projects

Lemos and Cario (2017) categorized these methods into four main types of channel, namely traditional, services, commercial, and bi-directional (see Figure 2.4 on the following page). In each of these channels, forms of interaction take place between the university and the industry.

The traditional channel involves the following possibilities: hiring recent graduates, conferences and committees, publications, informal contacts, and social networks. Publication is the most common mean of interaction among researchers with firms in situation proved to be the most common form among researchers, particularly theses and dissertations produced from interactions with firms to discuss, observe and explore issues of concern. In terms of *services channel*, it includes personnel training, seminars for industry, and other types of skill building; the exchange of information, consultancy, and the temporary exchange of personnel, such as scientists and staff; and facility sharing (Lemos & Cario, 2017).

Figure 2.5: Four Main U-I Interaction Channels



Sources: Lemos, D. C., & Cario, S. A. F. (2016). University–industry interaction in Santa Catarina: Evolutionary phases, forms of interaction, benefits, and barriers. *RAI Revista de Administração e Inovação, 14*(1), 16-29.

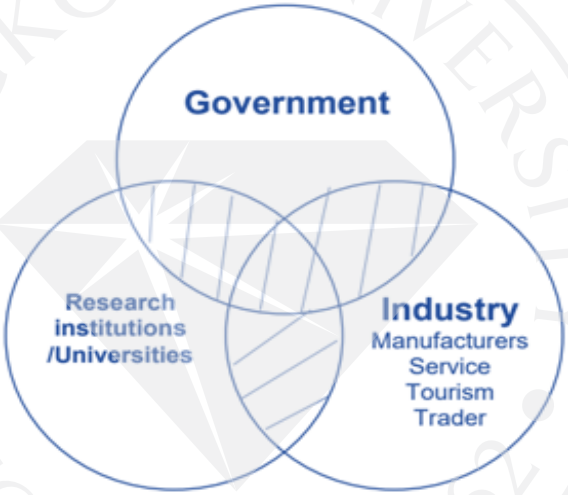
Through these channels, patenting and licensing has attracted the most attention in both legislative practices and academic research, and licensing is considered one of the crucial ways for universities to transfer scientific knowledge (Bozeman, 2000).

2.17 Triple Helix and U-I Collaboration

From a theoretical perspective, the tripods of university industry government relations are mainly described by the Triple Helix (Etzkowitz, 2008). The concept of "triple helix" highlights the relationship of mutual exchange between universities, industries and the government (See Figure 2.5 for illustration of the relationship) under this approach, universities take on its "commitment" to economic and social development, characterizing themselves as entrepreneurial universities.

Besides its primary functions in the training human resources and scientific research, the university has acquired a new role in today's society, contributing directly to creating new products and services (Paranhos & Perin, 2018). Universities, therefore, are identified as fundamental institutional actors in innovation systems, since their role goes beyond the formation of qualified labor, as they also represent a source of technological and industrial knowledge for the productive sector (Fagerberg, et al., 2018).

Figure 2.6: Triple Helix Model



Sources: Etzkowitz, H., Dzisah, J., Ranga, M., & Zhou, C. (2007). The Triple Helix model of innovation. university – industry – government interaction. *Asia Pacific Tech Monitor*, *24*(1), 14-23.

2.18 The Triple Helix Approach in the Chinese Context

Importantly, by improving the performance of Chinese university knowledge and technology transfer through several programs, the Chinese government has recognized innovation and knowledge transfer to be the engine of economic development (De Moortel & Crispeels, 2018). Despite various science and innovation policies initiated by the Chinese government to forge R&D collaborations between universities (public research institutions) and industries for technology transfer and

commercialization, how institutional relationships are formed and developed to generate new knowledge has yet been fully understood properly. This lacking is also reflected in the study of Faria, Mixon and Upadhyaya (2019). These authors addressed the under theorization of the Triple Helix hypothesis examining how public policies affect the production of basic science at universities, facilitate interaction between universities, governments and firms.

Undoubtedly, the vital role of U–I interaction as a generator of innovation is widely acknowledged economic development of a nation However, there is a lack in the literature on the inverse relationship, that is, the impact of economic reality on U–I collaborations.

2.19 Knowledge Management (KM) and U-I Collaboration

Jasimuddin et al., 2005) explain that knowledge management, including both tacit and explicit knowledge plays an important role in collaborative technology programs. KM is used to capture, document, retrieve and reuse knowledge, as well as to create, transfer and exchange it (Dayan & Evans, 2006). In the context of U-I, Robertson, McCarthy and Pitt (2019) argue that U-I partnerships emphasize the transformation of knowledge into products and processes which can be commercially exploited, Sherwood and Covin (2008) report that the transfer of tacit knowledge can be influenced by the trust built up by the partners

2.20 Defining Knowledge Transfer

In this study, the operational definition of knowledge transfer refers to the two-directional interaction with knowledge passing from the University to the Commercial Partner and from the Commercial Partner to the University. The researcher based on his years of service in education administration is aware that the creation of knowledge in today's knowledge-based economies is a considerable challenging task for universities in China, based on the knowledge transfer study of several researchers such as Perkmann et al. (2013); Schoen, A., van Pottelsberghe de la Potterie, B., & Henkel, (2014) and Tornatzky, Waugaman & Gray (2002) suggested the 10 most commonly practiced KT activities between universities and external partners. The KT activities with brief description are listed on Table 2.4 on the

following page. As explained via the SECI model, knowledge externalization and socialization in the research group of specialists are important activities in human resources development process. These activities are based on the knowledge transfer process inside and outside the research groups.

2.21 Knowledge Transfer Processes - the University Perspective

Table 2.4: Knowledge transfer activities

No.	University knowledge transfer activities	Description
1	Patents and licensing	This refers to the exploitation of intellectual property. Through its patents a higher education organization can protect its intellectual property and if a patent is guaranteed it can be commercialized through sales of the patent or the license.
2	Spin-off and enterprise creation	A spin-off company is a new company whose formation was dependent on the use of intellectual property that was created and/or developed at a Public Research Organization; spin-off is the entrepreneurial route to commercializing knowledge of public research, both intellectual property and non-intellectual property based.
3	University-industry networks	This describes the dynamic two-way interaction, university-industry in the collaborative networks
4	International cooperation	This refers to the cooperation of the university with public and private organizations, beyond the national borders.

(Continued)

Table 2.4 (Continued): Knowledge Transfer Activities

No.	University knowledge transfer activities	Description
5	European affairs	It is related to the management, acquisition and monitoring of the European projects and the European funding.
6	Continuous professional development	This comprises the post-initial education programs aiming at improving the capability and realizing the full potential of professionals at work
7	Alumni affairs	It is related to the alumni contacts management.
8	National subsidies	National government programs and policies intended to encourage certain types of research programs and other specified university activities.
9	Regional subsidies	Regional government programs and policies intended to encourage certain types of research programs and other specified university activities.
10	Grants	The government or other non-profit organizations to encourage (individual) development or growth in a particular area provide them.

Sources: Röpke, J. (1998). *Innovation, academic knowledge creation and regional development in a globalized economy*. Germany: Plilipps-Universität Marburg.

Tornatzky, L. G., Waugaman, P. G., & Gray, D. O. (2002). *Innovation U.: New university roles in a knowledge economy*. Research Triangle Park, NC: Southern Technology Council.

2.22 Conclusion

This literature review examines the key elements in the UI collaboration innovation process. Much focus has been given to understand the enablers and

barriers of the sharing, transfer and co-creation of new knowledge to sustain the competitiveness of the industry in the fast pace technology environment**.** The literature review takes into consideration an array of findings in U-I related research and has identified multiple factors that drive U-I interaction and effective collaboration that follows**.** By exploring barriers, the review also takes into consideration various factors which can hinder progress and success in applying the new knowledge to innovation**.**

Importantly, the LR supports the conceptual framework of the study and provides substantial insights into possible answers to the research questions**.** However, as knowledge is situation dependent and context-sensitive, an in-depth interview with relevant personnel with insightful information is necessary for the continuity of this study.

CHAPTER 3
METHODOLOGY

3.1 Introduction

This research was conducted through the lens of the interpretive paradigms so as to better understand the complexity of the knowledge management (KM) phenomenon at the industrial based Baise University in Guangxi, China. Embedded in the KM process, the research examined closely how knowledge is shared, transferred, stored and reapplied among individuals, a unit/ team, between departments and the university as a whole. The interpretive paradigms are frequently combined with social constructivism paradigms (Creswell, 2007), requiring an understanding of the participants" perspective of the situation. As per Creswell (2007), a study carried out in this way seeks to find and interpret the subjective meanings of events or objects, acknowledging that each individual will have a unique and varied interpretation. This kind of research operates through observations, interactions, and open-ended questions that encourage participants to express their opinions.

3.2 Research Method

This study uses a single case study approach to examine the facilitators and barriers to U-I interaction and collaboration at Baise University in Guangxi, China**.** A single case study provides an in-depth analysis of an event, relationship, experience or process occurring in a particular situation by focusing on one **(**or several**)** instances of a particular phenomenon**.** Single case studies are widely used in social research, especially in small contexts**.** This method is most effective when the researcher wants to investigate an issue in depth and to provide an explanation of a complex and delicate real-life situation**.** Overall, it provided rich and good results for data analysis**.** Finally, in using CS, this study aims to contribute to existing theory, which will enable future research to use theoretical propositions to guide their data analysis**.**

The researchers engage first in a focus group interview to comprehend the existing factors that motivate instructors who understand have substantial understanding on the principle of knowledge management as well as the procedures and protocol of U-I interaction and collaboration in the industry-based university in

China**.** The findings add insights into the practices of U-I in the university to develop a questionnaire as the second phase of the study to collect data on the perception of fellow instructors as well as students**.** In doing so, the researchers will be able to make recommendations to improve university interaction with industries for future collaboration and to accelerate the co-creation of new ideas for innovation to take place**.**

3.3 Sampling: Purposive Sampling

Purposeful sampling is widely used in qualitative research for the identification and selection of information-rich cases related to the phenomenon of interest (Palinkas et al., 2015). The researcher has adopted this sampling method due to the fact that it is considered the most effective method for study with limited resources (Patton, 2002). Importantly, the purposive approach involves identifying and selecting individuals or groups of individuals who have the special knowledgeable about or experiences with the phenomenon of interest (Creswell & Plano Clark, 2011). In addition to knowledge and experience, Spradley (1979) indicated that the importance of availability, willingness to participate, ability to communicate experiences, as well as giving opinions in an articulate, expressive, and reflective manner were essential to capture insightful understanding of the situation. In contrast, random sampling is used to ensure the generalizability of findings by minimizing the potential for bias in selection and to control for the potential influence of known and unknown confounders.

To capture the essence of knowledge management experiences, the researcher selected a purposive sample of employees, mainly academic staffs from 5 collages and 4 major departments at Baise University. The faculties comprise of the College of Foreign Languages, School of Information, College of Education, and School of Entrepreneurship. The 4 departments consisted of the Network Canter, Security Office, Academic Development Center and the Scientific Research Office. This cross section sampling enables a wider representation of the population to under the problems they encounter and their attitudes towards the issue. To ensure that all the participants understood the purpose and objectives of the study, a short briefing was carried out. When participants gave their support to the study, the researcher

began the questioning session and posted the questions onto the QQ apps of the group. A list of participants by position, department, age and years of working have been provided in Table 3.1 on the following page.

Table 3.1: List of Interviewees

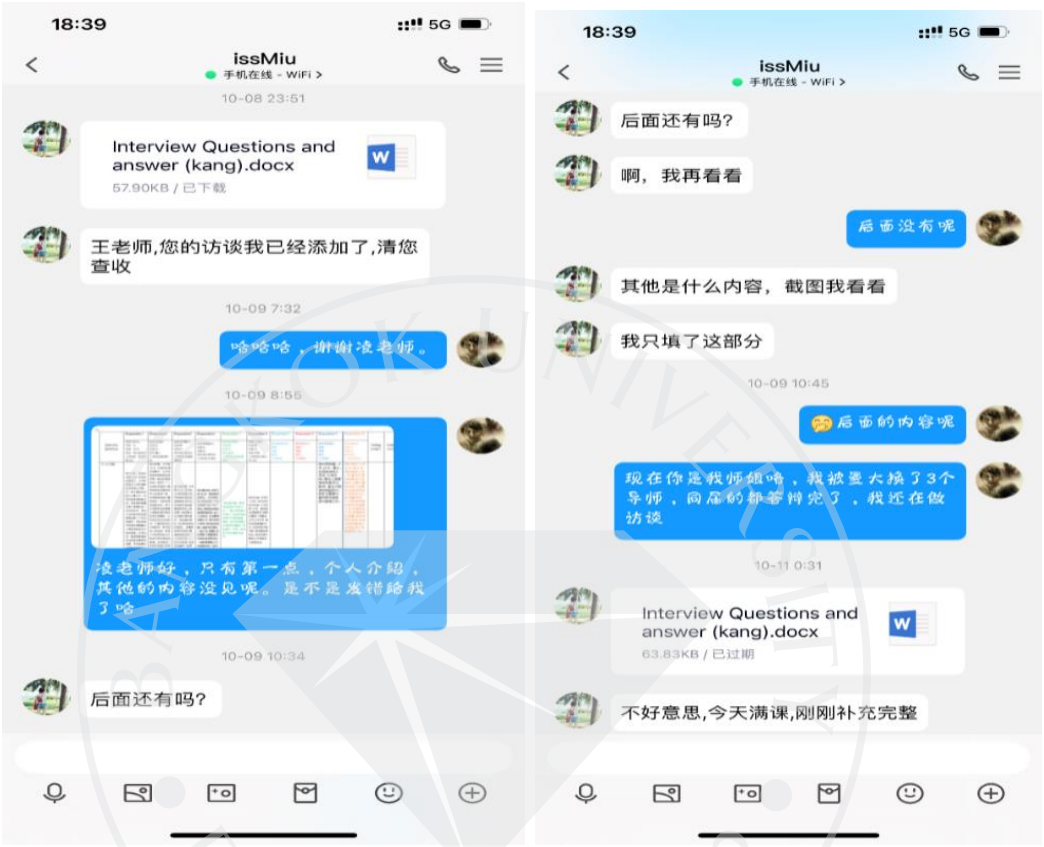
No.	Name	Gender	Position	Department	Age	Yrs. of working
P1	Naixin	Female	Teachers	College of Foreign Languages	38	12
P2	Li Lin	Female	Teachers	College of Foreign Languages	36	10
P3	Li Zongwei	Male	Laboratory Manager	School of Information	34	6
P4	Zhai Zhaoxin	Female	Tutors	College of Education	32	8
P5	Yao Yinheng	Male	Network Center Administrator	Network Center	33	7
P6	Jiang Hao	Male	Section Chief	Security Office	35	11
P7	Qin Qinqinghua	Male	Teachers	College of Business	44	11
P8	Song Bei	Female	Deputy Director	Academic Development Center	34	9
P9	Luo Qiuxue	Female	Deputy Director	Scientific Research Office	36	10
P10	Ling Miao	Female	Teacher	School of Entrepreneurship	29	7

In this study, there were 6 females and 4 males involved in the face-to-face in-depth interview over a time period of 4 hours. The session started 14:30 to 18:30 at the university conference room. All except one participant were in the room. However, Participant 10 was online at all time during this time period. Many of these participants were senior"s staffs at the university holding positions of over 6 to 12 years period. They had selected due to the fact that many of them hold an important position and were in a position to give comments, share experiences, highlight case examples and reflect overall sentiments in their workplace.

