TOWARD WORLD-CLASS UNIVERSITIES: ADMINISTRATORS' PERCEPTIONS RELATED TO DEVELOPING DYNAMIC CAPABILITIES OF TARGETED TAIWANESE UNIVERSITIES

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This study aims to develop a scale of dynamic capabilities of targeted Taiwanese universities and understand how senior administrators perceive the strategic management practices of their affiliated universities in their quest for becoming WCUs. A three-stage data collection design, including a pilot study, personal interviews, and the main survey, was adopted in this study. Research participants were senior administrators in the 12 targeted Taiwanese universities. The collected data included qualitative and quantitative data; the former came from ten personal interviews, and the latter involved a pilot study (with a response rate of 53 percent) and the main survey (with a response rate of 49 percent).

The findings of the quantitative data showed that universities had six dynamic capabilities for responding to external challenges. The more emphases on these six dynamic capabilities, the better performance a university has. The scale developed by this study was influenced by respondents' backgrounds and institutional characteristics. In addition, the findings of the qualitative interviews showed that a university should pursue the goal of being a useful university, not a WCU; WCUs cannot escape the nature of a good university education—teaching and making social contributions; social responsibilities of universities, university-

industry collaborations and university-government relationships can enhance the establishment of WCUs; the lack of a clear, specific positioning is a challenge for targeted Taiwanese universities; the Five-Year-50-Billion NT Dollars Budget Project has a labeling effect; universities should support the integration of resources; benchmarking and creating cross-discipline communities can help the pursuit of WCUs; professional leadership and organizational cohesion accelerate the pursuit of WCUs; global rankings as double-edged swords can either promote or impede the sustainability of university development; the Five-Year-50-Billion NT Dollars Budget Project deepens the gap between sciences and humanities; a primary challenge to university development is the lack of stable financial and human resources; internationalization is a necessary institutional mission but it is often impeded by financial issues; and the effectiveness of Flexible Merit Pay for faculty members is limited. This study also provides theoretical and practical implications for dynamic capabilities scale application, university strategic management, policy reform, and suggestions for further research.

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LIST OF ACRONYMS

AGFI	Adjusted Goodness-of-Fit
ARWU	Academic Ranking of World Universities
AVE	Average variance extracted
BIS	Department for Business Innovation and Skills
BPs	Berlin Principles on Ranking of Higher Education Institutions
CF	Code families
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CGU	Chang Gung University
CR	Composite reliability
DCA	Dynamic capabilities approach
EFA	Exploratory factor analysis
EGM	Emerging global model
GATS	General Agreement on Trade in Services
GFI	Goodness-of-Fit
HEIs	Higher education institutions
IREG	International Ranking Expert Group
IS	Inquiring system
KCTCS	Kentucky Community and Technical College System
KMO	Kaiser-Meyer-Olkin test
ML	Maximum likelihood method
NCCU	National Chengchi University
NCHU	National Chung Hsing University
NCKU	National Cheng Kung University
NCTU	National Chiao Tung University
NCU	National Central University
NFI	Normed fit index
NSC	National Science Council
NSYSU	National Sun Yat-Sen University
NTHU	National Tsing Hua University
NTNU	National Taiwan Normal University
NTU	National Taiwan University
NTUST	National Taiwan University of Science and Technology
NYMU	National Yang-Ming University
OECD	Organization for Economic Co-Operation and Development
PAF	Principal axis factoring

PCA	Principal component analysis
PNFI	Parsimony fit index
QS	World University Rankings released by Quacquarelli Symonds
RBV	Resource-based view
RMSEA	Root Mean Square Error of Approximation
SCI	Science Citation Index
SEM	Structural equation modeling
SJTU	Shanghai Jiao Tong University
SRMR	Standardized Root Mean Residual
SSCI	Social Science Citation Index
STEM	Science, technology, engineering, and mathematics
SWOT	An analysis of strengths, weaknesses, opportunities, and threats
THE	*Times Higher Education* World University Rankings provided by Thomsom Reuters
TLI	Tucker-Lewis Index
UK	United Kingdom
US	United States
WCUs	World-class universities
WTO	World Trade Organization

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1.0 INTRODUCTION

> Striving for excellence is not a bad thing, and competition may spark improvement. (Altbach 2004, p. 23)
>
> To thrive in the new market, colleges and universities will need to live by a whole new set of rules. *Strategy* and *anticipation of change* will become part of every institution's agenda. (Alfred 2006, p. xiv)

This is a study about senior higher education administrators' perceptions of dynamic capabilities of Taiwanese universities in response to the trend of pursuing world-class university (WCU) status. In today's global competitive environment, senior university administrators attempting to advance their affiliated universities to achieve WCU status need to sense, seize, and transform their affiliated universities into responsive and adaptive organizations.

1.1 WORLD-CLASS UNIVERSITIES AS THE FACILITATORS OF A NATION'S ECONOMIC COMPETITIVENESS

Pursuing the status of WCUs requires a dramatic transformation of the higher education enterprise worldwide in the twenty-first century, which is characterized by the knowledge-based economy[1] and globalization. WCUs drive a country's economic growth and its international competitiveness across the globe (Lane 2012) since they serve as knowledge carriers and

[1] Knowledge-based economies refer to "economies which are directly based on the production, distribution and use of knowledge and information" (OECD 1996, p. 7).

facilitators for knowledge transfer existing within the country and across the world. Even though their definitions and ways to describe them are multiple and ambiguous (Altbach 2004, 2007; Deem, Mok, and Lucas 2008; Li 2012; Mohrman, Ma, and Baker 2008), WCUs often refer to research-intensive universities (Altbach 2007). For instance, the University of Oxford and the University of Cambridge in the United Kingdom (UK) and the Ivy League in the United States (US) typically are considered exemplars for establishing WCUs in non-English speaking countries (Khoon et al. 2005; Marginson 2011). WCUs play a crucial role with multiple tasks, including the value of creating knowledge, the recruitment of high-caliber scholars and brilliant students, the cultivation of a globally competitive workforce, and the facilitation of the international trading of higher education services (Altbach 2007; Geiger 2004; Lane and Owens 2012; Salmi 2009; Wildavsky 2010). Their concerns focus on gaining globally operating capacities, improving connected partnerships, and engaging in global activities (Marginson 2011).

The marketization and internationalization of higher education make the higher education environment more complex and dynamic. One assumption of higher education marketization is that students are customers and university education serves as a product. Students as customers can choose the university they want to attend and review the returns of their investment in that university's services; as a result, universities need to scrutinize themselves to pursue maximum profits and efficiencies (Molesworth, Scullion, and Nixon 2011). Moreover, the General Agreement on Trade in Services (GATS) initiated by the World Trade Organization (WTO) has legitimatized the international exchange of higher education services. GATS illustrates the increasing importance of knowledge innovation, scholar and student mobility, and economic value creation, while it also gives rise to considerable criticism, such as the privatization and

marketization of higher education, the threatened role of government, and the debate on quality assurance and accreditation of higher education (Knight 2002; Tilak 2011; Verger 2009). Although the GATS is still controversial, it is a given that a complex and dynamic quasi-market of higher education[2] is emerging. In the quasi-market, both choice and competition interplay; the former involves the decision-making about which higher education institutions (HEIs) students would like to attend, and the latter involves university management. That is, a university—public or private—embarks on diverse market-like activities in relation to the development of academic capitalism[3] (Slaughter and Rhoades 2004) and entrepreneurial university management (Clark 1998) to increase its competitiveness and engage in more competitive behaviors (Torres and Schugurensky 2002), such as fundraising, merit pay, university-industry collaboration, and even an international race for human capital (Wildavsky 2010). To achieve sustainable competitiveness, a university inevitably has to inventory its core competencies and competitive advantage deriving from its strategic management.

The emergence of global university rankings also accelerates the dynamic competition and strategic orientation in higher education. As expressed by Simon Marginson and Marijk van der Wende (2007), the spur for institutional, intra-national, and international competition is the league tables produced by global university rankings, such as what Ellen Hazelkorn (2014, p. 17) called the "big three"—the Academic Ranking of World Universities (ARWU) issued by the Shanghai Jiao Tong University (SJTU), the *Times Higher Education* World University Rankings (*THE*) provided by Thomsom Reuters, and the World University Rankings released by

[2] Many governments introduce the concept of the competitive market into the higher education landscape, but because of insufficient information consumers can receive and the connection to public policies, universities exist in a quasi-market (Agasisti and Catalano 2006; Dill 1997; Glennerster 1991).

[3] Academic capitalism "sees groups of actors—faculty, students, administrators, and academic professionals—as using a variety of state resources to create new circuits of knowledge that link HEIs to new economy" (Slaughter and Rhoades 2004, p. 1).

Quacquarelli Symonds (QS). As a result, universities gradually become "strategic enterprises" (Hazelkorn 2009, p. 72) by using global rankings to deploy their resources, set institutional goals and priorities, do strategic planning, and position themselves.

Another thrust of building WCUs is the launching of national excellence initiatives by many countries in Europe, Latin America, Africa, and Asia (see Altbach and Salmi 2011; Liu, Wang, and Cheng 2011; Salmi 2009; Shin and Kehm 2013). Asian governments take advantage of these initiatives with specific funding policies to improve targeted universities' performance and advance them toward world-class status, such as the Global 30 Project in Japan (Yonezawa 2003, 2011), the Brain Korea 21 Project in South Korea (Shin 2009), the Projects 211 and 985 in China (Liu and Wang 2011; Yang and Welch 2012), and the Five-Year-50-Billion NT Dollars Budget Project[4] in Taiwan (Ministry of Education 2011). Table 1.1 shows national initiatives in six Asian countries. These excellence initiatives reflect that pursuing WCU status is equifinal: that is, seeking a common goal through different paths (Wang, Cheng, and Liu 2013).

Because the idea of establishing WCUs is difficult to define precisely and no certain approach to HEIs' success can be guaranteed, a major topic for researchers and practitioners in the higher education fields is how universities in quest of becoming WCUs develop and sustain their competitive advantage to survive in this dynamic global higher education market. Studying WCUs' definitions and features and relevant challenges as well as potential cases in different cultures is still popular, yet developing dynamic capabilities of those targeted universities is no doubt the key to their value creation and their sustainable advantage, one of the emerging issues of importance for university management in the future (Darden and Duderstadt 2009).

[4] The term Five-Years-50-Billion is the nickname of the Development Plan for World Class Universities and Research Centers for Excellence launched in 2006. Since 2011, this project is known as the Aim at Top University Project.

Table 1.1. Excellence Initiatives in Six Asian Countries

Country	Initiative	Starting Year (Recipients)	Focus
Japan	COE 21	2002-2007	Quality improvement of target research units
	Global 30	2008	Talent mobility, focusing on international students
	Global 30 Plus	2011	Talent mobility, focusing on Japanese students
China	211	Announced in 1993 Implemented since 1995	Quality improvement of 100 key HEIs
	985	Launched in 1998 First stage: 1999-2001 (9 HEIs) Second stage: 2004-2007 (39 HEIs) Third stage: 2010-2020	Status elevation of a few leading universities Human resource development (especially in the 3rd stage)
South Korea	Brain Korea 21	First stage: 1999-2005 Second stage: 2006-2012	Human resource development Status elevation of a few leading universities Research collaboration between universities and industry
	WCU	2009-2012	Talent mobility, focusing on international scholars
	BK 21 Plus	2013-2019	Quality improvement of graduate schools
Taiwan	Five-Year-50-Billion NT Dollars Budget program	First stage: 2006-2010 (12 HEIs)	Status elevation of a few universities and research centers
	*Its title changes to "Aim at Top University."	Second stage: 2011-2016 (12 HEIs)	The internationalization of top universities Quality improvement in research Human resource mobility and development University-Industry collaboration
Malaysia	National Higher Education Strategic Plan 2020	First phase: 2007-2010 Second phase: 2011-2015	Quality improvement and status elevation of targeted HEIs
Singapore	Research Centers of Excellence	2007	Establishing research centers Human resource mobility and development Knowledge innovation in specific fields

Source: Created by the author.

A major theme of strategic management is how an organization develops and sustains its unique advantage. Theories in strategic management have significant implications for university organizations because in the competitive knowledge-based environment universities need to create and adopt strategies appropriate for their distinctive histories and goals and should strategically reduce threats derived from the interactions between their institutions and the external environment (Alfred 2006). Today, this theme holds great significance for research-intensive universities when the aspiration for WCU status emerges in the global knowledge economy. Compared with the environment in which most K-12 schools reside, the higher education environment is more dynamic, competitive, and non-equilibrium-oriented. Individual universities, therefore, should align their strategic plans to address challenges from domestic and global pressures.

1.2 PROBLEM STATEMENT

A common critique of educational organizations, such as universities, is that they respond slowly to internal and external challenges and resist change—a characteristic of loosely coupled systems (Weick 1976). Persistence, often referring to stability and avoiding a drastic change, is the consequence of loosely coupled organizations, along with buffering, adaptability, satisfaction, and effectiveness (Orton and Weick 1990), but it might be a two-sided coin; the desired outcomes from persistence determine it as either an advantage or a disadvantage. Similarly, an organization's competitive advantage might arise from its core capabilities, while its innovation might be hindered by the negative side of core capabilities; that is what Leonard-Barton (1992, p. 118) called "core rigidities." It is unclear whether a university in quest of WCU status possesses

its core capabilities to gain competitive advantage and what kinds of core capabilities it develops in today's dynamic higher education landscape.

Few studies address how universities are capable of becoming WCUs in terms of institutional strategic planning even though many studies have documented the topic of WCUs from multiple perspectives. The common themes concerning WCUs in East and Southeast Asia are: the comparison of academic competitiveness among universities (e.g., Chen 2013); university performance in global university rankings (e.g., Hou, Ince, and Chiang 2012; Li, Shankar, and Tang 2011); and the exploration of various excellence initiatives (e.g., Byun, Jon, and Kim 2013; Ho 2009; Liu 2013; Ngok 2008; Ngok and Guo 2008; Ramakrishna 2012; Shin 2009; Yonezawa 2003). Some studies use a single university as a case to study its strategies for attaining world-class status (e.g., Kim 2007; Xavier and Alsagoff 2013; Yang and Welch 2012), while others focus on the effectiveness of specific funding projects (e.g., Chang et al. 2009; Mohrman 2013), higher education internationalization and related policies (e.g., Cho and Palmer 2013; Lo 2009; Mok and Cheung 2011; Song and Tai 2007), and stakeholders' opinions (e.g., Jang and Kim 2013) as well as university leadership issues (e.g., Hassan et al. 2011; Shahmandi et al. 2011). Although these studies have documented various issues well regarding WCUs, it is not really understood how a university internally strengthens itself and then deals with the external challenges.

In addition, few studies are conducted to explore dynamic capabilities of universities that aspire to become WCUs. Organizational innovation has become an imperative for university management, and an aspiring university needs to "build the management of change into its very structure" in the competitive knowledge-based society (Drucker 1995, p. 79). The term *dynamic capabilities*, as defined by David J. Teece, Gary Pisano, and Amy Shuen (1997, p. 510), refers to

a continuous condition in which managers sense opportunities and threats, seize opportunities, and adapt and transform their organizations rapidly and flexibly. Such a description of dynamic capabilities implies that, on the one hand—similar to managers in the organizations—senior administrators in the universities, such as presidents, vice-presidents, deans of administrative offices, and deans of schools as well as directors of departments, have a crucial role to play in developing the strategic management practices of their affiliated universities, and, on the other hand, university organizations are capable of constant advances and innovations to adapt to changing times. In other words, the concept of dynamic capabilities provides an alternative theoretical framework to explore an organization's sustainable competitive advantage, even though in the strategic management field, many theories, such as SWOT analysis, Porter's Five Forces Model (Porter 1990), and a resource-based view (RBV) (Barney 1991; Peteraf 1993) are used considerably in discourses about developing competitive advantage. According to available materials, few studies I found connect dynamic capabilities to educational organizations. One study conducted by Cheng Joo Eng (2005) investigated the development of dynamic capabilities in Taiwanese senior high schools, but it focused on K-12 schools, different from the research target—universities—of my study. In terms of universities as organizations, one study demonstrated the theoretical discussion of dynamic capabilities in universities (Navarro and Gallardo 2003); and another indicated an entrepreneurship orientation as a dynamic capability in Canadian universities (Todorovic 2004). Although these studies bridge dynamic capabilities and educational organizations and make an important contribution to the research design of this study, the issue concerning the development of dynamic capabilities of HEIs still needs more effort and more study.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to (a) develop a scale of dynamic capabilities of targeted Taiwanese universities and understand (b) how senior administrators perceive the strategic management practices of their affiliated universities in the quest for becoming WCUs. Although the issue of pursuing WCUs is worldwide, this study looks specifically into Taiwan. Establishing WCUs has become a national agenda in Taiwan. As shown in Table 1.1, the Taiwan government has launched its own excellence initiative—the Five-Year-50-Billion NT Dollars Budget Project—with a specific funding regulation to select targeted universities. Moreover, the number of recipients of this excellence project is far less than the total number of colleges and universities in Taiwan. For instance, in 2013, the number of the recipients was 12, while the total number of Taiwanese colleges and universities was 161 (Ministry of Education 2014a). The specific financial resource provided by this project is no guarantee of excellent performance of recipient universities (Chang et al. 2009). Hence, these recipients need to explore how they can sustain their competitive advantage and compete with other Taiwan HEIs.

The number of Taiwan universities in the top 400 HEIs of world university rankings is stagnant or on the decline (Table 1.2). Compared to universities in its neighboring countries, Taiwan's universities gradually lose their visibility in international higher education. Global university rankings are often used as an indicator to assess a university's performance, even though some criticisms may be produced. For instance, some scholars claim that if high-ranked research universities in the US and UK serve as standardized models of WCUs, the higher education landscape across the globe might lean toward the isomorphism that most universities tend to be Westernized and are subject to becoming exclusive mechanisms that imply elitism, hierarchical order, and numerous losers' sacrifices as well (Amsler and Bolsmann 2012; Deem,

Mok, and Lucas 2008; Lang 2005). These isomorphic organizations follow a "preferred route to increased legitimacy and autonomy" (Toma 2012, p. 120) so that they might receive and share more resources. However, rather than discuss the quantitative comparison concerning global rankings, my intention in this study is to focus on whether Taiwanese universities are capable of becoming world-class and how they can be innovative and transformative in this dynamic global market.

Table 1.2. Number of Top 400 Universities in East Asia

	ARWU		*THE*		QS	
	2013-14	2014-15	2013-14	2014-15	2013-14	2014-15
Japan	15	14	11	12	14	14
South Korea	7	8	7	9	8	10
China (including Hong Kong)	21	29	16	17	17	18
Taiwan	5	4	8	6	6	6

Note: I chose the sample size of top 400 because the *THE* ranking system simply provides the best 400 rankings in these two periods of time on its website.
Sources: Quacquarelli Symonds (2014), Shanghai Jiao Tong University (2014), and Thomson Reuters (2014).

Nowadays, senior administrators in the universities "become navigators on a highway to the future" (Alfred 2006, p. 20). In the context of Taiwanese universities, most senior administrators, except presidents, are also academic faculty members: they offer instruction and deal with administrative affairs in their affiliated universities. Moreover, senior administrators do not merely conduct strategic planning for their affiliated institutions to achieve better performance; they also look for and sustain competitive advantage to shape the future of their affiliated universities. Such dual status—both administrative and instructional—ensures great significance of their perceptions of strategic management of their affiliated universities in response to challenges from domestic and global higher education environments.

1.4 RESEARCH QUESTIONS

The two overarching questions that guided this study are (1) what kinds of dynamic capabilities do Taiwanese leading research universities develop in response to challenges from the domestic and global higher education markets? and (2) how do senior administrators' perceptions and institutional variables influence the development of dynamic capabilities within their universities?

1.5 SIGNIFICANCE OF THE STUDY

As previously discussed, the trend of pursuing WCU status in East Asia has become prevalent, while Taiwanese universities might lose their visibility due to the fact that where they rank in the global ranking systems is declining. This does not mean that Taiwanese universities make no effort to improve for external global competition, but rather that it is a good chance for them to review, reflect, renew, and transform themselves to adapt to dynamic change in the future. It is important for higher education administrators to be very familiar with what it is that their HEI does and does not do well, and be adaptable to change when necessary. Additionally, understanding the dynamic capabilities a university possesses may help it become a distinctive institution, not merely an isomorphic or Westernized one.

This study enriches the research fields of dynamic capabilities and strategic management of universities in Taiwan. As mentioned above, there are few studies on building dynamic capabilities in the universities. The differences between Zelimir William Todorovic's (2004) view and mine include that (a) he tries to deduce entrepreneurship as a dynamic capability of

Canadian universities, while I would like to explore what kind of dynamic capabilities a targeted Taiwanese university has, and (b) the selection of research contexts between his work and mine is different; traditionally, as opposed to Canada, Taiwan has been a peripheral country in terms of the global economy of production and distribution. Although Taiwan is an industrialized country, it is a small island country with 161 HEIs (Ministry of Education 2014a). HEIs are accessible to Taiwan citizens. But these HEIs, especially those selected to receive funding from the Five-Year-50-Billion NT Dollars Budget Project, face crises in terms of survival in domestic and global higher education environments, such as public funding stringency, decreasing enrollments resulting from continuous low birth rate, intensified competition for human resources, and the pressure for quality assurance resulting from government initiatives for WCU status (e.g., Chang 2013; Song and Tai 2007; Wang 2003). These challenges are not unique to Taiwan, but through the Taiwan case, this research study provides an alternative exploration of higher education practices in the small, periphery country. Thus, the findings and policy implications from this study will make a contribution to higher education policies and university development in other countries.

Theoretically, this study explores the possibilities of closer links between strategic management practices of targeted Taiwanese universities and the theory of dynamic capabilities proposed by Teece, Pisano, and Shuen (1997). As mentioned earlier, establishing WCUs has become a national agenda in East Asian countries and this popular issue has been discussed in many studies, but no study has described and explained how selected universities receiving the grants from national excellence initiatives strengthen and better themselves to respond to external challenges from a bottom-up perspective: that is, from administrators' perceptions within universities. Moreover, few studies have employed the theory of dynamic capabilities to

analyze strategic management of universities and to explain what senior administrators are concerned about and which dynamic capabilities universities should possess in the current higher education environment. Thus, through this research study, an empirical evidence basis is provided for the frontier of connection between university management and the dynamic capabilities theory.

Moreover, this study makes a significant practical contribution to the field of higher education in Taiwan. Currently, major foci are on a few targeted universities which the Taiwan government endeavors to promote in terms of their research reputations and global standings, while other important missions of university education, such as research quality, institutional management, and students' and faculty's needs (Altbach 2007; Frey and Rost 2010; Proulx 2007), might become a secondary concern of the government and the society. Rather than emphasizing the numerical interpretation of global rankings, the study highlights the importance of dynamic capabilities and strategic management at the institutional level. Higher education administrators and practitioners should pay more attention to organizational dynamic capabilities to facilitate their sustainable competitive advantage in the global competitive environment.

1.6 DEFINITION OF KEY TERMS

In this section, I provide glossary definitions of the following three key terms. These definitions are important because they enable the reader to understand the specific meanings of how each term is positioned within this dissertation.

1.6.1 World-Class University

Although this is a controversial and ambiguous term, a WCU often refers to a research-intensive academic organization seen as a micro-ecosystem as proposed by Jamil Salmi (2009, 2011), involving many complicated factors and various interactions at institutional, national, and international levels. In today's globally competitive environment, WCUs should be responsive and adaptive organizations with multiple dynamic capabilities to enhance their quality and better their management, as well as to simultaneously respond to external pressures from the global higher education market.

1.6.2 Dynamic Capabilities

Many scholars deem dynamic capability as an organization's ability—a process, a pattern, or a behavioral orientation—emphasizing continuous integration, reconfiguration, and renewal of its resources and capabilities to adapt and respond to a rapidly changing environment (Eisenhardt and Martin 2000; Teece, Pisano, and Shuen 1997; Wang and Ahmed 2007; Zollo and Winter 2002). Based on these scholars' opinions, dynamic capabilities are related to an organization's strategic response abilities that enable this organization to integrate, reconfigure, and renew its resources and core capabilities, better its performance, facilitate its learning and competitiveness, transform its organizational governance toward its desired goals and construct social networks in response to changing external environments. These capabilities are different in accordance with variations of organization and context. Moreover, senior managers play an important role in the establishment of dynamic capabilities because they should understand, grasp, and transform their

existing mental models and thinking to ensure their organizations' adequate change and competitive survival.

1.6.3 Targeted Universities in Taiwan

Targeted universities in Taiwan refer to the grant-receiving universities in the second stage of the Five-Year-50-Billion NT Dollars Budget Project (Ministry of Education 2014c). They serve as the targets for transformation into WCUs. The second stage is implemented during the period from 2011 to 2016, and 12 universities and five research centers are selected and awarded specific funds. However, the major purpose of this study is to discuss strategic management of the university as a whole; thus the five research centers are excluded. The awarded universities include the National Taiwan University (NTU), the National Cheng Kung University (NCKU), the National Tsing Hua University (NTHU), the National Chiao Tung University (NCTU), the National Central University (NCU), the National Yang-Ming University (NYMU), the National Sun Yat-Sen University (NSYSU), the National Chung Hsing University (NCHU), the National Taiwan University of Science and Technology (NTUST), the National Chengchi University (NCCU), the National Taiwan Normal University (NTNU), and the Chang Gung University (CGU).

1.7 SUMMARY

This is a study about dynamic capabilities and strategic management of universities in response to global competition and national pressures regarding the pursuit of WCU status. In particular,

most East Asian governments have launched their excellence initiatives as a priority of their national agendas in higher education. The annual declarations by many world university ranking systems (e.g., ARWU, *THE*, and QS rankings) also have accelerated the emerging trend, which seeks better national economic competitiveness by facilitating excellent academic performance and higher global standings of targeted research universities within their countries. Thus to maintain a sustainable competitive advantage, these targeted universities need to develop their dynamic capabilities and plan their responsive strategies for their survival in a rapidly changing global environment. The following chapter provides a literature review concerning the quest for WCU status in targeted Taiwanese higher education institutions and the dynamic capabilities and strategic management of university organizations.

2.0 LITERATURE REVIEW

Change and *instability* are two major challenges to an organization's management. In a time of turbulence, people struggle "to make prudent decisions about the proper balance between or combination of stability and change" (Waldo 1971, p. 275). Today, organizations exist in the knowledge-based society full of open, dynamic competition derived from the use of technology and the accessibility of knowledge around the world (Drucker 1995). Both for-profit and not-for-profit organizations should seek their survival and success in competition "in the real world" (Bess, Dee, and Johnstone 2012, p. xxxiii). Every organization must endeavor to renew and adapt itself to change, and then to survive sustainably in the macro-environment. Strategic management for organizations, therefore, plays the critical role of developing their "external strategies" and "internal capabilities" (Steiss 2003, p. 1) to achieve organizational goals.

The literature review in this chapter seeks to provide a general image of dynamic capabilities of research-intensive universities with the aspiration of becoming WCUs. The literature describes the ecosystem of WCUs and then particularly discusses the development and challenges of higher education in Taiwan. Then the literature outlines the theory of dynamic capabilities of the organization. Finally, this section makes the connection to the setting of higher education and discusses the dimensions of dynamic capabilities in relation to university management.

2.1 THE QUEST FOR WORLD-CLASS UNIVERSITIES

Establishing WCUs has two functions: one represents the academic excellence of individual universities, and the other one serves as the facilitator of a nation's economic competitiveness and its global visibility. A British document published by the Department for Business Innovation and Skills (BIS) (2009) clarifies, "Our world class universities are unique national assets, and must be recognized as such" (p. 21). Along with the emergence of global university rankings and the increasing frequency of international activities, the aspiration to establish WCUs is becoming the priority of national agendas in many countries. The literature in this section provides a discussion concerning WCUs' characteristics and their internal and external environments.

2.1.1 What are World-Class Universities?

The term *world-class universities* often refers to research universities characterized by global reputation, outstanding human resources, remarkable research performance, effective governance, and abundant resources and technologies (Altbach 2004, 2007). Alternative labels shown in most studies include *flagship* and *first-class* universities; the former depicts public or private leading universities in a country that are large in size and have high prestige, and thus guide other HEIs towards excellence and higher global standings (Altbach 2007; Yonezawa 2007); as a result, they are also called *leading* or *top* universities. The latter means the winners are frequently shown on the league tables of top 100 HEIs provided by the most prominent global rankings, such as ARWU, *THE*, and QS rankings. In addition, another phrase used to portray WCUs is the emerging global model (EGM) with eight features, including cross-

boundary and education-for-all missions, a research-intensive orientation, interdisciplinary teamwork and international partnerships, high costs, better government-university-industry relationships, international scholar and student recruitment, greater internal governance, and collaboration with international non-governmental and multi-governmental organizations (Mohrman, Ma, and Baker 2008). These multiple phrases concerning WCUs result from the analysis of university organizations from different lenses. These phrases may imply vague definition and the ambiguity of WCU labels (Altbach 2004; Deem, Mok, and Lucas 2008), but on the contrary, they reflect that WCUs involve multiple activities and dynamic relations.

A few scholars have attempted to propose a variety of key features clustered around first-class universities. According to these scholars' ideals, a WCU should have a positive worldview and vision, conduct cutting-edge research and achieve excellent research performance, emphasize academic freedom and university autonomy, create an intellectually exciting environment with diverse expertise, have effective governance, build organizational cohesion and leadership, recruit highly qualified scholars and students, seek sufficient resources and funding, grasp opportunities to collaborate with other organizations in the country and overseas, and fulfill governments' desire for economic growth and international competitiveness (Altbach 2004; Deem, Mok, and Lucas 2008; Khoon et al. 2005; Lee 2013; Li 2012; Wang 2001). These expectations of WCUs cover the whole gamut from internal governance and academic quality improvement within HEIs to the external macro-environment in which they reside.

