STRATEGY TO THE EFFECTIVENESS OF UNIVERSITY–INDUSTRY COLLABORATION FOR TECHNOLOGY TRANSFER

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ABSTRACT

Universities are the best places to gather knowledge and innovation, but the basis of technological development lies in talented R&D personnel that provide services to enterprise R&D activities, research institutions and universities. Universities also gather many elites who cultivate talents for the country. However, universities don not have adequate technology transfer experience and do not network in industrial circles, therefore resulting in a huge gap between the concept and practice result. This research determines the critical success factors and explores the causal relationships influencing technology transfer from universities. We find that the main impact of the key factors is the technology market dimension. University technology transfer activities should be classified as top priority. Technology industrial applicability is the main key evaluation factor. Inventor attitude is also a main key evaluation factor. In the organizational culture dimension, attitude and the ability of top management are the main evaluation factors. We will attempt to draw upon our analysis results to make recommendations related to technology transfer to assist universities in successfully transferring their research results.

Key words: Technology Transfer, Innovation, University–industry, Decision Making Trial and Evaluation Laboratory (DEMATEL)

INTRODUCTION

Today's generation was built by a highly knowledge-based economy. Due to the relative restriction of resources, whether knowledge can be fully utilized has become a critical issue. The research and development results from universities are more forward-looking, belonging to the early technology development stage (Hansen, et al., 2015; Winkelbach & Walter, 2015). The key point in distributing resources effectively is good output utilization. Hence, this research uses DEMATEL to discuss the key factors for successful research result transfer and the connections between these two aspects. This study will focus on the key factors influencing universities' technology transfer, and provide universities with effective solutions and suggestions to achieve effective research resources allocation and promote the transfer of R&D results to industrial circles. To increase the university technology transfer success rate, we have to understand the key factors and connections between every aspect of the university technology transfer process. This will enable professors' R&D results to be popularized and utilized effectively.

TECHNOLOGY TRANSFER

Technology transfer encompasses a wide range of meaning and scope. Technology transfer enables the technology owner (supplier) and the technology demander (recipient) to mutually benefit. By signing technology transfer contracts or other kinds of contracts, technology owners provide technology recipients with skills, equipment, technical information, process information or other

information and services based on the contracts. It enables the technology recipient to complete their skills to increase industry development and create profits (Jun & Ji, 2016; Iwasaki & Tokunaga, 2016; Ungureanu, et al., 2016). Through technology transfer, technology recipients can decrease their investment in labor resources, material and finance resources and subsequently save development time and avoid losing business opportunities. Moreover, technology recipients get to improve their technology skills and therefore increase competitiveness and productivity. Suppliers receive authority and shoulder the associated fees and cost recovery through the technology transfer process. Hence, the actual benefits that universities get from the technology transfer are not merely for society and universities themselves but also stimulate industry and the university to collaborate and further inspire more invention and creation (Rai & Funkhouser, 2015; Kumar, et al., 2015). This study will discuss the factors that affect the technology transfer from universities' point of view. The following aspects will be discussed one by one.

Organizational culture aspect

Organizational culture is a kind of belief, expectation and value accumulated and formed through communication, sharing and delivery among the organization members. Culture is also the norm accepted by all members of the organization including both employers and employees. Matinaro & Liu (2017) mentioned that the key factor for successful R&D results is that the organizational culture is relatively open. Erhardt, et al.(2016) mentioned that universities encourage professors to start up their own businesses and become entrepreneurs by investing resources. This is a new model and trend in technology transfer that is quite popular in foreign universities with liberal culture (Lee & Kramer, 2016; An & Kang, 2016). Organizational culture will be discussed using the following three points "Top manager's attitude and capacity", "The school identity and the image" and "Entrepreneurship encouragement":

(1) Top manager's attitude and capacity

Top managers are the most important wealth and resources in an organization and the critical factor in organizational culture. Within any business and organization, an effective manager must also be a leader who can influence the dedication of members in the organization to achieve the organizational goals. The greater their influence is, the better their leadership effectiveness (Lee, et al., 2016; Yu & Choi, 2016; Lu, et al., 2016; Klimas, 2016; Chumg, et al., 2016). Since senior managers are primary determinants of structure strategies and operations, the resources and the leadership behavior they present has a critical impact on the overall operation performance. Top managers can influence, lead and motivate the members' behavior through choosing different leadership styles with formal and informal structures. The attitude of top managers in universities is very important. The so-called attitude influences how other people feel about the behavior and meaning of it (Chatman & O'Reilly, 2016; Lee, et al., 2016; Valmohammadi & Roshanzamir, 2015).