To ensure that everyone understood the questions and provided essential information without being interrupted or influenced by group thinking, the interview session was recorded and uninterrupted. As for participant 10 who had the online interview, her responses on the QQ social applications were illustrated in Figure 3.3 on the following page. All the responses presented the information in the Chinese language, which was later transcribed and translated into English for data analysis. The picture, as presented in Figure 3.1 illustrates the place and seating arrangement during the in-depth interview over the specified period.

Figure 3.1: In-depth Interviews

Figure 3.2: The Interaction that Took Place Online for Participant 10 on the QQ Social Application



3.4 Data Collection

In this IS the researcher took a "funnel approach," which is the often recommended strategy when conducting semi-structured interviews (Spradley, 1979) or focus groups. This approach begins with a broad view of the topic and then proceeds to narrow down the conversation to very specific components of the topic. In this study, the researcher first began with a general question about the opinion of the participants (as educators) on what KM was about. This question (Q1) specifically sought to gauge the participants" understanding of KM practices in their workplace. The second question asked participants to discuss how they managed knowledge on a daily basis. This question (Q2) stimulated the participants to recall and relate their everyday working processes. The researcher also asked the participants to provide specific examples of their experiences and best practices at work. Based on these two

questions, the researcher sought to identify the perceptions, motivations as well as apprehensions concerning activities related to KM.

Eventually, the researcher explored the insights of the participants on how knowledge sharing took place at work and the efficiency of the sharing (Q3). Another question on knowledge transfer (Q4) had also been asked. These two questions prompted the participants to engage further into their discussion as they began to provide case examples of how knowledge was effectively or ineffectively shared or transferred in the institution. These questions also prompted the participants to discuss about external sharing as well as the importance of sharing between units, departments and the university as a whole.

The researcher then moved into a more serious topic on knowledge creation, which is a critical KM process that facilitates new knowledge creation for competitive advantage. Participants were asked about their opinions as to how to knowledge creation could be enhanced in their daily work. This question (Q5) led to more discussion about possible collaborations within the university and collaborations with enterprises to have more applied research to meet the objectives of both the university and the industries. Upon the discussion of knowledge creation, the researcher posed the next question on the difficulties participants had encountered in the course of their work. This question (Q6) provided valuable information into the frustrations as well as barriers participants experienced or envisaged in their workplace. Many of the participants had common understanding of the problems and made significant comments as presented in Q8 on ways to overcome the problems concerning the KM system in the university. In question 8, participants were asked to share their views on how to effectively improve the sharing, transfer and creation of knowledge as an applied university for future development. To conclude the discussion, participants were asked to suggest some recommendations which they believe could benefit them and the KM development in the university.

The in-depth semi-structured interview was the main process in the collection of data in this independent study. The participants were asked to consent to the recording of each interview. The researcher took field notes as the interview progresses. The interview were conducted in one of the meeting room at the university. All the participants except one were in the same room. The discussion was

recorded and the text messages were transcribed and translated in the intelligent verbatim style by an experience English instructor in the university and crossed checked by the researcher"s advisor. With the completion of the edited transcribe, the researcher began the review and coding process.

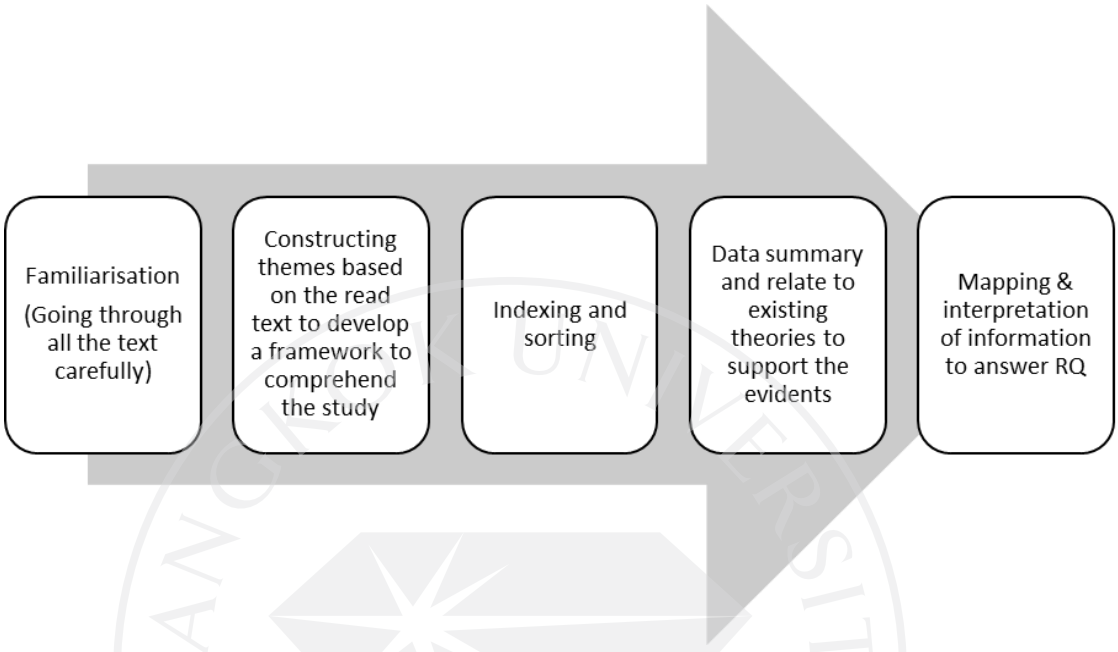
3.5 Data Analysis

Data is the important thing in this research. Data refers to and represents the phenomena in terms of feelings, perceptions, experiences or events captured or generated in the selected setting (Ritchie & Lewis, 2003, p. 202). The data of this research is in the form of words. Then, the unit of analysis is utterances or sentences contained idiomatic expression. These utterances and sentences is used as the main data which to be analysed.

Understanding the subjective nature of the information provided by the participants, the researcher reminded mindful of the aim of the research and the research questions throughout the analysis. The researcher followed the established techniques for grounded theory building when theorizing from the data according to Creswell (2007) in a 4 phases starting from initial coding, focused coding, and axial coding followed by a thematic analysis. Through this coding process, the researcher was able to develop ideas to grow based on an increasing understanding of the data.

At the end of the coding processes, the researcher constructed themes which were then indexed and sorted. Data summary was also written and related to existing theories to give supports to the emerging evidences. Once this was completed, the researcher did a mapping and interpreted the information to answer the 5 research questions. While interpreting, the transcripts, observations, and memos written were then compared against each other to verify emergent themes. There is thus a comparative analysis of the data to check for similarities and differences (Glaser & Strauss, 2008). The complete procedures were presented in Figure 3.3 as shown below.

Figure 3.3: The steps and procedures from the coding stage to the interpretation of information



3.6 Summary

This research adopted a qualitative approach that is flexible, highly focused, and designed to be completed quickly because the results are seen or heard first-hand, readers relate to the findings easily. The researcher sought the approval of all the participants before conducting the research. The 4 hours of discussion contained a huge amount of data that facilitated a good analysis based on the provided. The researcher was aware of the confidentiality of the information and followed all the regulations in the university in seeking approval from both the top management as well as the participants in the collection of the data. The following chapter, Chapter 4, presents the findings of this study.

CHAPTER 4
FINDINGS

In this chapter, the researcher conducted a qualitative content analysis based on the in-depth interview transcript among the instructors at Baise University in Guangxi, China. The researcher, through sense-making sough to understand the perception, existing practices of knowledge management, the perceived benefits of KM, enablers, and challenges in KM practices in the university, as well as how new knowledge has been created with industries to improve the industry-based or applied approaches of the university; The findings help to answer the research questions and provide directions for recommendations in the discussion section in Chapter 5. All 9 questions were asked among 10 participants who are currently holding various positions in different departments at the university.

4.1 Perception of KM

The focus group discussion revealed a significant understanding of the perception and understanding of knowledge management at the industrial-based Baise University. Many of these instructors were able to envisage the benefits of instilling KM practices into the organization. Participant 3 (P3) acknowledged the wide applications of KM practices that KM could be integrated into current teaching work. Participant 4 (P4) added that the implementation of KM into the university would accelerate the consolidation of the know-how of the organization and that it would become more dynamic when “individual through knowledge sharing and the transfer would continue the accumulate to create new knowledge or knowledge with creative value”. Participant 5 (P5) cited the use of ICT in the integration of knowledge as a system. Taking a technological perspective, P5 discussed the possibility of a system based KM “where sharing and retrieval of knowledge could facilitate new knowledge creation through acquisition of knowledge”. This absorption of knowledge has been perceived as personal growth and development for both students and instructors. In returns, these progresses could enhance the teaching and research outcomes (P4). Participant 7 (P7) had a holistic view of KM in the industrial based university, pointing out how organization could manage key KM concepts through the

“absorption (acquisition) and storage (knowledge repository)”. P7 used the metaphor of the flowing of knowledge to describe the university as a knowledge base and teachers as propellers in influencing the transformation and creation of **“**living knowledge**”.** The idea that industry requires **“**knowledge workers**”** has been brought up by Participant 9 (P9). P9 also indicated the need for KM in the area of academic scientific research when she said that **“**new reporting and creation of new documents attribute to new knowledge creation and better KM**”.** In other words, effective KM will lead to innovation related research**.** This understanding highlights participant**’**s acceptance that KM is significant for the university as a value creation tool to provide knowledgeable individuals that industries seek to employ.

4.2 The Practice of Personal Knowledge Management

Although the participants were able to comprehend KM at work, their feedbacks on the actual KM practices were rather unexpected. In terms of KM practice, the emphasis was geared towards personal KM and less organizational KM. This is a critical point that has important implications. When asked about how knowledge is transferred to enhance their teaching and research quality in the university, many participants including P1 cited that her knowledge sharing channels were very limited, according to Participant 8, collection of books, videos and creation database are part of a way to “preserve explicit knowledge” and making effort to develop tacit knowledge was also a way to acquire excellence skills and unique insights. Other participants such as P9, explained that she engages in KM practices daily without consciously knowing. These processes comprise self-learning, making a summary, sorting out notes and then imparting the knowledge to the students in class. Likewise, P4 placed greater emphasis on personal KM claiming that **“**personal knowledge may eventually lead to your teaching outcomes, and your research outcomes”. These discussions are still on a personal KM level. The above explanations by P1, P4, P8 and p9 signified the practice of personal knowledge management to a large extent among the instructors.

An instructor also expressed frustration to the fact that “the school pays attention to developing teaching files these teaching files are rarely shared and reused **(**P3**)** As a result, there was **“**little understanding of the teacher**’**s tacit knowledge”. P3

provided an example of how this could become a problem when students were required to do research work**.** Unware of the area of speciality of their academic advisors, they were unable to tap into the knowhow and be better guided in their research direction**.** Significantly, P3 highlighted the problem of **"**few platforms for knowledge sharing organized by the various schools**"** P10 also provided a good example of personal KM in the process of creating knowledge**.** P10 explained that as part of her teaching task, she has to **"**record all kinds of descriptive materials related to the professional practice and then rearrange them into personal professional growth files**.** These files include teaching plans, curriculum development, teacher-student interaction and teacher activities; Recorded materials consist of photographs, video tapes, audio tapes and written records, are also important contents of archival materials**".** She concluded that such strategies help teachers to carry out personal knowledge management and to discover the important role of personal knowledge**.** This process has been described as the reservation of knowledge which is **"**integrated in an individual**"** s mind**".** Nevertheless, this knowledge creation process **"**is very limited**"** for in depth learning (P4)**.** For Participant 10 **(**P10**)**, she expressed that currently, **"**I am still exploring the appropriate KM method for myself**".**

4.3 KM as a New Practice

Indeed, based on the discussion, it was relatively clear that almost all the participants regarded the practice of KM as a new management approach**.** This comes in line with Huang, Davison, Liu and Gu **(**2008**)** findings that while KM has been extensively studied in developed economies, it is much less well understood in developing economies, notably those that are characterized by different social and cultural traditions to the mainstream of Western societies**.** This is notably the case in China**.**

Sharing similar view as P1 and P2, P3 cited that as the university is in a developing city, KM is relatively new unlike the better developed larger universities in the northern region of China where KM has been long practiced**.** P8 also revealed that there was little understanding of the working of KM in the university which contributed to the shallow understanding of the practice**.** As such, **"**it is a topic not well discussed in the university**"** according to P8**.**

4.4 Lacking in KM Awareness and Readiness

The KM awareness level is considerably lower than expected**.** P1 indicated that **"**we should have the awareness of KM on organizational level**".** This implies that while focusing on one**'** s development, instructors should also promote the development of the team as whole**.** P2 had a relatively narrow concept of knowledge sharing at work when she cited that, **"**I am a teacher, and I share what I know with my students**.** This dissemination is knowledge absorption for the students**".** As for the university, **"**there is a kind of sharing that can be obtained from meetings at various work conferences, academic conferences, etc. Including the evaluation just mentioned, the feedback of experts during the evaluation is also a knowledge sharing

Noticeably, there was clearly a low level of awareness and 8 out of 9 respondents were not aware of the existence of a KM mechanism in the university. Only one participant (P9) spoke of the KM repository but expressed disappointment that the system had yet been put into use and to build the core knowledge of the organization. Respondent 1 specifically pointed out the problem of "limited knowledge sharing channels and platforms". It was a surprise even for some instructors like R8 who had no idea of the existence the practice of KM at the workplace. She lamented further on the relatively shallowness of her knowledge in terms of KM practices. This lacking inevitably impacted working performances of the instructors at the university.

There were several case examples that were mentioned by the participants in the discussion. P1 shared her "regretful "experience with a visiting professor at the university. She was quoted saying that "our School of Foreign Languages has hired a foreign professor in the Direction of English Education unit. It was a rare opportunity to have a doctorate consultant to join us, Unfortunately, I had little contact with him as a full-time teacher in the Direction of English Education. It was a pity that I could not learn the high-quality knowledge from him. We didn't set up a platform to collect or host that knowledge".

Based on this encounter, it signifies a working environment that is not conducive enough to support effective interaction and collaboration among teachers to exchange ideas between local and overseas instructors. There was no arrangement for co-creation of knowledge in terms of the diversity of human resources in the

university. Additionally, P1 also raised the issue that even for local professors, associate professors and other talents with high professional position, the same problem occurs. According to P1, there should be “special unit, special platform and special personnel to collect and manage knowledge, the sharing of high-quality knowledge will be more effective”

Therefore, this becomes a barrier in the KM development process in the retention of expert knowledge in the university. Despite the recruitment of foreign instructors who are a talented pool of human resource, the university does not have any knowledge sharing initiative to capture theses knowledge in its knowledge repository. Hence, when the foreign expert leaves the university, so does his or her know how.

4.5 Applying KM for Work Efficiency

Nonetheless, participants such as P1 were able to envisage the significant implications of a planned KM system to facilitate work processes. P1 vividly pointed out that at times, instructors acknowledged the use of KM tools in their work processes. Other times, they were unknowingly applying KM concepts in their teaching and research tasks. P1 added that “instructors need to consciously use knowledge management. We may be able to share advanced management models and teaching methods among departments and teaching and research offices in a faster way”.

4.6 KM Enablers

In the discussion, participants indicated several KM enablers for their university which emphasized on applied learning and research.