2.1.2 A WCU as a Micro-Ecosystem

Salmi (2011) advanced the *ecosystem* of tertiary education, a mechanism consisting of diverse forces within and among countries. A WCU, like a micro-ecosystem, involves many complicated

factors and various interactions at institutional, national, and international levels. To visualize the complexity of a WCU, an easily understood map based on Salmi's (2009, 2011) studies is provided (Figure 2.1). The periphery in Figure 2.1 shows the macro-environment in which a university resides, and the central part, consisting of three overlapped circles, refers to key components and relevant activities of a WCU. According to Salmi's (2009) work, the internationalization of a university is categorized relative to the dimension of talent concentration, while it should be seen as an element of the macro-environment. Higher education internationalization reflects the interaction between a university and the external macro-environment, since a WCU does not merely promote international mobility of scholars and students but also involves many international activities, such as global ranking competition, collaboration with international organizations, educational service trades, and the establishment of branch campuses. All are the products of internationalization in higher education.

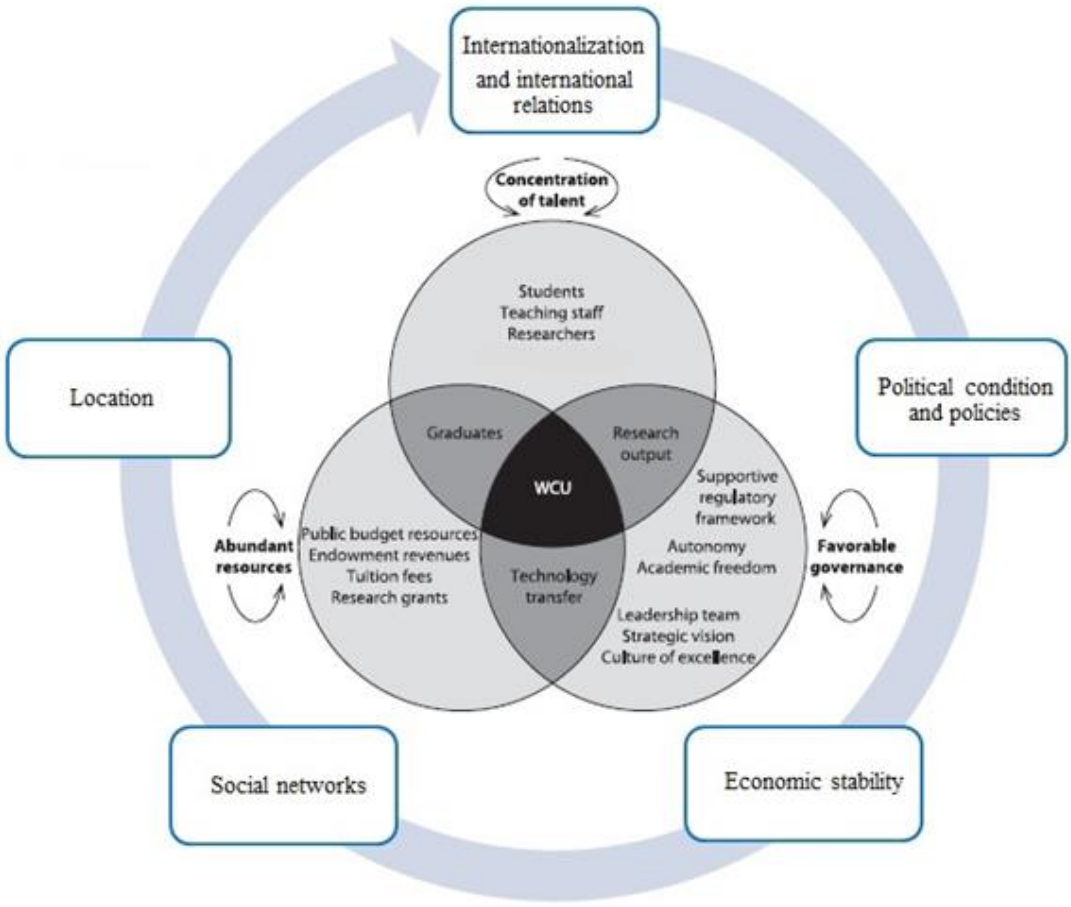


Figure 2.1. The Ecosystem of a World-Class University

Note: Primarily based on Salmi's study, a WCU is also affected by factors at the domestic and international levels.
Sources: Adapted by the author from Salmi (2009, p. 32; 2011, pp. 335–337).

2.1.2.1 A WCU's Internal Environment

As shown in Figure 2.1, how a WCU differs from other HEIs depends on three important features—attracting the best talents, having abundant resources, and being devoted to favorable governance (Salmi 2009). Human resources is an important asset of WCUs because the growth of faculty publications in the science citation (SCI) and social science citation (SSCI) indexed journals is seen as an indicator of assessing a university's research productivity, even though

these indexes have language and geographic biases (Cheng, Jacob, and Yang 2014; Deem, Mok, and Lucas 2008; Delgado and Weidman 2012). And because of a high reputation and excellent facilities, some first-class research universities are capable of *selecting* and *recruiting* high-caliber scholars and qualified students both from within the country and around the world; for instance, top universities have undergraduates who win the competition for admission into a US HEI (Altbach 2007) or those who succeed in their university entrance examination in South Korea (Kim 2007) and graduate students who are more engaged in doing research (Salmi 2009). Furthermore, WCUs serve as globalized intellectual hubs where faculty with diverse backgrounds can conduct interdisciplinary research and exchange their expertise (Mohrman, Ma, and Baker 2008).

Developing abundant resources is a feature of becoming WCUs, and this also is a challenge for most HEIs. Sustaining superior research output and other operations of WCUs require plentiful resources, since WCUs need to renew their advanced technological equipment and to facilitate their operation and sustainable development (Altbach 2004). WCUs' financial resources come from diverse revenue sources, such as considerable endowments, student tuition fees, government appropriations for research and operational expenditures, public and private contracts, and auxiliary and hospital services (Mohrman, Ma, and Baker 2008; Salmi 2009).

Having appropriate governance within institutions is also essential. Given the increasing complexity of organizations that results from institutional mergers, upgrades, integration, and other creative endeavors (Mohrman, Ma, and Baker 2008; Salmi 2009), the leaders and administrators of universities need to communicate with various schools and departments and to create group cohesion on their campuses (Khoon et al. 2005). Moreover, a culture that promotes HEIs to reflect constantly and to seek academic excellence should be created through academic

autonomy, academic freedom, effective and persistent leadership, and a supportive environment (Salmi 2009). Good governance and leadership can shape universities' vision and missions and guide them to becoming world-class.

2.1.2.2 A WCU's External Macro-Environment

In today's knowledge societies, to some extent, the success of first-class universities relies on their external environments. Research universities are no longer academic ivory towers and are now deeply affected by their geographical locations as well as the political, social, and economic situations at the domestic and international levels. As shown in Figure 2.1, five elements on the periphery have an impact on the organizational management of WCUs.

Internationalization underpins the idea of WCUs and it is essential to stimulate university development in the ecosystem of tertiary education (Salmi 2011). Existing in the rapidly changing global context, targeted universities that pursue academic excellence have established closely collaborative partnerships and engaged more in international activities to communicate and respond more immediately to changes in the world higher education market (Lindsay 2012). The academic and administrative activities of these institutions are no longer restricted to their national boundaries. Through the internationalization of higher education, research-intensive universities establish international academic communities and enhance their reputations by attracting high-caliber scholars and researchers as well as considerable investment in research (Lee 2013). Another international activity is the cross-border institutional collaboration and the creation of branch campuses, such as the University of Nottingham-Ningbo in Zhejiang, the Xi'an Jiaotong-Liverpool University in Jiangsu, the Duke-Wuhan University in Kunshan, and the Shanghai-New York University in Shanghai (Feng 2013). Thus it is noticeable that the

mobility of human resources and institutional collaboration around the world strengthens the pursuit of WCU status.

Moreover, competition among HEIs has become intense since the marketization of higher education. Knowledge and educational services are viewed as commodities that can be exchanged in the higher education market. Similar to the concepts of the entrepreneurial university (Clark 1998) and academic capitalism (Slaughter and Rhoades 2004), the marketization of higher education has accelerated a number of competitive activities among HEIs, including faculty recruitment and their pay, the fluctuation of scholarships and student tuitions, the relations between pricing and prestige of universities, student enrollment, the expansion of branch campuses, and university positioning and differentiation strategies (Rothschild and White 1993).

No HEI exists in a vacuum; instead, each is found within a real and complex set of circumstances that involve the politics, economy, and social culture within the country. For the political factors, the governments, including federal/central and state/local[5] ones, are both policy makers and resource providers. As previously mentioned, many Asian governments have launched their own excellence initiatives to reinforce the pursuit of WCU status worldwide. For instance, since 1998 the central government in China has begun implementing Project 985, which aims to elevate the global standings of selected leading universities; these selected HEIs have been supported with special funds from annual revenue of the central government in China (Xiong, Zhang, and Liu 2011). However, political factors sometimes lead to negative burdens on academic autonomy and university management. Whereas political turmoil may delay the reform of HEIs and pose obstacles to cultivating the future workforce, there is a gap between the need of

[5] The federal/central government refers to the government of a country consisting of various states, provinces, or counties; the state/local government indicates the government of a country subdivision.

qualified human capital and that of national economic development (Lee 2013). Furthermore, the study conducted by P. V. Indiresan (2007) indicates that government intervention might seriously influence university management. He analyzed the Indian HEIs and exemplified the intervention of the Supreme Court regarding tuition charges, student admissions of different Hindu castes, and the intervention of state governments in faculty appointments and chancellors' elections in the Indian HEIs.

A nation's economic stability and the role of national authority are significant to WCUs. For instance, in the United States, the federal/state government budgets and policies surrounding taxation and student aid serve as key financial supports for the maintenance of public universities (Altbach 2004; McGuinness 2011). Moreover, government regulations regarding accountability and research funding policies also determine resource allocation. Most large research universities are the major recipients of federal research funding (Mumper et al. 2011). These policies and phenomena have great impact on the priorities of research universities, such as more research-intensive activities, more attention on graduate education, and more emphasis on the fields of science, technology, engineering, and mathematics (STEM). However, if a nation lacks the aforementioned stability and the convention of academic autonomy, the development of its HEIs may be readily subject to market forces that dominate faculty research interests and their institutional orientations in order to ensure their survival (Altbach 2007).

Other important external elements for WCUs are social networks, multiple relationships with levels of government, students and parents, industry, and other for-profit and not-for-profit organizations. National and international collaboration is an essential tactic to build social networks and can bridge the gap between HEIs' revenues and their expenses. For instance, two trans-national organizations—the European Union's Erasmus Mundus program and the

Association of Pacific Rim Universities—are good examples for describing multiple advantages of global collaboration among the members, such as: information sharing, academic exchange activities, access to international resources, research collaboration, and an increase in members' reputations (Mohrman, Ma, and Baker 2008).

Last but not least, an institution's location in a metropolitan area is an important but not absolute ingredient of establishing a WCU. In general, WCUs have more chances to receive contracts and financial resources from big, international companies in the metropolitan cities where they function as high-tech and new business incubators and where quick money circulation is possible. For instance, the majority of recipients of the South Korean World-Class University Project proclaimed in 2008 are universities located near the metropolitan area of Seoul (Byun, Jon, and Kim 2013), where some large companies (e.g., SK, Samsung, and LG) which focus on specialized fields provide high prestige and employment opportunities (Kim and Nam 2007). In terms of human resources, leading research universities in close geographical proximity to the local job market also attract more domestic and international students. Convenient transportation links in the metropolitan cities also benefit WCUs since scholars can travel around the world to share their research results. These leading research universities in the metropolitan areas gain relatively more international visibility and prestige than those in the small and remote cities.

In summary, a number of different scholars have contributed their perspectives on the nature of WCUs. Some emphasize leading research universities' reputations and global university rankings, while some criticize WCUs as a Western form of re-colonization. Some also insist on the exploration of characteristics and qualities of WCUs and stress innovation and external collaboration since WCUs are the axis of the triple helix model of university-industry-

government relations (Etzkowitz and Leydesdorff 2000). In today's global environment, all these scholars' perspectives are equally important. Nevertheless, these offer the key to an understanding of how a research university transforms itself and then *fits* the change(s) in the global higher education market. The ecosystem of WCUs (see Figure 2.1) contributed by Salmi (2009, 2011) might be viewed as the prototype of WCUs; generally speaking, that is the goal every HEI should pursue. In brief, WCUs are responsive and adaptive organizations; they cannot just take account of numeric presentations of global rankings and their interpretations, and reversely, they should pay more attention to the improvement of quality of the overall university management and their response to external pressures from the global higher education market simultaneously.

2.1.2.3 World University Rankings as a Tool of Selecting World-Class Universities

The highest-ranked universities are often viewed as the best and the most competitive HEIs in the world. World university rankings serve as a tool of the competition and comparison among HEIs and a means for policy-making used by many policymakers and university leaders (Shin and Toutkoushian 2011). In particular, three well-known global ranking systems—ARWU, *THE*, and QS—serve as a reference to assess universities' performance and their global standing. The following section briefly introduces these selected ranking systems and their methodologies.

In general, these three global ranking systems highlight the evaluation of research-led universities in the world, although their methodologies are somewhat different (Table 2.1). Kay Cheng Soh (2011) indicated that the first league table of world university rankings is the Academic Ranking of World Universities (ARWU) annually offered by the Shanghai Jiao Tong University since 2003. In the ARWU, data are collected from some databases, such as Science Citation Index-Expanded (SCI), Social Science Citation Index (SSCI), Nobel laureates, and

Fields Medals. A list of the best 500 is released on its web. According to its methodology, six indicators are included within four dimensions (Shanghai Jiao Tong University 2014). First, the dimension of education quality is assessed by alumni who win the Nobel Prizes and Fields Medals; this indicator contributes 20 percent to the overall score. Second, the dimension of faculty quality is evaluated on the basis of two indicators: one is related to faculty receiving Nobel Prizes or Fields Medals, and the other one is HiCi, a parameter related to the highly cited researchers in 21 subject categories. These two indicators are given a weighting of 20 percent separately. Third, the research output dimension is also estimated by two indicators—the papers published in Nature and Science (coded as N&S) and those indexed in SCI and SSCI (coded as PUB). These two indicators are worth 20 percent separately. Finally, the per capita performance of an institution (abbreviated to PCP) contributes ten percent to the overall score.

The league table of the *Times Higher Education* World University Rankings (*THE*) is released by media companies. In 2004, *Times* Higher Education Supplement cooperated with Quacquarelli Symonds (QS), and so was called *THE*-QS rankings at that time. However, the *THE* stopped its collaboration with QS in 2010 and then started a new cooperative effort with Thomson Reuters. The *THE* ranking system has developed its own methodology since 2011. As its methodology shows (Thomson Reuters 2014), the function of Z-scoring is used to standardize the different types of data on a common scale. Its data come from the Elsevier's Scopus database, university portfolios, and the reputation survey; then it provides the league table of top 400 universities online. The methodology of the *THE* rankings includes 13 indicators within five dimensions. First, the teaching dimension is given a weighting of 30 percent and assessed by five indicators, including reputation survey for teaching, staff-to-student ratio, doctorate-to-bachelor's ratio, doctorates' awards-to-academic staff ratio, and institutional income. Second, the

research dimension is worth 30 percent and assessed by reputation survey for research, research incomes, and paper publications in peer-reviewed journals. The third dimension is a citation impact, given a weighting of 30 percent. The fourth dimension is the international outlook of an institution, given a weighting of 7.5 percent and assessed by international-to-domestic student ratio, international-to-domestic staff ratio, and the number of internationally co-authored research papers. Finally, the dimension of research income focuses on university-industry collaboration and fundraising from industry, contributing 2.5 percentages to the overall score.

In the QS methodology (Quacquarelli Symonds 2014), the Z-scoring method is also employed to normalize the different data types collected from the Scopus database, university portfolios, and two global surveys. Among the six indicators of the QS rankings, the most important one is academic reputation survey by peer review, given a weighting of 40 percent. Another reputation survey is for employers and worth ten percent. Then, the two indicators of research citation per faculty and faculty-student ratio contribute 20 percent to the overall score respectively. Finally, the indicator relevant to international student numbers is worth five percent and the indicator regarding international faculty numbers is also given the same weights.

In general, the indicators of these three global ranking systems can be divided into five categories, including traditional university missions consisting of teaching, research, and service, reputation management, and organizational internationalization (Table 2.2). These five categories cannot be ignored at all for those universities with the aspiration to become WCUs. Particularly, the last two categories seem very significant in today's societies of the knowledge-based economy.

Table 2.1. Indicators and Weights of Selected Ranking Systems

Title	ARWU	*THE*	QS
Dimension/ Indicator	◆Quality of Education -Alumni (10%) ◆Quality of Faculty -Award (20%) -HiCi (20%) ◆Research Output -*Nature* and *Science* (20%) -PUB: SCI & SSCI (20%) ◆Per Capita Performance (10%)	◆Teaching (30%) -Reputation for teaching (15%) -Staff-student ratio (4.5%) -Doctoral-bachelor's ratio (2.25%) -PhDs awarded (6%) -Income per academic (2.25%) ◆Research (30%) -Reputation for research (18%) -Research income (6%) -Research productivity (6%) ◆Citation impact (30%) ◆Industry income (2.5%) ◆International outlook (7.5%) -International-domestic students (2.5%) -International-domestic staff (2.5%) -International collaboration (2.5%)	◆Academic reputation (40%) ◆Employer reputation (10%) ◆Citation per faculty (20%) ◆Faculty-student ratio (20%) ◆International students (5%) ◆International faculty (5%)

Sources: Quacquarelli Symonds (2014), Shanghai Jiao Tong University (2014), and Thomson Reuters (2014).

It is worthwhile to note that some similarities and contrasts exist among the three global ranking systems. Taken as a whole, dissimilar to the *THE* and QS rankings, the ARWUA does not have any indicators obviously designed to assess a university's reputation and its internationalized condition. In terms of the detailed indicators, among these three ranking systems one identical indicator is research publication and contribution. It is usually seen as a symbolic of excellent research quality at the research-led universities, and simultaneously, it offers a good chance of gaining a higher reputation and making economic contributions to the country and around the world. The evaluative dimensions of the *THE* rankings and the QS rankings are similar, but the *THE* indicators are more complicated. Moreover, both the ARWU and *THE* systems focus more on excellent research performance, while the QS system converges on the prestige of university organizations. Consistent with some previous studies (see Aguillo et al. 2010; Huang 2011), in the ARWU system, approximately a weighting of 90 percent is assigned to impressive research performance, such as alumni and faculty being awarded the

Nobel Prizes or Field Medals and publications in famous English language journals. Similarly, in the *THE* system, research outcomes such as PhD awards, research grants, and publications and their citation contribute to nearly half of the overall score. However, in the QS system, less than one-fourth weighting of the total score is given for research outcomes.

Table 2.2. Characteristics of Selected World University Ranking Systems

Title / Category	ARWU	*THE*	QS
Teaching	✓	✓	✓
Research	✓*	✓*	✓
Service	✓	✓	✓
Reputation Survey		✓	✓*
Organizational Internalization		✓	✓

Note: * refers to the category assigned with the most assigned weights in the system.
Source: By the author.

The comparison of the methodologies of these three global ranking systems demonstrates a general imagining of what constitutes WCUs and illustrates the preference for research contributions and organizational reputation management. To some extent, these three global rankings have a positive impact on making policies focused on accountability and quality assurance, valuing stakeholders' choices and investments, setting institutional benchmarks, reorganizing HEIs that work ineffectively, determining institutional priorities, and boosting faculty's academic and professional reputations (Hazelkorn 2009; Shin and Toutkoushian 2011). However, the issue of global rankings has provoked much critical discussion, such as the neglect of various audiences' needs, the validity and reliability of ranking methodologies, the fake precision and bias in numeric representation, and the incomplete interpretation of educational quality of an individual university (Frey and Rost 2010; Proulx 2007; Soh 2011; Tofallis 2012; Williams and Van Dyke 2008). Taken together, these studies indicate that global rankings

represent the seeming image of successful universities without discussing how university organizations manage themselves to better their authentic and comprehensive quality in reality and to respond to external challenges from domestic and global higher education environments.

2.1.3 Higher Education in Taiwan

2.1.3.1 Higher Education Development: Elitism to Massification

Taiwan has transformed from the scarcity of HEIs to higher education expansion. Table 2.3 summarizes the history of higher education development in Taiwan. Before the 1950s, the Taiwanese education system focused more on elementary schools; during the 1960s, given economic growth and social needs, Taiwan shifted to reforming postsecondary and vocational education (Wu, Chen, and Wu 1989). In recent decades, influenced by globalization and internationalization, developing national competitiveness has greatly relied on knowledge innovation (OECD 1996). In Taiwan, the number of HEIs has presented an upward trend. Taiwanese higher education reform has moved from an elite education to a massification model (Chen 2012; Wang 2003), especially in the growth of private HEIs, and the "access to a university education has become a right enjoyed by all Taiwanese citizens" (Chang and Yeh 2012, p. 33). Table 2.4 shows the number of HEIs and college student enrollment between 1991 and 2013 in Taiwan. Student enrollment in 2013 was twice more than that in 1991, and it was also more than the 18-to-21-year-old population in 2013. This increase resulted from national policies favoring a market orientation (Gai 2004), increasing graduate education programs and rising enrollment of nontraditional populations (e.g., international students and those students whose ages are not during 18 to 21 years old).

Table 2.3. Higher Education Development in Taiwan

Time	Authority/Government	Situation of Taiwanese higher education
1895–1945	Colonized by Japan	Few medical schools for preventing epidemic diseases
1945–1949	Mainland China	1) Renaming and reorganizing previous schools built during the period of Japanese colonization 2) Slow growth of number of HEIs
1960s–	Republic of China (Taiwan)	With economic growth Taiwanese higher education moves toward postsecondary and vocational education
Late 1990s–	——	1) Increasing higher education opportunity 2) Increasing private HEIs 3) Flexible admission system (e.g., multiple paths of university entrance application)

Sources: Created by the author, based on Wu, Chen, and Wu (1989) and Chen (2012).

Table 2.4. Higher Education Institutions and College Students in Taiwan, 1991-2013

	1991	1996	2001	2006	2013
Number of HEIs	123	137	154	163	161
(Public, private)	(41, 82)	(51, 86)	(53, 101)	(55, 108)	(52, 109)
College student enrollments	612,376	795,547	1,187,225	1,313,993	1,345,973
18-to-21-year-old population	1,456,121	1,549,387	1,609,050	1,280,830	1,288,966

Source: Compiled from the Ministry of Education (2014b).

2.1.3.2 Taiwanese Initiatives in Pursuing World-Class Universities

Facing the challenges of global competition and national excellence initiatives launched by neighboring countries, the Taiwan government also has initiated three excellence policies over time for different purposes, including the Development Plan for World Class Universities and Research Centers for Excellence Project, the Teaching Excellence Project, and the Academia-Industry Collaboration Project (Hou, Ince, and Chiang 2013). Among these interrelated projects, the goal of the first one is to establish WCUs in Taiwan, and although the other two are not directly in connection with the pursuit of WCU status, Taiwanese HEIs are encouraged to move toward academic excellence and to enhance their relationships with industry. However, in this study I focus on the first project.

The Five-Year-50-Billion NT Dollars Budget Project refers to the Development Plan for World Class Universities and Research Centers for Excellence[6] launched in 2006. This project seeks to (a) elevate at least one university to being ranked in the top 100 HEIs of world university rankings within the coming ten years, and to (b) make ten impressive fields or cross-university research centers reach Asian first-class status within the next five years (Chang et al. 2009; Song and Tai 2007). Twelve recipients in the first stage of this project during 2006 to 2010 were rewarded with a budget of NT$50 billion (about US$167 million) (Song and Tai 2007). Currently, the second stage of this project is in progress (2011 to 2016), and ideally, similar to the first stage, the Taiwan government should appropriate a budget of NT$50 Billion to the next recipients. In particular, this project changed its title to the Aim at Top University Project; its five goals include (a) the acceleration of the internationalization of top universities and the depth of students' world visions, (b) the improvement of research quality and the visibility of top universities in international academies, (c) the recruitment of talent from domestic and foreign countries, (d) close relationships between HEIs and industry, and (e) the cultivation of interdisciplinary human resources in response to social and market demands (Chang 2013; Ministry of Education 2011). In the second stage, a total of 12 universities are granted.

The major difference between these two stages is the principle of using specific government funds. In the first stage, targeted universities receive government funds according to their *key development academic fields*, while in the second stage, the Taiwan government adopts the principle of block funding: that is, targeted universities have more flexibility in dealing with their money (Chang 2013). Table 2.5 illustrates the funding distribution of the Five-Year-50-Billion NT Dollars Budget Project. In both stages, the National Taiwan University and the

[6] This project is a part of a new national initiative—Ten Major Construction Plans—launched by the Taiwanese Executive Yuan in 2004. The core objective of this initiative is to improve public infrastructure in higher education, culture, transportation, technology, and water resource (Song and Tai 2007).

National Cheng Kung University are two major recipients. Both of them are granted annually more than NT$ 4.5 billion (US$ 150 million), almost half of the total annual budget of NT$10 billion (US$333.33 million) of the Five-Year-50-Billion NT Dollars Budget Project.

Table 2.5. Funding Distribution of the Five-Year-50-Billion NT Dollars Budget Project

	First Stage		Second Stage		Key Field/ Research Center
	2006-2010	2011-2012	2012-2013	2013-2014	
	(USD in millions)				
NTU	500	103.3	103.3	103.3	Institute for Advanced Studies in Humanities and Social Sciences Center for Information and Electronics Technologies Center of Genomic Medicine Center for Systems Biology Center for Theoretical Sciences Center for Biomedical Molecular Imaging Center for Emerging Material and Advanced Devices Medical Device Innovation Center
NCKU	283.5	53.3	53.3	53.3	Research Center for Energy Technology and Strategy Center of Infectious Disease and Signaling Research Instrument Development Center Low Carbon Energy Research Center Interactive Nano-X Research Center
NTHU	186.6	40.0	40.0	40.0	Brain Research Center Research Center on Fundamental and Applied Sciences of Matter Advanced Manufacturing and Service Management Research Center Emerging Nanoelectronics and System Research Center Center for Information and Communication Technology
NCTU	143.3	33.3	33.3	33.3	X-Photonics Interdisciplinary Center Biomedical Electronics Translational Research Center Center for Interdisciplinary Science Center for Bioinformatics Research Brain Research Center
NCU	109.9	23.3	23.3	23.3	Earth System Sciences and Environmental Technology Plasma Sciences and Complex Systems Humanities and Digital Technology Space Science Technology and Astronomy Optics and Optoelectronics
NYMU	83.5	16.7	16.7	16.7	Genome Research Center Brain Research Center
NSYSU	100	13.3	13.3	13.3	Asia-Pacific Ocean Research Center Electronic Commerce and Internet Society Center
NCHU	71.6	10.0	10.0	10.0	Biotechnology Center
NTUST	40.7	6.7	6.7	6.7	Taiwan Building Technology Center
NCCU	36.9	6.7	6.7	6.7	Center for China Studies Election Study Center Center for Creativity and Innovation Studies
CGU	40.1	6.7	6.7	6.7	Molecular Medicine Research Center
YZU	17.7	-	-	-	
NTNU	-	6.7	6.7	6.7	Center of Learning Technology for Chinese Science Education Center
Total	1613.8	320	320	320	

Notes: (a) Similar to the study written by Hou, Ince, and Chiang (2013, p. 41), the currency used in this table is 30 NTD to 1USD. (2) The Yuan Ze University (YZU) was selected in the first stage, but it was excluded in the second stage. (c) Reversely, the NTNU is granted in the second stage.
Sources: The Ministry of Education (2011; 2014c).

Government funds for the Five-Year-50-Billion NT Dollars Budget Project do not increase in the second stage and the granted key fields/research centers focus more on natural sciences than social sciences. As shown on Table 2.5, the Taiwan government annually invested US$322.8 million in the selected universities in the first stage, and more than US$320 million in the second stage. Moreover, most of these granted key fields/research centers focus more on the fields of natural sciences, medicine, and engineering than humanities and social sciences. This implies that these key research areas—natural sciences, engineering, and medicine—are the top priority of Taiwanese higher education development in order to facilitate the global standing of these targeted Taiwanese universities (Mok 2014).

2.1.3.3 University Organization Shifts

Entering the era characterized by the open system and globalization, there is little debate about whether universities need to change. Leaders and leader teams in the universities should be concerned about the maintenance of organizational capacity to innovate, one of multiple challenges universities face (Lockwood 1985). In Taiwan, the organizational management of universities has changed from a bureaucratic structure in a closed system to an innovative and responsive organic institution in the open system. The bureaucracy is a static, orderly, and standardized organization design that is disconnected from dynamic, unpredictable external environments (Bess, Dee, and Johnstone 2012). However, the bureaucratic model cannot completely explain the inefficiency of school organizational management or represent the complex interactions between individuals and school organizations and among individuals. Thus some theories (Table 2.6) have been proposed against bureaucratic school organizations, such as the loosely coupling theory (Weick 1976), the structuration theory, and a theory in which schools are seen as network organizations (Bess, Dee, and Johnstone 2012).

In the past, most Taiwanese HEIs were public and government-authority-controlled. They heavily relied on government supports and seldom connected with social change. Reversely, in recent decades, Ming-Ju Hsu (2003) laid out her views that Taiwanese HEIs, by breaking the barrier of elite education, increasing value-added services with local communities, building a channel enhancing knowledge transfer, and seeking cross-border collaboration, should have their own differentiation and positioning strategies to respond to social needs and develop sustainably around the world.