(2) The school characteristics and image

The school characteristics include the educational style, educational behavior and the educational achievement recognized as unique and remarkable by the society (Belasen, et al., 2017; Bortolotti, et al., 2015; Hemsley-Brown, et al., 2016). The school image is the objective comprehensive impression and evaluation from the public. It comes from the school interacting with the society through the media (Zhou, et al., 2016; Woods, 2016; Foroudi, et al., 2016).

(3) Entrepreneurship encouragement

The startup has become a way of describing the application of capitalists, maximizing capital, labor and resources to generate economic value and balance supply and demand. It is a means to maintain the economic system and excite the economy through new business and technology. Malen & Marcus (2017) mentioned that one of the important adjustments for university scientific R&D management is encouraging professors to engage in entrepreneurial activities related to scientific innovation (Walter & Block, 2016; Maresch, et al., 2016). Ruskovaara, et al. (2016) also mentioned that the university should encourage professors to have their own startups by investing in resources and introducing a professional reward system. In addition, Honjo (2015) mentioned that universities should encourage professors and students to startup businesses through technology transfers.

Organizational structure and system aspect

The university system is the general term referring to the relations between the university and external environment. It mainly includes the external system and university's own system. The external system involves the relations between the university, government and society through a series of regulations, laws and operational system applied for maintaining the university's relationship with external entities. The internal system involves internal management system regulations, operational system and organizational behavior. Zhang (2012) mentioned that organizational systems like rewards and support from management, the university is able to succeed in granting R&D patents. As a result, we will discuss the following points individually "degree of academic freedom", "internal incentive system" and "connection with industry":

(1) Degree of academic freedom

Academic freedom means that scholars are able to perform academic research based on their own willingness without any restrictions. Academic freedom protects scholars from any unreasonable disturbance and limitation from both inside and outside the university. Academic freedom guarantees the individual's fundamental rights and also the university's academic freedom (Zhang, 2012; Angulo-Guerrero, et al., 2017). The core of academic freedom is to ensure the freedom of academic activities including research activities, teaching, learning, academic speech and academic action.

(2) Internal incentive system

Kopytova (2016) believed that incentive is an intrinsic or extrinsic force that gives people enthusiasm to take actions to achieve a specific goal. However, Lee, et al. (2016) believed that incentive makes employees in an organization work hard; inspires their inner power and willingness and also tries to satisfy employees' needs. Fang, et al. (2017) mentioned that technology developers are producers of intellectual property rights. In order to make technology developers obtain intellectual property rights for the organization, the organization should have a reward system to incentivize technology developers to create intellectual property rights. The most ideal motivation for university professors to participate in school affairs is their inner needs and inspiration. Therefore, good use of the reward system or incentive system would attract and incentivize university professors to attend school affairs and further encourage the delivery of professional activities.

(3) Connection with industry

Industry-university cooperation is one of the most critical technology policies in many countries. Xiao, et al. (2017) mentioned that industry - university cooperation is a typical strategy for exercising academic R&D results and patents. Industry - university cooperation has been studied in foreign countries for a long time already. Both the university and industry can obtain huge benefits by cooperating (Liu, et al., 2016). Industry-university cooperation is the combination of using the university's existing equipment and research personnel and industry's needs to enable basic research and applied research to complement each other and accordingly generate economic benefits and increases the domestic R&D level. Industry-university cooperation also means that when industry and the university cooperate with each other, academia is helped to implement leading, practical technology research. On the other hand, enterprises are encouraged to participate in academic applied research (Bao, et al., 2016).