4.6.1 Digital platform for knowledge sharing

The majority of the participants has expressed the desire for greater knowledge sharing. As highlighted P5 that “I must admit that it is difficult to improve a person’s knowledge and innovation ability by only relying on our current ability. For others like P10, the opportunity for knowledge sharing and the transfer did not come frequently. P10 explained that she had to participate in all kinds of learning and training to seek opportunities to communicate with experts”. Making reference to the

dissemination of knowledge through knowledge repository base. P10 added that "teaching plans, teaching reference materials, educational magazines, educational lectures, proceedings, textbooks, teaching notes, education and teaching monographs, etc., which can be used as the sharing methods of teachers" knowledge should be shared through electronic storage. For example, in the teaching websites, teaching CDS, electronic documents, electronic resource libraries, Internet information, digital journals and so on.

Despite the mentioning of the electronic storage of resources, P1 opined that "we are lacking in the platform of knowledge sharing" and strongly believed that "the platform built by our school is not enough". In addition, P1 suggested that programs such as talent development training and training for curriculum and syllabus design "are essentially a kind of knowledge sharing "which has far reaching impact for individuals and small teams. These activities according to P1 required reform to optimized new knowledge creation for improvement and innovation at the university.

P2 also indicated that attending academic conferences was another channel to accelerate knowledge sharing. Such channel allows evaluation and feedbacks from expert educators which thereby "forms a crucial open knowledge base for continuous improvement". Furthermore, interaction from external sources provides valuable feedbacks and know how where instructors can combine for improvement at work (P2).

In agreement with P10, P1 and P2, P5 opined that "to achieve effective knowledge transfer in the university, there is a need to have an information platform to support the transfer of knowledge". P5 further indicated that "the information platform includes not only explicit knowledge such as words or books, but also implicit teacher recordings and videos". Based on the discussion, P5 seemingly was more receptive to the use of technology to embrace change in the learning and teaching environment. Students should then be able to acquire the transfer of learning both explicitly and implicitly through the E-platform (eBook or media materials). Significantly, P5 pointed out that students could acquire new skills such as digital literacy through the institutional e-platform infrastructures to support the transition from traditional learning spaces/environments to the web-based (digital) learning platforms (Okoye et al., 2022).

4.6.2 Contest as a business contact channel for knowledge sharing and transfer

P7 brought up the idea that contest such as the "+ Internet innovation entrepreneurship" as part of the Entrepreneurial Foundation course opened up an important channel for students to be in contact with businesses for innovation ideas and development. P7 opined that, “these projects cannot be taught in the business courses but, the accumulation of knowledge students experienced through their connect with the business community enhance their learning and can produce excellent grades”. In other words, by engaging students in contest, they are likely to explore new learning that relates to entrepreneurship. Innovation through new knowledge increases business competitiveness. Hence, the social and economic contacts have positive effects on the performances of the students who participated in the contest with applied projects.

4.6.3 Scientific research projects – University –Enterprise Cooperation

P9, who was once the vice dean of the School of Foreign Languages and in charge of teaching, said that “our school built the ASEAN Business Training Room together with the Shenzhen Internet Trade Association. I think through the internship and training practice platform; we have developed a very conducive environment for our school-enterprise cooperation. It is an effective way for knowledge creation for the school, enterprises, students and teacher’s stated by P10, this university and industry (UI) collaboration in the form of scientific research projects resulted in both theoretical and practical innovation, P10 affirmed that it was a “useful KM approach to serve the local economy and society in knowledge creation”.

This is a good case of UI collaboration for the School of International Language and their exchanges in learning through the ASEAN business training programs. The students being connected to the business community allows greater involvement and fosters trust and supports for new knowledge creation.

4.6.4 A success case of internal knowledge transfer

n interesting case was revealed by P3 with the integration of KM and laboratory management.in the setting up of a laboratory safety access system. The team in the laboratory department aimed to create a standard procedure for students and instructors to deal with emergency incidents and safety procedures for appropriate

use of the laboratory and classroom in the department. The process in establishing the system began using a KM approach of “collecting and sorting out relevant data, before summarizing the various solutions that can be considered as appropriate measures”. The important information is then shared on the QQ application for the teachers and students. All users are required to learn the system. To ensure that “the correct and relevant knowledge are understood and acquired, teachers and students have to take the safety system examination as a standard procedure to enter the laboratory for learning purposes. This better practice is considered as an application of the knowledge transferred to P3.

From this case, the knowledge transfers system aids in the streamlining of knowledge within the organization. This means that everyone has the information they needed to keep the system (in this case the laboratory system) to run smoothly. In this sense, “Knowledge Transfer” is a practical method for transitioning knowledge from one part of the organization to another. Hence, the testing is more than just communication. It involves the circulation of information, ideas, tasks, processes, tools, documents and so on. In other words, knowledge transfer in this context has more to do with identifying and harnessing the teachers and students” adaptable skills and abilities to apply information.

As for testing, the learning and retrieval process enable transfer-appropriate processing (Morris, Bransford & Franks, 1977). It is where successful retrieval of information invokes the cognitive processes to apply prior learning into practice as in the case the laboratory safety compliance procedures among teachers and students.

4.6.5 Incentive for Knowledge Transfer

When asked what were the challenges educators encountered in the implementation of effective KM practices in the university, P1 commented that “now we are studying how to apply the concept of KM in universities. This is also a process of combination. (the application of knowledge from different fields). But I think it is difficult to create knowledge effectively in daily work, because knowledge creation is a very complex, continuous, and multi-stage process”.

Participant 6 (P6) took a more proactive approach to the problem of sharing by suggesting that initiatives such as “Pay for the knowledge you get when ask for its”. should be taken to acquire the knowledge shared by others as a form of KM.

Expressing her view on this incentive issue, P4 added that it was “difficult to obtain the knowledge of many teachers in our school especially from some of the highly talented instructors”. P4 saw it as a cultural intellectual property problem and she was in her opinion that even if the “school builds a special knowledge management platform; many young teachers may not want to share”. The rational she provided was that “sometimes, we are reluctant to share because we have worked so hard to create this knowledge”. However, if the university creates a reward system that reward those who are willing to share their knowledge for hours or work, more teachers would be willing to share. That’s paid knowledge”.

These opinions have indicated that incentives are very important in individual’s decision to share knowledge in project teams even in a collectivistic culture like China. Both intrinsically and extrinsically motivated individuals tend to share more knowledge with their team members. Individuals with high altruism are also found more likely to share knowledge with others. Moreover, a trusting environment and explicit knowledge will facilitate knowledge sharing for better retention (Ma, Huang, Wu, Dong & Qi, 2014).

4.7 Barriers to KM Practices at the University

The in-depth discussion revealed several major obstacles in the implementation of KM strategies in the university. There were limitations in terms of lack of communication between departments, management commitment to KM, capacity to share, willingness to contribute, etc.

4.7.1 Lack of Communication between Departments

When asked about the effective knowledge creation, P1 raised the issue about the lack of communication between departments in the university. P1 claimed that “there is hardly any communication between our different teaching and research departments”. Using the case of the English team from the famous Tianyang Primary School, P1 highlighted that the teachers from the English department were able to work with knowledgeable experts over a period of 5 years and the effective transfer of knowledge had produced “a lot of results.

Obviously, P1 was making reference to the best practices of Tianyang Primary School with external (local) expertise to co-create new knowledge for the

establishment of a higher standard in teaching and learning. These efforts enable the school to lead in terms of innovative approaches to primary education.

Based on this case example, knowledge flows through better practices in the organization, from various departments to sections and units. The co-learning and sharing activities facilitate this knowledge flows in organizations (Bou-Llusar & Segarra-Cipres, 2006). As a KM process, it can be used for problem solving and operational enhancemen. The crucial interaction of individuals or making reference to codified knowledge (Lochhead and Stephens, 2004) influences the flow and effectiveness of the knowledge transfer. Even though the cooperation with the external experts ended, the staffs continued the knowledge sharing and creation culture to sustain the leading position of the school.

4.7.2 Inadequate interaction with competent leaders in the organization

The problem of inadequate interaction was also mentioned by P2 who claimed that "there was no opportunity to have in-depth communication with competent leaders in the institution". P2 remarked that contacts with leaders were usually in formal occasions and thus communication was relatively limited.

In the case of Baise University and its academic staffs, senior management and trusted supervisory staffs are look upon as repositories of knowledge. However, it is a limited by the one-way flow of information (superior to subordinate) and becomes difficult to build trust for knowledge sharing when teachers are employed on a short-term contractual relationship (Burrows, Drummond & Martinsons, 2005). Burrows and colleagues suggested that explicit knowledge is comparatively rare in China due to the strong cultural preference for personal social and economic relationships. The prevalence of this tacit knowledge, or how things are done, has frustrated the government' s effort to systematically develop nationwide knowledge bases.

In addition, ICT systems designed to capture reusable and transferable knowledge are also rare, as are data warehouses and intranets for enabling widespread access to organization-specific knowledge. Despite the increasingly widespread application of IT across China, personal interaction remains the preferred form of knowledge transfer (Burrows, et al., 2005).

4.7.3 Commitment of Management to Retain Knowledge

Another worth noting aspect brought up by P1 was that despite the invitation of over a hundred foreign academicians to work at the university, there was unfortunately no retention effort in capturing this valuable knowledge. P1 partly blamed the passive management role in not assigning any staff to manage the know-how and special skills of these overseas instructors. At the end of their contracts, the Chinese teachers "did not learn too much knowledge from them".

4.7.4 Lagging in professional assistance in the knowledge creation process

P4 cited the problem of a lack of professional guidance in developing academic research writing, which is considered as a serious problem in how knowledge is managed in the university. P4 lamented that when "you apply for a project or write a paper, no one points out whether your project is good or not, or how well your paper is written". The frustration increased when researchers like P4 have to verify the knowledge by oneself and not with the "highly talented academicians"

4.7.5 Low level of enthusiasm to communicate and share

As per P8, "the ability to transfer knowledge with willingness to share, enthusiasm to communicate, fluency in expression and rich communication skills are difficulties faced in the process of knowledge management in the university".

4.7.6 Low capacity for knowledge sharing

Relating her experiences in her long-term teaching practices, P10 believed that instructors in her university tended to ignore their own professional knowledge. Noticeably, they lacked the skills of sorting and integration of knowledge which resulted in the inability to share and apply existing knowledge (P10). This lacking in KM approaches to daily organization of work resulted in the restrictive knowledge process of "acquisition, preservation, extraction and application". These restrictions slowdown the value creation of the knowledge to improve the quality of teaching. Significantly, P10 associated the use of KM on a personal level. The low capacity to apply KM on an organizational level at work signified low level of sharing as well.

4.7.7 Implementation of KM practices in the university

In the following section, the researcher attempted to identify essential methods or necessary strategies needed to implement KM practices in the industrial

based industry. There were several suggestions indicated based on the experiences and expectation of the instructors involved in the in depth group discussion.

1) Cross-professional cooperation

P1 spoke about the practices within her School of Foreign Languages. She commented that "the most common practice in our language discipline is to serve local communities by participating in local translation activities. I often take part in various translation activities along with my students. This is the most direct service to local activities".

Understandably, this language translation activity enables the establishment of local networks and directly engages students to perform the translation. However, as highlighted by P1 that "but I found that this kind of practice was limited, the number of participants was small, and after the outbreak (Covid-19 pandemic), with the cancellation of these activities, the students did not have the opportunity to practice".

2) Case of Local Live Program

To support her statement, P1 provided a case example that related to the collaboration with a popular local live broadcast program whereby anchors were required to lead in Live program. Despite the language advantages and digital capacity of the students to search of information on the internet to deliver interesting talks on the programs, the students did not receive strong technical support from the school. Based on this perspective, it signified the importance of fostering greater collaboration at the school level. The opinion indicated the need to first initiate inter-faculty collaboration as a mean to build core knowledge of the university, that is internal knowledge sharing. In doing so, it could then strengthen the external collaboration as the next best step. This type of cooperation not only promotes the development of the professions, but also receives feedbacks for school to better serve the local area. Importantly, P1 foreseen the benefits of the cooperation to facilitate an open network system for knowledge flow between university, industries and society as a whole. In citing the case of the broadcasting of agricultural producers to international platforms through the participation of English, Thai and Vietnamese speaking students (which are the languages taught in the university), these multilingual collaborative programs create an engaging learning and working

environment for feedbacks and practices are deemed relevant. Additionally, by promoting reflection, it encourages learners to consider differences between diverse learning contexts and the challenges these may pose (Jackson, Fleming & Rowe, 2019).

3**)** Inter-Departmental Collaboration

In addition to the above example, P1 further elaborated that inter-department collaboration was equally crucial. P1 indicated that there were some joint projects between the corporation of the School of Innovation and Entrepreneurship and the School of Communication. Both departments worked to complement one and other in terms of skills and expertise. The School of Communications provided the support in photography and operation. It also needed students who could speak the English language for the production of the programs. However, these organized activities failed to receive support from the top management. This led P1 to advise that the school management to recognize the implications of knowledge building and creation within various colleges to co-create new knowledge and enhance the capacity of the students. To do so, top management should give more autonomy to various colleges to organize more activities. To make her point through P1 emphasized that "the live broadcast of agricultural products selling on international platforms from Thai, Vietnamese or English can have one more channel than the Chinese platform. That"s the way I see it!"

4.7.8 Challenges in University-Industry (UI) Collaboration

Like P1, P2 affirmed that the school has now attached greater importance to collaboration between school-enterprises (UI). Acknowledge that students studying in foreign languages have fewer opportunities to go out and practice during the pandemic period; he mentioned that the "Winter Camp activity conducted by the School of Foreign Languages was actually very effective. Besides establishing a good reputation for the faculty, it also allowed the students to learn new knowledge, which was necessary to ensure greater diversity in terms of activities for the school". However, P2 was quick to highlight obstacles encountered in these Knowledge creation activities. He pointed to 4 major problems which are listed as below:

1) Insufficient funding

2) Unwillingness of the students to pay extra for the learning opportunity

3) Lacking in specific knowledge among students

4) Fewer opportunities for collaboration

4.7.9 Encouraging enterprises to have trainings in the university

Taking a different approach to UI collaboration, P3 from the School of Information, felt one providing trainings for industries was a good channel in the exchange and transfer of knowledge between institutions. Both the university and the industries can gain in the form of mutual understanding of the practices and need of the industries. University trainings can then be attuning to the needs of the industries while it design and deliver training programs. The exposure of the students and the working professionals further create a connected learning environment. It also bridges organizations and the students in the University for Job Opportunities. However, this process is not without challenges as stated by P3. Specifically, P3 highlighted the problems over the availability of facilities and equipment.

1) Problems encountered in University-Industry trainings

According to P3, "our facilities and equipment are insufficient or we are worried about affecting the normal class of students. I think in terms of teacher or school-enterprise training, schools can provide students with a better learning environment by reducing tuition fees and so on. To give them a better environment, to increase their employment, and I think it's also a process of sharing"

4.7.10 Internship training as channel for UI collaboration

Participants like P4, felt that GUI collaboration level was relatively low. One of the collaboration was through internship. Internship is perceived as an important channel of knowledge transfer from industries to universities. Mentioned by the instructor of the career development programs (P4), "the design of the programs was not as effective as expected". Students were placed in industries in their junior years and they may not have required skills to absorb and apply the learning from the industries as effectively when compared to students in the senior years. P3 raised an interesting aspect of knowledge sharing through internship. P3 suggested that students should be encouraged to take up part time jobs where their UI collaborations had been

established. This aspect was strongly supported by P4, who gave a good case example of the benefits to have UI internship.