Table 2.6. Approaches to Organizational Structure

Approach	Features
Bureaucracy model	Orderly and static structure Focus on coordination Emphasis on organizational tradition Hierarchical authority (fixed role and responsibility) Centralized management
Loosely coupling theory	Indirect linkage structure Allowing individuals/sub-units to have their own identity and autonomy Emphasis on collaboration among sub-units Leadership emphasis on encouraging collaboration, building a trusting working climate, and creating communication
Structuration theory	Individuals and groups as active agents Enacted structure that is created by individuals but also controls human behaviors Stable or dynamic structures, depending on the interactions between individuals and organizations. Leadership focuses on encouraging interactions among stakeholders
Postmodern views	Schools as network organizations De-differentiation structure (e.g., self-managed team) Emphasis on partnerships and negotiation among network partners Organizations in response to external environmental change Leadership emphasis on empowerment, the establishment of learning communities, and the encouragement of authentic communication

Source: Compiled by the author, based on Bess, Dee, and Johnstone (2012).

2.1.3.4 Major Challenges and Issues

As previously discussed, the massification of higher education benefits Taiwanese citizens by providing the chance to receive higher-level study, but this massive growth of HEIs also leads to some challenges regarding university management. The first challenge is teaching-learning quality. Dian-Fu Chang and Chao-Chi Yeh (2012) analyzed students' opinions on the performance of universities that received government grants from the Teaching Excellence Project and they found that teaching-learning quality is affected by physical teaching equipment, instructors' expertise and their teaching skills, curriculum, counseling services, and student satisfaction with teaching; they also found that lower teaching-learning quality might happen in universities located in the eastern and southern parts of Taiwan. The increasing population participating in higher education, therefore, might not be equal to decreasing teaching and learning effectiveness, but the pedagogical quality might be seriously influenced by insufficient infrastructure and the lack of resources available to universities, another threat for Taiwanese higher education development.

The second challenge refers to the inequality of resource allocation among universities in Taiwan. More and more resources are distributed to fewer public universities (Chou and Wang 2012), and the specific funds for advancing WCUs are appropriated by the Taiwan government only for those targeted universities. Most Taiwanese HEIs cannot benefit from these limited resources and should seek other sources of financial resources by themselves (Chen 2012). The faculty factor also has an impact on the amount of research funds from the National Science Council (NSC); the top three universities receiving most of the research funds are the National Tsing Hua University (NTHU), the National Chiao Tung University (NCTU), and the National Taiwan University (NTU) (Wang 2010). This implies that insufficient support and unequal

allocation of financial and human resources led to an obstacle for Taiwanese HEIs to pursue academic excellence because "resource limitations constitute a solid barrier" (Marginson, Kaur, and Sawir 2011, p. 440).

The third crisis involves the colonization of SCI and SSCI and the trend towards the marginalization of the humanities and social sciences. As previously discussed, faculty publication in international journals, especially SCI and SSCI paper publication, has been an important evaluative indicator in the global rankings. This SCI- and SSCI-orientation trend produces the "'I'-idolization" (Su 2014, p. 51); both the Taiwan government and individual universities *jump on the bandwagon* of taking advantage of the SCI- and SSCI-publication to boost their image and high global rankings. The research done on evaluating the performance of targeted universities indicates that in a short time, an increase in SCI-and SSCI-oriented paper publication is likely to result from the huge government funding input (Hou, Ince, and Chiang 2012). However, for a long time, overvaluing the hard sciences and undervaluing humanities and social sciences may lead to several negative effects, such as language disadvantage, local-journal degradation, the unfairness of academic positioning for humanities and social sciences faculty, and unequal distribution of resources (Su 2014). In order to destroy the myth of I-idolization and avoid the marginalization of the humanities and social sciences (e.g., education), evaluating the influence of given international journal rankings regularly and developing non-SSCI or relevant international journal rankings suitable for the Taiwanese context are necessary tasks (Cheng, Jacob, and Yang 2014).

Fourth, the rankings of these targeted Taiwan universities differ in the big three global ranking systems (Table 2.7). Most targeted universities' rankings had an upward trend in the QS system, while in the ARWU and *THE* systems, several universities' rankings fell off. This

implies that in general, "The more funding the institution gains, the higher it ranks" (Hou, Ince, Chiang 2012, p. 32). However, as Table 1.2 and Table 2.5 show, fewer Taiwanese universities are ranked in the list of top 400 in these three global rankings and government funding is decreasing a little bit. An emerging dilemma resulting from the decrease of government funding and the number of Taiwanese universities ranked in the global rankings needs to be noticed and solved by the Taiwan government and academic communities.

Table 2.7. Rankings of Targeted Taiwanese Universities

	ARWU		*THE*		QS	
	2013-14	2014-15	2013-14	2014-15	2013-14	2014-15
NTU	101-150	101-150	142	155	82	76
NTHU	201-300	201-300	251-275	251-275	199	167
NCKU	301-400	201-300	301-350	351-400	247	232
NCTU	301-400	301-400	251-275	276-300	230	202
NCU	401-500	-	351-400		401-410	401-410
NSYSU	401-500	401-500	301-350	351-400	461-470	431-440
NYMU	401-500	401-500	-	-	295	256
NTUST	-	-	351-400	351-400	411-420	371
NTNU	-	-	-	-	481-490	411-420
NCCU	-	-	-	-	601-650	601-650
NCHU	-	-	-	-	551-600	501-550
CGU	301-400	401-500	-	-	501-550	431-440

Sources: Quacquarelli Symonds (2014), Shanghai Jiao Tong University (2014), and Thomson Reuters (2014).

The fifth threat has emerged from top-down, government-driven mergers of HEIs in Taiwan (Tai 2006). The motivations of most higher education mergers are academic- and strategic-driven, in need of organizational development, and inclined to an efficiency approach; these merger events are "costly" and "messy" (Rowley 1997, p. 261). The mergers of HEIs involve two explanations: one derives from the theories of natural selection and resource dependency involving an organization's survival, its scale expansion, and the monopoly of available resources; the other is related to the pressures of achieving and maintaining

organizational efficiency and effectiveness in the face of accountability and global competition (Tai 2006). A study found that the mergers of Taiwanese HEIs are not necessarily consistent with positive efficiency effects; instead, the resource dependency perspective can provide a better exploration of merger events (Chan 2007). In brief, higher education mergers are a controversial issue, but one way of organizational innovation and reorganization in response to social changes at the domestic and global levels.

The last, but not least of these challenges involves the tension between accessibility and equitability. The expansion of higher education is no guarantee of equal access to universities because students' ethnicity, socioeconomic status, and gender inequalities still have impact on their access to the top universities in Taiwan (Cheng and Jacob 2012). A similar finding can be found in other studies (e.g., Chen 2012; Chou and Wang 2012). Although a scale consisting of four major dimensions with 45 indicators to assess equity in higher education has been developed (see Changyang, Yang, and Liu 2014), more efforts are still needed to address this issue, such as qualitative data support and relevant public policy-making.

All of the discussions in this section indicate that modern university organizations in Taiwan, as Val D. Rust and James W. Jacob (2005) said, have faced "the changing environment requiring desperate institutional adaptations" (p. 249). Thus they should be innovative and transformative in response to today's dynamic and competitive environments at the domestic and global levels.

2.2 THEORIES OF STRATEGIC MANAGEMENT

In the dynamic and competitive global environment, colleges and universities need to develop revolutionary strategies rather than traditional ones that just focus on goal achievement and resource allocation. Peter F. Drucker (2008) defined strategic planning as:

> [T]he continuous process of making present risk-taking decisions systematically with the greatest knowledge of their futurity; organizing systematically the efforts needed to carry out these decisions; and measuring the results of these decisions against the expectations through organized, systematic feedback. (p. 125)

Through this strategic planning process, an organization needs to receive resources, develop capabilities, constitute core competencies, and seek sustainable competitive advantage to achieve strategic competitiveness (Hitt, Ireland, and Hoskisson 1995). As such, the theories concerning competitive advantage and strategic management are permanently in the spotlight.

2.2.1 SWOT Analysis

One of the early strategy models seeking competitive advantage is a SWOT analysis. Components of the SWOT technique include: strengths as positive attributes enhancing an organization's competitive position; weaknesses as negative attributes damaging an organization's competitive position; opportunities as positive stimulation from the external environment to develop competitive advantage; and threats as negative external influences diminishing an organization's competitive advantage.

Heinz Weihrich (1982) configured these four elements to analyze an organization's various strategies in practice, that is, the "TOWS" matrix (Table 2.8). He argued that strategic planning is a complex process involving identifying external factors and matching them with an

organization's internal capabilities. Thus an organization needs to choose and develop different strategies in accordance with a variety of combinations of these four elements.

Table 2.8. Weihrich's Matrix and Corporate Strategy

Internal factors / External factors	Strengths (List internal strengths)	Weaknesses (List internal weaknesses)
Opportunities (List external opportunities)	SO (To maximize both)	WO (To minimize weaknesses but maximize opportunities)
Threats (List external threats)	ST (To maximize strengths but minimize threats)	WT (To minimize both)

Source: Adapted from Weihrich (1982, p. 60) with the permission from Elsevier, Nov. 18, 2014.

The SWOT technique provides a basic and easily-used analysis to understand an organization's internal and external situations (Steiss 2003). However, because of its oversimplification, this theory fails to review the dynamics and complexity of organizational activities and neglects internal organizational capabilities in response to future change.

2.2.2 Porter's Five Forces Model

A well-known framework in strategic management is the Five Forces model proposed by Michael E. Porter (1979). This model provides a holistic understanding of the relative competitive position of an organization in a given industry. The following part describes the five sources of competitive pressure shown in this model (Porter 2008).

The *threat of new entrants* refers to the barriers that a new competitor might experience when starting to enter an industry; these difficulties come from (a) supply-side economies of scale achieved by organizations, which produce a larger volume of production with lower unit

costs; (b) demand-side benefits of scale, which involve brand reputation and customer loyalty; (c) customer switching costs as the determinant of customer population; (d) capital/financial resource requirement; (e) the incumbency advantage not available to new entrants (e.g., the cost and quality advantage, proprietary technology, and preferential access, etc.); (f) unequal and limited access to distribution channels; and (g) restrictive government policies.

The *bargaining power of supplier group* becomes stronger when the supplier group is dominated by few companies and involves a monopoly of specific products and few substitutes for these unique products. Bargaining power also increases along with high switching costs when industry participants attempt to change suppliers.

The third force is the *bargaining power of customers*. Stronger bargaining power for customers happens in the following situations: (a) products are bought by few buyers only; (b) some buyers purchase a large volume of products; (c) products are similar to the industry's standardized ones; (d) buyers can freely select vendors with few switching costs; and (e) buyers can produce similar products by themselves.

The *threat of substitutes* is the fourth competitive pressure. In the view of Porter, because substitutes can provide alternative sources of products for customers, they might become a threatening factor. The threat of substitutes intensifies if the costs at which buyers switch to the substitutes are lower, and this also happens when the trade-off value of the substitutes is better and more attractive than industry's products in terms of products' prices and their performance.

The fifth challenge organizations face comes from the *existing competitors/rivals* in a given industry. This competitive pressure becomes intense in the following situations: (a) there are many competitors that are approximately equal in size or have similar resources; (b) organizations need to fight for market share in a slowly growing industry; (c) existing barriers

are too high to leave the competitive industry even though organizations have low or negative returns; (d) rivals (e.g., state-owned competitors) are highly committed to the business and aspire to be leaders; and (e) organizations are unfamiliar with the goals and operation of their competitors.

Porter's Five Forces framework is considered to be the adaptive approach (Alfred 2006) and has shortcomings. First, the assumption of the market structure in Porter's theory is "exogenous," not "the (endogenous) result of innovation and learning" (Teece 2011, p. 15). Another critique is relevant to the paradigm shift of strategic management. Porter's theory is criticized for its overemphasis on industry-level analysis, the way that organizations develop their "defensible positions" against competitive forces generated from the macro-environment (Teece, Pisano, and Shuen 1997, p. 510). However, this theory pays little attention to core competencies of organizations giving rise to a firm's sustainable competitive advantage (Prahalad and Hamel 1990). The Five Forces Model also overlooks the heterogeneity of organizations' resources (Barney 1991). Moreover, if "network effects, path dependencies, and the co-revolution of technologies and institutions are significant, the Five Forces framework is of limited utility" (Teece 2011, p. 15).

2.2.3 Resource-Based View (RBV)

Since the 1980s-1990s, the issue of sustainable competitive advantage resulting from resource and organizational capabilities has become prevalent (Grant 1996). Different but complementary to Porter's industry-level analysis, this resource-based view (RBV) is an alternative emphasizing the establishment of competitive advantage through firm-specific resources and capabilities (Barney 1986, 1991; Peteraf 1993; Teece, Pisano, and Shuen 1997). Along with the rapid change

of firms' structures and the external society, the RBV paradigm is re-conceptualized and has evolved into a dynamic capability approach.

2.2.3.1 Traditional RBV: Focusing on VRIN Resources

Developing and possessing resources benefits the formulation of organizational strategies for external competition. A firm's resources can be tangible and intangible. They can be divided into three categories—physical capital resources (e.g., equipment and locations), human capital resources, and organizational capital resources (e.g., formal structures, planning and controlling systems, informal relations among a firm's subunits and between a firm and others in the environment). However, not all firm resources can create sustainable competitive advantage, following Barney (1991), unless they are what the *VRIN* resources:

- Valuable resources that enable organizations to implement strategies, improve their efficiency and effectiveness, and to diminish their external threats.
- Rare resources that are unique or difficult for competitors to possess.
- Imperfectly imitable resources that derive from a unique historical condition, causal ambiguity (e.g., like chickens and eggs), and social complexity (e.g., organizational culture and a firm's reputation among suppliers and customers).
- Non-substitutable resources strategically equivalent to valuable resources that are rare or inimitable.

Owning these four-characteristic resources is necessary but insufficient to incorporate the dynamic environmental element of organizations (Eisenhardt and Martin 2000) and to create sustainable competitive advantage (Priem and Butler 2001), since competition is "a process involving the development, accumulation, combination, and protection of unique skills and capabilities" (Teece, Pisano, and Shuen 1997, p. 513). In this regard, several studies have documented the difference between resources and organizational capabilities. The former refers to the inputs accelerating a firm's production, such as personnel, capital equipment, and

technologies; and the latter refers to the capacity to integrate a set of resources to accomplish a task, such as R&D activities and customer service (Alfred 2006; Amit and Schoemaker 1993; Helfat and Peteraf 2003; Hitt, Ireland, and Hoskisson 1995). Specifically, "resources are stocks of available factors that are owned or controlled by the firm, while capabilities refer to a firm's capacity to deploy resources" (Amit and Schoemaker 1993, p. 35). As an essential factor of implementing a strategy in the market, resources refer to what firms can buy and sell and these resources can be divided into tangible and intangible capital, such as physical equipment, financial capital, and human resources (Barney 1986). Relatively, capabilities refer to the knowledge synthesis and integration which embed in the routines of firms; they are intangible per se (Kogut and Zander 1992). Capabilities involve how to perform and coordinate individual tasks, thus this implies that individuals create capabilities (Helfat and Peteraf 2003). Additionally, the nature of traditional RBV tends to be static because it cannot explain the timing of value creation and the ways of organizational innovation and new source generation (Kraaijenbrink, Spender, and Groen 2010).

To summarize, the inimitability of organizational core capabilities is likely to become the source of sustainability of competitive advantage; however, in a rapidly changing and competitive context, core capabilities might become core rigidities embedded in inappropriate sets of knowledge (Leonard-Barton 1992). Hence, the issue arises that competitive advantage can be sustained if organizations continuously and purposefully renew and integrate their capabilities, or how organizations, by developing capabilities, reinvent themselves to seek sustainable balance between their institutions and rapidly changing external environments. All these are related to the following section—a dynamic capabilities approach, the theoretical basis for this study.

2.2.3.2 Dynamic Capabilities Approach (DCA)

Facing challenges from dynamically competitive environments, organization managers have emphasized the development of dynamic capabilities. Below are the natures and definitions of dynamic capabilities as described by some scholars.

> Dynamic capabilities are defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece, Pisano, and Shuen 1997, p. 516).
>
> Dynamic capabilities are seen as "the firm's processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change" (Eisenhardt and Martin 2000, p. 1107).
>
> Dynamic capabilities are "a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness" (Zollo and Winter 2002, p. 340).
>
> Dynamic capabilities refer to "a firm's behavioral orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environments to attain and sustain competitive advantage" (Wang and Ahmed 2007, p. 35).

Based on the literature review on dynamic capability definition, in this study, dynamic capabilities are in relation to an organization's strategic response abilities that enable this organization to integrate, reconfigure, and renew its resources and core capabilities, better its performance, facilitate its learning and competitiveness, and transform its organizational governance toward desired goals and constructing social networks in response to external changing environments. Such strategic response capabilities should be understood differently in different contexts and organizations. Moreover, dynamic capabilities, as proposed by Teece, Pisano, and Shuen (1997), suggest that organizations strategically sense, seize, and transform their capabilities. This implies that senior managers should understand, grasp, and transform their existing mental models and thinking to ensure their organizations' adequate change and

competitive survival. Catherine L. Wang and Pervaiz K. Ahmed (2007) noted that "dynamic capabilities are not simply processes, but embedded in processes" (p. 35). I agree with this and I think that these processes also involve cognitive transformation resulting from knowledge integration (Grant 1996). Thus I deem that both for-profit and nonprofit organizations should develop dynamic capabilities as responsive strategies to help guide their vision and overall direction (Teece 2011).

Different to technical capabilities, dynamic capabilities include the sensing capability, the seizing capability, and the managing threats/transforming capability to enable an organization to best reach its performance for a long time (Teece 2007, 2011). In order to sense what an organization needs, this organization should scan changes in environments, capture ideas from customers' feedback and employees' suggestions, and then identify new opportunities. By investing in technology and complementary assets, the seizing capability helps the organization to take advantage of new opportunities. The transforming capability involves the "orchestration" of using various kinds of capital (Teece 2007, p. 1320), that is, the organization can effectively reconfigure various assets and transform itself into a flexible organization in response to the challenges from rapidly changing and dynamic environments. These capabilities lie in a firm's organizational and managerial processes, positions, and paths (Teece, Pisano, and Shuen 1997). Wang and Ahmed (2007) considered that organizations' resources and capabilities are in a hierarchical order. Organizations can continuously develop, allocate, and redistribute resources (on the zero order), capabilities (on the first order), core capabilities (on the second order), and dynamic capabilities (on the third order) to respond to future changes. They also pointed out that dynamic capabilities of an organization should include the adaptive capability, the absorptive capability, and the innovative capability. Synthesized by the literature, these dynamic capabilities

can be seen as a continuum with six stages of an organization's response to external pressures (Figure 2.2).

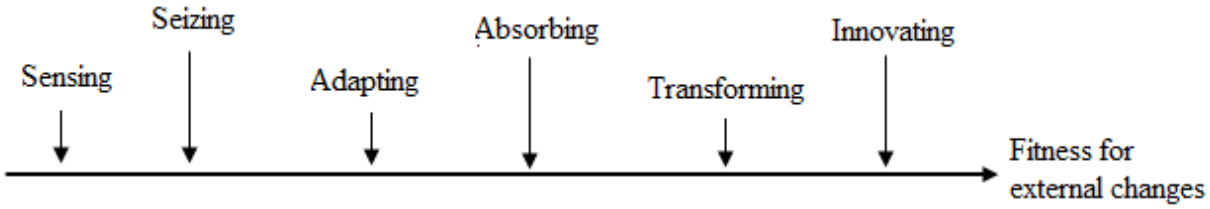


Figure 2.2. A Continuum of an Organization's Response to External Pressures

Source: Created by the author.

Teece, Pisano, and Shuen (1997) argued that capital positions and organizational pathways influence an organization's managerial processes, which yield dynamic capabilities, the source of competitive advantage. Capital positions refer to organizations' specific locations and financial resources, the use of knowledge and technology, and their external relations; organizational pathways involve the history of an organization and its routines and experience of creating and implementing strategies; and managerial processes are related to the activities, routines, or patterns of how organizations carry out their responsive strategies. The details concerning these three dimensions are described in the following section.

In the managerial processes of organizations, Teece, Pisano, and Shuen (1997) argued that three tasks are carried out: coordination/integration, learning, and reconfiguration.

Coordination/integration involves static processes by which organizations coordinate or integrate their internal and external activities and technologies, such as strategic alliances, customers' experience recollection, supplier relations, and technological collaboration among organizations. The paths of coordination and integration are firm-specific and the integrative

activities might promote the internal consistency of managerial processes and organizational cohesion. Sometimes, although managerial processes and human incentives (e.g., employees' motivation and customers' interests) are not similar and might produce conflict, coordination and integration can aid in developing organizational capabilities.

Learning provides a dynamic concept in the managerial processes of an organization. According to Teece, Pisano, and Shuen (1997), learning is "a process by which repetition and experimentation enable tasks to be performed better and quicker" (p. 520). Learning is social, collective orientation because it involves the interactions between individual value/skills and organizational collaboration and social networks. Organizational activities such as collaboration and partnerships can also stimulate the emergence of new ideas and knowledge, generate inter-organizational learning, and even discover organizations' weaknesses and blind spots.

The capacity of *reconfiguration and transformation* promotes organizational flexibility. "The capacity to reconfigure and transform is itself a learned organizational skill; [and] the more frequently practiced, the easier accomplished" (Teece, Pisano, and Shuen 1997, p. 521). In a dynamic environment, through constant evaluation of market change, organizations should realize what they need, reconfigure their internal and external resources and capabilities, and transform them into learning institutions by using the benchmarking technique.

Capital positions shape managerial processes of an organization but also have impact on what strategies the organization should adopt (Teece, Pisano, and Shuen 1997). The positioning of organizations is determined by eight assets, including technological assets (e.g., know-how and intellectual property), complementary assets (e.g., computer systems that empower the product sales force), financial assets, reputation assets, structural assets (e.g., the degree of hierarchy and the level of vertical and lateral integration), institutional assets (e.g., public

policies and the economics of a nation, social culture, geographic locations, and the higher education system), market assets (e.g., product market position), and organizational boundaries.

Another dimension Teece, Pisano, and Shuen (1997) stressed is *organizational pathways* consisting of path dependencies and technological opportunities. The successful performance of an organization is affected by its current positioning and its trajectories. Path dependency refers to regular patterns of an organization's investment and its managerial routines; the success and failure of habitual organizational experiences have impact on an organization's behaviors in the future. In particular, organizational learning as a long-term investment is connected to past activities and experiences, whereby organizational members can use cognitive scaffolding resulting from organizational experience to accelerate learning. However, the transformation of an organization might be impeded by overemphasizing past trajectories, the rigidity of constant technology changes, and lacking understanding of the current market. As such, organizations need to search for technological opportunities and to support or devote themselves to basic research and innovative activities because these technological opportunities are not "completely exogenous to industry" (Teece, Pisano, and Shuen 1997, p. 523).

In order to possess dynamic capabilities and competitive advantage, assessments are necessary for organizations. Managerial processes of an organization are affected by its organizational pathways and capital positions (Teece, Pisano, and Shuen 1997), but in fact, these three dimensions reshape each other because of the assessments in the overall process of developing dynamic capabilities of the organization. For instance, an organization assesses its paths and capital positions to determine its managerial strategies and to complete organizational transformation, while the organization's transformation might generate new organizational positioning and paths. In addition, organizations should constantly assess themselves and their

competitors. According to the argument proposed by Teece, Pisano, and Shuen (1997), an organization should reduce replication when its organizational competencies are useless and avoid imitation when competitors can obtain a duplicate routine. They exemplified that in the high-tech industry; an organization's competencies, capabilities, and routines are difficult to replicate and imitate in different contexts since they involve tacit knowledge and intellectual property rights. In brief, dynamic capabilities of an organization generate from its assessment activities and the interactions among its managerial processes, paths, and capital positions.

Figure 2.3 illustrates the framework for developing dynamic capabilities of organizations based on Teece, Pisano, and Shuen's (1997) work. The analyses of internal and external environments can affect organizations' major activities, consisting of their capital positions, paths, and managerial processes. These activities produce dynamic capabilities of organizations and help them to sense, seize, adapt, absorb, transform, and reinvent themselves. Through constant assessments, organizations can develop their responsive strategies with dynamic capabilities to reshape the internal environment and to stimulate, as Eisenhardt and Martin (2000) argued, the change of external environment.

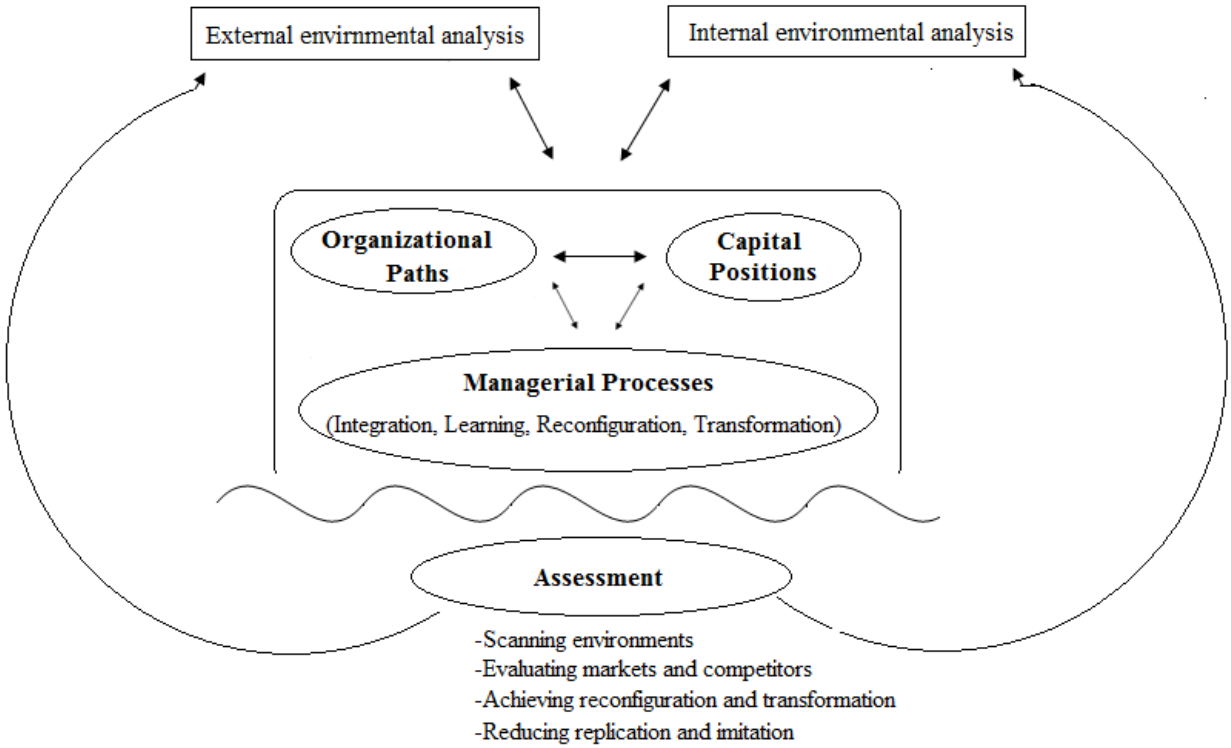


Figure 2.3. Operational Framework of Dynamic Capabilities and Responsive Strategies

Source: Drawn by the author, based on Teece, Pisano, and Shuen (1997).

2.3 DYNAMIC CAPABILITIES AND TRATEGIC MANAGEMENT WITHIN RESEARCH-INTENSIVE UNIVERSITIES

A dynamic capabilities approach is usually applied in an entrepreneurial enterprise, but seldom in the higher education arena. However, higher education institutions, especially research-intensive universities, face intense competition from other HEIs within the country and around the world. Modern competitive activities are characterized by economic relevance (Geiger 2006), academic capitalism (Slaughter and Rhoades 2004), and a revenue-driven and market-responsive approach (Toma 2010). Similar to business firms, these research-intensive universities need to

develop dynamic capabilities, sense and seize opportunities, and boost transformation to respond to social needs. Thus how a dynamic capabilities approach is applied to HEIs is the focus of this section.

2.3.1 Firms versus Higher Education Institutions

A dynamic capabilities approach is one of various theories concerning how strategic management originates in business firms, different from higher education institutions (Table 2.9). Robert Birnbaum (1988) analyzed the difference between a business firm and a university in terms of organizational authority, management, and power. He noted that in a firm, the organizational authority comes from superiors who serve higher positions in a hierarchy of administration and control and coordinate core activities of their organizations, while in the university the administrative authority is secondary and supports professional authority, which focuses on academic autonomy, individual expertise, and core activities implemented by faculty members. The mission of firms is to increase profits and they insist on the identification of responsibility, cost measurement, regular reports of organizational operations and analyses of external markets, while the mission of universities is "diverse, fragmented, specialized, and connected with other social systems" (Birnbaum 1988, p. 11). Thus the lack of clarity and agreement on organizational mission has great impact on university management and is characterized by overlapping, complexity and inefficiency. From a power perspective, business firms are utilitarian organizations that often stress rewards and the legitimate power to control employees, while universities are generally normative organizations that emphasize referent and expert powers. J. Douglas Toma (2010) also pointed out that universities lack a tangible criterion for measuring university success (e.g., students' investment returns) and the structure of firms is

more complex but less fragile than that of universities. Compared to K-12 and secondary schools, colleges and universities, like firms, have more flexibility and autonomy to manage their organizational development and their customers and their managerial activities are often more complicated. The external environment both firms and universities face is shaped by globalization and internationalization even though the external market for business industry is more competitive than for universities. In terms of educational products and service, many research universities sell research products and services to customers and make connections with social communities, and some firms provide educational training and service to enhance their employees' productivity. To some extent, as Michael N. Bastedo (2012) stated, campuses tend to act and operate like firms; and reversely, firms also tend to function much like campuses do. Although firms and universities seem to have some commonalities, the difference between them still needs to be considered when theories of strategic management (e.g., dynamic capabilities approach) are applied to universities.