TECHNOLOGY INVESTOR ASPECT

People are the most significant resources in the organization. University professors have become the major and necessary part in university internal organization and they have the most authority for the final decisions in university affairs. University professors are instructors, researchers and inventors (Boyack & Klavans, 2008; Fallah, et al., 2012). In the university organization, technology and the inventor have a close relationship. Technology or inventions are used mainly for teaching, technology R&D and service. Lubango (2015) mentioned that most researchers say that inventors tend to commercialize the R&D result based on their viewpoint, background and experience. We will discuss the following points "attitude of inventor", "knowledge of inventor" and "experience of inventor":

(1) Attitude of inventor

Attitude is how other people feel about the behavior and the meaning of the attitude shows a like or dislike for a thing. Positive or negative behavior for the environment reflects a person's subjective sense toward the surroundings. Besides the educational background, attitude is the overall of personality and experience. The university professor is required to be highly self-disciplined and independent when working. They also must have a strong sense of responsibility and duty for academic development. To successfully apply R&D results, Breschi & Catalini (2010) mentioned that inventors must pay much attention to the result conversion rate.

(2) Knowledge of inventor

Knowledge is the basic element of academic activities. Academic members' common beliefs, values and behavior are built on the pursuit of knowledge and effectiveness in the pursuit of knowledge is the evaluation criteria for every academic activity (Kang & Motohashi, 2015; Xiang, et al., 2013). In a university organization professors are the owners, disseminators and creators of knowledge. Professors are also the users of intellectual capital and the owners of the data required by the knowledge economy. University professors engage in specialized research fields, so besides the knowledge and ability relevant to their professions, they should have extensive industry knowledge as well. For example, when contacting and cooperating with industry professors usually have problems with bargaining and dealing with enterprises (Crescenzi, et al., 2016; Melero & Palomeras, 2015; Drivas, et al., 2016).

(3) Inventor experience

Experience is a complicated concept. It involves perception, emotion and desire, and is the main part of human activities. The personal experiences of people are their knowledge. The starting point of knowledge is the termination of knowledge at the same time. Due to their experience inventors are in contact with more kinds of people and things. They also have scruples and therefore limit themselves. The discussion in this study focuses on inventors' working experience (including industry), the experience of contacting industrial circles and the experience of engaging in technology transfer.

ESSENCE OF TECHNOLOGY ASPECT

With the changes in industry, technology and dissemination, the importance of intellectual property has increased. The protection of intellectual property rights has also become a critical issue for countries and international organizations. The patented R&D results help generate effective technology transfer and facilitate the operation and promotion of technology transfer (Lee, et al., 2015). Patent right means that inventors or creators can control the patent of objects on their own and also has excludability (Padula, et al., 2015). This study will talk about the three points, "Industrial applicability", "Novelty" and "Inventive" which are the important elements of patent based on the US patent guide.

(1) Industrial applicability

Industrial applicability, also known as utility and usefulness, is not expressly provided in patent law (Chinkatham & Cavallucci, 2015). Padula, et al. (2015) mentioned that industrial applicability means those inventions that can be utilized by industry. The purpose of patent protection is to increase the technology level and the protected patent must be available for industrial manufacturers and users. Hence, when the three essentials are under examination, industrial applicability will be the priority over novelty and inventive.

(2) Novelty

Lee, et al. (2015) mentioned that the simplest definition of novelty is something new that never existed before until now. The literal meaning of new is beginning or even the very beginning. Strumsky & Lobo (2015) mentioned that novelty usually means to encourage inventors and creators to publicize their R&D results but not conceal them. Novelty depends on the overall comparison to prior art, so the research completeness of prior art (Stand der Technik, SdT) would affect the novelty judgment including display or use of domestic and international patents, publications, and inventions or creations. Novelty is the core of the patent system and it ensures that the patent system is for facilitating the generation of new works and improving upon existing works.