P4 regarded this approach as necessary and “there was still rooms for growth and development in terms of knowledge sharing and should be extended widely to cover more industries so that students could have more opportunity to be in contact with engineers. P3 further emphasized the need for social interaction between students and industries personnel for good direction in academic development”. P3 mentioned that the School of Information is a model software school where students and teachers built a team together with the Meteorological Bureau, other government departments and enterprises to provide a platform to cooperate in a knowledge sharing project. Through the participation in the project, teachers and students could learn and develop their knowledge, while enterprises and governments could meet, their needs and goals based on the UI project. This is thus a “win-win situation” for the whole community. In other words, the GUI activities and training serve as good indicators for students as well as the university for academic development, this is crucial for the university development and expansion. When the university gains strength and recognition in this aspect, it reinforces student’s employment opportunities. This is seen as mutual benefits gained from GUI collaboration.

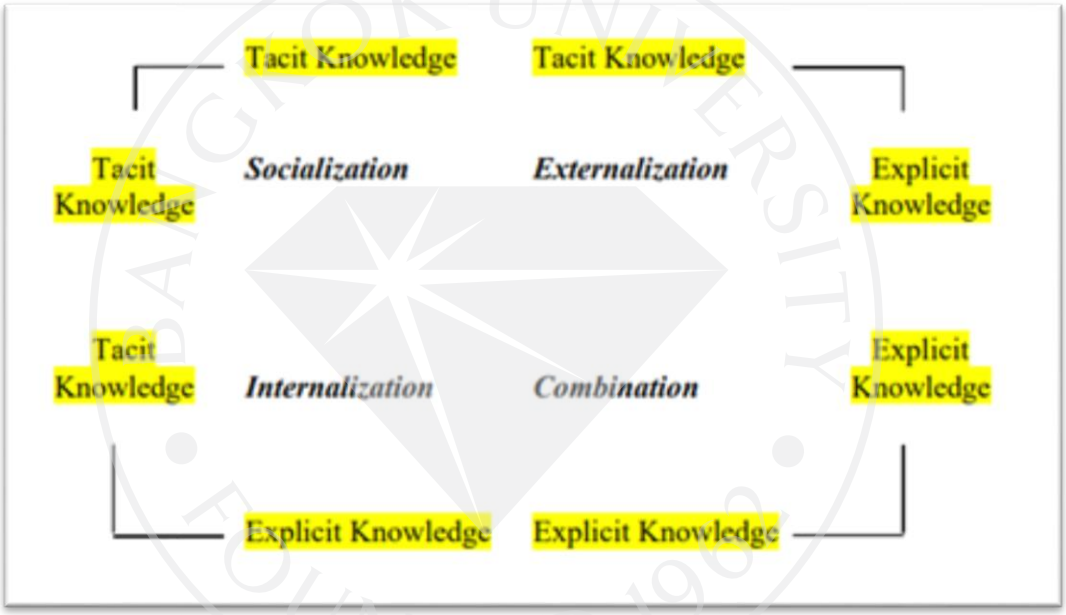
4.7.11 Fostering knowledge sharing culture through inter-department meetings

As another internal approach to build up knowledge sharing culture, P5 opined that for “effective knowledge sharing to prevail, it requires regular knowledge sharing in meetings within the department to share with other colleagues the problems encountered in daily work or the new knowledge and skills learned”.

Similar to P1, internal departmental knowledge sharing enables the accumulation of information and skills building. Social interaction based on the Social Learning Theory, places an important role in the flow of knowledge. Meetings to discuss problems have been perceived as an externalization process which can be useful and having impact in terms of problem solving. Working environment that promotes interaction is seen as necessary. When colleagues share their insights and know how as to how problems can be solved, they are also passing down their experiences. Others can then adapt, internalize and apply what they have learned to

the problems that they are facing. This is in accordance to the four principles of knowledge transitions by Nonaka (1997). As illustrates in Figure 4.1 on the following page, the knowledge flow in the institution where social interaction enables greater flow of explicit knowledge (information) and tacit knowledge (sharing of valuable knowledge) via the process of socialization, externalization, combination and internalization.

Figure 4.1: Adapted from Nonaka's Four Modes of Knowledge Conversion (1997)



Sources: Nonaka, I. (1997). *Organizational knowledge creation*. Retrieved from https://www.uky.edu/~gmswan3/575/nonaka.pdf.

P5 observed that one improvement measure to promote KM in the university is to "develop an intelligent and efficient knowledge management system, so that students and teachers can systematically and efficiently obtain the knowledge they wanted".

Based on this statement, P5 is referring to the best practices from the industries and how the learning from these successful cases allow the university (for

teachers and students) to learn and combine the knowledge acquired. This combination process is a part of the social interaction process.

An important point brought up by P5 is that for improvement to take place, “the improve measures have to be appropriate and flexible in terms of policies or systems. This in turn will help to create a good innovation environment to generate enthusiasm of employees to create more knowledge and strengthen awareness for innovation through effective KM”. Hence, some key criteria to nurture an open and innovative environment is to have flexible policies to drive new knowledge creation for innovation purposes.

4.7.12 Incentive measures to in building a knowledge sharing database

Rewards for sharing knowledge was being mentioned by P6 who strongly felt that such policy would encourage engineers in companies, academics in schools and researchers in government to share their knowledge. Like P1 and P4, P6 also recognized the importance of GUI collaboration and specifically talked about co-establishing a KS database and the provision of incentives in the setting up of the system. An integrated database strengthens the linkages between GUI. In this discussion, P6 was making references to research contribution between engineers in companies and academicians increase the sharing of knowledge. This is highly recommended by R6.

Noticeably, knowledge is formed through the conversion process from data to information and then to knowledge. When information or data is retrieved from the database, that information will then become knowledge that can be employed by individuals. This conversion process requires the generation of valuable and exclusive knowledge. Theoretically, this knowledge conversion theory explains the formation of knowledge. The theory focuses on the interaction between tacit knowledge and explicit knowledge (Nonaka, Konno & Toyama, 2001). The conversion to valuable knowledge must be carried out on the basis of the prior common knowledge among individuals, which is the prerequisite condition of this theory.

In addition to P5 remarked on the essence of having a good innovation environment which implied the importance of interaction among key players in the building of a knowledge database, also mentioned earlier, P6 suggested that

incentives should be provided to increase the sharing. This is due to the fact that the flow and storage of knowledge will strengthen UGI collaboration.

4.7.13 Active sharing of KM approaches - UI collaboration in mango planting

P7provided a good illustration of successful UI collaboration with local planters. According to P7, the College of Agriculture had sent a team of experts from the university to guide farmers on mango planting and how to improvise better management methods in farming. It is a kind of knowledge sharing (P7). Understanding that it is the national policy to assist farmers through scientific knowledge, the university has an important role to circulate and educating planters to innovative farming. The collaboration has helped to revitalize the local economy. This doing so, the university not only imparted know how but also built local resilience to economic problems. This, therefore, enhanced the trusting relationship between the institution and the community it served.

Significantly, as P7 put it, "this to a certain extent to improve the visibility of our school or the ability to serve the local". In return for the sharing and transfer of knowledge, the university's reputation has increased.

4.7.14 Setting clear goals for the implementation of KM in the organization

Apparently, many of participants like P1, P4, P6, P7, P8, P9 and P10 felt that the university must deliver clear policies and directions towards the implementation of KM in the institution. The "establishment of both internal and external networks for knowledge sharing should be established". A university research center holds an impetus position to increase communication for every collaboration between UI. This would ensure continuous efforts in propelling knowledge sharing and foster new knowledge creation for innovation to take place. The researcher center P10 with its coordinating role should promote the university as a learning place for knowledge sharing. Activities that promote external networking of industries for sustainable development of teachers and students such as seminars and exhibitions as be encouraged. These activities will foster and develop a more positive culture towards knowledge sharing. Like P6, P10 also recommended the use of technology as essential means of allowing tacit knowledge to be captured and stored in the knowledge base.

4.7.15 More applied research that meet the needs of industries

P5 highly recommended that instructors in the university to engage in more industrial based research or applied research. The university should “send teachers to enterprises, R&D institutions or engineering centers to encourage and support them (teachers) to transform and promote scientific research”. To do so, the university need to “build an information-based knowledge management platform, and develop a complete knowledge transmission and feedback channel platform” (P5). P5 made used the metaphor of the university website as "supermarket purchase" of professional knowledge comprising of various disciplines, and could be conveniently retrieved and applied for enterprises.

P5 added that to facilitate these development, communication between the university and the enterprises must take place in order for the latter to know the existence of the knowledge available. Therefore, a conducive environment is needed to increase the frequency of connection and communication to update knowledge between the 2 entities.

4.7.16 Performance measurement for knowledge sharing efforts

To encourage this interaction and involvement in research and development, P7 recommended that a good measurement of KM needed to be development. For the students, P7 felt that “we can put the project into the curriculum, such as a course design. Then the knowledge sharing and transfer efforts can become part of the final appraisal. The knowledge creation can be observed base on what the students have learned based on good videos, create commercially valuable works, or putting on the platform to play”.

In terms of science and engineering projects, “we can measure by have products and patents”. P7 added that even though this was still a task that the university had tried to “develop into something with commercial value, they have so far not done enough to make them into a capitalized operation”.

4.7.17 Technical expertise to implement KM system

A final remark came from P9 who felt strongly about how to cultivate high quality technical talents to implement KM system in the university. P9 opined that” all departments and secondary colleges should also have corresponding knowledge management policies concerning documents, internal and external communication

and management mechanisms, so as to perform a good job in school-enterprise cooperation (UI) as well as reminding actively engaged.

In this section, the participants have discussed a wide range of KM-related issues. There was numerous discussion over problems related to the implementation of KM. Many of these apprehensions discussed by the participants have also been mentioned in many research as such Dyer & McDonough (2001), these researchers also identified several KM challenges affecting public sector organizations. Among the challenges were the lack of understanding of the benefits of KM, skills in KM techniques, funding for KM, incentives or rewards for sharing, appropriate technology, commitment from senior management as well as not having time for KM and a culture that fails to encourage sharing.

The discussion highlighted several major enablers that are presented in the followings:

1) Digital platform for knowledge sharing

2) Contest as a business contact channel for knowledge sharing and transfer

3) Scientific research projects – University –Enterprise Cooperation

4) Success cases of internal knowledge transfer

6) Incentives for Knowledge Transfer

As for the challenges, many barriers have been identified and uncovered in this in depth discussion. A list of the obstacles are as follows:

1) Lack of communication between departments

2) Inadequate interaction with competent leaders in the organization

3) Commitment of management to retain knowledge

4) Lagging in professional assistance in the knowledge creation process

5) Low level of enthusiasm to communicate and share

6) Low capacity for knowledge sharing

7) Implementation of KM practices in the university

- Cross-professional cooperation
- Case of Local Live Program
- Inter-departmental Collaboration

8) Challenges in University-Industry (UI) Collaboration

9) Encouraging enterprises to have trainings in the university

10) Internship training as channel for UI collaboration

11) Fostering knowledge sharing culture through inter-department meetings

12) Incentive measures to in building a knowledge sharing database

13) Active sharing of KM approaches - UI collaboration in mango planting

14) Setting clear goals for the implementation of KM in the organization

15) More applied research that meet the needs of industries

16) Performance measurement for knowledge sharing efforts

17) Technical expertise to implement KM system

In the final chapter, the study provides some key recommendations based on the discussion and findings in this chapter.

CHAPTER 5
DISCUSSION AND CONCLUSION

5.1 Discussion

The findings of this IS suggested a rather different outcome from what the researcher has anticipated. Nevertheless, it is a good indication of the stage of readiness to implement proper and effective KM practices in the university before it engages in UI interaction and collaboration. For Chapter 5, the researcher will review the findings to answer the RQs. Appropriate recommendations will be provided to reduce the KM practice gaps and establish a stronger foundation of KM practices to accelerate the application requirement of the industry-based university policy at Baise University in China.

5.1.1 Infancy stage of KM at Baise University

When asked how KM is practiced in the industry-based university (RQ 1), instructors and administrators revealed a low level of awareness regarding a formal KM system. It was a surprise as many of the participants (9 out of 10) did not know the existence of the KM e-storage space in the university. This is a clear indication of a lack in KM practices on an organizational level as discussed in section 4.2, and 4.5 of Chapter 4. From these viewpoints, it reflected a considerably low level of awareness of KM processes in the university.

As highlighted in section 4.4 of Chapter 4, the majority of the participants (P1, P2, P3, & P8) had the perception that KM was a new approach that required more commitment from the top management of the university (P1) and that KM policies should be explained clearly in terms of 8 dimensions which is presented in Figure 5.1 (see following page) and explained as follows:

1) How the KM system works (KM mechanism)

2) How to integrate ICT into the KM system (KM repository)

3) How individuals can contribute to building the KM database (Knowledge flow)

4) How to build a culture of knowledge sharing and transferring at the workplace (KM Culture)

5) How to ensure an open knowledge sharing platform which incorporates feedbacks and evaluations from the experts (strong internal knowledge sharing and acquisition)

6) How the increase interactions between knowledge providers and knowledge seekers to accelerate learning among intellectuals. (knowledge creation through social learning)

7) How to increase academic scientific research (New knowledge building)

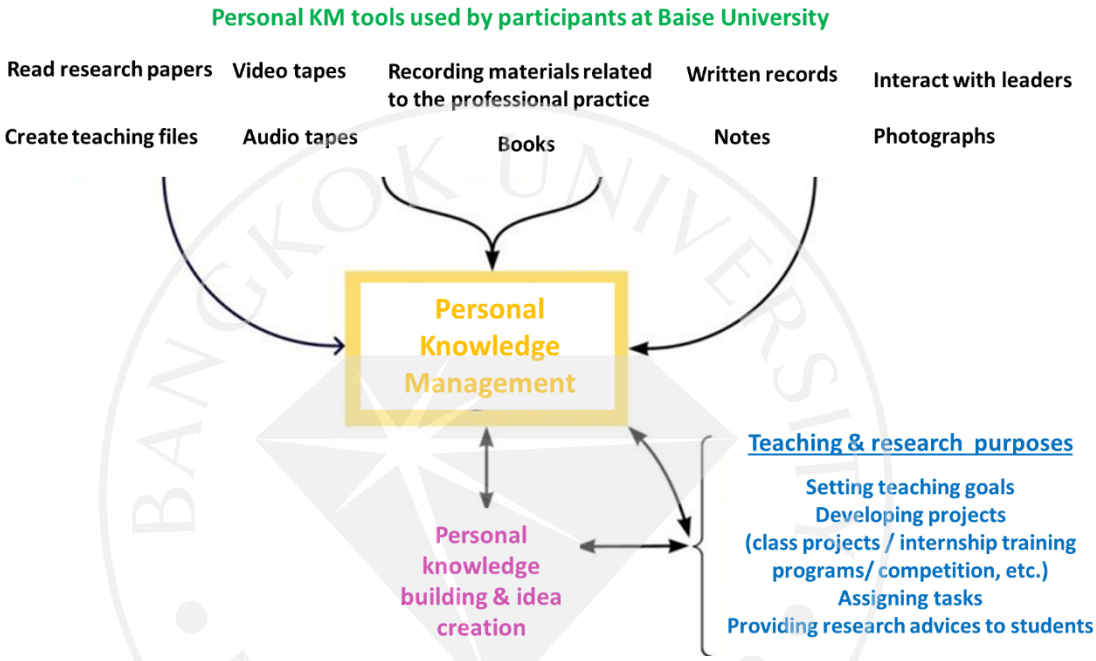
8) How to develop skills that industries seek among the students (UI collaboration for new skills development)

Figure 5.1: A Summary Diagram of the 8 Dimensions to Drive KM in Baise University