Table 2.9. Differences between Firms and HEIs

	Firms	HEIs
Organizational authority	Administrative authority is supported by staff authority	Professional authority is supported by administrative authority
Mission	Increasing profits Providing products and services for social needs	Multiple, fragmented, specialized, and connected with other social systems, but somehow unclear
Structure	Complex and solid	Complex but fragile
Management	Responsibility identification Cost measurement Regular reports of organizational operations and analyses of external market	Overlapping responsibilities Lack concrete measure of success Inefficiency because of the lack of clear and measurable goals
Power form	Focus on reward and legitimate powers	Focus on referent and expert powers

Sources: Created by the author, based on Birnbaum (1988) and Toma (2010).

2.3.2 Dynamic Capabilities and Strategic Management of Universities

Research universities, particularly those that pursue WCUs, need to discover their appropriate strategic management in a dynamic environment. According to Salmi's (2009) work, the third prerequisite of a WCU involves effective institutional governance. Having better university governance depends on whether universities possess dynamic capabilities and how they take advantage of these capabilities to develop their responsive strategies. Quantitative data shown on global university rankings and the analyses of the features of high-ranked research universities in the United States or in the United Kingdom cannot completely reveal whether these famous universities have distinct dynamic capabilities and what capabilities become the sources of sustainable competitive advantage. Hence, a dynamic capabilities approach provides an alternative way to explore the strategic management of research universities.

Emphasizing entrepreneurial responses is essential to WCUs. They focus more on commercial values by conducting applied research and selling their educational products and services to gain abundant funding and develop themselves sustainably in today's global market (Altbach 2007; Etzkowitz et al. 2000; Mohrman, Ma, and Baker 2008). Burton R. Clark (1998) has indicated that universities could become entrepreneurial if they have a strengthened steering core, an enhanced developmental periphery, a diversified funding base, a stimulated academic heartland, and an entrepreneurial culture. Universities under a dynamic competitive climate need to integrate these five elements to develop entrepreneurial responses and then transform themselves to adapt to environmental changes. "Transformation requires a structured change capability and development of an overall internal climate receptive to change" (Clark 1998, p. 25). Viewed in this light, research universities indeed need to realize and develop their dynamic capabilities in order to best reach optimal performance. Moreover, good strategic management

enables universities to learn from mistakes, what Greg Kerr and Peter Hoise (2013, p. 61) termed "strategic avoidance."

Some studies have shown that a dynamic capabilities approach serves as a model of strategic management of universities. José Ruiz Navarro and Francisca Orihuela Gallardo (2003) have documented the theoretical basis for developing the dynamic capabilities of universities by using RBV and institutional theory. They stated that modern universities are entrepreneurial and learning organizations and the strategic success of these organizations relies on two conditions: one is that universities should reconfigure and develop their resources, routines and processes, and core capabilities; the other is to create social capital. Universities should transform their internal factors (e.g., resources and capabilities) and connect with the external environment by building social capital to achieve their strategic change, cross their current boundaries, and then affect their environments.

The empirical study conducted by Todorovic (2004) has explored entrepreneurial behaviors in Canadian universities. He indicated that an entrepreneurial orientation is a latent dynamic capability of universities and it is positively correlated with university performance. To more deeply understand universities' entrepreneurial activities, he used in-depth interviews and exploratory factor analysis to find some dimensions of the entrepreneurial orientation of Canadian universities, including organizational culture, outcomes of entrepreneurship, people, current emphasis, unconventionality, risk-taking, opportunity recognition, and external orientation. Thus, "universities that are more entrepreneurially oriented are more like to respond to community feedback, further enhancing university effectiveness" (Todorovic and Suntornpithug 2008, p. 403).

In brief, developing dynamic capabilities benefits research universities as they seek to achieve their desired goals and helps prevent many inconsistencies with social change in the future.

2.3.3 The Dimensions of Dynamic Capabilities within Universities

Based on previous literature on dynamic capabilities and universities' strategic management, in this study the development of dynamic capabilities of university organizations can be divided into six dimensions—positioning, organizational history and culture, coordination and integration, learning, reconfiguration and transformation, and innovation and leadership. Their details are described in the following section.

2.3.3.1 Positioning

Capital positions, which refer to organizations' unique assets or capabilities, partly determine organizational competitiveness and organizations' positions in the market. According to Teece, Pisano, and Shuen (1997), firms' assets include technology, complements, finance, reputation, structural assets, institutional assets, market assets, and organizational boundaries. However, these eight concepts of firms' kinds of capital might be not completely suitable for educational organizations. The positioning of research universities is influenced by the following factors.

Financial capital. Undoubtedly, research universities require plentiful financial resources to renew their advanced technological equipment and to facilitate their operation and sustainable development (Altbach 2004; Salmi 2009). Many studies have documented that the amount of resources Taiwanese universities receive are far less than that of their US counterpart (Sheu 2009) and entrepreneurship seems not to be encouraged in Taiwan higher education (Chang

2010). Most recipients of specific funding from the Taiwanese excellence initiative project carefully spent the received government grants for their anticipated goals, but in practice, some nuance still resulted from the overinvestment or misuse of the funds (Chang et al. 2009).

Institutional capital. An institution's geographic location is an important factor for the establishment of WCUs. For instance, as previously discussed by Byun, Jon, and Kim (2013) and Kim and Nam (2007), in South Korea, most universities that pursue WCU status are located near the metropolitan area of Seoul, which has many large companies (e.g., SK, Samsung, and LG) and job opportunities. This implies that universities located in metropolitan areas gain more international visibility and prestige than those in the small and remote cities. Additionally, government policies have an impact on organizations' institutional capital. For instance, the winner (selected research universities) of the Aim for the Top University initiative in Taiwan can gain substantial financial resources and a good reputation. These research universities might adjust their priorities (e.g., focus more on the STEM fields) to respond to national policy directives and social needs (Chang 2013).

Reputation capital. University reputation is related to university history. To be famous leading universities, good university performance over a long time is necessary. Moreover, global university rankings accelerate the accumulation of reputation capital of research universities. The positional goods generated from league tables (Horta 2009) reflect a university's capacity in research and human resources, but also intensify competitive dynamics among universities at the global level (see Dill and Soo 2005; Hazelkorn 2009).

Complementary capital. Research-intensive universities require interdisciplinary teamwork and international partnerships (Darden et al. 2009) and they also emphasize communication and the establishment of new relationships with other academic institutions,

governments, and industry (Mohrman, Ma, and Baker 2008). Additionally, building trust facilitates teamwork and enhances institutional identity among organizational members and between the organization and external communities, but it is also an essential ingredient of overall organizational success (Gayle, Tewarie, and White 2003; Tierney 1999). The complementary assets—collective teamwork, trust, communication, and partnership—benefit research universities as these enhance their sustainable competitiveness.

Organizational boundaries. The position of an organization is influenced by its boundaries, which reflect the degree of integration (e.g., vertical, horizontal, or lateral) (Teece, Pisano, and Shuen 1997). To become high-performance universities, decision-making relies on a wide group of participants, not on a centralized team on the top of a hierarchical administrative structure. Regardless of age and service years, everyone can equally participate in the decision-making process. In brief, the organizational structure of high-performance universities is flat (Tierney 1999).

On the basis of the literature review, the operational definition of the positioning dimension is that an organization positions itself by taking advantage of its unique assets, capabilities, or advantages, such as financial assets, reputation capital, and geographic location. The following 11 descriptions might be used as survey questions to measure universities' capabilities in this dimension.

1. The geographic location of our university benefits the establishment of a WCU.
2. The ratings of our university in the global university rankings (e.g., Shanghai ARWU, *THE*, and QS rankings) are rising annually.
3. The higher ranking of our university in the global university rankings, the more obvious contributions to fundraising.
4. Most government grants from the Five-Year-50-Billion NT Dollars Budget Project are used for infrastructural improvement.

5. Most government grants from the Five-Year-50-Billion NT Dollars Budget Project are for human resource recruitment purposes.

6. Obtaining government grants from the Five-Year-50-Billion NT Dollars Budget Project greatly contributes to enhancing our reputation.

7. Decision-making regarding becoming a WCU mainly depends on superiors' opinions (e.g., presidents, vice-presidents, and deans of administrative offices); other middle managers (e.g., deans of schools and directors of departments) seldom express their opinions.

8. Most financial resources are distributed to key fields, such as medicine, science, technology, engineering, and mathematics.

9. We have more collaboration with domestic partners than with international ones.

10. Most our research projects are interdisciplinary studies.

11. The research projects we conduct with industry greatly increase funding for the university.

The positioning dimension reflected in these 11 questions helps us to understand whether targeted Taiwanese universities possess and employ different kinds of capital; the history and culture of university organizations might influence their positions in the higher education environment.

2.3.3.2 Organizational History and Culture

A dynamic capabilities approach stresses the importance of organizational pathways (Teece, Pisano, and Shuen 1997), such as an organization's managerial philosophy, routines, regular patterns, or past experience of implementing activities and strategies shown in the organization's history. A university might review its experience in strategic management and then develop and carry out new strategies by choosing proper paths which "[s]ometimes the path actually taken may be the most efficient; other times it may simply be the path of least resistance" (Gayle, Tewarie, and White 2003, p. 59).

Possessing and disseminating organizational culture and uniqueness is essential to build high-performance organizations. Organizational culture and organizational climate are quite different but also in many ways overlap. The former refers to the deeply held values and beliefs shaping organizational structures and organizational members' behaviors, and the latter refers to how organizational members perceive the overall organization and its context (Bess, Dee, and Johnstone 2012). For instance, if a university organization emphasizes collegial culture, its organizational structure tends to be flatter and faculty of the university are loyal and willing to participate in decision-making; as in a community, organizational members can share values and create consensus (Baer, Duin, and Ramaley 2008; Toma 2010). Organizational culture is also a facilitator for institutional transformation (Gayle, Tewarie, and White 2003). For instance, Todorovic (2004) argued that an entrepreneurial university requires a proper organizational culture.

Accordingly, the operational definition of this dimension refers to the unique values and assumptions an organization holds, thereby having impact on organizational performance and its members' behaviors. Seven descriptors are designed to measure universities' dynamic capabilities in terms of organizational pathways.

1. We have the clear, written vision and mission of becoming a WCU.
2. We have a well-developed strategic plan/action plan for sustaining our competitive advantage.
3. Each student, faculty, and staff understands that becoming a WCU is the goal of our university.
4. Because of the long history of our university, we have more opportunities to become the targeted university of the Five-Year-50-Billion NT Dollars Budget Project.
5. The vision of becoming a WCU is impeded by our anti-marketization-oriented campus culture.
6. Building an entrepreneurial culture is essential for our university to become a WCU.

7. We encourage our students and faculty to engage in entrepreneurial activities.

In order to sustain development and achieve the goal of becoming WCUs, universities need to learn from their organizational pathways, histories, and cultures, which can guide them and form future strategies to respond to the international higher education market. In other words, universities' paths can shape their managerial processes, such as coordination and integration, learning, transformation and innovation.

2.3.3.3 Coordination and Integration

Coordination and integration refer to the links of an organization's internal departmental functions and organizational members' roles and behaviors, as well as external activities and resources (Bess, Dee, and Johnstone 2012; Teece, Pisano, and Shuen 1997), such as removing departments/units, hiring and firing faculty and staff, and strategic alliances. Organizational resources include "facilities and people, not just money" (Darden et al. 2009, p. 34) and an organization should "identify and align" its resources (Toma 2010, p. 15). Robert M. Grant (1996) argued that the efficiency of integration is determined by three factors—the level of common knowledge, the frequency and variability of task performance, and organizational structure; integration is more effective if organizational members can communicate with each other, have similar expertise, values, and experience, and receive and share knowledge via their specific channels. Further, the efficiency of integration is affected by an organizational structure promoting effective communication and by organizational members' highly skilled experience, learned from frequent task performance. Thus it is significant to realize that transformative change requires the support of "integrative engagement," by which all participants can reciprocally and mutually share resources, expertise, and values (Baer, Duin, and Ramaley 2008, p. 11).

Possessing abundant resources, better university governance, and eminent scholars and students is important for establishing WCUs (Salmi 2009). The selected universities in the Five-Year-50-Billion NT Dollars Budget Project can make decisions by themselves to allocate government grants to better their infrastructure and the resources for teaching and in key research fields (Chang 2013). In addition, strategic alliances and mergers are viewed as a good way to solve the ineffectiveness and low accountability of badly-run universities and promote mutual growth and competitive advantage in response to external challenges (Harman and Harman 2008). An example of such strategic alliance is the Victoria University of Manchester which merged with the Manchester University of Science and Technology in 2004 and then renamed itself as the new University of Manchester with the goal of becoming high-ranked internationally by 2015. In Taiwan, the issue of integration and mergers in higher education has become a priority agenda item of the government. If unchecked, these integrative activities among universities can form a resource dependency on others rather than developing self-institutional reliance (Chan 2007) and promote the pursuit of academic excellence through economies of scale, low-cost practices, and better efficiencies (Tai 2003).

In today's global higher education market, although many scholars criticize and resist the underlying concepts of higher education marketization, they do not oppose the approaches to marketing their affiliated universities (Foskett 2012). Many universities attempt to increase their revenues and the visibility of their brands by using marketing techniques, establishing branch campuses, and recruiting international scholars and students (see McGettigan 2013; Salmi 2009; Wildavsky 2010). Every university wants to attract students from overseas; however, international students are affected by different media and universities' statements. For instance, students in Malaysia, Singapore and Hong Kong often receive information from media such as

the webpages of universities, newspapers, television, trade fairs and open days with campus tours (Gray, Fam, and Llanes 2003).

Coordination and integration play a significant role for internal management of universities. For instance, coordination and integration might promote the trust connection between administrative authority and professional authority, create a supportive climate among students to increase minorities' accessibility and narrow the gap of inequity (Hrabowski III 2014), and retrieve students' decreasing sense of belonging, as a result of which students may view universities as more of a shopping mall instead of a "home" (Keohane 2013, p. 103).

Coordination and integration are a challenge for university management, but they help a university to review and integrate its resources, enhance communication among students and faculty, and share its values within and outside the country. Briefly, this dimension of coordination and integration can be operationally defined as the links and sharing of an organization's internal and external activities and resources. Thus nine designed statements are shown below.

1. Integrative activities (e.g., to merge, to join University System of Taiwan or Mid-Taiwan University System, etc.) accelerate our university toward the goal of becoming a WCU.

2. The motivations of our integrative activities focus more on resource sharing than on performance improvement.

3. We usually market our brand via more than five media (e.g., newspapers, televisions, University webpage, online advertising on Facebook, International Education Fair, and open days with campus tours).

4. We have high visibility for international scholars and students.

5. Our target market of recruiting international students and scholars focuses more on East and Southeast Asia than on other regions (e.g., West Asia, Europe, North America, Latin America, and Africa).

6. We are more attractive than other universities at the domestic and global levels.

7. Our students have strong university identity and close ties to our university.
8. We emphasize that each of our branch campuses is closely connected to the host campus.
9. In our university, the pace of integrating vacant space and of renewing outdated buildings is much slower.

This dimension with nine designed statements presents a static assessment concerning the integration of internal and external resources and capabilities of universities. This can be viewed as the first step of organizational management. However, in today's knowledge-based society, continuous learning is a principle for organizational transformation and innovation. Next, organizational learning is discussed.

2.3.3.4 Learning: Collaboration and Knowledge Management

According to Teece, Pisano, and Shuen (1997), the second activity in the managerial process is learning. Through learning, an organization can develop and sustain its competitive advantage (Hatch and Dyer 2004). Although not every university is willing to learn to change, organizational learning encourages employees to adapt themselves to changes and new conditions, to facilitate their knowledge- and experience- sharing, and even to build reciprocal and supportive approaches to organizational governance (Gayle, Tewarie, and White 2003). Peter M. Senge (2006, p. 3) has defined learning organizations as places "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together." He argued that a learning organization should have five disciplines, including systems thinking, personal mastery, mental models, building shared vision, and team learning. Hence, organizational learning focuses on the exchange of individual experience and knowledge, but also involves collective learning within an organization (Bui and

Baruch 2012; Easterby-Smith, Crossan, and Nicolini 2000). Further, good use of individuals' and groups' collective intelligence and learning capacities is the root of successful transformation of an organization (Bierema 1999).

Universities are viewed as models of learning organizations or communities (Rowley 2000). They can learn through strategic alliances and become learning universities to adapt to a changing environment (Patterson 1999). The success of learning universities greatly depends on teamwork and self-managed team-workers (Duke 2002). Learning universities persistently revise their missions, make their goals clearer, create cultures emphasizing change, and adjust their organizational structures and operations in response to external challenges (Toma 2012).

Collaboration is related to learning. Collaboration enables individuals to gain knowledge from their social relations with others and expand their social networks through knowledge sharing. Organizations not only promote closer communicative relations among employees, but also facilitate partnerships between themselves and other organizations through various types of collaboration, such as technological integration, entrepreneurial marketing, and knowledge transfer (Trim 2003). Although the processes and results of collaboration are diverse, organizations can gain social capital under the stimulus of collaboration.

Another issue related to organizational learning is knowledge management (King 2009). Undoubtedly, universities are places where knowledge is created and disseminated, but their fragile, loosely-coupled structures cause the speed of implementing knowledge management practice in the universities to be slower than that in industry; universities should emphasize knowledge sharing (Santo 2005; Townley 2003). Knowledge can be divided into explicit and tacit knowledge. The former can be easily codified, kept, corrected, shared, represented and readily communicated and obtained without specific experience, while the latter is personal- and

context-oriented, difficult to be generated, seized, shared, and internalized in actions (Brewer and Brewer 2010; King 2009; Wedman and Wang 2005). Although there is a challenge involving how individuals and an organization make tacit knowledge explicit and communicable throughout the organization (Wedman and Wang 2005), tacit knowledge has an impact on individuals' values and organizational routines and performance and it also promotes organizational transformation (Teece, Pisano, and Shuen 1997), thus.

The fundamental concept extracted from the literature review on knowledge management refers to the creation, acquisition, dissemination, sharing, and re-utilization of knowledge (King 2009) and its benefits to organizational performance. In university organizations, knowledge management has been represented by many facilities and systems, such as databases concerning student and personnel profiles, libraries, coursewebs, and student e-portfolios, which electronically collect their learning materials and communicative networks via e-mails (Rowley 2000; Wedman and Wang 2005). King (2009) proposed a process model of knowledge management (Figure 2.4). This holistic model illustrates how an organization may gain, store, and practice knowledge, and it shows that dynamic capabilities creation results from knowledge utilization characterized by knowledge transformation and sharing. This is why Teece, Pisano, and Shuen (1997) stressed that knowledge transformation and sharing exist in different human relationships and social networks and promote organizational benefits as well as influence an organization's survival (Brewer and Brewer 2010; Rowley 2000).

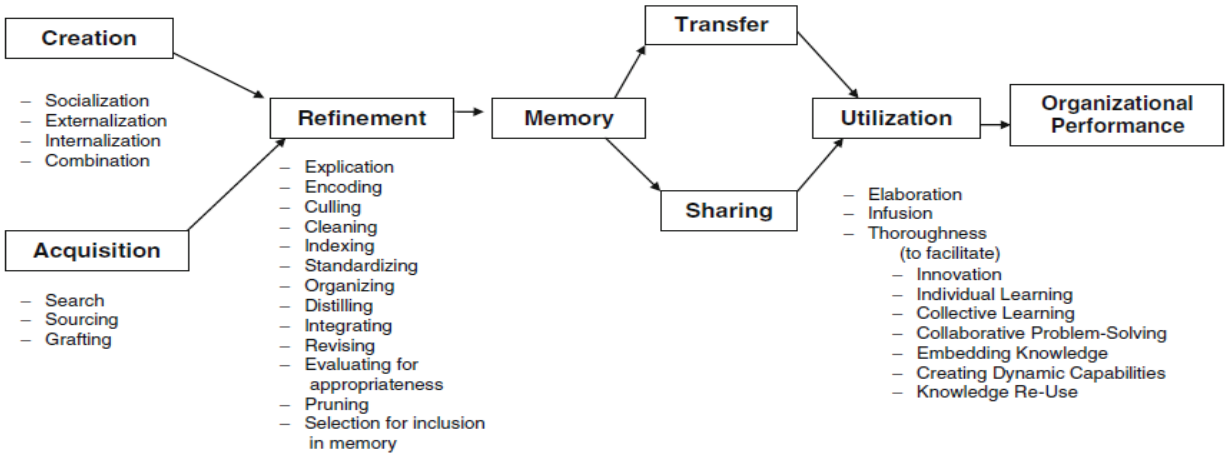


Figure 2.4. Knowledge Management Process Model

Source: Adapted from King (2009, p.7) with the permission from Springer, Nov. 18, 2014.

Based on the literature review, the operational definition of the learning dimension is that through collaboration and knowledge management, an organization can constantly learn new knowledge and then advance its transformation into a learning organization. Accordingly, eight descriptions are shown below to assess learning capabilities of universities.

1. We greatly emphasize cross-school/department learning activities for our students and faculty.
2. Internship opportunities for our students are actively provided in most administrative offices and academic schools/colleges.
3. The communication between our administrators and faculty members is reciprocal and effective.
4. We have close partnerships with industry.
5. We often collaborate with international for-profit and not-for-profit organizations.
6. We have specialized knowledge repositories to systematically record administrators' experience, faculty's research, and interaction with international scholars.
7. In our university, a part of government grants from the Five-Year-50-Billion NT Dollars Budget Project is used in reward for students' and faculty's participation in international conferences and academic exchange activities.

8. We are very concerned with the loyalty of part-time faculty members at the university.

The learning dimension with eight designed statements is used to assess a university's practice of knowledge management and collaboration with other organizations. Since universities themselves are intellectual spaces, their intellectual capital can be created by bettering knowledge management. Close collaboration not only means learning from others, but also provides transformative opportunities for universities.

2.3.3.5 Reconfiguration and Transformation: Benchmarking and Strategic Flexibility

Benchmarking represents the concepts of reconfiguration and transformation. Benchmarking is an organizational approach emphasizing learning from the "best practices" (Teece, Pisano, and Shuen 1997, p. 520). Benchmarking originates in strategic management of for-profit business; thus some barriers occur when it is applied in higher education, such as the perspectives of organizational uniqueness and resistance to compulsory practices and market-driven ideas (Levy and Ronco 2012). However, the process of benchmarking (Figure 2.5), going beyond competition and comparison, enables university organizations to plan their desired goals, examine and analyze the gap between themselves and their peers, learn these peers' advantages, and then improve organizational performance, quality, transformation, and accountability (Comm and Mathaisel 2005; Levy and Ronco 2012; Nazarko et al. 2009; Welch 2002).

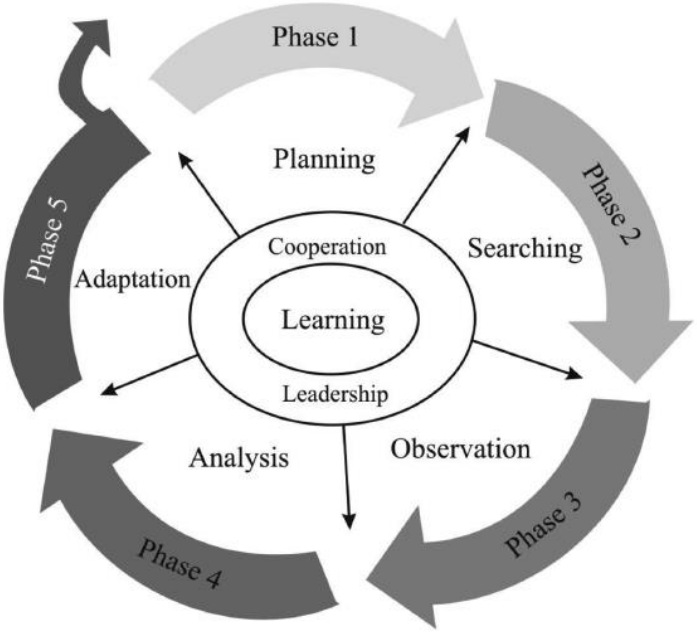


Figure 2.5. The Process of Benchmarking

Source: Adapted from Nazarko et al. (2009, p.502) with the permission from Taylor and Francis Group, Nov. 21, 2014.

Many studies have applied benchmarking to research different topics and issues (Levy and Ronco 2012; Nazarko et al. 2009), such as choosing learning communities (Dawson, Burnett, and O'Donohue 2006), learning from high-performing state higher education agencies (Welch 2002), and evaluating European ranking systems with the Berlin Principles on Ranking of Higher Education Institutions[7] (BPs) released by the International Ranking Expert Group (IREG) (Stolz, Hendel, and Horn 2010). Among various studies on benchmarking, the fundamental skill of implementing benchmarking is in need of possessing appropriate and measurable metrics as the medium of achieving desired goals (Comm and Mathaisel 2003; Dawson, Burnett, and O'Donohue 2006).

[7] To understand the details of Berlin Principles, please go to the following web page: http://www.ireg-observatory.org/index.php?option=com_content&task=view&id=41&Itemid=48.

The aspiration for WCU status is itself the application of benchmarking. The national excellence initiatives represent how the China and Taiwan governments have established a benchmarking initiative in these two areas with WCUs (Mok and Chan 2008). They indicated that the Chinese government endeavors to send faculty members to participate in overseas academic exchanges, seeks collaboration with well-known international universities, establishes international advisory committees to advise on ways to gain better rankings in the league tables, designs research fields that benefit research excellence, and creates joint-research centers and joint programs. In Taiwan, students are encouraged to participate in overseas internships to experience different cultures, and faculty members are encouraged to attend international conferences, participate in joint-research projects, and publish their research in English language journals. Sometimes, international scholars are invited to offer seminars and speeches. Although these two Chinese societies strive to elevate targeted universities by benchmarking high-ranked and well-known western universities, benchmarking is different from copying and imitation, thus more concrete benchmarking metrics are still needed to check for and pursue more objective goals (Altbach 2004).

Another relevant concept concerning transformation is strategic flexibility. Like the focus on dynamic capabilities (Teece, Pisano, and Shuen 1997), the advocates of strategic flexibility emphasize that organizations should adapt and respond to uncertain environmental changes. A comprehensive definition of strategic flexibility is "a company's ability to manage strategic risk through its ability to respond to both opportunities and threats in its environment through using its resources in both a pro-active and a reactive way" (Roberts and Stockport 2014, p.41). In order to achieve the success of organizations under globalization, organizations should constantly review their resources, core competencies, strategic actions, organizational structures

and culture, capital deployment, the use of technologies, and investment strategies (Evans 1991; Hitt, Ireland, and Hoskisson 1995; Sanchez 1995). Without strategic flexibility, organizations' core competencies might become core rigidities (Leonard-Barton 1992). When emphasizing strategic flexibility, for-profit organizations might have greater technological capability for exploration and achieving innovation in products (Zhou and Wu 2010). Organizational development also can be positively related to strategic flexibility because of competitive intensity and resource combination activities, even though strategic flexibility might be influenced by environmental resources and managerial factors (e.g., information and knowledge about the environment, relationships with partners, and resource support) (Guo and Cao 2014). This concept of strategic flexibility can benefit higher education institutions in rapidly changing higher education environments (Darden et al. 2009). Leaders and leader teams in universities should endeavor to review internal resources and capabilities, manage strategic risks, and respond to the challenges in their environments, and more importantly, pursue a balance between internal and external environments, whereby universities can achieve sustainable survival.

Benchmarking and strategic flexibility are two obvious transformative practices of strategic management. The dimension of reconfiguration and transformation can be operationally defined such that through benchmarking and strategic flexibility, universities can effectively utilize their existing capabilities, create new capabilities, and constantly adjust their practical strategies to adapt and respond to external environmental needs as well. Below are six statements designed to measure universities' capabilities developed in the dimension of reconfiguration and transformation.

1. We have developed benchmarking metrics that are proper to our vision of becoming a WCU.
2. We usually choose high-ranked US and UK research universities as our benchmarks instead of those in other countries (e.g., South Asia, Latin America, Africa, etc.).

3. We often make timely decisions about adding and reorganizing our departments/ institutes to fit social needs.

4. The development of our university is little affected by uncertainty and risks (e.g., ambiguous definition of world-classness and the lack of students and financial resources).

5. Social relations between our faculty and stakeholders outside the campus (e.g., policy-makers, parents, staffs of other universities) benefit us as we pursue the goal of becoming a WCU.

6. The collaboration with industry mediates and narrows the gap between our academic missions and social needs in reality.

Benchmarking is an effective strategy for a university to learn from other universities and then transform itself. However, benchmarking is not equivalent to imitation and copying, which might lead to the phenomenon of isomorphism and academic recolonization (Deem, Mok, and Lucas 2008; Lang 2005). This also implies that leaders and leader teams in university organizations should emphasize strategic flexibility and better manage the uncertain risks derived from external environmental pressures. Next, university innovation and its leadership are discussed.

2.3.3.6 Innovation and Leadership

Today's rapidly changing environment and global competition in higher education force universities to innovate and transform themselves. National excellence initiatives launched by Asian governments accelerate the need for creative and excellent targeted universities that provide scientific and technological breakthroughs and educate specialized professionals to drive further economic prosperity and social development. Hence, rather than resist change, university organizations need to achieve "smart change," which appropriately and in a timely manner utilize different types of approaches to change, including organizational routines change, strategic change, and transformative change (Baer, Duin, and Ramaley 2008, p.6).

Innovation can be divided two categories: one is product innovation, and the other one involves the process of innovation (Van Vught 1989); the former has a specific object (e.g., a program or a course), while the latter—innovation as a process—involves new idea creation and better problem-solving approaches. These two categories of innovation are complementary and neither can be neglected. As previously discussed, modern universities, especially those which pursue WCUs, not only need to produce excellent research and an outstanding workforce, but also improve their managerial processes to complete organizational transformation and innovation. In brief, innovation serves as the driver of an organization's transformation and its sustainable development.