(3) Inventive

Inventive is from the updated Art. 103 of US patent law in 1956 as well as Art. 22.2 of the Taiwan patent law; "inventions cannot be patented if inventions in that specific field can be easily constructed by persons having ordinary skill with prior art ." (Padula, et al., 2015; Mansoor, et al., 2017). Prior art means all of the information known by the public without the restrictions of place, languages and forms such as in written, digital, internet, and verbal forms, etc. Being easily accomplished means that the person having ordinary skill or creative ability applies the patents with adaption, replacement; alteration and combination of prior art and ordinary skill from the document citation.

Because university R&D results technology transfers involve multi-criteria problems this study uses Decision Making Trial and Evaluation Laboratory, DEMATEL to understand the factors driving the technology transfer and the relation between every objective to further identify the key factors.

DECISION-MAKING TRIAL AND EVALUATION LABORATORY (DEMATEL)

This study discusses the key factors in university technology transfer and the relationship between the key factors. We use the DEMATEL information analysis method effectively integrates the knowledge of experts (Baykasoğlu & Gölcük, 2017). To understand the complicated relationship structure between every variable we will observe the influence level of two elements and then utilize the matrix and the associated mathematical theories to calculate the relations and strength of influence among all the elements (Baykasoğlu & Gölcük, 2017; Büyüközkan & Güleryüz, 2016).

Data collection

The data collection method this study uses is delivering Questionnaires to professionals in the related industry and academia to gather and survey the information. By adopting DEMATEL to analyze the causal relation of each factor in decision-making, we can clarify the interrelation of the assessment factors when conducting technology transfer.

The structure of the study

According to the discussion and the literature summary, this study inducts the factors involved in conducting technology transfer into four main aspects: organizational culture aspect, organizational structure and system aspect, technology inventor aspect and essence of technology aspect. Organizational culture aspect is distinguished into three factors “top manager’s attitude and capacity” , “the identity and the image of school” and “encouragement of entrepreneurship”. Organizational structure and system aspect is distinguished into three factors “degree of academic freedom”, “internal incentive system” and “connection with industry”. Technology inventor aspect is distinguished into three factors “attitude of inventor”, “knowledge of inventor” and “experience of inventor”. Essence of technology aspect is distinguished into three factors “industrial applicability”, “novelty” and “inventive”. Shown as Figure 1.

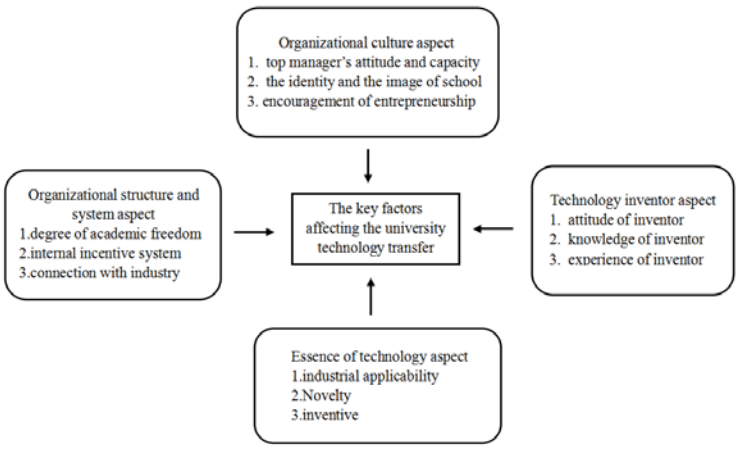

Figure 1 Research Framework

EMPRICIAL RESEARCH AND DISCUSSION

The purpose of this study is to discuss the key factors for facilitating university technology transfer success and the interrelated structure of each aspect. Hence, this study uses DEMATEL, and the date of delivering the questionnaires began on Oct. 29, 2014 to Nov. 23, 2014 for a total of 26 days. We expected the professionals from either academic circles or industry circles to have related knowledge and experience to provide the university with key factor assessment model measurements and professional suggestions for technology transfer. Thirty copies of the questionnaires were issued, and 22 copies were retrieved. Four of 22 copies were eliminated due to incompletion. Thus, after screening the questionnaires, the effective return rate 18 copies.