Specifically, in RQ1, the participants were asked on how they manage their routine knowledge management at workplace. All the participants conveyed their regular processes of knowledge sharing, transfer and creation. As presented in section 4.3 in Chapter 4, about 2/3 of the participants (P1. P3, P4, P8, P9 and P10) revealed that they were actively engaging in the practice of personal knowledge management

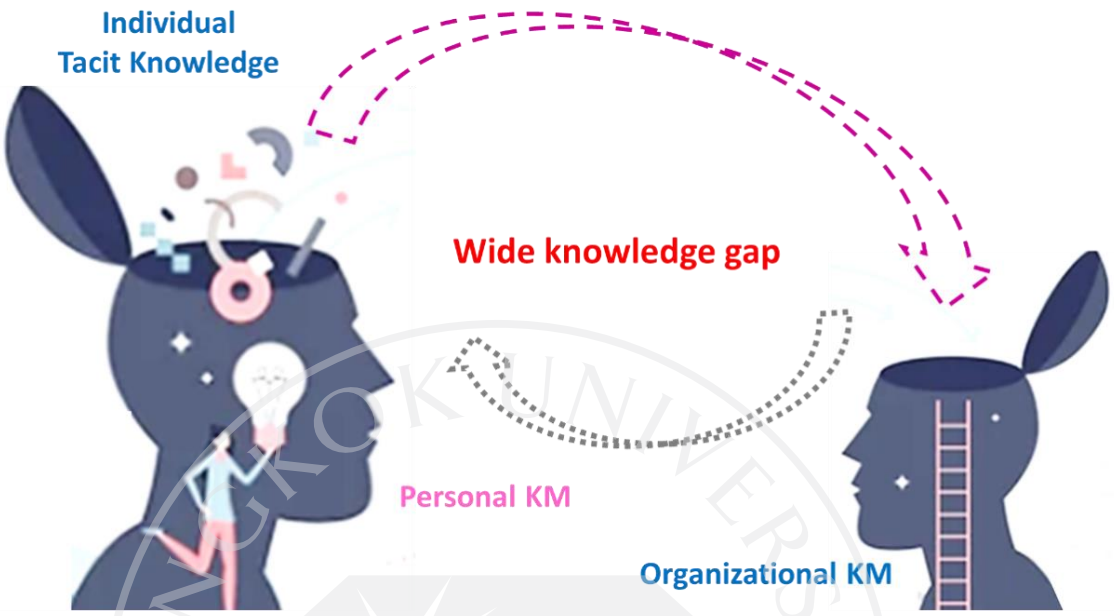
to organize core learning and teaching materials for work purposes. A listing of the PKM tools used by the participants is presented in Figure 5.2 as illustrated below.

Figure 5.2: The PKM tools used by Instructors and Administrators at Baise University for Teaching and Research Purposes



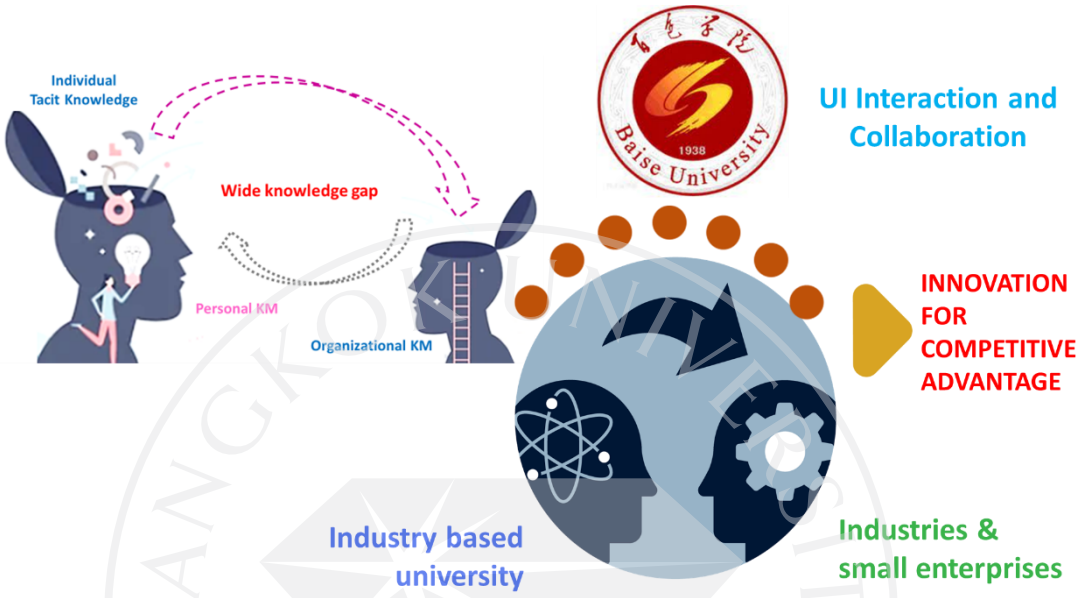
Undoubtedly, these participants saw the potential of building and contributing to the KM database. P10 had provided a clear example of the PKM practices to create knowledge but the lack of official guidance means that the KM process remains primary on the individual level. This in fact is one of the major problem "little understanding of the teacher's tacit knowledge" (P10) due to the fact that "this tacit knowledge is rarely shared and reused" (P3). Significantly, this strong PKM culture as shown in Figure 5.3 on the following page has resulted in the wide gap between personal KM and organizational KM, which has adverse effects on the overall growth and development of KM in the industry based Basie University.

Figure 5.3: The wide knowledge gap that prevailed in Baise University



Crucially, it can cause the dysfunction of Baise University as a knowledge base for the provincial or regional industries to connect and collaborate for effective knowledge sharing and transfer to take place. In other words, the university as depicted in Figure 5.4 as shown on the following page may not efficiently serve as a knowledge house for new knowledge generation to achieve the KPI of being an industry based or applied university as set by the national policy of the government for higher educational institutions.

Figure 5.4: The significant KM impact on the development of innovation for competitive advantage for the industry based university and industries in the region



Noticeably, as pointed out by P1, the willingness of an individual in sharing critical knowledge could affect the effectiveness of the knowledge transfer within the university as well as between the university and the industry sector. Citing the dependency of the willingness to depart knowledge, P1 brought up the notion that the s knowledge stickiness when sharing is concerned. This is because; it involves quantifying and qualifying knowledge that exists in the mind. A knowledge transfer system helps to translate that knowledge into words, visuals, and processes that can then be shared within the institution. It is this process in which an organization recreates a complex, causally ambiguous set of routines in new settings and keeps it functioning (Kahveci, Gündüz & Yozgat, 2011).

This prevalence of unwillingness to share has been mentioned in Dyson (2004), where the researcher explored knowledge sharing barriers among faculties in an Australian university. It was reported that among the many factors that affected effective sharing were lack of time, unwillingness to share knowledge, lack of

common cultures and languages. As a result of such unwillingness for sharing as well as the lack of KM infrastructure for sharing, it created a wide knowledge gap.

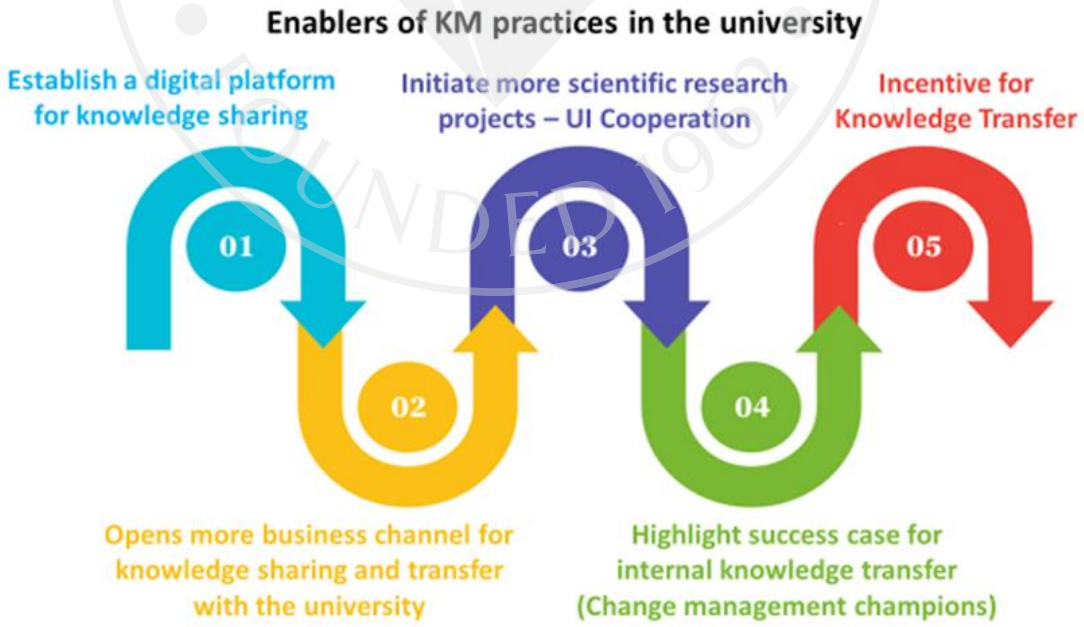
This relatively wide knowledge gap eventually will lead to various issues that had been discussed by the participants. The issues include the motivation for sharing, the availability of the KM channels and infrastructure (P3) as well as quality and quantity of the sharing for deep learning (P3 and P4), which will be further discussed in this chapter under the section on enablers and barriers of KM.

5.1.2 Enablers for effective knowledge management in the university

The second research question focuses on the enablers of KM practices in the Baise University. The participants have identified 5 major keys enablers in the interview session. These enablers are presented in Figure 5.5 as shown below.

Majority of the participants expressed interest in the establishment of a KM repository system to retain knowledge of the intellectuals (both local and foreign educators) for effective sharing and transfer of knowledge.

Figure 5.5: The Enablers of KM Practices Identified for Baise University



Knowledge retention is the capture of critical knowledge and expertise that is at risk of loss when employees leave an organization (Kim, 2005). According to

Peterson (2012), knowledge retention seeks to retain as much as possible of the departing employees" expertise and knowledge. For the university, management must be able to formulate knowledge retention policies and develop have institutionalized processes to capture and retain employee knowledge (Thomas, 2009). This is utmost important to consolidate and expand existing knowledge.

According to Bratianu (2011), universities are knowledge intensive organizations (Bratianu, 2011) the loss of knowledge contributes directly to decreasing their competitive advantage. As such strategies such as using interviews, videotaping, structured use of subject matter experts, repositories, mentoring and apprenticeship, knowledge maps, recruiting strategies, storytelling, leveraging retirees" in-house training functions, and sharing knowledge such be available to fill the knowledge gaps between local educators and foreign professors (Peterson, 2012).

Significantly, a university is by its own nature a nested Ba, where the inner most layers are represented by older professors who concentrate the fundamental structures of knowledge, and the outer layers are represented by students in their different cycles. Thus, the intergenerational knowledge transfer becomes a core competence of the university able to contribute substantially to its competitive advantage (Carpenter & Sanders, 2007). However, as university starts to internationalize, international knowledge transfer becomes significant to accelerate the diversity within the academic institution.

In this case study of Baise University, it is important that industrial based universities manage their knowledge assets effectively. They have to understand and work creatively with the enablers as well as barriers associated with knowledge management processes. Whilst previous studies have reported on enablers and barriers to knowledge management (Tian, Nakamori & Wierzbicki, 2009); none has performed the context of an industrial based university at a country level. Therefore, the findings of enablers in Chapter 4 is useful as supporting factors for KM implementation.

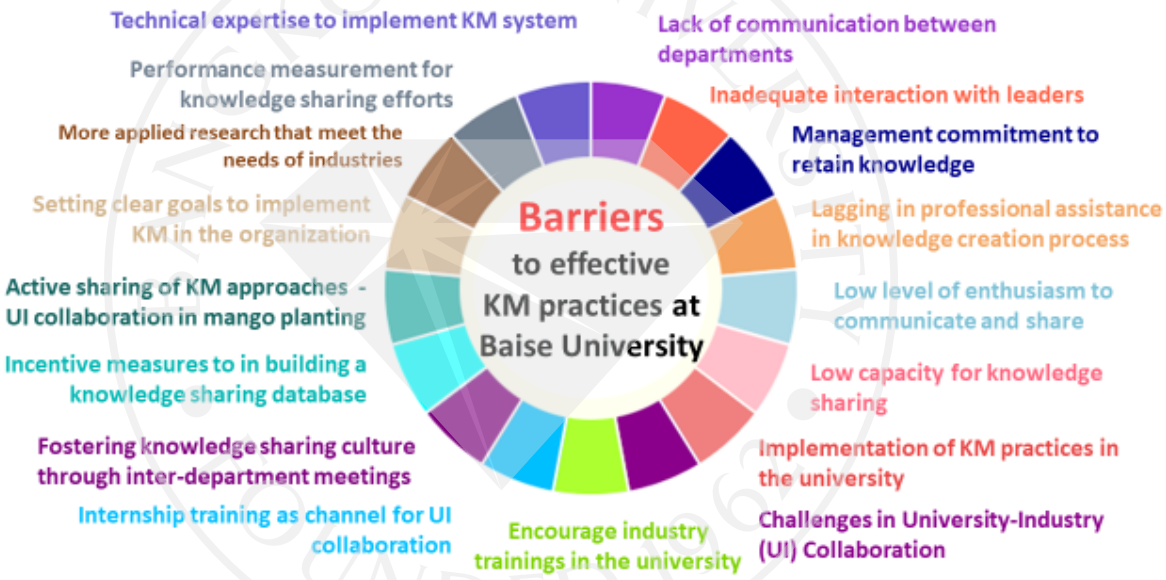
Other enablers are vital as these factors encourage the building of a knowledge sharing culture of the university and bridge the gaps with industries to foster innovation and improvement through interaction and research activities. An interesting motivating factor highlighted was the sharing of successful cases. When

cases like the mango planting UI collaboration are promoted, it showcases change management champion and encourages more projects to take place.

5.1.3 Challenges towards effective KM practices in the industry-based university

As discussed in details in Chapter 4, there were numerous barriers identified. A summary in a diagram form is presented in Figure 5.6 as shown below.

Figure 5.6: The barriers identified by participants that influenced effective implementation of KM at Baise University



These factors are identified obstacles are crucial as directional indicators for improvement and development for the implementation of KM practices for industry-based universities like Baise University.

5.1.4 Improving knowledge sharing and transfer to enhance UI performances

In RQ4, participants attempted to contribute their ideas into how to improve the current knowledge sharing process and practices in the university. This process has been seen as vital to enhance UI performances.

A significant component for knowledge sharing and transfer is the setting of the KM infrastructure such as the formation of a digital knowledge repository. This has been seen by many of the participants (P1, P2, P5, and P9) as a major shortfall in

the KM effort in the university. As such, it seriously limited the storage, flow as well as the application of the knowledge. The development of this knowledge base must be given the top priority before becoming a collaborative platform that is user friendly for both university and industry.

Various forms of programs have also been suggested that enable essential knowledge transfer and building. Activities involving students and industry such as the School of Foreign Languages and the ASEAN Business Training Room together with the Shenzhen Internet Trade Association provided the necessary base to bridge UI interaction and collaboration. Significantly, such an initiative connected the students with the business community and allowing students to have greater involvement and develop trust via the internship training to support skills development and new knowledge creation.