Additionally, innovation in HEIs relies on change in organizational structures and cultures. William G. Tierney (1999) believed that the innovation of being a responsive campus might fail if universities focus more on organizational structures than their cultures. As Harold Enarson (1960) stressed, innovation is the examination of "the unstated premises and the comfortable routines of academic life" (p. 496). As such, the innovation is successful when a university can often redefine its mission, review current processes, satisfy individual and organizational needs, develop its responsive strategies, and fit external markets.

Leaders and leader teams in the universities play an important role in developing and implementing organizational transformation and innovation. Leadership is a popular issue and many theories and studies have documented the characteristics of leaders and their responsibilities as well as how leaders affect organizational performance. Facing up to dynamic changes, leaders should draw on their leadership skills in transforming universities and seeking their organizations' financial effectiveness and sustainable development (Sutin et al. 2011). Managers in the universities should better their knowledge management practices and learn

general knowledge regarding new technologies, thereby reducing resistance from staff and faculty and leading them to use these new technologies effectively (Darden and Box 2009). For instance, instructors resist changing their teaching strategies because they might not acquire mastery of these new technologies, have insufficient skills for them, or misunderstand them (Enarson 1960). Hence, through the learning of new technologies, leaders and leader teams are able to boost knowledge sharing with staff and faculty, but also guide their affiliated universities toward transformation and innovation.

Unlike those studies focusing on leaders' characteristics and the procedures and practices of leadership, the best interpretation of leadership in the rapidly changing and uncertain environment is learning to change. For instance, adaptive leaders can analyze and mobilize organizational members to deal with the challenges and make appropriate changes: "adaptive leadership requires transformative learning and depends on mature development capacity" (Nicolaides and McCallum 2013, p.251). Strategic leadership asks leaders to learn the skills for strategic planning and implementation to manage change (Hitt, Ireland, and Hoskisson 1995; Marshall 2007). Thus, leaders "hold the levers and mechanisms of change" (Clark 1989, p. 98) and they need careful strategic planning and flexible actions.

Accordingly, innovation and leadership drive organizations' transformation and their sustainable development. To respond to future change, leaders and leader teams should be able to analyze and learn from challenges, mobilize and reconfigure resources, plan and develop strategies, and select appropriate strategic actions. The following seven descriptions are used to explore the innovation and leadership of universities.

1. Our current university culture focuses more on research innovation than on teaching performance.
2. Our students actively engage in knowledge discovery and innovative activities instead of single-way knowledge acquisition.

3. The pace of updating and adopting new technologies in our university is much slower than that in other universities.
4. Our faculty members are happy to go to different schools/departments and to share their research and innovative activities.
5. As leaders of the university, we need to learn new technologies.
6. As leaders of the university, we are often off-campus for meetings and collaborative activities with industry.
7. Our leader teams sometimes make a business trip to learn from other universities outside Taiwan.

Organizational innovation cannot happen in a vacuum and it needs the support of organizational leadership. If leaders and leader teams within a university cannot constantly learn and strategically think and act, the university may fail to transform itself, find it difficult to keep its competitiveness and sustainable development, and ultimately, be eliminated from the higher education market at the domestic and global levels.

2.4 SUMMARY

Pursuing WCUs has been prevalent since most East Asian governments have launched their excellence initiatives as a priority of their national agendas in higher education. Some universities in each country are designated to transform themselves toward world-class status and serve as the benchmarks for other HEIs within each country. There is no exception in Taiwan. Moreover, the internationalization of higher education intensifies the competition among universities at the domestic and global levels. Instead of impeding universities' resistance to change, such a global competitive environment brings a good chance of reviewing university management and driving the transformation of university organizations to seek their sustainable

survival. It is of great worth to explore what capabilities targeted universities that pursue WCUs should have in order to survive and respond to national and global pressures. Thus the aims of the study, focusing on the Taiwanese context, are to understand senior administrators' opinions concerning the WCUs issue and to develop a scale of dynamic capabilities of universities with which Taiwanese universities can assess their responsive capabilities and university management practices. In terms of dynamic capabilities as the source of sustainable competitive advantage (Teece, Pisano, and Shuen 1997), dynamic capabilities of universities might come from six interactive dimensions, including positioning, organizational history and culture, coordination and integration, learning, reconfiguration and transformation, and innovation and leadership. To achieve the goals of the research study, a three-stage research design is adopted and presented in the following chapter.

3.0 RESEARCH DESIGN

The research method proposed by Gilbert A. Churchill (1979) contributes to developing a scale of dynamic capabilities of universities to measure how targeted Taiwanese universities manage themselves strategically. Churchill (1979) indicated that construct development and factor analysis benefit to develop scales in marketing studies. A proper scale should consist of items based on the literature, and then their validity and reliability should be assessed, even though the "informal" measures, selected items of which cannot totally originate from the literature, may benefit the scale development (DeVellis 2003, p. 13). In addition, the issue concerning the validity and reliability of the scale is controversial (Flynn and Pearcy 2001; Gerbing and Anderson 1988). These scholars introduced the confirmatory factor analysis or the use of structural equation modeling to assess the unidimensionality of the scale and to improve its validity and reliability. Thus, based on Churchill's (1979) work, which emphasizes construct development and factor analysis of a scale, a three-stage data collection design was adopted in this research study.

3.1 RESEARCH FRAMEWORK AND HYPOTHESES

The three-stage data collection design in this study includes a pilot study, personal interviews, and the main survey. The pilot study was used to assess the appropriateness of the predesigned

questions based on the literature review. Then personal interviews were conducted to understand senior administrators' opinions on the issues concerning WCUs and the predesigned dimensions and questions of dynamic capabilities of universities. Finally, an empirical survey was conducted to investigate senior administrators' perceptions related to the dynamic capabilities and strategic management practices of their affiliated universities, which are the recipients of the Five-Year-50-Billion NT Dollars Budget Project. Figure 3.1 shows the research framework of this study. As shown on Figure 3.1, this study was empirically carried out by using the mixed methods approach—quantitative surveys and qualitative interviews.

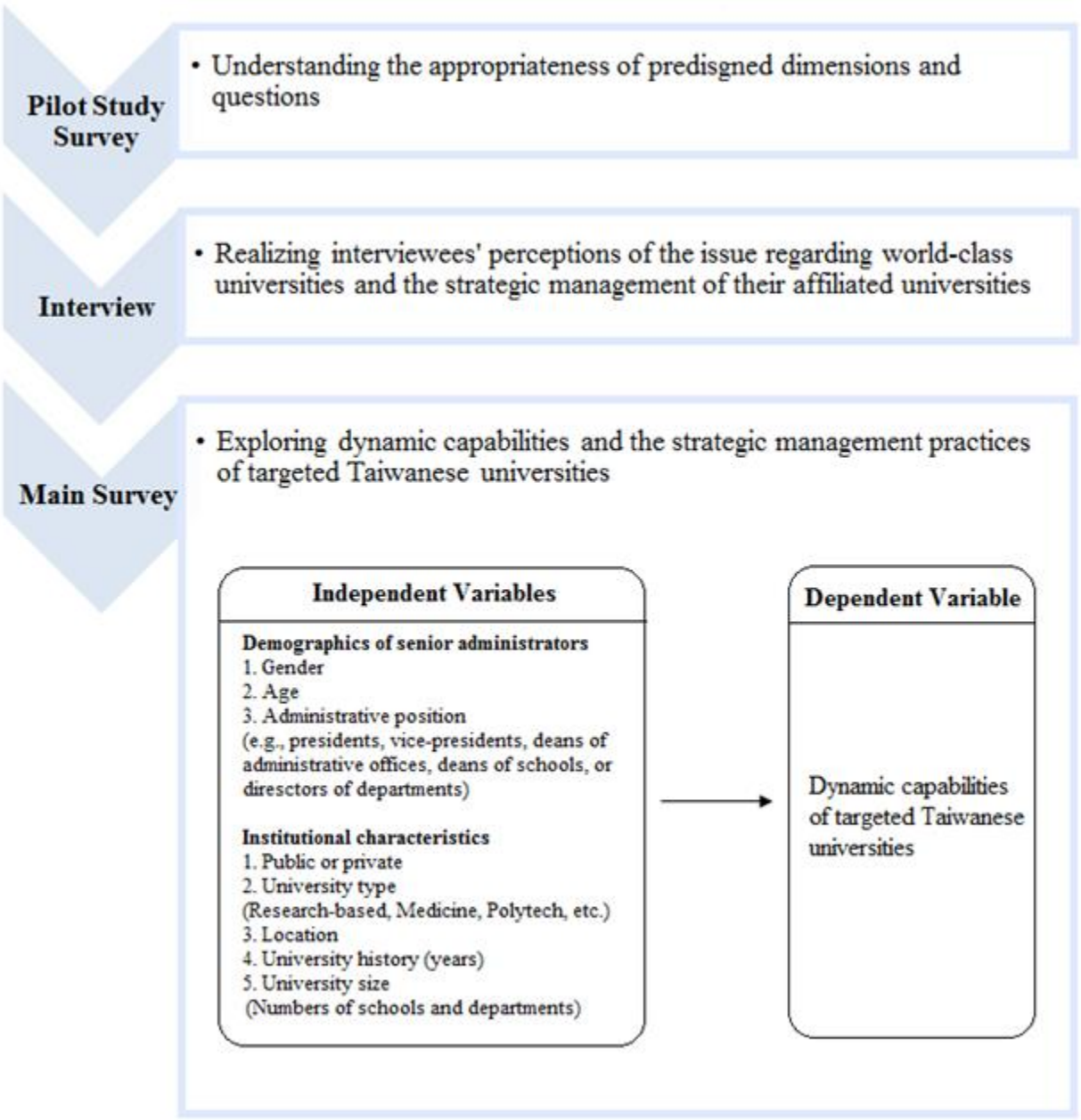


Figure 3.1. Research Framework

Source: By the author.

Based on the literature review, the predesigned scale of dynamic capabilities of universities in Taiwan was divided into six dimensions with 48 statements, including the positioning, organizational history and culture, coordination and integration, learning,

reconfiguration and transformation, and innovation and leadership. However, it is unclear whether these six dimensions are dynamic capabilities a WCU should develop or whether some capabilities are ignored. Thus individual interviews were conducted. Finally, in the third stage, the designed scale resulting from the pilot study and the interviews was used to empirically survey senior administrators' perceptions of targeted Taiwanese universities' dynamic capabilities development. The assumptions included that (a) targeted Taiwanese universities have six dynamic capabilities; (b) senior administrators with multiple personal backgrounds from various universities are likely to perceive differently. The hypotheses of the study were listed in the following section.

H1: There are six dynamic capabilities of targeted Taiwanese universities and all dimensions of dynamic capabilities of universities should be integrated.

H2: Males and females have different perceptions of the dynamic capabilities their universities developed.

H3: Senior administrators of various ages perceive the dynamic capabilities their universities developed differently.

H4: Senior administrators with various administrative positions have different perceptions of the dynamic capabilities their universities developed.

H5: Public or private universities significantly influence the establishment of universities' dynamic capabilities.

H6: Different types of universities have significant impact on the establishment of universities' dynamic capabilities.

H7: The location of a university importantly affects the establishment of universities' dynamic capabilities.

H8: The length of the university history (the years) significantly affects the establishment of universities' dynamic capabilities.

H9: The university size (the numbers of schools and departments) has an important impact on the establishment of universities' dynamic capabilities.

3.2 RESEACH METHODS

The research methods used in this study included personal interviews and mailed paper-based surveys. The details are described in the following section.

3.2.1 Semi-Structured Interviews

In this research study, the interviews are not just "an alternative method of collecting survey data" (Babbie 2010, p. 274). Interviewing is an important method of data collection and it can be used for quantitative and qualitative study purposes. Interviewing is a good way to increase the response rate of the survey, and it is also a channel to collect detailed, in-depth data and to allow participants to express their diverse views and values (Mertens 2010). Moreover, personal interviews can strengthen the content of the consequent survey. In this study, therefore, the personal interview technique was adopted to better understand the participants' opinions concerning the predesigned scale of university dynamic capabilities and the establishment of WCUs, a debatable issue in contemporary higher education across the globe.

3.2.2 Paper-Based Survey

To understand the practice of developing dynamic capabilities of targeted universities in Taiwan, senior administrators serving in these universities were surveyed. Senior administrators include presidents, vice-presidents, deans of administrative offices, and deans of schools as well as directors of departments. Because their administrative positions within the university have significant impact on strategic planning of their universities, their perceptions are valuable

(Hambrick 1981). Additionally, although online surveys are a means of inexpensive and quick data collection for large samples (Schonlau, Fricker, and Elliott 2002), two reasons for paper-based surveys used in the study include that (a) schoolteachers prefer mail surveys, which probably gain a higher response rate than online surveys (Shih and Fan 2008) and (b) numerous emails these senior administrators receive every day might result in the neglect of my study.

3.3 RESEACH SUBJECTS

3.3.1 Pilot Study

According to the document issued by the Ministry of Education (2014c), 12 Taiwanese universities are the recipients of the grants of the second-stage Five-Year-50-Billion NT Dollars Budget Project. In the pilot study, two of 12 targeted universities in Taiwan were chosen and 103 senor administrators were surveyed to examine the feasibility and appropriateness of the predesigned scale that included six dimensions and 48 statements.

3.3.2 Participant Groups

In order to understand different groups' opinions, the purposeful sample of the interviews was divided into five groups, including presidents, vice-presidents, deans of administrative offices, deans of schools, and directors of departments. Three or four senior administrators from each group were invited. The final sample consisted of a total of 10 senior administrators from four universities.

The interviews were conducted during a period of one and one-half months (Middle-February to March, 2015) due to the schedules of the participants. The majority of interviews lasted 45-60 minutes. Some interviewees were the same as the participants in the pilot study, so these participants also provided their comments on the pilot study questionnaire. Due to the anonymity and protection of individual privacy, the interviewees were coded as: A-01-Date, where A indicates the interviewee's affiliated university and 01 is a series number. Table 3.1 shows the demographic details.

Table 3.1. Participant Demographics

Variable		*n*
Gender		
	Male	9
	Female	1
Administrative Position		
	President	1
	Vice-president	3
	Dean of administrative office	1
	Dean of school/college	2
	Director of department	3
Instruction field		
	Humanities (e.g., history, literature, philosophy, etc.)	0
	Social science (e.g., business, education, politics, etc.)	7
	Natural science (e.g., physics, chemistry, engineering, etc.)	3

Note: (a) n =10. (b) Most senior administrative positions in the Taiwanese universities are served by the full-time academic faculty, thus they are still affiliated with the departments they offer courses.
Source: By the author.

3.3.3 Main Survey

The survey in the study was used to explore the factor analysis, model fit and the correlations among the observed variables. For the SEM studies, many studies have documented that

different levels of sample size have impact on the measurement of goodness-of-fit of the SEM model (Ding, Velicer, and Harlow 1995; Kenny and McCoach 2003; Marsh, Balla, and McDonald 1988), but scholars have no consensus regarding the number of samples contributing to the most appropriate estimation (Teo, Tsai, and Yang 2013). Goodness-of-fit can be obtained with a small sample size (< 100) (Nevitt and Hancock 2004), but a minimum sample size of between 100 to 150 is suggested in terms of the ML estimation perspective and the number of indicators per factor (Anderson and Gerbing 1984; Ding, Velicer, and Harlow 1995).

The sample of the main survey comprised 460 senior administrators serving in ten targeted universities (excluding two universities chosen in the pilot study). Not all the ten targeted universities had the same surveyed sample. Based on the information shown on the websites of these ten targeted universities, most universities have 50 to 65 departments. The smallest surveyed university has less than 45 senior administrators, while the biggest one has more than 100 potential participants. Hence, a different number of participants (30, 50, and 70) was selected in accordance with the university size.

3.4 RESEARCH INSTRUMENTS

The instruments of the three-stage data collection design in this study included a list of semi-constructed interview questions and quantitative, structured questionnaires. All interview questions and questionnaires were translated into traditional Chinese, the official language in Taiwan and my native language. And to better fit for local language use, draft interview questions and questionnaires were reviewed and revised by my advisors from the United States and Taiwan. In the following section, the instruments used in this study are briefly described.

3.4.1 Pilot Study Questionnaire

In the pilot study, A Pilot Study of Developing Dynamic Capabilities of Universities (Appendices A in English and B in Chinese), a questionnaire was sent by mail to the senior administrators of two selected universities. This questionnaire has three parts: one is about demographic data of respondents including gender, age, and administrative position, and details about their affiliated universities, including university characteristics (public or private), types, locations, and histories as well as the sizes of schools and departments within the universities; the second part is comprised of six dimensions with 48 statements concerning the establishment of dynamic capabilities of universities for respondents to choose from in terms of which best fits their perceptions; and the third part involves how the respondents assess the significance of these six dimensions and some open-ended questions. The questions in the second part were designed as a Likert scale with five choices, including strongly disagree, disagree, somewhat agree, agree, and strongly agree.

3.4.2 Interview Question List

Before conducting the personal interviews, the Invitation to Interview and Informed Consent Statement (Appendices C in English and D in Chinese) was emailed to inquire whether the selected participants consented to participate in the personal interviews and described the interview procedure in details. Then a list of semi-structured interview questions (Appendices E in English and F in Chinese) was also provided in advance. During the interviews, the interviewees were informed that they could skip or deny replying to any of the designed questions and that every question proposed by the interviewees was welcome.

3.4.3 Main Survey

The main survey for ten targeted universities was conducted in the third stage of this study. The content of A Survey of Developing Dynamic Capabilities of Universities (Appendices G in English and H in Chinese) depended on the previous two-stage research. In other words, the design and content of the main survey questionnaire came from the results of the pilot study and personal interviews. The main survey questionnaire had 52 questions and consisted of two parts: one for demographic variables, and the other one for surveying respondents' perceptions.

3.5 DATA COLLECTION AND ANALYSIS

3.5.1 Data Collection

This study was a three-stage data collection design—the pilot study, personal interviews, and the main survey. Senior administrators in 12 targeted Taiwanese universities were the research subjects in every stage of the research study, and consisted of five groups—presidents, vice-presidents, deans of administrative offices, deans of schools, and directors of departments. In the pilot study, 103 senior administrators in two selected universities were surveyed. Then, ten personal interviews were conducted either face-to-face or by phone. Finally, 460 senior administrators from ten universities were surveyed.

The questionnaires used in this study were sent out by mail because, as mentioned previously, the attempt was made to avoid senior administrators' neglect of my study and to

obtain a higher response rate. Additionally, a stamped, self-addressed envelope for easy return (Mertens 2010) was provided.

3.5.2 Data Analysis

The research study collected both quantitative and qualitative data. The details are discussed in the following sections.

3.5.2.1 Quantitative Data

The quantitative data were mainly obtained from the pilot study survey and the main survey. They were analyzed using the SPSS and AMOS software. In particular, the item components hypothesized as dynamic capabilities of universities in this research study were extracted from the main survey with exploratory factor analysis (EFA), followed by the second order confirmatory factor analysis (CFA).

For the EFA, some statistical techniques and criteria regarding reliability and validity evaluations were adopted. First, estimating the reliability of a survey questionnaire is often the first step to examine the internal consistency. "It is not possible to have a valid instrument that is not reliable" (Black 1999, p. 272). In other words, measuring the reliability of the surveys is necessary. The Cronbach's alpha > .70 or .80 and an acceptable corrected item–total correlation > .30 or .40 (Furr 2011; Nunnally and Bernstein 1994) often serves as the cutoff to measure reliability, although the cutoff alpha value is controversial (Lance, Butts, and Michels 2006). Then, the Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity should be conducted to examine whether the survey is appropriate to implement the EFA. "The KMO value between .70 and .80 is good, the value between .80 and .90 is great, and the value more

than .90 is marvelous" (Hutcheson and Sofroniou 1999, p. 225). Finally, the EFA involves the factor extraction and rotation method. Using the principal component analysis (PCA) with the orthogonal rotation (e.g., Varimax) is a common strategy to implement factor analysis in many research studies, but it is criticized for its purpose, "reducing a large number of variables to a smaller, more manageable number of components" (Bandalos and Finney 2010, p. 98), rather than exploring the latent constructs. Thus the principal axis factoring (PAF), a better approach to conduct factor analysis with correlated constructs in the social sciences (see Bandalos and Finney 2010; Furr 2011), was used to explore the dimensionality of the quantitative data of the research study.

In the research study, structural equation modeling (SEM) was utilized to test the hypothesis presented earlier. Although the SEM can be exploratory, it is largely used in confirmatory studies. The SEM is a confirmatory statistical technique, using a hypothesis-testing approach to analyze whether a certain structural model is valid (Byrne 2010). To establish the unidimensionality of the scale and model-data fit showing the extent of assumed relations among multiple variables, the SEM aims to examine the consistency between a hypothesized theoretical model and the collected data which are used to reflect this theory (Lei and Wu 2007; McQuitty 2004). The use of the SEM has been documented in numerous studies (see Duarte, Alves, and Raposo 2010; Khine 2013; Marsh et al. 2009; Shook et al. 2004).

As a rule, the approach to the SEM involves five core steps (Teo, Tsai, and Yang 2013): model specification, identification, estimation, assessment of fit, and modification. They stated that first, researchers specify the structural equation model and the hypothesized relations between variables presented by parameters or paths; second, researchers collect samples and obtain a value for each parameter; third, researchers estimate parameters by the estimated model-

implied covariance matrix; then, researchers assess the goodness-of-fit of the model, which refers to the consistency between sample data and a hypothesized distribution; and finally, they modify this model if necessary.

The common approach to estimate the SEM model is the maximum likelihood (ML) method (Iacobucci 2010; Teo, Tsai, and Yang 2013). The ML estimation allows the unknown model parameter and maximizes the sample data probability with the assumption of a normal distribution. In order to understand the appropriateness of employing the ML method to estimate the model fit, the normality test of the sample data is required and the minimum sample size needs to be more than 100 (Ding, Velicer, and Harlow 1995).

The normality test includes the univariate and multivariate normal distribution. For the univariate normality, the skewness and kurtosis values of each variable should be less than absolute values of 2 and 7, respectively, to avoid the inflated Type I error and the distorted factor analysis results (Curran, West, and Finch 1996; Muthén and Kaplan 1985). Further, Mardia's multivariate generalization of skewness and kurtosis is the most widely used. According to her theory, the basic requirement of the multivariate normal distribution is that the Mardia's multivariate kurtosis value is smaller than p (p+2), where p is the number of observed variables (Mardia 1970).

Model fit evaluation usually involves three categories of fit indices—the model fit, the comparative fit, and the parsimonious fit (Teo, Tsai, and Yang 2013). The model fit can be assessed by the chi-square (χ^2), the Goodness-of-Fit index (GFI), the standardized Root Mean Residual (SRMR), and the root mean square error of approximation (RMSEA); and the comparative fit and the parsimonious fit involve the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI). Barbara M. Byrne (2010) and Randall E. Schumacker and Richard G.

Lomax (2010) provided empirical examples and tips for beginners using the SEM relevant software (e.g., AMOS and LISREL) and particularized various model-fit indices.

The chi-square index is the simplest, most common way to examine the model fit. However, the chi-square is sensitive to the sample size and it is likely to be statistically significant if the sample size is very large. The chi-square/degree of freedom (presented as CMIN/DF on AMOS output) is seen as the supplement to the chi-square (Byrne 2010) and a CMIN/DF value less than 3 may be acceptable (Kline 2005). Except for the sensitivity of the sample size, the significant p-value may also result from the inappropriate model design (Bollen and Stine 1992). In the AMOS software, the Bollen-Stine bootstrapping can be used to examine the p-value issue.

Because of the sensitivity of the chi-square analysis, other model-fit indices also need to be considered simultaneously. Table 3.2 shows the model-fit indices and their acceptable criteria. The convergent validity evaluation for the SEM model can be assessed by the composite reliability (CR) and average variance extracted (AVE) (Fornell and Larcker 1981) and their acceptable levels are: the CR > .60 and the AVE > .40 or .50 (Bagozzi and Yi 1988; Fornell and Larcker 1981; Hair et al. 2006).

Table 3.2. Measures of Model Fit

Model-Fit Criterion	Acceptable Level
Chi-square	Not statistically significant
Goodness-of-fit index (GFI)	> .90
Adjusted GFI (AGFI)	> .90
Standardized RMR (SRMR)	< .05
Tucker–Lewis Index (TLI)	near 1 (perfect fit)
Normed fit index (NFI)	near 1 (perfect fit)
Parsimony fit index (PNFI)	near 1 (perfect fit)
Root-mean-square error of approximation (RMSEA)	< .01 excellent, < .05 good, < .08 mediocre

Sources: Adopted from MacCallum, Browne, and Sugawara (1996) and Schumacker and Lomax (2010, p.76).

3.5.2.2 Qualitative Data

The qualitative data were mainly obtained from the personal interviews and they were analyzed using the qualitative data analysis software ATLAS ti. The qualitative data analysis in this study followed the four phases proposed by L.R. Gay and Peter Airasian (2003). The first phase emphasizes "reading and memoing," referring to familiarity with data and theme identification; the second phrase entails "describing" the data; the third phrase is about how to "categorize, code, and group the data into themes"; and the final phrase is data interpretation (Gay and Airasian 2003, p. 229).

Utilizing ATLAS ti, a software for qualitative data analysis, I listened to digital recordings of interviews and textualized them in the form of transcripts. Before data analysis, transcripts for review were sent out to the interviewees in order to make sure I understood the interviewees' opinions. The transcripts were then read multiple times to develop a holistic sense of the data. After reading and listening holistically, I briefly analyzed the descriptiveness of the data and the interviewees' demographics. Subsequently, I performed open coding, reading for themes/code families (CF) (Ryan and Bernard 2003). For instance, one theme I identified was "organizational history and culture," which came from the repetition of relevant concepts I was seeing in the data (see Figure 3.2). Finally, I strove to discuss these themes and their relations.

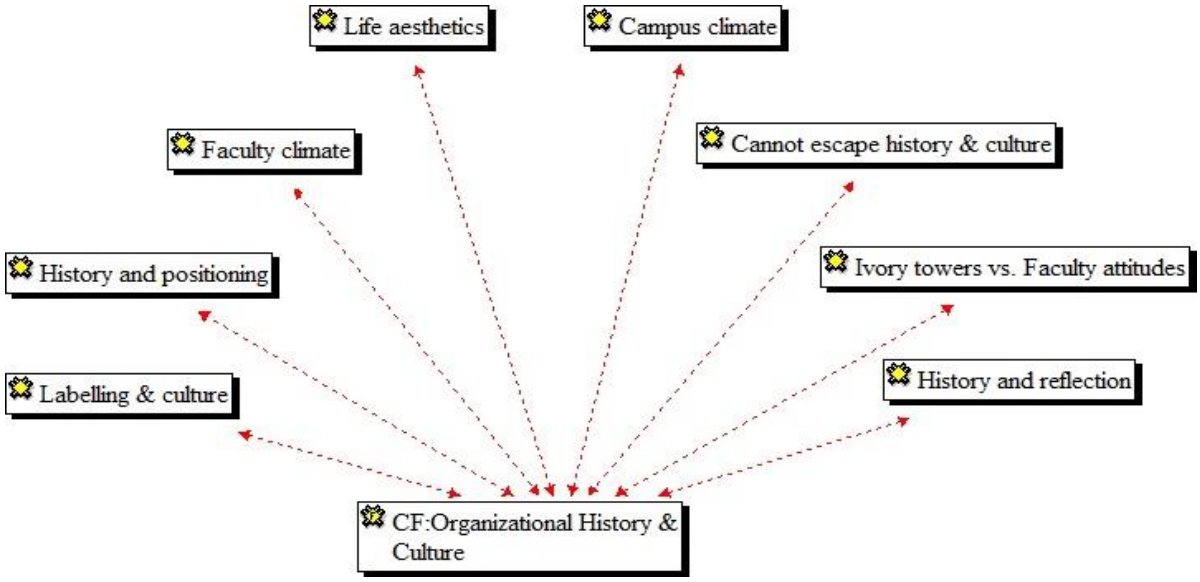


Figure 3.2. Coding and Theme Formation

Source: By the author.

3.6 SUMMARY

This three-stage research design—the pilot study, personal interviews, and the main survey— aimed to achieve the purposes of this study—developing a scale of university dynamic capabilities, thereby measuring the strategic management practices of 12 targeted Taiwanese universities rewarded by the Five-Year-50-Billion NT Dollars Budget Project. Through these research methods, the perceptions of senior administrators regarding dynamic capabilities development in their universities were understood. This chapter has described the three-stage research design, including sample selection, research instruments, and data collection and analysis. The results of the three-stage research study are presented in following chapter.

4.0 RESEARCH RESULTS

The purpose of this chapter is to respond to two research questions and to present the process of developing the scale of dynamic capabilities of targeted universities in Taiwan and overall findings of this three-stage-data-collection research study. This chapter first illustrates the demographic and reliability analysis of the pilot study (see Section 4.1) in order to examine the appropriateness and objectivity of the pre-designed questionnaire used in the pilot study. Second, this chapter discusses the findings of semi-structured interviews (see Section 4.2) with direct quotations. The findings of individual interviews produce a more comprehensive lens for the issue of pursuing world-class universities (WCUs) and strategic management practices of Taiwanese universities. Then, based on some findings of the pilot study and personal interviews, the questionnaire of the main survey was formed and its findings are presented in Section 4.3. Finally, the chapter discusses the impact of respondents' personal and institutional variables on university dynamic capability development (see Section 4.4).

4.1 PILOT STUDY SURVEY

Reviewing the suitability and reliability of the survey questionnaire is the focus of the pilot study. This section begins to describe demographic results of the pilot study and then to discuss its reliability.