Analysis of direct and indirect impact of main aspects on university technology transfer

The main aspect is designed to identify the impact and interrelations between the four aspects organizational culture, organizational structure and system, technology inventor and essence of technology, and university technology transfer success. Furthermore, it will screen out those aspects that are key aspects. The direct/indirect main aspect matrix is shown in table 2.

Table 2 direct/indirect matrix of main aspect

	organizational culture	organizational structure and system	technology inventor	essence of technology
organizational culture	-0.746	-0.050	-0.171	-0.220
organizational structure and system	-0.025	-0.826	-0.184	-0.212
technology inventor	-0.195	-0.151	-0.817	-0.030
essence of technology	-0.226	-0.175	-0.028	-0.674

From table 2, you can see that “essence of technology” is the key aspect that has the most impact on other aspects. “Technology inventor” and “organizational culture” follow in order. However, the negative value of “organizational structure and system” is the largest, so it would be impacted by the other aspects which are relative impacted aspects. “Essence of technology” is the driving factor for solving the core problems, so it is the first aspect that should be considered when conducting the technology transfer. Using the value provided by direct/indirect matrix main aspect, you would get interrelation analysis of the main aspects which is the interrelation impact on every aspect.

Analysis of direct and indirect impact of sub-aspects of organizational culture on university technology transfer

In the organizational culture aspect, we will discuss the impact and interrelation between the three factors “top manager’s attitude and capacity” , “the identity and the image of school” and

"encouragement of entrepreneurship" and the success technology transfer in order to screen out the key factors. The direct/indirect matrix of sub-aspects of organizational culture is shown as table 3.

Table 3 The direct/indirect matrix of sub-aspects of organizational culture

	top manager's attitude and capacity	the identity and the image of school	encouragement of entrepreneurship	total
top manager's attitude and capacity	-0.899	-0.165	-0.172	-1.237
the identity and the image of school	-0.176	-0.913	-0.169	-1.259
encouragement of entrepreneurship	-0.198	-0.191	-0.863	-1.252
total	-1.274	-1.269	-1.205	
d+r	-2.510	-2.527	-2.457	
d-r	0.037	0.010	-0.047	

Within the decision-making assessment for the success technology transfer, "top manager's attitude and capacity" is the critical factor of impacting other factors, and then it is "the identity and the image of school" (0.010) which only impacts few other aspects. "Encouragement of entrepreneurship" is the factor being impacted. It shows that in the organizational culture aspect, "top manager's attitude and capacity" is the key factor for solving the core problems which is the first factor that should be considered. Using the value provided by the direct/indirect matrix of organizational culture sub-aspects to get the interrelation analysis of the organizational culture sub-aspects which represents the interrelation of impact on every factor.

Analysis of direct and indirect impact organizational structure and system sub aspects in university technology transfer

In the organizational structure and system aspect, we will discuss the impact and the interrelation between the three factors "degree of academic freedom", "internal incentive system" and "connection with industry "and the success technology transfer. The direct/indirect matrix of sub-aspects of organizational structure and system is shown as table 4.

Table 4 The direct/indirect matrix of sub-aspects of organizational structure and system

	degree of academic freedom	internal incentive system	connection with industry	total
degree of academic freedom	-0.867	-0.208	-0.197	-1.273
internal incentive system	-0.181	-0.901	-0.195	-1.277

connection with industry	-0.190	-0.175	-0.903	-1.269
total	-1.239	-1.285	-1.295	
d+r	-2.511	-2.562	-2.564	
d-r	-0.034	0.007	0.026	

From the above result, we can know that in the organizational structure and system aspect, "connection with industry" is the key factor in solving the core problems, which is the first factor that should be considered. Interrelation analysis of organizational structure and system sub-aspects represents the relative impact relations between every aspect. The "internal incentive system" and "degree of academic freedom", from the direct/indirect matrix of sub-aspects of organizational structure and system, the total value (-0.181) of "internal incentive system" impacting on "degree of academic freedom" subtracts the total value (-0.208) of "degree of academic freedom" impacting on "internal incentive system". Accordingly, the interrelation analysis of "internal incentive system" toward "degree of academic freedom" is 0.027 which represents that the impact intensity of "internal incentive system" impacting on "degree of academic freedom" is 0.027.