In addition, P2 also pinpointed that scientific research projects with industry were a valuable knowledge channel to serve the local economy and society for effective knowledge creation. Other than research projects, the contest has been regarded as an interesting channel for business knowledge sharing and transfer. This idea was supported by P7 who provided the case of the "+ Internet innovation entrepreneurship" as part of the Entrepreneurial Foundation course. Such activity has opened up an important channel for students to become part of the business ecosystem for innovation. It was seen as important because the learning was beyond classroom learning. It has application purposes that meet the goal of an industry-based university.

5.1.5 Recommendations for successful KM implementation

As a reflection from the remarks of the participants, the researcher has provided a list of recommendations to support KM transformation in the university to path the way for potential UI interactions and collaborations. These proposals are essential for the building up of competitive advantage for not only the industry based university, but also the industry as a whole. The KM-UI recommendations are as follows:

One critical influencing factor to successful KM implementation as pointed out as a weakness in the system is the lack of clear KM policy direction from the top management of the university. This weakness in policy clarification resulted in low

awareness and an apparent lack of urgency towards the formal commitment to manage knowledge within and beyond the university. In addition, the absence of knowledge sharing hinders the cultivation of knowledge sharing culture among the employees in the university. Hence, the official launch of the KM campaign should be introducing (or re-introduce) in an effort to stimulate interest, desire and actions among the intellectuals.

For a start, it may require a change management strategy to manage information at each departmental level in the university. This has been pointed out by P9 that in fact, all departments and secondary colleges should also have corresponding knowledge management policies, documents, internal and external communication and management mechanisms, and do a good job of school-enterprise cooperation actively and spontaneously. This suggested actions signified top-level commitment towards KM which is in line with the concern over leader's commitment towards KM process in the university.

It is essential to understand the characteristics of the university and industry before Basie University can make appropriate recommendations to adopt KM for its dual functional purposes (as an education institution and a research base for industry). University possesses general to specific know-how in the spectrum of learning. Industry, on the other hand, is able to integrate technology into value chain. Industry with their concern about their technology security and may engage in highly sticky interaction in their knowledge sharing process.

As seen in the case of Baise University, the low level of interaction or the little formal interactions with industry may not support UI interactions.

To counter this problem, the Ba concept by Nonaka and Takeuchi (1996) needs to be adopted to create a knowledge space for interaction to take place. This interaction space concept will be useful to make the university service known and increase the awareness of the industry to re-connect to the university for R&D discussion and potential collaborations. The space for regular interaction will intensify the relationship (informally or formally) and develop trust as the formation phase of the UI collaboration.

The Ba concept can also be extended to programs such as encouraging industries to conduct co-training or training with the university has also been

recommended by P5. P5 regarded such activity as an effective interaction channel between university and industry.

Based on the interaction with the participants, it has been noted that there were limited channels raised which signified the low level of interest, understanding and connectivity with the industry. In fact, there was only 1 participant (P9) that made a reference on conducting research with enterprises. However, P4 did comment that "our teachers need to go out for further study or training". These participants recognized the value of awareness among researchers about the product and services of the industry.

Understanding the real product and its contributing environment will lead to increased engagement between researchers and industry. It will also broaden the perspective of researchers about their work. Universities need to encourage such relationships to foster the transition from basic research to applied research in order to meet its objectives as an industry based university.

This recommendation has significant implication. Through the UI interactions and collaborations, researchers being educated and trained to think beyond the narrow confines of their research outcome as a publication but to the real-world application. Furthermore, researchers will become engaged as they are able conduct the research in the right context of application to industry to create impacts.

As university and industries make effort to interact, successful UI collaborations also need to be encouraged and supported by policy interventions (Awasthy, Flint, Sankarnarayana & Jones, 2020), Crucially, the industry based institution must collaborate to develop a common policy on conflicts of interest for themselves and their faculty. Incentive policies should help in resolving institutional conflicts and filling role gaps at the university–industry interface. Policies must be revised to meet the changing features of the research environment while preserving the academic and financial integrity.

Hence, Baise University should examine the financial/material costs of interaction and long-term development of industrially relevant academic R&D resources. The university may have to explore possibilities of increasing research funding or acquiring technical and financial supports from the industry. These policies should therefore be in line with the national policy formulation and influence it for

increased mutual benefits. If the university is able to attend to these issues, it may overcome the incentive barriers mentioned by the participants to knowledge sharing and ownership of intellectual property (IP).

To address the lack of visibility of the university research, Basie University needs to create a platform where people can reach out to relevant contacts to discuss ideas and achievements. It became apparent from this qualitative research that digital platforms have been underutilized and there is a need to focus on providing an online medium to connect people for sharing ideas and working together. However, there is a concern about the willingness of people to share their research ideas. This can be addressed by adopting a university strategy to encourage people to network, gain mutually and share.

As mentioned by p9, at the individual level, both teachers and students are good human resource for knowledge sharing, knowledge transmission and new knowledge generation. Participant 10 also pointed out that "the school should establish a campus network for knowledge sharing, which is connected with the external network". These participants highlighted the value of the greatest asset of a university: its people, especially alumni.

Baise Universities should therefore maintain a connection with alumni and share the progress within the university. Good and continued relationships with alumni can contribute to increase industry engagement, funding for research, donation and broader societal impact.

5.2 Conclusion

For future study, these research findings have provided essential foundation understanding to the perception and readiness of the industrial based university to develop and implement KM as a strategic policy to become innovative institution that can serve the industries to a higher standard. There can be 2 spectrums for future research as illustrated in Figure 5.6 on the following page. First, it should focus on the university" KM transformation processes and second on the UI relationship in terms of interaction and collaboration. The areas that require more research are as follows:

For the Industry-Based University

1) The 8 dimensions to drive KM strategic transformation provide an array of areas that the university can work on to start to kick the desired change.

2) Develop and promote a KM repository that is both university and industry-friendly. This is a necessary alliance as a KM tool to strengthen the relationship and understanding between the two sections.

3) To explore ways and channels to foster the knowledge-sharing culture of the university to motivate intellectuals to share and create new knowledge to better serve the industrial community in terms of human resources and intellectual property development.

4) Research into the areas of better practices among academicians and industry to enhance the quality and quantity of applied research will be a significant contribution to the R&D efforts towards innovation and improvement of the UI collaborations.

Industry Focused Research

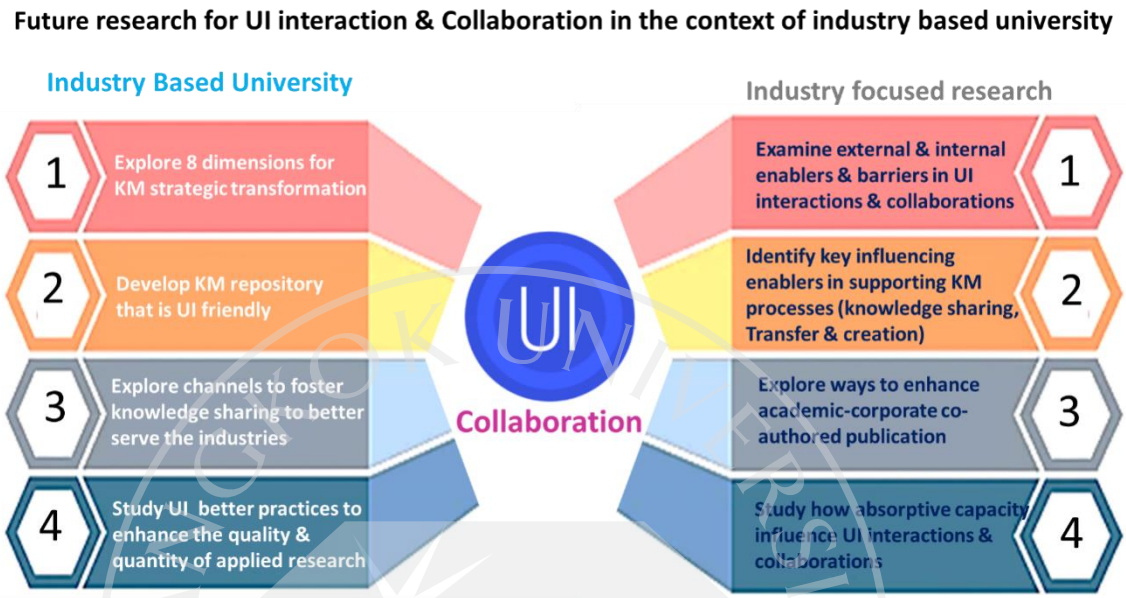
1) To examine the external and internal enablers and barriers in UI interactions and collaborations as a preliminary step

2) Identify key influencing enabler factors in supporting KM processes such as knowledge sharing, knowledge transfers and knowledge creation for successful UI collaboration

3) Explore ways to enhance academic-corporate co-authored publication as efforts to drive innovation in the industry

4) To study how absorptive capacity influence UI interactions and collaborations and how knowledge absorption can be enhanced to positively impact UI collaboration

Figure 5.7: Future research for UI collaboration for Industrial based University in China



5.2.1 Limitation

Although this study has been conducted with a small number of selected participants (10), their representation was significant as they were mostly middle management level personnel in various schools and department of the university. These participants have substantial influences in terms of their leadership in the KM transformation process of the university. This qualitative research undoubtedly, has allowed the researcher to understand the KM concepts. perception and experiences of the instructors and administrators.

However, the small population size and the subjectivity of the study are of concern. To overcome these shortfalls, the researcher hopes to further this qualitative study with a quantitative research method to be more scientific, objective, focused and acceptable in terms of outcomes. A questionnaire survey can be used to gather a larger amount of data and be analyzed statistically.

This method will help to reduce the level of biasness. When this is achieved, it also ensures the objectiveness of the study. Additionally, with a well-designed questionnaire and a sample that is representative of the study population, the research

outcomes can then become generalize concepts which can be applied more widely, predict future results, and even help to investigate causal relationships.

Other limitations are that the research focuses on the perspective of the university. Hence, to ensure a more holistic overview, future research should also incorporate the viewpoints of the industries, government as well as the students.

5.2.2 Future Study

This study attempts to study the stage of readiness and understanding of the application of KM in the context of an industry-based or applied-based university in China with the case study of Baise University. So far, there has no research conducted under this context based on the literature review and as mentioned in several UI research indicating that this is a relatively new concept for the industry based university.

The findings were very challenging and a true reflection based on the experiences of the educators. Indeed, this social interaction has uncovered many elements in this interdisciplinary research area. Acknowledging the fact that KM is a new approach in information management in the university, there are many improvements that can be made.

The significance of the findings provided a fundamental understanding of the lacking in KM infrastructure as well as the inadequate directions from the top management over KM policy making. Thus, there is an urgent need to review and form a team of KM consulting team to deliver the new practices and designing of the process of internal management of knowledge. The change management approach to KM implementation is a desired solution to develop a new mindset and openness in a knowledge-sharing culture. It can be a significant change from the traditional way of personal management of data to an effective implementation of a knowledge repository to an integrated mechanism with the critical know-how from the industry for innovation to take place.

In sum, the enablers and obstacles discussed in this IS will provide good guidelines to implement changes on an institutional, departmental and individual basis. The internal reorganization will facilitate a conducive KMUI ecosystem for competitive advantage to prevail.

BIBLIOGRAPHY

Abbas, A., Avdic, A., Barker, K.C., & Xiaobao, P. (2018). Knowledge transfer from universities to industry through university technology transfer offices. *Science and innovation, 14*(2), 5-18.

Agrawal, A. K. (2001). University-to-industry knowledge transfer: Literature review and unanswered questions. *International Journal of Management Reviews, 3*(4), 285-302.

Agarwal, N. K., & Marouf, L. N. (2014). Initiating knowledge management in colleges and universities: A template. *International Journal of Knowledge Content Development & Technology, 4*(2), 67-95.

Ahmed, F., Fattani, M. T., Ali, S. R., & Enam, R. N. (2022). Strengthening the bridge between academic and the industry through the academia-industry collaboration plan design model. *Frontiers in Psychology, 13*, 1-11.

Ahrweiler, P., Pyka, A., & Gilbert, N. (2011). A new model for university–industry links in knowledge-based economies. *Journal of Production and Innovation Management, 28*, 218–235.

Ahuja, G., Soda, G., & Zaheer, A. (2012). The Genesis and Dynamics of Organizational Networks. *Organization Science, 23*(4), 1211-1211.

Albats, E., Fiegenbaum, I., & Cunningham, J. A. (2018). A micro level study of university industry collaborative lifecycle key performance indicators. *The Journal of Technology Transfer, 43*(2), 389–431.

Albuquerque, E., Suzigan, W., Kruss, G., & Lee, K. (2015). Developing national systems of innovation: University–industry interactions in the global south, *Southeast Asian Economies, 33*(3), 430-432.

Aldrich, H. E. (2012). The emergence of entrepreneurship as an academic field: A personal essay on institutional entrepreneurship. *Research Policy, 41*(7), 1240-1248.

Alshehri, A., Gutub, S. A., Ebrahim, M. A. B., Shafeek, H., Soliman, M. F., & Abdel-Aziz, M. H. (2016). Integration between industry and university: Case study, Faculty of Engineering at Rabigh, Saudi Arabia. *Education for chemical engineers*, *14*, 24-34.

Al-Tabbaa, O., & Ankrah, S. (2016). Social capital to facilitate "engineered" university–industry collaboration for technology transfer: A dynamic perspective. *Technological Forecasting and Social Change*, *104*, 1–15.

Argote, L., Mcevily, B. & Reagans, R. (2003). Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*, *49*, 571-582.

Awasthy, R., Flint, S., Sankarnarayana, R., & Jones, R.L. (2020). A framework to improve university–industry collaboration. *Journal of Industry - University Collaboration*, *2*(1), 49-62.

Bäck, I., & Kohtamäki, M. (2015). Boundaries of R&D collaboration. *Technovation*, *45*, 15–28.

Barnes, T. A. (2000). *A framework for the effective management of collaborative R&D projects: Executive summary*. Unpublished doctoral dissertation, University of Warwick. UK.

Barnes, T., Pashby, I. R., & Gibbons, A. M. (2002). Effective university–industry interaction: A multi-case evaluation of collaborative R&D projects. *European Management Journal*, *20*(3), 272–285.

Bekkers, R., & Bodas Freitas, I. (2008). Analyzing knowledge transfer channels between universities and industry: To what degree do sectors also matter?. *Research Policy*, *37*, 1837-1853.

Bennet, D., & Bennet, A. (2008). Associative patterning: The unconscious life of an organization. In J. P. Girard (Ed.), *Organizational memory*. Hershey, PA: ICI Global.

Beyhan, B., & Cetindamar, D. (2011). No escape from the dominant theories: The analysis of intellectual pillars of technology management in developing countries. *Technological Forecasting and Social Change*, *78*(1), 103–115.

Bjerregaard, T. (2010). Industry and academia in convergence: Micro-institutional dimensions of R&D collaboration. *Technovation*, *30*(2), 100–108.

Bloedon, R. V., & Stokes, D. R. (1994). Making university/industry collaborative research succeed. *Research Technology Management, 37*(2), 44–48.

Borgatti, S. P., & Foster, P. C. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management, 29*(6), 991–1013.

Bou-Llusar, J. C., & Segarra-Ciprés, M. (2006). Strategic Knowledge Transfer and Its Implications for Competitive Advantage: An Integrative Conceptual Framework. *Journal of Knowledge Management, 10*,100-112.

Bozeman, B. (2000). Technology transfer and public policy: A review of research and theory. *Research Policy, 29(*4–5*)*, 627-655.

Bratianu, C. (2011). Universities as knowledge intensive learning organizations. In: A. Eardley & L. Uden (Eds.), *Innovative knowledge management: Concepts for organizational creativity and collaborative design* (pp. 1-17). New York, NY: Information Science Reference.