4.1.1 Descriptive Profile

In the pilot study, two targeted Taiwanese universities—University A and University G—were purposively selected due to the consideration of sample size > 100, the minimum sample size of the SEM (Ding, Velicer, and Harlow 1995). Moreover, University A changed itself from a social science-based institution and University G transformed itself from a science and engineering-based institution. All senior administrators in the universities A and G, including presidents, vice presidents, deans of administrative offices, deans of schools, and directors of departments, were invited to participate in this pilot study (N = 103). Fifty-five senior administrators consented to complete the survey (53 percent response rate). However, three returns were excluded because of the mission data and unengaged responses. Thus a total of 52 returns remained to be analyzed.

The 52 returns included 38 males and 14 females; one university president, three vice-presidents, seven deans of administrative offices, eight deans of schools, and 33 directors of departments. More than half of the 52 respondents were from 51 to 60 years old (approximately 60 percent), 17 respondents were 41 to 50 years old, and four were more than 61 years old. Both A and G universities are public and located in the northern part of Taiwan. Of 52 returns, 42 respondents believed that universities A and G are research-based comprehensive universities, while 12 respondents categorized their affiliated universities as teacher education-based. There is evidence that two of 52 respondents made more than two choices simultaneously when they answered the question concerning the role of their affiliated universities. In addition, 28 of 52 respondents thought that the histories of their affiliated universities were 41 to 80 years in duration, while 24 respondents considered their affiliated universities' histories were more than 81 years in duration. For university sizes, 28 returns showed that their affiliated universities were comprised of more than nine schools and 23 credited their affiliated universities with six to eight

schools; just one person considered his/her affiliated university to consist of three to five schools. Finally, more than half of the 52 respondents believed that their affiliated universities included 51-75 departments, while 12 respondents thought their universities had fewer than 50 departments; six thought that their affiliated universities were comprised of more than 75 departments.

A total of 48 items representing the six dimensions were used to form the initial pool of items for the scale of dynamic capabilities of WCUs. The pilot study consisted of six dimensions with 48 questions. For dimension A, comprised of 11 questions, the question A4 (M = 2.90) indicated that 44 percent of respondents disagreed with the use of the received grants from the Five-Year-50-Billion NT Dollars Budget Project for the purpose of campus infrastructure improvement. Twenty-nine percent of the returns showed negative responses to question A5 (M = 2.96) regarding the use of the received grants for human resource recruitment purposes. For question A7 (M = 3.23), 31 percent of respondents disagreed that the decision-making regarding becoming a WCU mainly depends on superiors' opinions (e.g., presidents, vice-presidents, and deans of administrative offices) and that other middle managers (e.g., deans of schools and directors of departments) seldom express their opinions. Twenty-seven percent of the returns illustrated a somewhat negative response to question A10 (M = 3.13) concerning most interdisciplinary research projects in their affiliated universities.

In dimension B, just one of seven questions gained a lower percentage of positive responses. For instance, question B5 (M = 2.62) had 52 percent of respondents in disagreement, indicating that approximately half of the respondents disagreed that their affiliated universities have an anti-marketization-oriented campus culture as an obstacle to becoming a WCU.

Although more than 80 percent of the returns showed positive responses on dimension C, two of the nine questions showed a lower percentage of positive responses. For instance, for the question C5 (M = 2.94), 60 percent of the respondents believed that the target market of their affiliated universities for international student and scholar recruitment does not focus more on East and Southeast Asia than on other regions, while 40 percent of them thought it does. Question C9 (M = 3.10)—a quick update for vacant space and outdated buildings in their affiliated universities—gained 71 percent positive and 29 percent negative responses.

Dimension D included eight questions and two of the eight questions gained a lower percentage of positive responses. Compared with other questions for dimension D, question D5—the collaboration with international for-profit and not-for-profit organizations (M = 3.02)—had 71 percent positive and 29 percent disagreeing responses. Approximately 25 percent of the respondents negatively answered question D7 (M = 2.98) regarding the use of the grants for the purpose of student and faculty participation in international conferences and academic exchange activities.

Finally, both dimension E with six questions and dimension F comprising seven questions obtained positive responses. In particular, question F5: As leaders of the university, we need to learn new technologies (M = 4.27) had a 100 percent positive response, and question F6 (M = 2.67) showed a small gap between the percentage of respondents with positive responses (52 percent) and those with negative responses (48 percent).

4.1.2 Reliability Evaluation

The initial internal consistency for the pilot study survey was measured by using the Cronbach's alpha test and it was 0.933, which was considered as having excellent internal consistency. Table

4.1 shows the internal consistency for the scale. Eight questions increased alpha if they were deleted. Their removal from the scale would improve the alpha coefficient to .946. However, looking at the column of correlated item-total correlation in Table 4.2, the item-total correlation coefficients of eight questions were still below .40. Again, when these eight questions with lower coefficients were removed, the Cronbach's alpha of the overall scale increased to .949, indicating its great internal consistency.

Table 4.1. Initial Reliability Evaluation of the Pilot Study Survey

Item	Mean	SD	Item-Total Correlation	Alpha if Item Deleted	Item	Mean	SD	Item-Total Correlation	Alpha if Item Deleted
DAQ1	3.92	1.100	.644	.930	DDQ1	3.65	.905	.638	.930
DAQ2	3.73	1.173	.591	.930	DDQ2	3.63	.886	.549	.931
DAQ3	3.31	1.001	.577	.931	DDQ3	3.60	.748	.545	.931
DAQ4	2.90	1.015	.114	.935	DDQ4	3.21	.800	.675	.930
DAQ5	2.96	.862	.391	.932	DDQ5	3.02	.896	.552	.931
DAQ6	4.15	.826	.567	.931	DDQ6	3.46	.939	.673	.930
DAQ7	3.23	1.002	-.017	.936	DDQ7	2.98	.727	.575	.931
DAQ8	3.75	.837	.146	.934	DDQ8	3.35	.861	.433	.932
DAQ9	3.42	.750	.175	.933	DEQ1	3.69	1.001	.701	.930
DAQ10	3.13	.908	.559	.931	DEQ2	4.08	.763	.165	.934
DAQ11	3.38	.993	.551	.931	DEQ3	3.40	.869	.632	.930
DBQ1	3.94	.826	.679	.930	DEQ4	3.33	.879	.531	.931
DBQ2	3.90	.955	.704	.930	DEQ5	3.58	.801	.454	.932
DBQ3	3.56	.938	.697	.930	DEQ6	3.40	.664	.518	.931
DBQ4	3.85	.872	.510	.931	DFQ1 (reversed)	3.13	.908	.157	.934
DBQ5	2.62	.867	.082	.934	DFQ2	3.54	.803	.532	.931
DBQ6	3.37	.817	.405	.932	DFQ3 (reversed)	3.60	.823	.357	.932
DBQ7	3.37	.864	.444	.932	DFQ4	3.50	.960	.664	.930
DCQ1	3.58	.936	.551	.931	DFQ5	4.27	.689	.276	.933
DCQ2 (reversed)	3.29	.800	.268	.933	DFQ6	2.67	1.024	.125	.935
DCQ3	3.48	1.038	.394	.932	DFQ7	3.81	.864	.216	.933
DCQ4	3.44	.895	.685	.930					
DCQ5 (reversed)	2.94	1.018	.181	.934					
DCQ6	3.65	.837	.484	.931					
DCQ7	3.63	.715	.727	.930					
DCQ8	3.44	.895	.683	.930					
DCQ9 (reversed)	3.10	1.034	.425	.932					

Note: The bold number indicates that the alpha increases when the item is removed.
Source: By the author.

Table 4.2. Second Reliability Evaluation of the Pilot Study Survey

Item	Mean	SD	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
DAQ1	3.92	1.100	.639	.943
DAQ2	3.73	1.173	.601	.944
DAQ3	3.31	1.001	.597	.944
DAQ5	2.96	.862	**.352**	.946
DAQ6	4.15	.826	.576	.944
DAQ9	3.42	.750	**.186**	.946
DAQ10	3.13	.908	.545	.944
DAQ11	3.38	.993	.545	.944
DBQ1	3.94	.826	.693	.943
DBQ2	3.90	.955	.706	.943
DBQ3	3.56	.938	.697	.943
DBQ4	3.85	.872	.499	.944
DBQ6	3.37	.817	**.378**	.945
DBQ7	3.37	.864	.466	.945
DCQ1	3.58	.936	.531	.944
DCQ2 (reversed)	3.29	.800	**.274**	.946
DCQ3	3.48	1.038	**.398**	.945
DCQ4	3.44	.895	.660	.943
DCQ6	3.65	.837	.476	.945
DCQ7	3.63	.715	.730	.943
DCQ8	3.44	.895	.709	.943
DCQ9 (reversed)	3.10	1.034	.460	.945
DDQ1	3.65	.905	.643	.943
DDQ2	3.63	.886	.577	.944
DDQ3	3.60	.748	.587	.944
DDQ4	3.21	.800	.641	.944
DDQ5	3.02	.896	.514	.944
DDQ6	3.46	.939	.714	.943
DDQ7	2.98	.727	.577	.944
DDQ8	3.35	.861	.454	.945
DEQ1	3.69	1.001	.741	.943
DEQ3	3.40	.869	.639	.943
DEQ4	3.33	.879	.564	.944
DEQ5	3.58	.801	.454	.945
DEQ6	3.40	.664	.514	.944
DFQ2	3.54	.803	.545	.944
DFQ3 (reversed)	3.60	.823	**.345**	.946
DFQ4	3.50	.960	.670	.943
DFQ5	4.27	.689	**.269**	.946
DFQ7	3.81	.864	**.213**	.946

Note: The bold number refers to its item-total correlation coefficient below .40.
Source: By the author.

4.1.3 Limitation of Factor Purification of the Pilot Study

The KMO of this pilot study survey was .387, indicating the misfit of the EFA to extract latent factors. The sample size of the pilot study is likely to become an obstacle for the EFA. The sample of the pilot study was 52, far from the minimum requirement for the sample size > 100. Although studies with small sample sizes are likely to produce reliability, a large sample size is still acceptable, required, and beneficial in the context of the EFA (Kline 1994). Conducting the EFA, therefore, is inappropriate because the results would be seriously biased. As Robin K. Henson (2001) demonstrated, whether a survey is reliable and valid can be influenced by "different samples, testing conditions, and any other factor that may affect observed scores" (p. 178).

The language of this pilot study questionnaire was somewhat complex and involved the use of jargon. As one respondent commended, "It is hard to understand this questionnaire. Some descriptions are unclear. Some are nothing special to survey because every university does similar thing (e.g., marketing and administrative communication online system)" (A017).

The third part of the pilot study survey was intended to rate these six predesigned dimensions in accordance with respondents' perceptions (Table 4.3). Sixty-five percent of the 52 respondents believed that the most important dynamic capability of targeted Taiwanese universities is dimension A—positioning, while approximately 65 percent of the returns considered that dimension B—organizational history and culture—is the least important. Other dimensions were given second to fifth significance levels and two dimensions simultaneously showed on the same level. For instance, on the second significance level, the top two dimensions were dimension F—innovation and leadership (37 percent) and dimension C—coordination and integration (29 percent). The top three dimensions on the third level were dimension F (23

percent) and dimension C (21 percent) as well as dimension D—learning (21 percent). On the fourth significance level, 29 percent of the returns checked dimension D (29 percent) and dimension C (21 percent). On the fifth significance level, the top two dimensions were dimension E—Reconfiguration and transformation (33 percent) and dimension D (29 percent). This indicated that except for dimensions A and B, other dimensions are difficult to place in a clear order. As one respondent said, "In my opinion, the six dimensions are equally important, hard to be rated" (A003).

Table 4.3. Rating the Six Predesigned Dimension of the Pilot Study Survey

Dimension / Scale	A	B	C	D	E	F
1 (most important)	65.4	0	9.6	5.8	3.8	15.4
2	7.7	5.8	28.8	9.6	11.5	36.5
3	13.5	7.7	21.2	21.2	13.5	23.1
4	9.6	3.8	21.2	28.8	17.3	19.2
5	3.8	17.3	13.5	28.8	32.7	3.8
6 (most unimportant)	0	65.4	5.8	5.8	21.2	1.9

Note: A is Positioning, B is Organizational history and culture, C is Coordination and integration, D is Learning, E is Reconfiguration and transformation, and F is Innovation and leadership.
Source: By the author.

In addition, regarding the issue of WCUs, several respondents indicated some challenges and dilemmas. The following quotations are their feedback.

> In my opinion, the quantitative statistics and digital technology are overvalued. The uniqueness and core values of a university are also lacking. The nature of university education may be neglected since the overvaluation of comparing universities' performance among countries. Finally, it is a narrow, wrong perspective that the increasing number (e.g., the ranking of universities) is interpreted as the quality improvement of university education. (A041)

> Two big challenges Taiwanese universities face include (a) faculty members who are earnest in their work are not truly encouraged primarily because of the limits of the government regulation of university management in Taiwan, and (b) the financial resources are often concentrated in only a few universities. (G061)

To sum up, the pilot study with the small sample size is reliable. According to the reliability analysis, 16 questions are considered to be revised or removed. In order to deeply understand senior administrators' opinions regarding the issue of WCUs and the strategic management practices of targeted Taiwanese universities, individual interviews were conducted and the discussion is shown in the following section.

4.2 SEMI-STRUCTURED INTERVIEWS

The purpose of individual interviews in the research study is twofold: (a) to explore salient themes in the ways that most interviewees discuss the issue of WCUs and the practices of their affiliated universities and (b) to form some questions that can be used in the main survey. Ten senior administrators accepted the invitation to face-to-face interviews. These ten interviewees, who serve in the four targeted Taiwanese universities, included nine males and one female; one president, three vice presidents, one dean of administrative offices, two deans of schools, and three directors of departments. The interviews are qualitatively-oriented and the relevant results are discussed in this section.

4.2.1 Although the Five-Year-50-Billion NT Dollars Budget Project is Worthy, What a University Pursues is a Useful University, not a World-Class One

The Taiwan government has initiated the Five-Year-50-Billion NT Dollars Budget Project and during the period from 2011 to 2016, 12 universities have been awarded grants to promote their world-class standings. Although many criticisms about this project permeate academic

communities in Taiwan, four of ten interviewees positively approved the advantages of this project, including investing resources in higher education, promoting the reputation of their affiliated universities, and encouraging faculty to conduct research.

> This project can satisfy the needs of my affiliated university where there is a lack of resource inputs. In the past, some faculty members just offered instruction, and did not participate in research. Now, because of this project and its consequent reward mechanism for faculty performance in research, those faculty members pay more attention to do research. In addition, faculty can share a common goal, that is, to improve the world-class standing of my affiliated university. (I-01-February 12, 2015)

> The impact on the overall campus…I believe this project has a certain benefit to increase universities' reputations. Many universities market themselves when they receive funding from national higher education projects, such as the Five-Year-50-Billion NT Dollars Budget Project and the Teaching Excellence Project. (I-02-March 9, 2015)

> In general, I affirm that this project has substantial benefits to research universities like my affiliated university. These benefits include the financial support for research and teaching and the improvement of the research environment and infrastructure. I believe that, to some extent, this will improve the quality of faculty members' teaching and research. (K-01-March 19, 2015)

> [T]his project is good for teaching, research, and service in a university. For example, if you have money, you can buy advanced equipment and technology for research, or allocate some to increase opportunities for students and faculty members to participate in academic exchange programs and internationalized activities, or seek collaboration opportunities with industry. In brief, the money input is a great help. (K-03-March 27, 2015)

Several interviewees suggested that the most important thing in Taiwan higher education is to pursue a *useful university with a good nature*, not a world-class one. And as Salmi (2009) stated, WCUs cannot be self-declared. They said,

> The most important thing for a university is something inside…. [R]ather than being a world-class university, being a useful university is more significant, realistic, and easier to achieve. Who can define world-classness? Not by yourself, but it is being defined by others. (A-03-March 17, 2015)

> Actually, universities with famous reputations and global standings do not declare themselves as world-class; they do not wait to be selected and asked to improve their performance. (K-02-March 25, 2015)

To sum up, these interviews show that in practice, Taiwanese universities need to pay more attention to their usefulness and active improvements, the basis for sustainable university development and for the pursuit of WCU status.

4.2.2 WCUs are not Special Places Where Teaching and Community Engagement Can be Neglected

Most WCUs are research universities (Altbach 2007). Producing high quality research becomes a major tactic to increase *tangible, substantial* performance of faculty and universities around the world. However, nine of ten interviewees commented that core values and distinct features are lacking in their affiliated universities as a result of the trend of pursuing world-class university status. As an interviewee stated, "if we always follow the trend of pursuing WCU status without considering our needs, we will be overwhelmingly influenced by the international trend, and then, we will lose our own characters and distinctive features both on the university level and on the national level" (A-03-March 17, 2015).

Several interviewees proposed that a WCU should have academic freedom, effective communication and a strong consensus among faculty members, high-caliber scholars and students, abundant resources, high-quality research environments, and internationalized activities as well as the capability of self-reflection. They said,

> Learners including faculty and students have sufficient freedom in the university, such as academic freedom and learning freedom. And then…faculty members should achieve a consensus about university improvement and its future development. (K-02-March 25, 2015)

> In my opinion, the most important thing a world-class university should have is the academic ideal of pursuing truth. Of course, other important things include high-caliber scholars and brilliant students, advanced technologies and information resources, and adequate funding. (I-01-February 12, 2015)

> As a world-class university, in my opinion, it should have three essential capabilities. First, self-reflection. A university needs to create a self-reflected campus culture. This helps us to know what needs to be improved. Second, internationalization. In order to become a world-class university, participating in internationalized activities is necessary. Finally, distinctive features. This is the only way to be unique…to make a university stand out in a crowd of higher education institutions in Taiwan. (A-01-March 2, 2015)

Good universities should focus on education students, not just on research performance. As an interviewee noted, "In my opinion, a university should have a learner-based orientation even though it is a research university" (K-02-March 25, 2015). In addition, making social contributions are important because it serves as a bridge between universities and external societies both domestically and around the world. As some interviewees indicated,

> A world-class university should have three capabilities: innovation, impact, and engagement. A good university should intend to make the innovations in research, teaching, and curriculum. The capability of the impact indicates whether the faculty's research and teaching have a lasting influence in society. Besides, in a good university, the faculty and students are engaged in contributing their expertise to the societies and making life better. (K-03-March 27, 2015)

> We need to think how research can be done for maximum effectiveness and how it makes our lives better. This is what sustainability is. (C-02-March 21, 2015)

> The expectation of university education is… [that] students become social participators who contribute their expertise to the society. I agree with the idea concerning university classification. It is impossible that in all universities all students become leaders or scholars. Each student should utilize their knowledge and skills learned from universities to facilitate sustainable development of the society. (C-01-March 20, 2015)

> The fundamental task of a university is to educate talented students and to empower them to contribute themselves to the society. Now this task seems to be neglected. (I-02-March 9, 2015)

According to these interview narratives, universities should supply their internal stakeholders—students and faculty—with better instruction and research environments because their graduates and faculty members' research performances can be of great help in establishing these universities' external social networks. In other words, in order to possess sustainable

competitive advantages, both internal and external management should be emphasized by universities, and more importantly, good internal management benefits the establishment of external management.

4.2.3 Social Relations Facilitate the Pursuit of WCU Status

Pursuing WCU status requires three social relations between universities and industry and between universities and the government. A social relation is the industry-university collaboration. Such collaboration can be viewed as the presentation of universities' "social responsibilities" (I-02-March 9, 2015). For instance, one interviewee said, "one role my affiliated university plays is to drive the development of the local society" (K-01-March 19, 2015). Moreover, through collaborative activities, faculty members have opportunities to apply their research outcomes in practice and companies also have the chance to consult with university faculty for technology development. "Both of them are engaged in innovation and in the promotion of social development; of course, the industry-university collaboration is a source of universities' revenues" (K-03-March 27, 2015). Another interviewee also noted, "in addition to the fundraising efforts from alumni, the industry-university collaboration is also a great help to universities" (I-02-March 9, 2015).

Another social relation involves the Taiwan government, particularly the Ministry of Education. The decision-making of the government has a great impact on university administration and development. For instance, the issue about "students from China" (I-02-March 9, 2015) is an obstacle to student recruitment because of the limitations in the regulations permitting students who come from China to study in Taiwan. For instance, students from China cannot work in Taiwan after their graduation and the diploma in medicine awarded by HEIs in

China cannot be recognized. Thus, "if the limitations about students who come from China cannot be removed or overcome, they may have an impact on Taiwanese universities' reputations and visibility in the global higher education environment" (A-03-March 17, 2015).

The government-university relation is influential and powerful because "no political impact a university has implies that it will not be able to obtain government funding" (A-03-March 17, 2015). However, an interviewee criticized this perspective by saying that "whether a university receives the grants of this project cannot be determined by a few policymakers and the project's committee members" (A-01-March 2, 2015). Moreover, "the use of the grants a university receives greatly relies on the leaders' thoughts and their interaction with the officers of the Ministry of Education" (C-01-March 20, 2015). Thus, many interviewees strongly criticized the manner in which this project was implemented and its consequent effects, because to some extent, "non-academic factors may cause the inequitable allocation of financial resource" (A-02-March 12, 2015). This is a "re-allocation of resource" (K-01-March 19, 2015).

4.2.4 The Lack of a Clear, Specific Positioning is a Challenge

Being a WCU and possessing sustainable competitive advantages greatly depend on how universities position themselves. According to interviewees' opinions, their affiliated universities are *research-oriented comprehensive universities* (I-02-March 9, 2015; A-02-March 12, 2015; K-01-March 19, 2015; C-01-March 20, 2015) because these universities include many academic and applied fields, cutting-edge research, outstanding teaching, and close connection with Taiwanese society.

In these interviews, several factors are used to distinguish a targeted university from other HEIs in Taiwan. First, these targeted universities gain their competitive advantages because of

their geographic locations. The metropolitan location with a convenient transportation system benefits targeted universities, because compared with those universities in rural areas, these universities have more opportunities to possess "many centers in research and technology" (I-01-February 12, 2015) and to recruit "international scholars and students" (A-02-March 12, 2015). Second, a university's positioning is related to its history. One interviewee stated, "the long history is a help for increasing reputation, one of the competitive advantages of my affiliated university" (C-01-March 20, 2015). Another interviewee also noted, "universities with a long history have many alumni and some fields with high-reputation, high-caliber faculty, and more resource" (I-01-February 12, 2015). Also, university internationalization is necessary in current age. "Our students and faculty should go to globe and participate in international activities even though our university is located in Taiwan" (A-02-March 12, 2015). For all targeted universities internationalization is "a very important way which helps others to know you and increase your visibility, if you want to be world-class" (K-03-March 27, 2015).

No clear positioning and indistinct features of targeted universities are the main comments from these interviews. For instance, a university positions itself as a grand university and its goal is to educate leaders for the future; "however, this is too vague," one interviewee serving in this university said (C-02-March 21, 2015). Moreover, similar to the three university missions—teaching, research, and service, "internationalized activities and integration with local societies are focuses for each university; in brief, the positioning of every university is similar without differences" (K-02-March 25, 2015). "Only when a university confirms its core values, its positioning will be unambiguous and it will not be submerged by this trend of pursuing world-class university status" (A-03-March 17, 2015). And "a university should contentiously enhance its capabilities for research, teaching, and internationalization. This university succeeds in

possessing world-class status when it is seen as one of the most reputable HEIs in Taiwan and everyone wants to attend it" (C-01-March 20, 2015).

4.2.5 The Five-Year-50-Billion NT Dollars Budget Project Label

The history and culture determine the future of a university. As one interviewee said, "a university existing in the society is unlikely to escape from social cultures completely" (K-01-March 19, 2015). Also "a university will become better and sustainable only when Taiwanese citizens support it" (C-01-March 20, 2015).

According to these interviews, two issues regarding the organizational history and culture emerge; one involves the university itself, and the other involves external social regulations and relations. In the past, the ivory tower was used as shorthand for the university; however, "this is inappropriate to depict a modern university in the current age because of faculty diversity and their participation and contribution to local society" (K-02-March 25, 2015). Universities are no longer disconnected from the social needs and they begin to "improve their performance and internationalize themselves in order to make them better and increase their visibility around the world" (A-01-March 2, 2015).

In terms of social culture in Taiwan, the Five-Year-50-Billion NT Dollars Budget Project has a labeling effect. "A university excluded from the recipient list of the project implies that it is not excellent enough to be a targeted one ranked at the first-class level" (A-01-March 2, 2015), and "if a university is not research-oriented, it seems to be categorized as a second-class institution or as inferior" (I-02-March 9, 2015). Moreover, as world university rankings and university evaluation emerge, the quantitative research index (e.g., faculty publications) dominates the climate within universities. For instance, one interviewee mentioned, "overvaluing

research always happens in higher education; for the requirement of minimum teaching credits, faculty never decrease their teaching loads, but they may put less attention to their instruction" (K-02-March 25, 2015). Thus the development of a university is deeply affected by the fabric of the social culture and the public values.

4.2.6 Universities should focus on the Integration of Resources

Integrative activities such as strategic alliances and mergers among universities in Taiwan have become the alternative way to manage universities and help them survive. The issue of university mergers is popular in low-birth-rate Taiwan. University mergers have an advantage in deals with bankrupt universities, but they involve a complicated process and the related political regulation. Among the ten interviews, just one interviewee talked about it. He stated,

> The government policy is an important medium for university mergers. For instance, if the Taiwan government supports the merger between my university and other HEIs, academic fields can be reorganized, resources can be integrated, and the pool of faculty members can become more diverse as well as my affiliated university can be more comprehensive. On the contrary, if the Taiwan government does not support it, my affiliated university represents the domination of key fields which have more financial and human resources than the marginalization of those which have less resources. (I-01-February 12, 2015)

In this research study, the issue of university mergers was excluded for two reasons: (a) to some extent, the success of university mergers is determined by the Taiwan government, and not entirely controlled by universities themselves; and (b) my interviewees seldom talked about the issue of university mergers.

Based on several interviewees' suggestions, the integrative activities within a university benefit effective resource utilization and the diversity of faculty and students. As one interviewee noted, "[t]he integrative power is double…[because] the integration of small, related departments

facilitates resource sharing, reduces the unnecessary duplication of administrative efforts, and increases communications between students and faculty and among faculty" (A-03-March 17, 2015). Another interviewee suggested,

> We need to learn from Singapore. Singapore creates its own way, which recruits human resources from different countries. The Singaporean culture is inclusive and is a way of supporting its survival. Recruiting talented people from around the world with high salaries can increase the diversity of its human resources and the research quality of its universities. (A-03-March 17, 2015)

As a result, these interview narratives indicate that through integrative activities, Taiwanese universities can combine and reconfigure resources, increase the effectiveness of the use of resources, and develop specific avenues for university management.

4.2.7 Learning Enhances the Pursuit of WCUs

Benchmarking is one way by which these targeted universities learn from other HEIs, especially the universities outside Taiwan. All interviewees indicated that the targets their affiliated universities chose are famous research universities in the United States, such as the University of Illinois at Urbana–Champaign, the Pennsylvania State University, and the University of California, San Diego. The reasons why these US research universities were selected include (a) "the core values of the target and its geographic environment are similar to those of my affiliated university" (K-01-March 19, 2015), and (b) "we have the research collaboration project with the US university" (A-01-March 2, 2015). However, several interviewees queried the effectiveness of benchmarking. For instance, one interviewee complained "there may be some ideas exchanged when the president and his leadership team visit the target university, but, from the teaching perspective, I do not think there are specific, authentic connections between the target and my affiliated university" (K-02-March 25, 2015). Another interviewee commented,

> Benchmarking is a good method for comparison so far as it goes. However, does this help us to achieve the goal of becoming a world-class university? Not really. If there are no substantial and specific collaborations, the partnership is difficult to be sustainable. (C-02-March 21, 2015)

The collaboration between a university and other organizations such as other HELs, governments, and for-profit and not-for profit organizations in Taiwan or around the world also contributes to the partnership and the advancement of their mutual interests as well as the traditional three university missions—teaching, research, and service. As one interviewee described, "the collaboration among different organizations involves the professional knowledge consultation and technology transfer but also activates faculty's instruction with their research" (I-01-February 12, 2015).

Another way to enhance learning is to establish *cross-discipline communities*, where social networks share common goals and values and (or) the appropriate collaboration is created among diverse academic groups. As one interviewee described, "now doing interdisciplinary research gradually gains attention…we encourage faculty to conduct such research and to organize topic-related communities, whereby faculty and their partners can exchange their ideas, the gap among different fields and organizations can be reduced, and even the advantages in the academic fields can be strengthened" (I-02-March 9, 2015). Moreover, another interviewee expressed, "when doing interdisciplinary research, we should concentrate our attention on the connection between the research and the local culture in Taiwan. Otherwise, becoming a world-class university is impossible and Taiwanese universities are just overwhelmingly influenced by the trends of globalization in higher education" (A-03-March 17, 2015). Hence, these interdisciplinary communities serve as a platform of dialogue and innovation, but also as a connection between theories and practices.

4.2.8 Professional Leadership and Organizational Cohesion Accelerate the Pursuit of WCU Status

Of the ten interviews, four interviewees believe that the success or failure of a university greatly relies on the chancellor's and the leader team's vision and values. The leaders play an important role to guide the entire organization and promote organizational cohesion among different departments and individuals. Their narratives included,

> The most important factor is a leader's vision and attitude, which can be considered as the basis of directing the university development and of influencing their subordinates' actions and responses. (C-01-March 20, 2015)

> When a leader's vision is consistent with a university's core values, the reforms in that university can be implemented effectively and the organizational cohesion can be created with less resistance from faculty members. (A-03-March 17, 2015)

> Sometimes, faculty and students may not directly perceive the benefits of the Five-Year-50-Billion NT Dollars Budget Project. Hence, leader teams should create and promote the cohesion and consensus regarding the goal of pursuing world-class universities and resource allocation. (I-02-March 9, 2015)

To sum up, similar to Salmi's (2009) observation, these interviewees argued that professional leadership is one of the important ingredients of becoming a WCU. Engaging in university administrative affairs, professional leaders would promote organizational cohesion and lead students and faculty toward the mutual goal of achieving a WCU.