Analysis of direct and indirect impact of sub-aspects of technology inventor on university technology transfer

In the technology inventor aspect, we will discuss the impact and interrelation between the three factors "attitude of inventor", "knowledge of inventor" and "experience of inventor "and the success technology transfer. The direct/indirect matrix of sub-aspects of technology inventor is shown in table 5.

Table 5 The direct/indirect matrix of sub-aspects of technology inventor

	attitude of inventor	knowledge of inventor	experience of inventor	total
attitude of inventor	-0.857	-0.163	-0.162	-1.182
knowledge of inventor	-0.208	-0.905	-0.176	-1.289
experience of inventor	-0.204	-0.163	-0.912	-1.278
total	-1.269	-1.231	-1.250	
d+r	-2.450	-2.520	-2.528	
d-r	0.087	-0.058	-0.029	

"Attitude of inventor" is the key factor impacting the other factors. "Knowledge of inventor" has the largest negative value followed by "experience of inventor". The other two factors impact "attitude of inventor" and are the factors being impacted. This shows that in the technology inventor aspect, "attitude of inventor" is the key factor solving the core problems, which is the factor that should be considered first. The causal diagram of technology inventor sub aspects is shown in Figure 5 below. In this analysis, "attitude of inventor" is the only factor impacting the other factors positively, which means that "attitude of inventor" is the key factor impacting the other factors in the technology inventor aspect.

Analysis of direct and indirect impact of essence of technology sub aspects in university technology transfer

In the essence of technology aspect, we will discuss the impact and interrelation between the three factors “industrial applicability”, “novelty” and “inventive “and the success technology transfer. The direct/indirect matrix of essence of technology sub aspects are shown in table 6. “Industrial applicability” and “inventive” are the major key factors impacting the other factors and “novelty” is the factor being impacted. It shows that in the essence of technology aspect, “industrial applicability” is the factor impacting the other factors, which is the factor that should be considered first. Practically, the above three factors are interrelated.

Table 6 The direct/indirect matrix of sub-aspects of essence of technology

	industrial applicability	inventive	novelty	total
industrial applicability	-0.900	-0.156	-0.150	-1.206
inventive	-0.149	-0.904	-0.156	-1.209
novelty	-0.163	-0.154	-0.891	-1.209
total	-1.212	-1.214	-1.197	
d+r	-2.418	-2.423	-2.405	
d-r	0.006	0.006	-0.012	

CONCLUSION

The motive and purpose of this research was to identify the core impact factors and causal relations that impact university technology transfer success. Therefore, the university technology transfer factor evaluation model enables universities to allocate technology development resources to key impact factors. This increases the university technology transfer success rate and makes professors better able to promote the R&D result for effective utilization and decrease technology research resources waste. How universities spend technology R&D expenditures and resources on the most critical factors to R&D technology continue to boom. According to this research, we suggest that the largest proportion of resources input be “essence of technology” aspect which can successfully make the other aspects develop positively and facilitate the university technology transfer. The other key evaluation factors derived from “essence of technology”, we suggest that universities allocate the major resources to the R&D result with “industrial applicability” which is valuable for industrial use. “Industrial applicability” is the key impact factor for solving university technology transfer activities. The other factors will have serial improvements if “industrial applicability” is well managed and improved.