Bruneel, J., D'Este, P., & Salter, A. (2010). Investigating the factors that diminish the barriers to university– industry collaboration. *Research Policy*, *39*(7), 858–868.

Bstieler, L., Hemmert, M., & Barczak, G. (2015). Trust formation in university–industry collaborations in the US biotechnology industry: IP policies, shared governance, and champions. *Journal of Product Innovation Management, 32*(1), 111–121.

Burrows, G. R., Drummond, D. L., & Martinsons, M. G. (2005). Knowledge management in China. *Communications of the ACM, 48*(4), 73-76.

Buser, M. (2013). Engineering students as innovation facilitators for enterprises. *International Journal of Engineering Education*, *29*, 1080–1087.

Butcher, J., & Jeffrey, P. (2005). The use of bibliometric indicators to explore industry-academia collaboration trends over time in the field of membrane use for water treatment. *Technovation*. *25*, 1273–1280.

Carpenter, M. A., & Sanders, W. G. (2007). *Strategic management: A dynamic perspective concept and case*. New Jersey: Pearson Education.

Cassanelli, A. N., Fernandez-Sanchez, G., & Guiridlian, M. C. (2017). Principal researcher and project manager: Who Should drive R{&}D projects?. *R and D Management*, *47*, 277–287.

Cetindamar, D., Wasti, S. N., Ansal, H., & Beyhan, B. (2009). Does technology management research diverge or converge in developing and developed countries?. *Technovation*, *29*(1), 45–58.

Chan, I., & Chau, P. Y. K. (2005). Getting Knowledge management right: Lessons from failure. *The International Journal Knowledge Management*, *1*(3), 40-45.

Chen, X., Yang, J. A., & Park, H. W. (2012). Chinese patterns of university-industry collaboration. *Asian Journal of Innovation and Policy*, *1*(1), 116-132.

Chikoore, L., & Ragsdell, G. (2013). *Knowledge sharing in higher education: A study of students preparing assessed group work*. Retrieved from http://www.tlainc.com/articl328.htm.

Choo, C. W., Furness, C., Paquette, S., Van Den Berg, H., Detlor, B., Bergeron, P., & Heaton, L. (2006). Working with information: information management and culture in a professional services organization. *Journal of Information Science*, *32*(6), 491-510.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, *35*(1), 128–152.

Collins, J. D., & Hitt, M. A. (2006). Leveraging tacit knowledge in alliances: The importance of using relational capabilities to build and leverage relational capital. *Journal of Engineering and Technology Management*, *23*(2), 147-167.

Cong, X., Li-Hua, R., & Stonehouse, G. (2007). Knowledge management in the Chinese public sector: Empirical investigation. *Journal of Technology Management in China*, *2*(3), 250-263.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V.L. (2011). *Designing and conducting mixed method research* (2nd ed.). Thousand Oaks, CA: Sage.

Dang, Q. T., Jasovska, P., Rammal, H. G., & Schlenker, K. (2019). Formal-informal channels of university-industry knowledge transfer: The case of Australian business schools. *Knowledge Management Research & Practice*, *17*(4), 384-395.

Davenport, S., Davies, J., & Grimes, C. (1999). Collaborative research programmes: Building trust from difference. *Technovation*, *19*(1), 31-40.

Davenport, T.H., & Prusak, L. (1998). *Working knowledge: How organization manage what they know*. Boston: Harvard Business School.

Davis, J. P., & Eisenhardt, K. M. (2011). Rotating leadership and collaborative innovation: Recombination processes in symbiotic relationships. *Administrative Science Quarterly, 56*, 159–201.

Dayan, R., & Evans, S. (2006). KM your way to CMMI. *Journal of Knowledge Management, 10*(1), 69-80.

De Moortel, K., & Crispeels, T. (2018). International university-university technology transfer: Strategic management framework. *Technological Forecasting and Social Change, 135*, 145–155

D'Este, P., Guy, F., & Iammarino, S. (2013). Shaping the formation of university-industry research collaborations: What type of proximity does really matter?. *Journal of Economic Geography, 13*(4), 537-558.

Dhanaraj, C. (2006). Book review: Research methodology in strategy and management, Vol. 1 & 2. *Academy of Management Review, 31*, 497-500.

Duffy, J. (2000). Knowledge management: to be or not to be?. *Information Management Journal*, 34(1), 64-67.

Dutrénit, G., & Arza, V. (2010). Channels and benefits of interactions between public research organizations and industry: Comparing four Latin American countries. *Science and Public Policy, 37*, 541–553.

Dyer, G., & McDonough, B. (2001). The state of KM. *Knowledge management 3*(70), 33–38.

Dyson, L. (2004). Barriers to sharing and creating knowledge in higher education. *Advances in Intelligent Systems Research, 172*, 189-193.

Edquist, C. (1997). *Systems of innovation: Technologies, institutions and organizations*. London: Pinter.

Ensign, P.C., & Hébert, L. (2009). Competing explanations for knowledge exchange: Technology sharing within the globally dispersed R&D of the multinational enterprise. *The Journal of High Technology Management Research, 20(*1*)*, 75-85.

Epetimehin, F. M., & Ekundayo, O. (2011). Organizational knowledge management: Survival strategy for Nigeria insurance industry. *Interdisciplinary Review of Economics and Management,* 1(2), 9-15.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From National Systems and "mode 2" to a Triple Helix of university-industry-government relations. *Research Policy*, *29*(2), 109–123.

Etzkowitz, H. (2008). *The Triple Helix university-industry-government innovation in action*. London: Routledge.

Etzkowitz, H., Dzisah, J., Ranga, M., & Zhou, C. (2007). The Triple Helix model of innovation. university – industry – government interaction. *Asia Pacific Tech Monitor, 24*(1), 14-23

Fagerberg, J., Lundvall, B. A., & Srholec, M. (2018). Global value chains, national innovation systems and economic development. *European Journal of Development Research*, *30*(3), 533–556.

Faith, C. K., & Seeam, A. K. (2018). Knowledge sharing in academia: A case study using a SECI model approach. *Journal of Education, 9*(1), 53-70.

Faria, J. R., Mixon, F.G., & Upadhyaya, K. P. (2019). Public policy and the university-industry R&D nexus. *Knowledge Management Research & Practice, 17*, 499 - 506.

Ferreira, J. J., & Carayannis, E. G. (2019). University-industry knowledge transfer-unpacking the "black box": An introduction. *Knowledge Management Research & Practice*, *17*(4), 353-357.

Fields, G. (2006). Innovation, time, and territory: Space and the business organization of Dell Computer. *Economic Geography*, *82*, 119–146.

Filippetti, A., & Savona, M. (2017). University–industry linkages and academic engagements: Individual behaviors and firms" barriers. Introduction to the special section. *The Journal of Technology Transfer*, *42*(4), 719–729.

Fong, P. S. W., Chang, X., & Chen, Q. (2018). Faculty patent assignment in the Chinese mainland: Evidence from the top 35 patent application universities. *Journal of Technology Transfer, 43,* 69–95.

Garcia, R., Rapini, M., & Cario, S. (2018). *Experiences de interaçao universidade-empresa no Brazil*. Belo Horizonte: Cedeplar.

Grimaldi, R., & Grandi, A. (2005). Business incubators and new venture creation: An assessment of incubating models. *Technovation*, *25*, 111–121.

Grunwald, A. (2004). Strategic knowledge for sustainable development: the need for reflexivity and learning at the interface between science and society. *International Journal of Foresight and Innovation Policy, 1(*1/2*)* , 150–167.

Huang, Q., Davison, R. M., Liu, H., & Gu, J. (2008). The impact of leadership style on knowledge-sharing intentions in China. *Journal of Global Information Management*, *16*(4), 67-91.

Hubert, S. O. (1996). Tacit knowledge: the key to the strategic aliment of intellectual capital. *Strategy and Leadership*, 24(2), 10-16.

Jackson, D., Fleming, J., & Rowe, A. (2019). Enabling the transfer of skills and knowledge across classroom and work contexts. *Vocations and learning*, *12*(3), 459-478.

Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter?. *Academy of Management Journal, 48*(6), 999–1015.

Jasimuddin, S. M., Klein, J. H., & Connell, C. (2005). The paradox of using tacit and explicit knowledge: Strategies to face dilemmas. *Management Decision, 43*(1), 102-112.

Jiang, J., Zhao, Y., & Feng, J. (2022). University–Industry Technology Transfer: Empirical Findings from Chinese Industrial Firms. *Sustainability*, *14*(15), 9582.

Jianzhong, C., & De Graeve, J. (2005). *Project report: University industry partnership in China: Present Scenario and Future Strategy*. Beijing: UNESCO Office in Beijing.

Johnson, W. H. A. & Johnston, D. A. (2004). Organizational knowledge creating processes and the performance of university-industry collaborative R&D projects. *International Journal of Technology Management*, *27*, 93- 114.

Jormanainen, I., & Koveshnikov, A. (2012). International activities of emerging market firms. *Management International Review*, *52*(5), 691-725.

Kahveci, C., Gündüz, Ş., & Yozgat, U. (2011). *What really is knowledge stickiness? wisdom metaphor in knowledge transfer and the movie*. Retrieved from https://www.researchgate.net/publication/320034919_What_is_knowledge_stickeness_Wisdom_metaphor_in_knowledge_transfer_and_the_movie_Les_Schtroumpfs.

Kim, M. P. (2005). Knowledge retention enhances performance-based management. *DCMA Communicator, 5*(3), 49-51.

Kopczynska, E., & Ferreira, J. J. (2017). How universities and industry can improve communication for open innovation?. In *ISPIM conference proceedings* (pp. 1-22). Manchester: The International Society for Professional Innovation Management (ISPIM).

Korzhenevskaya, O. N. (2014). The socio-economic role of entrepreneurial universities in development of innovation-driven clusters: The Russian case. *Asian Social Science, 10*, 113–122.

Kruss, G., & Visser, M. (2017). Putting university–industry interaction into perspective: A differentiated view from inside South African universities. *The Journal of Technology Transfer, 42*(4), 884–908.

Laupase, R. (2003). Rewards: Do they encourage tacit knowledge sharing in management consulting firms? Case studies approach. In E. Coakes (Ed.), *Knowledge management: Current issues and challenges* (pp. 92-103). Hershey, PA: Idea Group.

Lee, J., & Win, H. (2004). Technology transfer between university research centers and industry in Singapore. *Technovation, 24*(5), 433-442.

Lee, K. J. (2011). From interpersonal networks to inter-organizational alliances for university–industry collaborations in Japan: The case of the Tokyo Institute of Technology. *R&D Management, 41*(2), 190–201.

Lehrer, M., Nell, P., & Garber, L. (2009). A national systems view of university entrepreneurialism: Inferences from comparison of the German and US experience. *Research Policy, 38*(2), 268–280.

Lei, X., Zhao, Z., Zhang, X., Chen, D., Huang, M., & Zhao, Y. (2011). The inventive activities and collaboration pattern of university-industry-government in China based on patent analysis, *Scientometrics, 90*(1), 231-251.

Lemos, D. C., & Cario, S. A. F. (2016). University–industry interaction in Santa Catarina: Evolutionary phases, forms of interaction, benefits, and barriers. *RAI Revista de Administração e Inovação, 14*(1), 16-29.

Liefner, I. (2013). Explaining innovation and regional development in China: How much can we learn from applying established Western theories?. In I. Liefner & Y. D. Wei (Eds.), *Innovation and regional development in China* (pp. 21–40). New York: Routledge.

Lockett, N., Kerr, R., & Robinson, S. (2008). Multiple perspectives on the challenges for knowledge transfer between higher education institutions and industry. *International Small Business Journal*, 26, 661–681.

Lochhead, C., & Stephens, A. (2004). *Employee retention, labour turnover and knowledge transfer: case studies from Canadian plastics sector*. Canada: Canadian Labour and Business Centre.

Ma, Z., Huang, Y., Wu, J., Dong, W., & Qi, L. (2014). What matters for knowledge sharing in collectivistic cultures? Empirical evidence from China. *Journal of Knowledge Management*, *18*(5), 1004-1019.

Meyer-Kramer, F., & Schmoch, U. (1998). Science-based technologies: University industry interactions in four fields. *Research Policy, 27*, 835–851.

Miesing, P., & Tang, M. (2017). Technology transfer institutions in China: A comparison of value chain and organization structure perspective. In D. Libaers and D. Dunlap (Eds.), *World Scientific Reference on Innovation* (Chapter 3). Massachusetts: World Scientific.

Molas-Gallart, J., & Sinclair, T. (1999). From technology generation to technology transfer: The concept and reality of the "dual-use technology centres". *Technovation, 19*(11), 661-671.

Morris, C. D., Bransford, J. D., & Franks, J. J. (1977). Levels of processing versus transfer appropriate processing. *Journal of Verbal Learning & Verbal Behavior, 16*, 519 –533.

Motohashi, K., & Yun, X. (2007). China's innovation system reform and growing industry and science linkages. *Research Policy, 36*(8), 1251-1260.

Nassuora, A. B. (2011). Knowledge sharing in institutions of higher learning. *International Journal of Economics & Management Sciences, 1*(3), 29-36.

Niosi, J., Bellon, B., Saviotti, P., & Crow, M. (1992). Les systèmes nationaux d'innovation : à la recherche d'un concept utilisable. *Revue Française d'Économie, Programme National Persée, 7*(1), 215-250.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1), 14–37

Nonaka, I. (1997). *Organizational knowledge creation*. Retrieved from https://www.uky.edu/~gmswan3/575/nonaka.pdf.

Nonaka, I., & Konno, N. (1998). The concept of Ba building a foundation for knowledge creation. *California Management Review, 40*(3), 40-54.

Nonaka, I., Konno, N., & Toyama, R. (2001). Emergence of "Ba": A conceptual framework for the continuous and self-transcending process of knowledge creation. In I. Nonaka and T. Nishiguchi (Eds.), *Knowledge emergence social, technical, and evolutionary dimensions of knowledge creation* (13-29). New York: Oxford University.

Nonaka, I., & Takeushi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University.

Nonaka, I., & Takeuchi, H. (1996). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. Oxford, UK: Oxford University.

O'Dwyer, M., Filieri, R., & O'Malley, L. (2022). Establishing successful university–industry collaborations: Barriers and enablers deconstructed. *The Journal of Technology Transfer*, 1-32.

Okoye, K., Arrona-Palacios, A., Camacho-Zuñiga, C., Achem, J. A. G., Escamilla, J., & Hosseini, S. (2022). Towards teaching analytics: A contextual model for analysis of students' evaluation of teaching through text mining and machine learning classification. *Education and Information Technologies, 27*(3), 3891–3933.

Oliver, A. L. Montgomery, K., & Barda, S. (2019). The multi-level process of trust and learning in university– industry innovation collaborations. *The Journal of Technology Transfer*, 1–22.

Pablo-Hernando, S. (2015). Transferring knowledge: PhD holders employed in Spanish technology centres. *International Journal of Technology Management*, *68*(3–4), 228–254.

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and policy in mental health*, *42*(5), 533–544.

Paranhos, J., & Perin, F. S. (2018). *Relacionamento universidade-empresa no setor farmaceutico: Duas pesquisas comparadas experiencias de interaçao universidade-empresa no Brazil*. Belo Horizonte: Cedeplar.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Peterson, D. (2012). *Knowledge retention strategies in selected Southern Africa public broadcasting corporations*. Unpublished doctoral dissertation, University of Fort Hare. South Africa.

Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P. et al. (2013). Academic engagement and commercialisation: A review of the literature on university–industry relations. *Research Policy*, *42*(2), 423-442.

Phelps, C., Heidl, R., & Wadhwa, A. (2012). Knowledge, networks, and knowledge networks: A review and research agenda. *Journal of Management, 38*, 1115-1166.

Plewa, C., Korf, N., Baaken, T., & Macpherson, G. (2013). University–industry linkage evolution: An empirical investigation of relational success factors. *R&D Management*, *43*(4), 365–380.

Protogerou, A., Caloghirou, Y., & Vonortas, N. S. (2017). Determinants of young firms innovative performance: Empirical evidence from Europe. *Research Policy*, *46*(7), 1312–1326.

Rad, M. F., Seyedesfahani, M. M. & Jalilvand, M. R. (2015). An effective collaboration model between industry and university based on the theory of self organization: A system dynamics model. *Journal of Science and Technology Policy Management, 6*, 2–24.

Ranga, L. M., Miedema, J., & Jorna, R. (2008). Enhancing the innovative capacity of small firms through triple helix interactions: Challenges and opportunities. *Technology Analysis and Strategic Management, 20*, 697–716.

Ranjan, J., & Khalil, S. (2007). Application of knowledge management in management education: A conceptual framework. *Journal of Theoretical and Applied Information Technology, 3*(3), 15-30.

Ritchie, J., & Lewis, J. (2003). *Qualitative research practice: A guide for social science students and researchers*. London: Sage.

Robertson, J., McCarthy, I., & Pitt, L. (2019). Leveraging social capital in university-industry knowledge transfer strategies: A comparative positioning framework. *Knowledge Management Research & Practice*, *17*(4), 461-472.

Röpke, J. (1998). *Innovation, academic knowledge creation and regional development in a globalized economy*. Germany: Plilipps-Universität Marburg.

Sahibzada, U. F., Jianfeng, C., Latif, K. F., Shafait, Z., & Sahibzada, H. F. (2022). Interpreting the impact of knowledge management processes on organizational performance in Chinese higher education: Mediating role of knowledge worker productivity. *Studies in Higher Education, 47*(4), 713-730.

Salter, A.J., & Martin, B. R. (2001). The economic benefits of publicly funded basic research: A critical review. *Research Policy*, *30*, 509–532.

Sampson, R. C. (2004). Organizational choice in R&D alliances: Knowledge-based and transaction cost perspectives. *Managerial and Decision Economics*, *25*(6–7), 421–436.

Sandberg, J., Holmström, J., Napier, N. P., & Levén, P. (2015). Balancing diversity in innovation networks: Trading zones in university-industry R&D collaboration. *European Journal of Innovation Management, 18*, 44-69.

Schoen, A., van Pottelsberghe de la Potterie, B., & Henkel, J. (2014). Governance typology of universities' technology transfer processes. *The Journal of Technology Transfer, 39*(3), 435-453.

Sheen, M. R., & Macbryde, J. C. (1995). The importance of complementary assets in the development of smart technology. *Technovation, 15*, 99–109.

Sherwood, A. L., & Covin, J. G. (2008). Knowledge acquisition in university-industry alliances: An empirical investigation from a learning theory perspective. *Journal of Product Innovation Management*, *25*(2), 162-179.

Siegel, D. S., Waldman, D., & Link, A. (2003). Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: An exploratory study. *Research Policy*, *32*(1), 27–48.

Soltani, Z., & Navimipour, N. J. (2016). Customer relationship management mechanisms: A systematic review of the state of the art literature and recommendations for future research. *Computers in Human Behavior*, 61, 667-688.

Spradley, J. P. (1979). *The ethnographic interview*. New York: Holt, Rinehart & Winston.

Tan, C. N., & Md. Noor, S. (2013). Knowledge management enablers, knowledge sharing and research collaboration: A study of knowledge management at research universities in Malaysia. *Asian Journal of Technology Innovation*, *21*(2), 251-276.

Tartari, V., & Breschi, S. (2012). Set them free: Scientists' evaluations of the benefits and costs of university–industry research collaboration. *Industrial and Corporate Change*, *21*, 1117–1147.

Teubner, R. A. (2007). Strategic information systems planning: A case study from the financial services industry. *Journal of Strategic Information Systems*, *16*, 105–125.

Thomas, L. (2009). Improving student retention in higher education. *Australian Universities Review*, *51*(2), 9-18.

Tian, J., Nakamori, Y., & Wierzbicki, A. P. (2009). Knowledge management and knowledge creation in academia: a study based on surveys in a Japanese research university. *Journal of Knowledge Management*, *13*(2), 76-92.

Tornatzky, L. G., Waugaman, P. G., & Gray, D. O. (2002). *Innovation U.: New university roles in a knowledge economy*. Research Triangle Park, NC: Southern Technology Council.

Tyagi, S., Cai, X., Yang, K. & Chambers, T. (2015). Lean tools and methods to support efficient knowledge creation. *International Journal of Information management*, *32*(2), 204-214.

Van Den Berghe, L., & Guild, P. D. (2008). The strategic value of new university technology and its impact on exclusivity of licensing transactions: An empirical study. *Journal of Technology Transfer*, *33*, 91–103.

Vick, T. E., & Robertson, M. (2018). A systematic literature review of UK university-industry collaboration for knowledge transfer: A future research agenda. *Science Public Policy*, *45*, 579–590.

Vijayan, K. K., Mork, O. J., & Hansen, I. E. (2018). Knowledge creation in engineering education (University-industry collaboration). *Strategic Management Journal*, *17*, 109-122.

Villani, E., Rasmussen, E., & Grimaldi, R. (2017). How intermediary organizations facilitate university– industry technology transfer: A proximity approach. *Technological Forecasting and Social Change*, *114*, 86–102.

Wang, Y., & Lu, L. (2007). Knowledge transfer through effective university-industry interactions: Empirical experiences from China. *Journal of Technology Management in China*, *2*(2), 119-133.

Woo, E. (2022). What is the problem represented to be in China"s world-class university policy? A post structural analysis. *Journal of Education Policy*, 1-21.

Woolgar, L. (2007). New institutional policies for university-industry links in Japan. *Research Policy*, *36*(8), 1261-1274.

Worasinchai, L. (2009). The role of knowledge flow in the Thai GUIN version of the triple helix model. *Electronic Journal of Knowledge Management*, *7*(2), 287-296.

Worasinchai, L., Ribière, V. M., & Aurélie Bechina Arntzen, A. (2008). Working knowledge, the university-industry linkage in Thailand: Concepts and issues. *VINE*, *38*(4), 507-524.

Ye, Y., De Moortel, K., & Crispeels, T. (2020). Network dynamics of Chinese university knowledge transfer. *The Journal of Technology Transfer*, *45*(4), 1228-1254.

Zawislak, P. A., & Dalmarco, G. (2011). The silent run: new issues and outcomes for university-industry relations in Brazil. *Journal of Technology Management & Innovation*, *6*(2), 66-82.

Zhang, W. (2022). The relationship between authentic leadership and teacher knowledge sharing in China: The mediating role of teachers social-emotional competence. *Beijing International Review of Education*, *4*(1), 152-172.

Zhao, S. L., Cacciolatti, L., Lee, S. H., & Song, W. (2015). Regional collaborations and indigenous innovation capabilities in China: A multivariate method for the analysis of regional innovation systems. *Technological Forecasting and Social Change*, *94*, 202-220.

Zheng, J., & Kapoor, D. (2021). State formation and higher education (HE) policy: An analytical review of policy shifts and the internationalization of higher education (IHE) in China between 1949 and 2019. *Higher Education, 81*, 179–195.

Zhou, C., & Peng, X. M. (2008). The entrepreneurial university in China: Nonlinear paths. *Science & Public Policy*, *35*(9), 637-646.

APPENDICES

Appendix A

Interview Questionnaire

Face-to-Face Interview Questionnaire (Sample)

1. As an educator, what is "knowledge management" in your opinion? How do you understand knowledge management?
2. Would you please tell me whether you carry out knowledge management in your daily teaching, research or work? Please share your feelings, experiences and practices.
3. Would you please talk about how you share knowledge in ordinary times? How to share effectively?
4. Would you please talk about how you carry out knowledge transfer in daily life? How to achieve effective transfer?
5. Please talk about how you enhance knowledge creation in daily life? How to create effectively?
6. Would you please tell me what difficulties you encountered in knowledge management?
7. Would you please talk about how to solve the problems encountered in knowledge management?
8. Would you please tell us how we can effectively improve knowledge sharing, knowledge transfer and knowledge creation as an applied university to promote the development of the university?
9. Would you please give us some suggestions for the successful implementation of knowledge management in our school?

Appendix B

Interview Coding Process

	Respondent 1	Respondent2	Respondent3	Respondent4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10
Interview Questions	Name: Nai Xin (A) Gender: female Age: 38 years old Education: Master's degree Position: Deputy Director of the English Department	Name: Li Lin (B) Gender: female Age: 36 Education: Doctor Position: Teaching position	Name: Li Zongwei (C) Gender: male Age: 34 Education: Master's degree Position: Laboratory administrator	Name: Zhai Xiaoxin (D) Gender: female Age: 32 Education: Master's degree Position: Coordinator	Name: Yao Yinheng (E) Gender: male Age: 33 Education: Bachelor's Degree Position: Laboratory administrator	Name: Jiang Hao (F) Gender: male Age: 35 Education: Bachelor's Degree Position: Administrative staff	Name: Qin Qinghua (G) Gender: Age: Education degree: Job Position:	Name: Song Bei (H) Gender: female Age: 34 Education: Doctor Position: Deputy Director of Teaching Quality Evaluation Center and Teacher Teaching Development Center	Name: Luo Qiuxue (I) Gender: Age: Education degree: Job Position:	Name: Ling Miao (G) Gender: female Age: 29 Education: Master's Degree Position: Teacher

	Respondent 1	Respondent2	Respondent3	Respondent4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10
Personal introduction	My name is Nai Xin. I am 38 years old, with a master's degree and 12 years of working experience. Since 2006, I have been working in Foreign Affairs Office, Deputy director of English Department, head of discipline competition and so on. First of all, I am a professional teacher, and the courses taught by professional teachers are basically English education courses. The daily	My name is Li Lin. I am 36 years old. I am a PhD candidate and currently the director of the Practical Teaching Center of the School of Foreign Languages. Once worked as foreign affairs liaison, deputy director of the Oriental Department. Previously, I was responsible for all kinds of daily affairs of foreign teachers, including foreign teachers' daily life teaching management and life management. Also worked as the administrative secretary of the	My name is Li Zongwei. I am 34 years old, with a master's degree and six years of working experience. Now I'm a lab manager. I was responsible for the maintenance of the computer room and laboratory in the position of laboratory administrator, and then organized students to assist in the management of the laboratory. In addition, I am also responsible for the management of	My name is Zhai Xiaoxin, 32 years old, with a master's degree and eight years of working experience. My current position is a full-time organization member, which is mainly responsible for Party building. At the same time, I have some part-time teaching work. Party building work is in addition to the management of the party affairs, but also includes a number of members of the	My name is Yao Yinheng. I have been working in Baise College for seven years. I have been working in the Cyberspace Administration Office, and now I am the administrator of the print laboratory in the School of Information. The main work of the past seven years is network construction, network maintenance, and some information platform construction and	My name is Jiang Hao. I am 35 years old. I am a master's student and have worked for 11 years. I once served as a counselor, and suspended the beautiful Guangxi clean rural work team member, suspended the deputy secretary of the county Youth League Committee. I have also worked in the Secretary Section of the Party and Government Office, and now I am working in the Armed Security	My name is Qin Qinghua. I am 44 years old, with a PhD degree and 11 years of working experience. I once served as a counselor, deputy dean in charge of teaching and professional leader of the secondary school. Now I am a full-time teacher in the School of Business Administration, mainly engaged in teaching work.	My name is Song Bei. I majored in knowledge management during my doctorate. Now I am working in the Teaching Quality Evaluation Center and Teacher Teaching Development Center of the University. My main research direction is pedagogy, mental health education.	My name is Luo Qiuxue, 36 years old, doctor, working in Baise College for nearly 10 years. I used to be a full-time teacher in the School of Business Administration and vice dean of the School of Foreign Languages. Now I am mainly in charge of the application and management of scientific research projects.	My name is Ling Miao. I am 29 years old and have a master's degree. I have worked in Baise University for 7 years. I had worked in foreign language college administrative secretary, mainly in charge of administrative affairs of the college, including college file transceiver and reporting, attendance statistics, assist leader to finish the annual recruitment, annual appraisal

	Respondent 1	Respondent2	Respondent3	Respondent4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10
1.As an educator, what is "knowledge management" in your opinion? How do you understand knowledge management?	It is a new management method, combined with the relatively new modern information technology and some ideas of enterprise management. As educators, one of our most important responsibilities is to pass on, impart, and share knowledge. So knowledge management is closely related to us. Therefore, I think as an educator, we should have the awareness of knowledge management, which can better promote our own	At the beginning, I think knowledge management is relatively novel, but after learning, I find that there are related researches in China. May be in the underdeveloped city will feel that knowledge management is relatively new, but the north of the vast number of advanced cities such as the university, has set up such a course. Although it is a direction or a branch of business administration, these universities will set up a separate course. As an educator, I have to cover a wide range of	Combined with the position of laboratory management, For example, when I was a laboratory administrator, I assigned students computer maintenance work. Through my presentation, and then they practice, and then they absorb, and then I think this is an aspect of knowledge management.	For education workers, first is must have certain knowledge accumulation to become a teacher, the teacher also should pass from your colleague, from your other of the predecessors to learn, you will be able to constantly through someone else's share, constantly absorbing knowledge growth, then into one of your personal knowledge. Your personal knowledge may eventually lead to your teaching outcomes, your	Based on my work experience, I think knowledge management is to use modern educational technology to integrate knowledge into a system so that students can get the knowledge they want and share the knowledge with students better. Through our management work, students can create new knowledge while acquiring knowledge.	I think knowledge management includes some activities related to knowledge, as well as some practical elements. For example, in our daily knowledge sharing or knowledge transfer, as far as my personal work is concerned, I think we should use some cases to analyze and share knowledge. Just like we that a team member of the law, we don't have the executive itself, if say someone makes disturbance to the school, who can, who is not above, then how	Knowledge should also be a category like personnel or management within a company. Especially for colleges and universities, if these management can be done well, it is of great help to accelerate education. If knowledge management is not well done, it is difficult to update and make progress by training talents according to the general exam-oriented teaching. Only when knowledge management is done well can it generate greater value and	From the perspective of educators, I think knowledge management mainly includes the management, application and even the transfer of knowledge and the influence brought by it. It also includes the management of external knowledge around, such as knowledge learning and knowledge absorption. Specifically, teachers' sensitivity to knowledge around, such as	I have seen it in some extracurricular reading before, and I probably know that knowledge management is related to knowledge sharing, transmission and innovation. I also know that knowledge can be divided into explicit knowledge and invisible knowledge. I think knowledge management is particularly important in colleges and universities, but it is a pity that I have Colleges and universities are a teaching base, and	As for the word "knowledge management", I learned this course when I was studying for a master's degree in Bangkok University, and then I learned it systematically, so as to apply it to my work and study. Today as a teacher, I more is to let people understand the industry as a "knowledge workers" in creating value, in front of the profession, more hope I can put my employer all teach students knowledge, but you

BIODATA

Name-Last name: Kang Wang

Education Background: Bachelor degree

Work Experience: 2010-2022, Administrative Office of Baise University.