4.2.9 Rankings Promote and Impede the Sustainability of University Development

World university rankings (e.g., the ARWU, *THE*, and QS rankings) have triggered the pursuit of WCUs and higher education competition around the world. These rankings are seen as a symbol of the global reputation of a university, but they also cause critique concerning meaningless numeric presentation and the loss of core values of universities. One interviewee

saw rankings as a game metaphor and he argued, "Relying much on this numeric game means that universities are controlled by external forces and not really governed through their administrative personnel" (C-01-March 20, 2015). Another two interviewees also commented, "[t]his ranking number is helpless to my affiliated university. If the core values of a university cannot be found, created, and maintained, it is only an evaluated university on the ranking lists, and not a useful, world-class one" (A-03-March 17, 2015) and "reviewing and contemplating why a university is gradually losing its positioning and core values is a better way to sustain university development" C-02-March 21, 2015).

4.2.10 A Project That Deepens the Gap between the Sciences and the Humanities

The climate of overvaluing scientific fields and undervaluing humanities disciplines pervades Taiwanese society. The Five-Year-50-Billion NT Dollars Budget Project focuses on scientific fields; as one interviewee described it, "this project is likely to trace the international trend which the scientific, practical fields are emphasized in most famous top research universities" (A-03-March 17, 2015). Moreover, this climate exists in the university structure and has impact on resource allocation. One interviewee expressed his observation.

> In my affiliated university, the gap among the sciences, humanities, and the social sciences is obvious. For instance, the science school has a long history since the creation of this university, approximately more than 80 years, and it has more than 200 faculty members, a good research environment, and advanced technology and the newest equipment. On the other hand, my affiliated school focuses on the social sciences, was created less than 20 years ago, and has less than 50 faculty members. Moreover, the science school gains more opportunities and funding through industry-university collaborations, while my affiliated school seldom collaborates with industry and gains less funding from such collaborations. I think this is a big difference between these disciplines. Patent creation and technology transfer seldom happens in my affiliated field. (I-01-February 12, 2015)

Although this climate exists in several dimensions, some interviewees criticized it as needless and suggested diverse disciplines have their own values and usefulness. They stated,

> Most funds are allocated to science and engineering fields, but, I believe, humanities and social sciences can create more academic advantages with less money, such as the caring of minority and the improvement of labor rights. (K-01-March 19, 2015)

> The sciences and humanities are indeed a little different, especially from the university-industry collaboration perspective. However, I believe, the interdisciplinary collaboration serves as an opportunity to integrate resources among different fields and as a platform for faculty to engage in the dialogue and exchange their ideas. (I-02-March 9, 2015)

> …the biggest challenge is the lack of diverse academic values as the scientific fields are given priority emphasis in the Five-Year-50-Billion NT Dollars Budget Project. However, sometimes, the social contribution of a social science-based university is more than that of a science-based university. I suggest the public values regarding social contributions of different academic fields should change. (A-01-March 2, 2015)

Based on these interview narratives, different academic fields have their value. These interviewees also argued that overvaluing certain academic fields is the cause of the partial, non-comprehensive development of universities.

4.2.11 The Lack of Sustainable Resources are Challenges to University Development

Even though many interviewees affirmed the significance of the Five-Year-50-Billion NT Dollars Budget Project, they still expressed their deep skepticism about the stability of the grants of this project. One interviewee indicated, "the grants of the Five-Year-50-Billion NT Dollars Budget Project are decreasing and they are limited…[because] the Taiwan government is experiencing national financial difficulties" (C-01-March 20, 2015). Another interviewee also stated, "The grants of the Five-Year-50-Billion NT Dollars Budget Project are unstable and

competitive… and a recipient this time may not obtain project funding next time" (I-02-March 9, 2015).

Several interviewees also complained that their affiliated departments do not have better administrative performance, and still lack financial and human resources. One interviewee described it this way: "it is impossible that all departments receive the part of the grants of the Five-Year-50-Billion NT Dollars Budget Project; these grants are limited" (I-01-February 12, 2015). Another interviewee indicated, "this is really an ironic situation. Although my affiliated university receives funding, my department lacks sufficient money and faculty members, which are controlled by the president and his team of my affiliated university" (K-02-March 25, 2015).

Moreover, one interviewee indicated that the top two challenges are the lack of stable financial and human resources even though his affiliated university received considerable grants from the Five-Year-50-Billion NT Dollars Budget Project. He said,

> To sustain a competitive advantage, in fact, still requires resource inputs… [hiring] new, young faculty, whereby University C has a new human resource input and more connections with international HEIs. In addition, it is important to assure continuous investment… where many researchers are able to do research in accordance with where the money flows. This is not good for the sustainable development of a university. Think about it…can the research projects be suspended when a university does not receive the national grants? (C-02-March 21, 2015)

Based on these interviews, the uncertainty and cut of government grants of the Five-Year-50-Billion NT Dollars Budget Project are obstacles to university development. In brief, stable finance and appropriate human resources are necessary for the sustainability of universities.

4.2.12 University Internationalization is Often Impeded by Funding

University internationalization is seen as a way of entering international academies and it is generally a good way to improve global standings. However, seven of ten interviewees indicated the challenge of recruiting international scholars and students results from the lack of money. As one interviewee stated, "we do not have sufficient funding to recruit long-term international scholars and provide student scholarships" (K-02-March 25, 2015). Another interviewee also noted, "The lack of money is a disadvantage when a university wants to recruit high-caliber international scholars and brilliant international students. In the long run, Taiwan will lose its competitiveness" (C-01-March 20, 2015).

According to four of ten interviews, another reason why international scholars do not come to Taiwan involves the national regulations concerning faculty pay. They noted,

> The faculty pay in Taiwan is approximately one third of that in Singapore and Hong Kong. And the salary for faculty serving in public universities is a little inflexible; it is controlled by the Ministry of Education. (K-03-March 27, 2015)

> Because of the regulations regarding the fixed rule of faculty pay, the salary, even with some additional bonuses, is still not attractive enough to international scholars. (I-02-March 9, 2015)

> Why do international scholars not come here? It, in real life, involves the faculty pay. International scholars will not come to Taiwan when they know how much income they can earn. (C-02-March 21, 2015)

> Compared with other universities in other countries, it is a little difficult for my affiliated university to provide similar or the same amounts of salaries for international scholars. (A-02-March 12, 2015)

National regulations in some ways also cause challenges in recruiting international students, especially those from China. As one interviewee described it, "to some extent, the survival of a university depends on its teaching quality. How do we teach without students? I suggest the Taiwan government should loosen restrictions

against the recruitment of international students from China" (A-03-March 17, 2015). Another interviewee argued, "the regulation concerning the recruitment of international students from China really has an impact on university internationalization" (I-01-February 12, 2015).

4.2.13 The Effectiveness of Flexible Merit Pay for Faculty is Limited

Flexible merit pay for faculty involves the recruitment and retention of high-caliber scholars. Faculty's publication in famous international journals (e.g., SCI and SSCI journals) is a significant index in global rankings such as the ARWU, *THE*, and QS rankings. To achieve the goal of pursuing WCUs and to recruit high-caliber scholars, many universities have developed the reward system for faculty called flexible merit pay; in addition to their monthly salaries, faculty members can receive extra funding based on exceptional performance. However, the money from the flexible merit pay mechanism is limited and useless for recruiting scholars. As one interviewee admitted, "in fact, the offer of the flexible merit pay is not attractive enough to famous, respectable scholars" (K-01-March 19, 2015).

In addition, within interviewees' narratives there also existed a notable contradiction: although flexible merit pay is viewed as a strategy to encourage faculty publications and retain talent, it is also seen as a source of conflict between faculty members. One interviewee noted, "this extra funding stream is a little helpful to faculty income, but it causes a potential negative climate—where you have, but I do not" (I-02-March 9, 2015). Another interviewee also indicated, "different universities have their own system…. Such inconsistencies on faculty extra income may cause the re-allocation of financial resources and the political conflict and competition among faculty members" (K-02-March 25, 2015).

4.3 MAIN SURVEY

The main survey was developed after the first-stage pilot study and the second-stage personal interviews. The main survey consists of 52 questions, including 35 revised questions from the pilot study survey and 17 questions developed from interviews. The dimension titles are removed and items are in disorder in order to reduce the common method biases (Podsakoff et al. 2003). The section is devoted to analyses involving the EFA and CFA of the main survey and other statistical techniques in order to respond to the research questions of this research study.

4.3.1 Demographic Profile

In this main survey, 460 senior administrators in the ten targeted universities in Taiwan were invited and 227 responded to the survey (49 percent response rate). Nine returns were excluded because of missing data and/or unengaged responses. Thus, a total of 218 possible responses remained. Table 4.4 illustrates the demographics of 218 respondents serving in these ten universities. Of the ten universities, nine are public and one is private. For the demographic variables, two are multiple-answer questions including respondents' administrative positions and how respondents perceived the university type. For instance, a professor can serve as the school dean and the department director at the same time. In addition, university stratification in Taiwan seems unclear and some universities are transforming. Thus answers to these two multiple-answer questions depend on respondents' individual opinions.

Of 218 respondents, the difference between male to female ratio was more than four to one. More than 80 percent of the respondents were between 41 to 60 years old. For the administrative positions, approximately 85 percent of respondents served as the middle managers

of their affiliated university, including the deans of schools (13 percent) and the directors of departments (74 percent). The return data indicated four respondents have multiple administrative positions simultaneously.

For the information about respondents' affiliated universities, most respondents (more than 90 percent) indicated their affiliated universities are research-activity-based comprehensive ones and 10 respondents checked that they are teaching-activity-based comprehensive ones. However, among these 10 respondents, nine believed that their affiliated universities are both research- and teaching-based. In addition, as shown in Table 4.4, respondents also categorized the types of their affiliated universities in accordance with academic fields.

Eighty percent of the respondents thought their affiliated universities had more than a 41-year history while 55 percent of the returns showed the histories of the universities being more than 81 years. Over 90 percent of respondents stated that their affiliated universities have more than six schools and approximately 50 percent of respondents stated that their affiliated universities have more than nine schools. Finally, 41 percent of respondents thought their affiliated universities have less than 50 departments, while 31 percent indicated their affiliated universities have more than 75 departments.

Table 4.4. Demographics of the Main Survey Respondents

Variable		n = 218 (%)
Gender	Male	177 (81)
	Female	41 (19)
Age	Less than 40 years old	2 (1)
	41-50 years old	56 (26)
	51-60 years old	132 (61)
	More than 61 years old	28 (13)
Position*	President	1 (0)
	Vice president	11 (5)
	Dean of administrative office	19 (9)
	Dean of school/ college	29 (13)
	Director of department/ institute	162 (74)
University type*	Research activity-based comprehensive university	201 (92)
	Teaching activity-based comprehensive university	10 (5)
	Service activity-based comprehensive university	0
	Teacher-education-based/ Normal university	0
	Humanities/social sciences-based university	10 (5)
	Medical university	17 (8)
	Technology/Engineering-based university	12 (6)
University history	Less than 40 years	44 (20)
	41-80 years	54 (25)
	More than 81 years	120 (55)
The number of schools	3-5 schools	19 (9)
	6-8 schools	89 (41)
	More than 9 schools	110 (51)
The number of departments	Less than 50	89 (41)
	50-75 departments	62 (28)
	More than 75 departments	67 (31)

Note: * indicates that is a multiple-answer question.
Source: By the author.

4.3.2 Scale Purification: Exploratory Factor Analysis (EFA)

The data received were subjected to data screening and question 6 was removed because of missing data. As one respondent suggested, “All universities do not have branch campuses” (J069). The analysis was followed by the reliability test and identification of the factors through

exploratory factor analysis (EFA). The reliability analysis was conducted twice. First, of the original main survey with 52 questions, its overall alpha was .957. Six questions including questions 17, 24, 39, 50, 51, and 52 increased the alpha when they were deleted. Then, without these six questions, the second reliability test was implemented. Its overall alpha increased to .965 and no questions increased the alpha value if they were removed. Hence, the main survey without these seven questions mentioned above was used to extract the factors by the EFA.

The EFA aims to identify the factors structure that explained dynamic capabilities of WCUs. The principal axis factoring extraction with the varimax rotation was employed. The KMO measure was .928. Bartlett's Sphericity was statistically significant (χ^2 = 6037.933, df = 990, $p < .001$). In this first EFA, nine factors were extracted and their cumulative variance explanation was 56.81 percent. With the threshold of 0.40, the items with lower factor loadings were removed and the EFA was re-run one by one. After the EFA was conducted repeatedly, a total of 22 items remained and their factor loadings were more than .40 without cross-loadings. According to the scree plot, these 22 items were divided into six factors (see Figure 4.1) with the cumulative variance explanation 57.71 percent. The factor loadings of the items ranged from .413 to .780.

Table 4.5 reveals the 22 variables and the extracted six factors. The first factor was comprised of five items and this designated the organizational mission and philosophy as one of the dynamic capabilities of a WCU. The second factor described the organizational structure and its positioning with four items. The third factor consisted of four items to describe the integration and transformation of an organization. The fourth factor regarding the partnerships and social networks was constructed with three items. The fifth factor depicted the organizational attractiveness and visibility with three items. Finally, the sixth factor included three items to

describe the allocation and reconfiguration among various resources an organization can receive. The Cronbach alphas of the six factors were .878, .765, .735, .809, .847, and .645 respectively. Thus this result indicates the internal consistency estimation of the data is adequate even though the sixth dimension's alpha is lower.

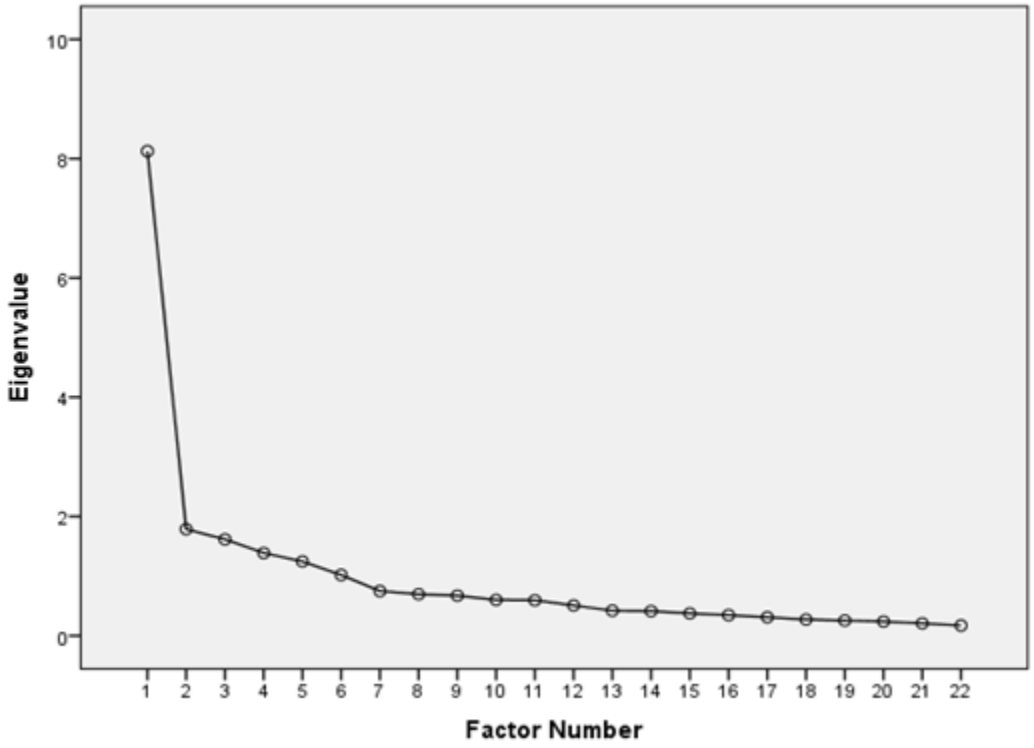


Figure 4.1. Scree Plot

Source: By the author.

Table 4.5. Extracted Six Factors of the Main Survey

Factor	Item	Description	Loading	Alpha for Factor
1: Mission and Philosophy	Q3	We have the clear, written vision and mission of becoming a world-class university.	.780	.878
	Q2	Each student, faculty, and staff understands that becoming a world-class university is the goal of our university.	.748	
	Q21	The benchmarking metrics, which are proper to our vision of becoming a world-class university, has been developed.	.647	
	Q4	Our students have strong university identity and close ties to our university.	.633	
	Q1	We have a well-developed strategic plan/action plan for sustaining our competitive advantage.	.557	
2: Structure and Positioning	Q27	Our university locating in the metropolitan area and having convenient transportation systems has more opportunities to recruit high-caliber talents in the domestic and around the world.	.769	.765
	Q26	The geographic location of our university benefits the establishment of a world-class university.	.679	
	Q31	The size of our university benefits the establishment of a world-class university.	.547	
	Q29	Because of the long history of our university, we have more opportunities to become the targeted university of the Five-Year-50-Billion NT Dollars Budget Project.	.503	
3: Integration and Transformation	Q34	Resource sharing is the fundamental motivation of our integrative activities.	.686	.735
	Q33	Integrative activities (e.g., to merge, to join University System of Taiwan or Mid-Taiwan University System, etc.) accelerate our university toward the goal of becoming a world-class university.	.579	
	Q48	We are very concerned with the loyalty of part-time faculty members at the university.	.525	
	Q44	The structure and size of our university are gradually transformed in order to increase the competitiveness.	.413	
4: Partnerships and Social Networks	Q38	We have close partnerships with industry.	.742	.809
	Q49	With good social relations, we often receive the donations from our alumni and industry.	.636	
	Q11	The research projects we conduct with industry greatly increase funding for the university.	.566	
5: Attractiveness and Visibility	Q8	We are more attractive than other universities at the domestic and global levels.	.686	.847
	Q7	We are attractive to international scholars and students.	.631	
	Q30	We have high visibility in the international higher education market.	.596	
6: Resource Allocation and Reconfiguration	Q13	Most government grants from the Five-Year-50-Billion NT Dollars Budget Project are for research support and equipment update purpose.	.659	.645
	Q14	In our university, the fields needing new technologies and equipment for experiments (e.g., medicine, science, technology, engineering, and mathematics) receive the funding more easily, which comes from the grants of the Five-Year-50-Billion NT Dollars Budget Project.	.651	
	Q15	In our university, a part of government grants from the Five-Year-50-Billion NT Dollars Budget Project is used in reward for students' and faculty's participation in international conferences and academic exchange activities.	.464	

Source: By the author.

4.3.3 Confirmatory Factor Analysis (CFA)

Those six extracted factors shown in the previous section were assumed as six dynamic capabilities of a WCU. In order to test such hypothesis and respond to my first research question, the hypothesized model (Figure 4.2) was designed and tested by the AMOS 21.0 with the ML estimation method.

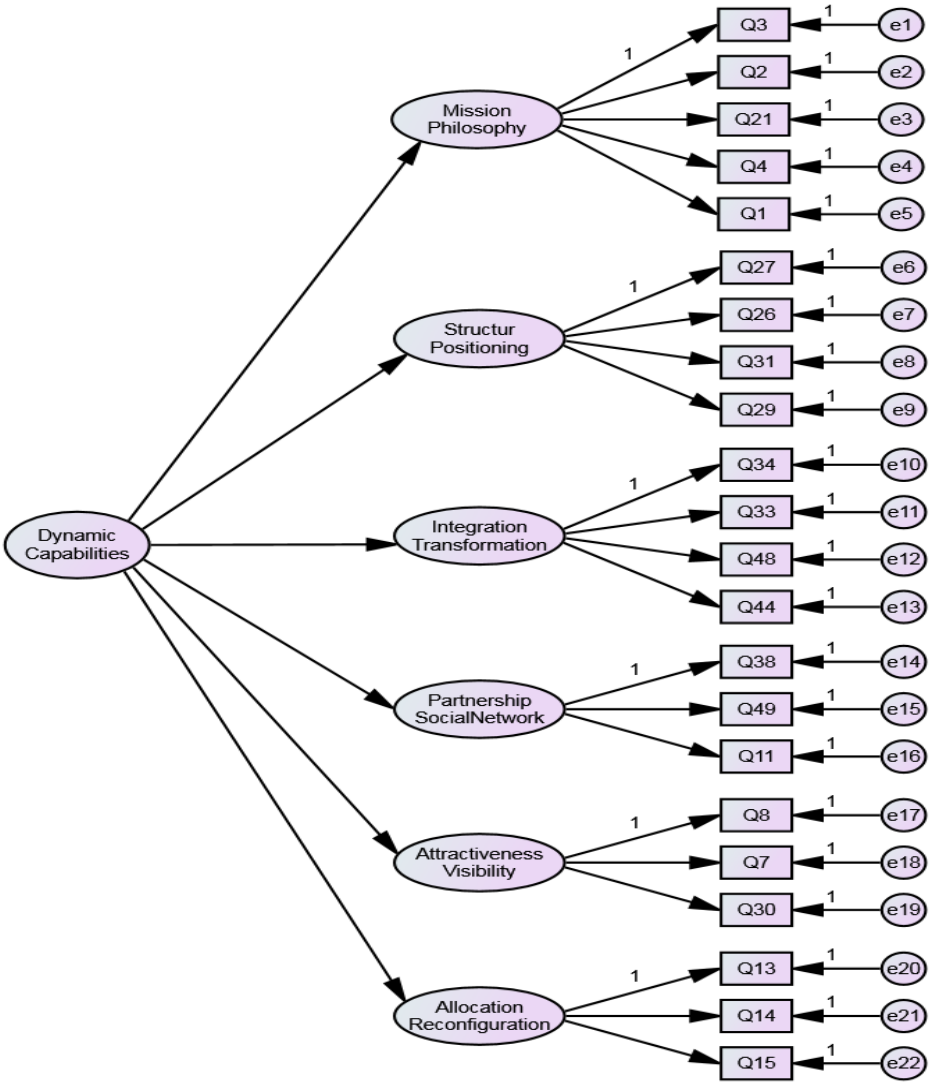


Figure 4.2. Hypothesized Model

Source: By the author.

4.3.3.1 Factor Characteristics

Table 4.6 shows the range of scores along with the means and standard deviations (SD) for the six extracted factors used in the study. The factor 6—Resource Allocation and Reconfiguration with the highest average (M = 3.91, SD = .70); the following is the factor 1—Mission and Philosophy with its M = 3.81 and its SD = .75. In addition, Attractiveness and Visibility (M = 3.73, SD = .82), Partnerships and Social Networks (M = 3.61, SD = .81), Structure and Positioning (M = 3.47, SD = .85), and Integration and Transformation (M = 3.29, SD = .76) exhibited the lower average scores. The statistic results illustrated that respondents perceived six factors on average somehow agreement (M > 3.0 on a 1 to 5 scale).

Table 4.6. Six Factors Characteristics

Factor	Number of Items	Range	Mean	SD
1: Mission and Philosophy	5	1.80 to 5.00	3.81	.75
2: Structure and Positioning	4	1.25 to 5.00	3.47	.85
3: Integration and Transformation	4	1.25 to 5.00	3.29	.76
4: Partnerships and Social Networks	3	1.67 to 5.00	3.61	.81
5: Attractiveness and Visibility	3	1.33 to 5.00	3.73	.82
6: Resource Allocation and Reconfiguration	3	1.67 to 5.00	3.91	.70

Source: By the author.

4.3.3.2 Normality and Multicollinearity

Data (n=218) were screened using univariate and multivariate tests for normality. The skew of these 22 items ranged from -.820 to .246 and Kurtosis values ranged from -.902 to .532, indicating this sample data have the univariate normal distribution. A review of the univariate normality test reported in Table 4.7 reveals no item to be substantially skewed and kurtotic. This sample data also have the multivariate normality according to the Mardia's multivariate kurtosis test. Thus the received data of current research study are normally distributed from both

univariate and multivariate analyses and the hypothesized model can be tested through the ML method.

Table 4.7. Summary of Observed Variables of the Hypothesized Model

Factor	Item	Mean	SD	Skew	Kurtosis
	Q3	3.86	.950	-.596	-.359
1: Mission and Philosophy	Q2	3.86	.917	-.470	-.567
Mardia's kurtosis = 2.091 ;	Q21	3.63	.991	-.259	-.838
p* (p+2) = 35	Q4	3.79	.881	-.267	-.480
	Q1	3.89	.849	-.702	.532
	Q27	3.59	1.104	-.336	-.864
2: Structure and Positioning	Q26	3.26	1.127	-.110	-.902
Mardia's kurtosis = 2.657	Q31	3.31	1.120	-.133	-.866
p (p+2) = 24	Q29	3.72	1.089	-.553	-.602
	Q34	3.55	.974	-.309	-.441
3: Integration and Transformation	Q33	3.20	1.149	-.135	-.837
Mardia's kurtosis = 2.056	Q48	2.92	.974	.246	-.470
p (p+2) = 24	Q44	3.50	.937	-.283	-.438
4: Partnerships and Social Networks	Q38	3.57	.944	-.212	-.709
Mardia's kurtosis = .774	Q49	3.72	.917	-.200	-.797
P (p+2) = 15	Q11	3.55	.998	-.181	-.797
5: Attractiveness and Visibility	Q8	3.90	.953	-.608	-.100
Mardia's kurtosis = .846	Q7	3.69	.907	-.360	-.449
p (p+2) = 15	Q30	3.58	.938	-.223	-.682
6: Resource Allocation and Reconfiguration	Q13	3.94	.963	-.820	.202
Mardia's kurtosis = 2.474	Q14	3.89	.984	-.671	-.270
p (p+2) = 15	Q15	3.89	.799	-.461	-.114

Source: By the author.

4.3.3.3 Multicollinearity Test

Another concern with SEM is multicollinearity, a situation which high correlations among variables may cause the biased statistical tests. Table 4.8 depicts the variance inflation factor (VIF) for multicollinearity diagnostics of the variables used in this CFA with the threshold of 10 as recommended by O'Brien (2007). All VIF values of variables are below the 10 cutoff so that the SEM in this research study has a lack of multicollinearity.

Table 4.8. VIF values of Variables of the Hypothesized Model

Dependent Variable / Independent Variable	Factor 1	2	3	4	5	6
Q3	2.825					
Q2	2.170					
Q21	2.328					
Q4	1.684					
Q1	1.851					
Q27		2.135				
Q26		2.060				
Q31		1.493				
Q29		1.335				
Q34			1.659			
Q33			1.468			
Q48			1.360			
Q44			1.316			
Q38				2.125		
Q49				1.547		
Q11				1.915		
Q8					2.124	
Q7					2.023	
Q30					2.009	
Q13						1.362
Q14						1.359
Q15						1.160
Factor 1		2.082	2.047	1.958	1.812	2.089
Factor 2	1.496		1.453	1.514	1.373	1.511
Factor 3	1.632	1.613		1.577	1.666	1.650
Factor 4	1.580	1.701	1.597		1.668	1.677
Factor 5	1.802	1.901	2.078	2.055		2.060
Factor 6	1.239	1.248	1.228	1.232	1.229	

Source: By the author.

4.3.3.4 Good-of-Fit Summary of the Hypothesized Model Evaluation

With the ML method, the hypothesized model was tested and indicators of model fit were examined. The parameter estimates of the model were illustrated in Table 4.9 and Table 4.10. All but one factor loadings and errors were positive and statistically significant ($p < .05$).

Table 4.9. Summary of Variable Estimates of the Hypothesized Model

Factor	Item	Unstandardized factor loading	S.E.	C.R.	Standardized factor loading
First Order					
1: Mission and	Q3	1.000			.836
Philosophy	Q2	.862	.069	12.563***	.746
	Q21	1.046	.073	14.365***	.839
	Q4	.739	.070	10.628***	.666
	Q1	.800	.066	12.111***	.748
2: Structure and	Q27	1.000			.801
Positioning	Q26	1.050	.087	12.002***	.824
	Q31	.742	.096	7.699***	.586
	Q29	.570	.094	6.079***	.463
3:Integration and	Q34	1.000			.728
Transformation	Q33	1.031	.122	8.421***	.636
	Q48	.829	.109	7.602***	.605
	Q44	.815	.109	7.478***	.618
4: Partnerships and	Q38	1.000			.821
Social Networks	Q49	.811	.081	9.951***	.686
	Q11	1.032	.088	11.778***	.802
5: Attractiveness and	Q8	1.000			.793
Visibility	Q7	.943	.078	12.113***	.786
	Q30	1.036	.083	12.413***	.834
6: Resource	Q13	1.000			.875
Allocation and	Q14	.644	.106	6.076***	.552
Reconfiguration	Q15	.375	.085	4.391***	.396
Second Order					
	Factor 1	.549	2669.422	1.000	.860
	Factor 2	.434	2111.989	1.000	.610
Dynamic	Factor 3	.458	2226.393	1.000	.802
Capabilities	Factor 4	.456	2219.575	1.000	.732
	Factor 5	.517	2516.090	1.000	.852
	Factor 6	.421	2049.382	1.000	.622

Notes: (a) ***$p < .001$. (b) S.E. presents the stand error and C.R. refers to the critical ratio, an index number of parameter estimate divided by its standardized error.
Source: By the author.

Table 4.10. Summary of Error Estimates of the Hypothesized Model

Item	Unstandardized Error	S.E.	C.R.
First Order			
e1	.271	.036	7.581***
e2	.372	.042	8.818***
e3	.290	.038	7.604***
e4	.429	.045	9.502***
e5	.317	.036	8.912***
e6	.434	.067	6.522***
e7	.405	.070	5.758***
e8	.820	.092	8.866***
e9	.928	.096	9.682***
e10	.444	.062	7.197***
e11	.782	.092	8.513***
e12	.599	.067	8.925***
e13	.541	.062	8.697***
e14	.289	.046	6.262***
e15	.443	.052	8.568***
e16	.353	.052	6.789***
e17	.335	.044	7.664***
e18	.313	.040	7.759***
e19	.266	.040	6.709***
e20	.217	.095	2.285*
e21	.670	.076	8.788***
e22	.536	.056	9.624***
Second Order			
e23	.163	.040	4.090***
e24	.489	.092	5.330***
e25	.178	.051	3.509***
e26	.277	.055	5.019***
e27	.156	.039	3.962***
e28	.433	.098	4.406***

Source: By the author.