“Technology inventor” and “Organizational culture” both have the features of driving factors which are able to impact the other factors a little. From the point of view of the 80/20 rule (Pareto Principle), we suggest that the proportion of management resources input to “Technology inventor” and “Organizational culture” be up to 80%. “Technology inventor” is the key factor that should be

considered first. Additionally, we suggest the university allocate most of the technology research resources to “attitude of inventor” which has core impact showing the consent or dissent of inventors. The inventors’ decision is the key impact factor of whether the university will be able to transfer the R&D result or not. About “organizational culture”, we suggest “the top manager’s attitude and capacity” be the priority of technology research resource input. With the messages (attitude and capacity etc.) delivered by top managers, the belief and the behavior of professors toward the R&D result transfer would be shaped or affected. This consequence also matches the research from previous scholars which shows that professors play important roles in the university technology transfer.

The interaction of “organizational structure and system” with the other key aspects is low, which is the independent factor, so we suggest the aspect just be managed alone. Among this aspect, the factor “connection with industry” is the most significant one that is the key impact factor of conducting university technology transfer. In addition, it matches the research from previous scholars, so we suggest that the university focus on the technology transfer fault model, which is the gap between academia and industry. Therefore, a bridge must be built between both sides to increase technology transfer success by the industry-university collaboration. The university can assist and encourage professors to apply for R&D result patents. By utilizing the unit’s expertise, it provides professors with advice, curriculum and conference about the R&D patent, so professors would have more knowledge about patents and thus be more willing to apply for it. This would also shorten the patent application process.

Professors are the inventors of R&D achievements, so whether R&D results are transferred or applied or not is all about professors’ decision. Hence, in order to facilitate R&D achievement transfers, both the university and industry should have a relationship built on mutual trust with professors so they have the possibility of further negotiation. Through continuous communication and interaction professors would have the will for technology transfer. The university can also present curriculum or conferences related to technology transfer to deliver positive technology transfer information to professors, further increasing the possibility for technology transfer. If universities or industry can clarify professors’ thoughts, it may effectively help the utilization of R&D achievements or patents. Messages from the university’s top managers are regarded as a norm that affects professors’ behavior and also their perceptions and attitude. Because top university managers are major decision-makers, the university should shape, influence or guide professors’ beliefs and behavior in conducting R&D achievement transfer, creating a suitable environment for professors. The university should help professors improve their know-how and capability about technology transfer and develop professors’ new potential. Top managers should have high self-efficacy, positive attitude toward technology transfer and highly support achieving the goal (the success of technology transfer), generating better management effectiveness and innovation. The quality of technology research directly affects the final R&D result, so top managers should have great management and R&D abilities to help improve the communication and interaction with professors. Due to the different perceptions of R&D between the university and industrial circles, the possibility for R&D achievements being directly used is low. Thus, the establishment of an industry-university cooperation platform would create a medium for interaction and information exchange. Through this platform, we can integrate academic theory and practical experience, and diminish the difference between theory and practice. This enables professors’ R & D directions and achievements to meet the needs of industry development and the

whole society. The university can also publish and promote R&D achievements. The university can plan to assign professors to businesses for advanced studies during the summer or winter break. By doing this, professors would become familiar with the development direction of industry, the problems they are facing and their actual needs. Further, they would build relationships with industry leaders and reinforce industry-university research cooperation. Hence, through the establishment of industry-university cooperation platform, the university and industry develop a close relationship facilitating the transfer of technology.

In every university in Taiwan, intermediary agencies plat an important role. We can find that the suggestions we propose in this study, intermediary agencies are planning and implementing which means that the functionality of intermediary agencies in university is not that well, so the overall effectiveness of technology transfer is comparatively low. Accordingly, we suggest that universities establish or reform the platforms or intermediary agencies in order to make the technology transfer smooth and increase technology transfer success.

Although the samples in this study were professionals from academia, industry and research units, most the samples were from academia. In future studies, we may have professionals from new fields or personnel who have experienced technology transfer. We would also consider conducting interviews and other qualitative methods for the research in order to make the research more accurate. We can know more about the key factors of university technology transfer. We also suggest that future research can build different evaluation models of key factors based on the qualities of schools. this work can be divided into public university, private university, public technical college, private technical college and so on. The factors that affect the university technology transfer are not only the variables we mentioned in this study, so we suggest that future research should involve more methods like interviews and look for more variables that may affect university technology transfer.

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