The chi-square goodness-of-fit index was statistically significant with χ^2 (202) = 517.595, p = .000 < .001, indicating a poorly-fitting model. The Bollen-Stine bootstrap was applied to examine whether such p-value results from model misfit or sampling fluctuation. With 2000 bootstrap samples, the Bollen-Stine bootstrap was statistically significant (p < .001). Hence, the sampling fluctuation may result in the statistically significant chi-square index.

In addition, solely relying on the chi-square index is likely to mislead the model-fit interpretation since the chi-square is sensitive to sample sizes; the larger sample size (> 200) may lead to gain the statistically significant chi-square easily. In order to weaken the sensitivity of the chi-square to sample size, the $\chi 2$ / degree of freedom (shown as CMIN/df) was used. In this research study, CMIN/df = 2.562, falls within the acceptable range (i.e., 1 to 3) for an acceptable good model fit (Kline 2005).

The model was also tested by other good-of-fit indices which categorize absolute fit, comparative fit, and parsimonious fit. The results of these indices were shown in Table 4.11. Although the χ^2 was statistically significant and the CMIN/df was acceptable, the GFI, AGFI, CFI, and RMSEA produced low but acceptable fit to the data.

Table 4.11. Good-of-Fit Indices of the Hypothesized Model

Fit Criterion	Result of the hypothesized model
χ^2	517.595
df	202
p	.000
CMIN/df	2.562
GFI	.823
AGFI	.778
CFI	.860
PNFI	.692
RMSEA	.085

Source: By the author.

As shown in Table 4.12, eight of 22 questions had their individual-item reliabilities < .50, including Q4 (.444), Q31 (.344), Q29 (.215), Q33 (.405), Q48 (.366), Q44 (.381), Q14 (.304), and Q15 (.156). The composite validities of the first-order factors ranged from .652 to .878, indicating internal consistency of the six extracted factors with the criteria of CR >.60 (Bagozzi and Yi 1988; Hair et al. 2006). Moreover, three of six factors had their average variance

extracted (AVE) ranged from .409 to .647, showing the acceptable convergent validity suggested by Bagozzi and Yi (1988) and Fornell and Larcker (1981). In brief, except the eight lower individual-item reliabilities, the hypothesized model had acceptable internal consistency, discriminatory validity, and convergent validity.

Table 4.12. Validity and Reliability Assessment of the Hypothesized Model

Second-Order Factor	First-Order Factor	Item	Single-item reliability	CR	AVE
Dynamic Capabilities				.969	.532
	1: Mission and Philosophy			.878	.592
		Q3	.698		
		Q2	.556		
		Q21	.703		
		Q4	.444		
		Q1	.559		
	2: Structure and Positioning			.771	.470
		Q27	.642		
		Q26	.679		
		Q31	.344		
		Q29	.215		
	3:Integration and Transformation			.743	.421
		Q34	.530		
		Q33	.405		
		Q48	.366		
		Q44	.381		
	4: Partnerships and Social Networks			.815	.596
		Q38	.675		
		Q49	.470		
		Q11	.643		
	5: Attractiveness and Visibility			.846	.647
		Q8	.629		
		Q7	.618		
		Q30	.696		
	6: Resource Allocation and Reconfiguration			.652	.409
		Q13	.765		
		Q14	.304		
		Q15	.156		

Note: CR refers to the composite reliability and AVE is the average variance extracted.
Source: By the author.

4.3.3.5 Tested Structure Model

Through the previous CFA process, the hypothesized model, which the six extracted factors served as dynamic capabilities of a world-class university, was adequate. Figure 4.3 showed its structure model and the related coefficients. The factor loadings of the six factors were .86, .61, .80, .73, .80, and .62, respectively. In other words, the more emphases on the six dimensions, the better dynamic capabilities a university has.

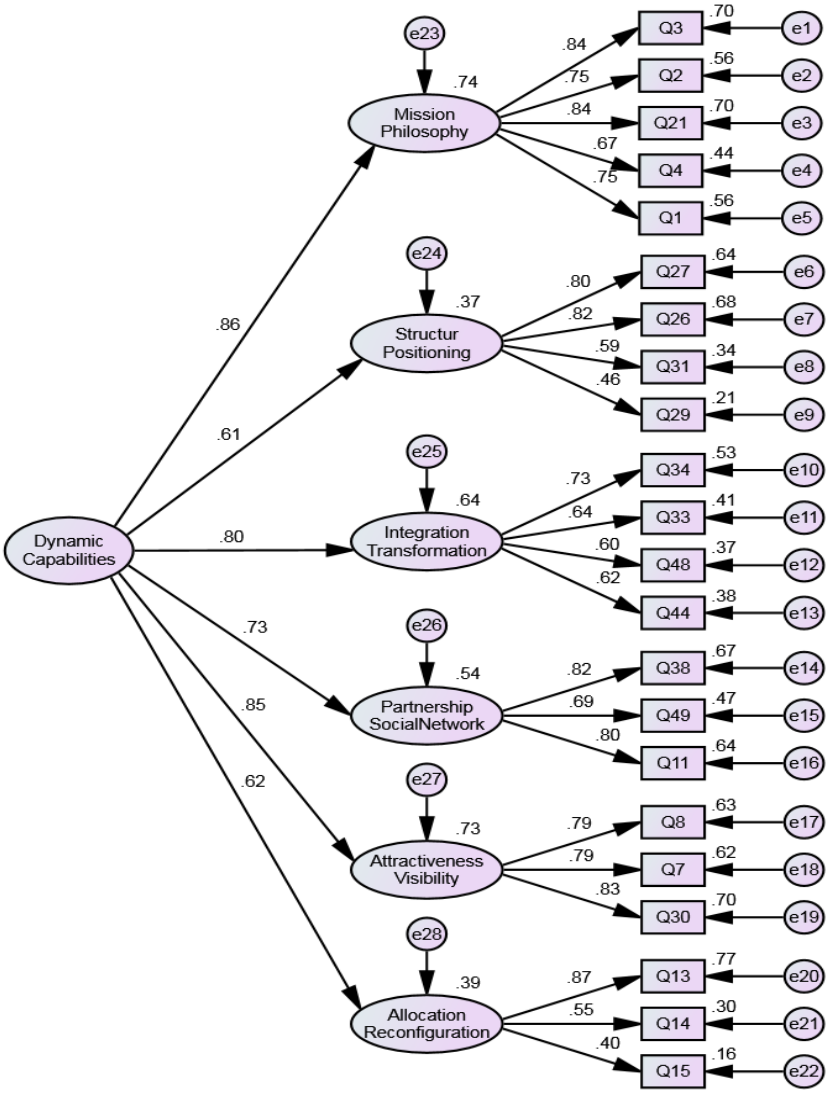


Figure 4.3. Tested Structure Model

Source: By the author.

4.4 VARIABLE DIFFIERENCES AND DYNAMIC CAPABILITIES DEVELOPMENT OF TARGETED TAIWANESE UNIVERSITIES

The purpose of this section is to present the findings in answer to the second research question concerning individual and institutional differences as impacts on university dynamic capabilities. University dynamic capabilities were empirically analyzed in Section 4.3 as sustainable competitive advantages of universities in the organizational mission and philosophy, organizational structure and its positioning, organizational integrative and transformative activities, the organization's partnerships and social networks, the attractiveness and visibility of the organization, and resource allocations and reconfigurations within the organization. Hence, Section 4.4, using statistical techniques including T-test and one-way ANOVA with the Tukey's post hoc test, further discussed the relations between different variables and university dynamic capabilities development.

4.4.1 Males and Females

Of 218 respondents, there were 177 males and 41 females. Table 4.13 shows the results of gender differences for the six dynamic capabilities of targeted Taiwanese universities. All but one of the six factors were not statistically significant, indicating no differences existed between males and females. The only factor with statistical significance was Partnerships and Social Networks. The interval for the difference in means (male minus female) is .35. In brief, compared with females, males agreed that there are closer social connections between their affiliated universities and organizations outside their universities.

Table 4.13. Gender Difference for University Dynamic Capabilities

Factor	Male (Mean)	Female (Mean)	t	p	Result
1: Mission and Philosophy	3.85	3.63	1.631	.104	None
2: Structure and Positioning	3.50	3.36	.808	.423	None
3:Integration and Transformation	3.30	3.26	.284	.777	None
4: Partnerships and Social Networks	3.68	3.33	2.482	.014*	Males > Females
5: Attractiveness and Visibility	3.74	3.67	.447	.655	None
6: Resource Allocation and Reconfiguration	3.89	4.00	- .927	.355	None

Note: ***p ≤ .001, **p ≤ .01, *p ≤ .05.
Source: By the author.

4.4.2 Respondents' Ages

In the main survey, individual ages were divided into four groups, including those less than 40 years old (group 1), 41 to 50 years old (group 2), 51 to 60 years old (group 3), and more than 61 years old (group 4). As shown in Table 4.14, no differences were produced when every pair of groups were compared. In other words, respondents of various ages for these six dynamic capabilities perceived similarly.

Table 4.14. Respondents' Ages for University Dynamic Capabilities

Factor	G1 (Mean)	G2 (Mean)	G3 (Mean)	G4 (Mean)	F	p	Result
1: Mission and Philosophy	3.60	3.75	3.81	3.91	.336	.799	None
2: Structure and Positioning	2.50	3.37	3.52	3.51	1.330	.266	None
3:Integration and Transformation	2.63	3.18	3.34	3.32	1.172	.321	None
4: Partnerships and Social Networks	4.00	3.65	3.57	3.74	.557	.644	None
5: Attractiveness and Visibility	2.67	3.56	3.80	3.80	2.355	.073	None
6: Resource Allocation and Reconfiguration	4.00	3.89	3.89	4.04	.365	.778	None

Note: ***p ≤ .001, **p ≤ .01, *p ≤ .05.
Source: By the author.

4.4.3 Administrative Positions

For individuals' administrative positions, the main survey included five groups, including presidents (group 1), vice presidents (group 2), deans of administrative offices (group 3), deans of schools/ colleges (group 4), and directors of departments (group 5). Of 218 respondents, however, just one served as the university president. In general, he perceived good performance of the six capabilities in his affiliated university; the average score of the six factors were 5.00, 3.50, 3.50, 4.33, 4.33, and 4.33, respectively. In addition, as previously discussed in Section 4.3.1, four respondents serve more than two positions simultaneously in their affiliated universities. Thus, Table 4.15 illustrates the comparison of different groups without these four data. Of the six factors, four were not statistically significant, whereas another two were. These two statistical-importance factors included factor 1: Mission and Philosophy and factor 3: Integration and Transformation. After the Tukey's post hoc test, for the first and third factors, the

mean of the group 3 was bigger than of group 5, indicating group 3 agreed more than group 5 on descriptions regarding university mission and philosophy and the integrative and transformative activities of their affiliated universities.

Table 4.15. Different Administrative Positions for University Dynamic Capabilities

Factor	G2 (Mean)	G3 (Mean)	G4 (Mean)	G5 (Mean)	F	p	Result
1: Mission and Philosophy	4.20	4.22	3.84	3.71	3.643	.014*	G3 > G5
2: Structure and Positioning	3.35	3.66	3.46	3.47	.342	.795	None
3:Integration and Transformation	3.65	3.72	3.36	3.21	3.425	.018*	G3 > G5
4: Partnerships and Social Networks	4.10	3.86	3.58	3.56	1.957	.122	None
5: Attractiveness and Visibility	3.90	3.84	3.78	3.68	.470	.704	None
6: Resource Allocation and Reconfiguration	4.33	3.88	3.88	3.88	1.313	.271	None

Notes: (a) ***p ≤ .001, **p ≤ .01, *p ≤ .05. (b) G2 refers to the group who are vice presidents; G3 is deans of administrative offices; G4 means those who served as deans of schools/ colleges; G5 refers to directors of departments.
Source: By the author.

4.4.4 Public vs. Private Universities

In the main survey, nine of ten surveyed universities are public. A total of 206 respondents were from these nine public universities and 12 returns came from this one private university.

The findings in Table 4.16 reveal that respondents from both public and private universities had no different perceptions on four of the six factors, including the Mission and Philosophy, Integration and Transformation, Partnerships and Social Networks, and Resource Allocation and Reconfiguration. However, two factors—Structure and Positioning and Attractiveness and Visibility—were statistically significant. The mean difference of the former is 1.07 and that of

the latter is .62. In brief, respondents from public universities perceived the structure and positioning of their affiliated universities and the organizational attractiveness and visibility better than those from the private university.

Table 4.16. Public and Private Universities for Dynamic Capabilities

Factor	Public (Mean)	Private (Mean)	t	p	Result
1: Mission and Philosophy	3.81	3.73	.345	.730	None
2: Structure and Positioning	3.53	2.46	4.419	.000***	Public > Private
3:Integration and Transformation	3.31	2.98	1.482	.140	None
4: Partnerships and Social Networks	3.60	3.83	-.968	.344	None
5: Attractiveness and Visibility	3.76	3.14	2.597	.010**	Public > Private
6: Resource Allocation and Reconfiguration	3.89	4.17	- 1.312	.191	None

Note: ***p ≤ .001, **p ≤ .01, *p ≤ .05.
Source: By the author.

4.4.5 University Types

As in the previous discussion, this is a multiple-answer variable. Of 218 respondents, 193 believed their affiliated universities are research-activity-based comprehensive ones (coded as Group 1), while 10 saw their affiliated universities as both research and teaching activity-based comprehensive ones (coded as Group 2). In addition, according to the returned data, 10 thought that their affiliated universities are humanities/social sciences-based; 17 saw them as medical universities; 12 believed that their affiliated universities are technology/engineering-based. These survey returns showed that some respondents define their affiliated universities in accordance with the three traditional missions of universities (e.g., research, teaching, and service), while

some describe them from an academic field perspective. Thus, separately, Tables 4.17 and 4.18 indicate the differences of university types for the six dynamic capabilities of targeted Taiwanese universities. The findings included that (a) respondents who define their affiliated universities as both research- and teaching-based ones gave higher scores on the structure and positioning factor than those who define their affiliated universities as research-based ones; (b) the perceptions of respondents who define their affiliated universities based on academic field categories were statistically significant for the six university dynamic capabilities; (c) for all six factors, the average scores obtained from respondents serving in the technology/engineering-based universities were larger than those who served in the humanities/law/business-based ones; and (d) in addition to the Resource Allocation and Reconfiguration factor, those respondents serving in the technology/engineering-based universities gave higher scores of other five factors than those who were serving in the medical universities.

Table 4.17. University Types for University Dynamic Capabilities by Functions

Factor	G1 (Mean)	G2 (Mean)	t	p	Result
1: Mission and Philosophy	3.80	4.20	- 1.550	.123	None
2: Structure and Positioning	3.47	4.06	- 2.062	.041*	G2 > G1
3:Integration and Transformation	3.26	3.75	- 1.882	.061	None
4: Partnerships and Social Networks	3.64	3.89	- .907	.365	None
5: Attractiveness and Visibility	3.75	3.78	- .111	.912	
6: Resource Allocation and Reconfiguration	3.92	3.85	.279	.781	None

Notes: (a) ***p ≤ .001, **p ≤ .01, *p ≤ .05. (b) G1 indicates research-based universities and G2 refers to both research-and teaching-based universities.
Source: By the author.

Table 4.18. University Types for University Dynamic Capabilities by Academic Fields

Factor	G1 (Mean)	G2 (Mean)	G3 (Mean)	F	p	Result
1: Mission and Philosophy	3.60	3.73	4.31	4.373	.020*	G3 > G1 G3 > G2
2: Structure and Positioning	3.13	2.81	3.94	9.634	.000***	G3 > G1 G3 > G2
3:Integration and Transformation	3.10	3.07	3.85	6.027	.005**	G3 > G1 G3 > G2
4: Partnerships and Social Networks	3.07	2.96	4.15	12.824	.000***	G3 > G1 G3 > G2
5: Attractiveness and Visibility	3.13	3.47	4.18	7.787	.002**	G3 > G1 G3 > G2
6: Resource Allocation and Reconfiguration	3.23	3.80	4.08	3.965	.028*	G3 > G1

Notes: (a) ***p ≤ .001, **p ≤ .01, *p ≤ .05. (b) G1 indicates humanity/Laws/Business-based universities, G2 refers to Medicine-based universities, and G3 means Technology/ Engineering-based universities.
Source: By the author.

4.4.6 University Histories

The findings regarding perceptions of respondents from targeted Taiwanese universities with different histories and dynamic capabilities were illustrated in Table 4.19. Two of the six dynamic capabilities, which are Structure and Positioning and Attractiveness and Visibility, had statistical significance. Through the Tukey's test, there is evidence that for the two statistically-significant capabilities, respondents from universities with more than 81-year histories gave higher scores than those with less than 40-year histories.

Table 4.19. University Histories for University Dynamic Capabilities

Factor	G1 (Mean)	G2 (Mean)	G3 (Mean)	F	p	Result
1: Mission and Philosophy	3.75	3.88	3.80	.377	.686	None
2: Structure and Positioning	2.86	3.56	3.65	16.574	.000***	G3 > G1
3:Integration and Transformation	3.26	3.42	3.25	1.047	.353	None
4: Partnerships and Social Networks	3.40	3.73	3.64	2.128	.122	None
5: Attractiveness and Visibility	3.43	3.87	3.77	3.976	.020*	G3 > G1
6: Resource Allocation and Reconfiguration	4.11	3.78	3.89	2.890	.058	None

Notes: (a) ***p ≤ .001, **p ≤ .01, *p ≤ .05. (b) G1 indicates that a university has less than 40-years history, G2 refers to universities with 41-80-years histories, and G3 means universities' histories are more than 81 years.
Source: By the author.

4.4.7 University Sizes

The main survey included two questions regarding university sizes: one focuses on the number of schools in a university, and the other is about the number of departments. Thus, separately, Tables 4.20 and 4.12 indicate the differences of university sizes for the six dynamic capabilities of targeted Taiwanese universities. The findings included that (a) respondents serving in the universities with more than 9 schools gave higher scores on the factors structure and positioning and organizational attractiveness and visibility than those serving in universities with three-to-five schools; (b) respondents who served in the universities with more than nine schools gave higher scores on the structure and positioning factor than those who served in universities with six-to-eight schools; (c) respondents who served in the universities with six-to-eight schools gave higher scores on the structure and positioning and organizational attractiveness and visibility factors than those who served in universities with three-to-five schools; (d) compared with

respondents from universities with less than 50 departments, those who served in universities with more than 76 departments had positive perceptions regarding university mission and philosophy and organizational attractiveness and visibility; and similarly, (e) for university mission and philosophy and organizational attractiveness and visibility, respondents who served in universities with more than 76 departments scored higher than those from universities with 51-75 departments.

Table 4.20. University Size for University Dynamic Capabilities by Schools

Factor	G1 (Mean)	G2 (Mean)	G3 (Mean)	F	p	Result
1: Mission and Philosophy	3.63	3.84	3.81	.613	.543	None
2: Structure and Positioning	2.61	3.36	3.71	17.319	.000***	G3 > G1 G3 > G2 G2 > G1
3:Integration and Transformation	3.07	3.38	3.26	1.492	.227	None
4: Partnerships and Social Networks	3.58	3.52	3.69	1.058	.349	None
5: Attractiveness and Visibility	3.23	3.72	3.82	4.424	.013*	G3 > G1 G2 > G1
6: Resource Allocation and Reconfiguration	3.98	3.91	3.90	.119	.888	None

Notes: (a) ***p ≤ .001, **p ≤ .01, *p ≤ .05. (b) G1 indicates that universities consist of 3-5 schools, G2 refers to universities with 6-8 schools, and G3 means that universities comprise more than 9 schools.
Source: By the author.

Table 4.21. University Size for University Dynamic Capabilities by Departments

Factor	G1 (Mean)	G2 (Mean)	G3 (Mean)	F	p	Result
1: Mission and Philosophy	3.85	3.73	3.82	.493	.611	None
2: Structure and Positioning	3.26	3.44	3.79	8.039	.000***	G3 > G1 G3 > G2
3:Integration and Transformation	3.38	3.26	3.20	1.245	.290	None
4: Partnerships and Social Networks	3.51	3.57	3.78	2.208	.112	None
5: Attractiveness and Visibility	3.65	3.58	3.96	4.229	.016*	G3 > G1 G3 > G2
6: Resource Allocation and Reconfiguration	3.89	3.96	3.88	.259	.772	None

Notes: (a) ***p ≤ .001, **p ≤ .01, *p ≤ .05. (b) G1 indicate less than 50 department in a university, G2 refers to universities with 51-75 departments, and G3 means that universities comprise more than 76 departments.
Source: By the author.

4.5 SUMMARY

The chapter depicts the process of developing the survey questionnaire and the quantitative and qualitative results of the research study. The quantitative analyses mainly involve the data collected from the pilot study and the main survey. The comparison between the pilot study and the main survey is shown in Table 4.22. These two surveys obtained similar response rates and good internal consistency. Although these surveys included different numbers of questions, both of them had six dimensions (factors). However, between the pilot study and the main survey these six dimensions had some differences. First of all, the six dimensions of the pilot study questionnaire—Positioning, Organizational History and Culture, Coordination and Integration, Learning, Reconfiguration and Transformation, and Innovation and Leadership—were predetermined according to the literature. The six factors of the main survey—Mission and

Philosophy, Structure and Positioning, Integration and Transformation, Partnerships and Social Networks, Attractiveness and Visibility, and Resource Allocation and Reconfiguration—were determined based upon this study's empirical analysis. The six dimensions of the pilot study highlight an organization itself, that is, the internal process of strategic management within a university. Conversely, the six factors taken from the main survey data covered not only internal managerial strategies within an organization but also its external, social relationships. In other words, a targeted university in quest for WCU status should create its dynamic capabilities framework to quickly orchestrate internally- and externally-sourced resources and relations and strategically position itself become a responsive, adaptive organization.

Table 4.22. A Comparison of the Pilot Study Survey and the Main Survey

	Pilot study survey	Main survey
Response rate	53%	49%
Sample*	52	218
Questionnaire	48 questions within six dimensions	52 questions
Internal consistency	Excellent (Cronbach's Alpha > 0.90)	Excellent (Cronbach's Alpha > 0.90)
Factor analysis	no	six extracted factors

Note: * indicates that the samples with missing data and unengaged responses are excluded.
Source: By the author.

The results of the qualitative analysis principally come from individual interviews. These interviews deepen and widen my comprehensive understanding of the issue about WCUs and strategic management practices of targeted Taiwanese universities. In addition, the findings in this chapter also show that different individual backgrounds and institutional characteristics of universities have an impact on respondents' perceptions of university dynamic capabilities. A detailed discussion regarding the findings of this research study and their relevant implications are represented in the following chapter.

5.0 DISCUSSION AND CONCLUSIONS

Through the survey and individual interviews, this research study was designed to discover what dynamic capabilities targeted Taiwanese universities have when they pursue the goal of world-class university (WCU) status and individual perceptions for university strategic management. Chapter 4 provided thorough quantitative and qualitative analyses and reported the findings of this research study. In this concluding chapter, I summarize the key findings of the research study and the related discussion. I also provide suggested recommendations for scale application, university strategic management, and policy-making, as well as identify several areas for future research.

5.1 SUMMARY OF KEY FINDINGS AND DISCUSSION

The quantitative and qualitative data analyses and findings of this research study are informative and provide a comprehensive map for understanding the issue regarding WCUs and university management in Taiwan. However, the issue of WCUs is often controversial, and universities are very complex organizations. In order to better understand strategic management practices of targeted Taiwan universities, the following section presents a discussion based on the qualitative findings of this study and previous studies in the literature.

5.1.1 Dynamic Capabilities Theory and University Strategic Management

The dynamic capabilities theory proposed by Teece, Pisano, and Shuen (1997) is appropriate for the application of university management although it originates from the for-profit industry. They argued that through organizational pathways, capital positions, and managerial processes, organizations develop their dynamic capabilities and competitive advantages to respond to competition in societies. The findings of the research study also support this theory.

According to the qualitative findings, many interviewees believe that establishing distinct features, core values, and possessing a clear, specific positioning are important tasks for targeted Taiwanese universities. In addition, the result of the quantitative data analysis shows that targeted Taiwanese universities have the following six dynamic capabilities: (1) mission and philosophy, (2) structure and positioning, (3) integration and transformation, (4) partnerships and social networks, (5) attractiveness and visibility, and (5) resource allocation and reconfiguration. The mission and philosophy capability serves as *organizational pathways* to direct university development. The structure and positioning capability consists of various *capital positions*, such as the location, size, and the history of a university. Moreover, four other capabilities are related to *managerial processes* of universities. As Figure 4.3 shows, these six capabilities are correlated. The competitive advantages and uniqueness of universities are rooted in these six capabilities. In brief, the concept of dynamic capabilities has made a tremendous contribution to university management.

5.1.2 The Micro-Ecosystem of Targeted Taiwanese Universities

Based on Salmi's (2009, 2011) studies, a WCU, like a micro-ecosystem, needs high-caliber talent, abundant resources, and good governance, and exists in an external environment full of diverse forces within and among the global community. As Figure 2.1 illustrates, the development of a WCU is influenced by its external environment comprising internationalization and international relations, political conditions and policies, economic stability, social networks, and location. In this research study, both quantitative and qualitative data analyses provide the evidence. According to the quantitative data, partnerships and social networks and university positioning are two of six dynamic capabilities. The findings from the qualitative data also support the ingredients of the external environment for a WCU. For instance, most interviewees mention that internationalization is necessary to the development of their affiliated universities. They complain that government regulations limit the recruitment of international scholars and students. These narratives provide the evidence that universities cannot escape from the fabric of the social culture and public values; universities not receiving the grants from the Five-Year-50-Billion NT Dollars Budget Project may be labeled as second-class (see A-01-March 2, 2015; I-02-March 9, 2015).

5.1.3 Targeted Taiwanese Universities' Challenges of Pursuing WCU Status

According to the previous analysis of interviews in Section 4.2, targeted Taiwanese universities face many challenges regarding the Five-Year-50-Billion NT Dollars Budget Project and the issue of WCUs. The biggest challenge extracted from these interviews is resource allocation and the lack of resources. For resource allocation, one respondent to the pilot study survey indicates

the concentration of the grants of the Five-Year-50-Billion NT Dollars Budget Project on a few targeted Taiwanese universities. Several interviewees also criticize the labeling effect of this project. These are consistent with the observations and arguments proposed by Amsler and Bolsmann (2012), Deem, Mok, and Lucas (2008), and Lang (2005).

In terms of the lack of sufficient resources, some interviewees mentioned the threat from unstable support of the Five-Year-50-Billion NT Dollars Budget Project, and some described the development of their affiliated universities and departments as limited because of the lack of sufficient financial and human resources. Such challenges are also discussed by Altbach (2007) and Marginson, Kaur, and Sawir (2011). In addition, the lack of sufficient financial support is likely to pose obstacles to internationalized university activities, the recruitment of international scholars and students, and faculty merit pay.

The neglect or lack of core values and distinct features of universities is also a big challenge. Many interviewees complain that their universities are overwhelmed by the trend of pursuing WCU status, global rankings, and the preference for research publication in the SCI and SSCI journals. These are similar to previous studies (Deem, Mok, and Lucas 2008; Delgado and Weidman 2012). Because of overvaluing the numeric presentation of league tables and faculty publications, the uniqueness and core values of universities are gradually lost; ultimately, as Lang (2005) commented, universities may become isomorphic if they have no clear, specific positioning.

Another challenge involves the internal management practices of universities. One of the findings of the qualitative analysis in this research study indicates that leaders and leader teams play an important role in resource (re)allocation and university sustainable development. The qualitative results also show that the Five-Year-50-Billion NT Dollars Budget Project has

impacts on the priority of university development and resource investment in STEM fields. In other words, university development may be partial (not comprehensive) if the humanities are marginalized.

5.1.4 Gender Difference and University Dynamic Capabilities

In terms of gender differences, males are generally more perceptive about organizational partnerships and social networks than females. This finding may result from the sample bias of the main survey: the returns from males were three times greater than from females. Furthermore, in the universities generally, male faculty members outnumbered female faculty members, and compared with females, more males serve as senior administrators. This gender imbalance phenomenon may cause a perception difference between males and females. In addition, this finding of the main survey may indicate that targeted Taiwanese universities lack diversity of faculty and gender equality (Cheng and Jacob 2012).

5.1.5 Age Difference and University Dynamic Capabilities

For the six dynamic capabilities, there is no statistical significance for the perceptions of respondents with various periods of ages. However, it is worth noting that the two youngest respondents—who were less than 40 years old—reported poor performance of their affiliated universities on matters of organizational structure and positioning, integrative and transformative activities, and their attractiveness and visibility. Additionally, the young respondents were more perceptive to organizational partnerships and social networks and resource allocation and reconfiguration. This result may derive from the faculty member's individual experiences in

collaborating with other organizations and from their great satisfaction at receiving more resources from their affiliated organizations.

5.1.6 Difference of Administrative Positions and University Dynamic Capabilities

According to the result of the main survey analysis, deans of administrative offices are generally more perceptive than directors of departments to the mission and philosophy and the integration and transformation of their affiliated universities. The sample bias of the main survey may cause such a result (the number of department director respondents were more than eight times the number of dean respondents). The deans of administrative offices deal with the affairs of the overall universities, such as academic curriculum planning, faculty and student affairs, and budget management and financial services, and so on. Department directors on the other hand provide the general administrative services within departments. In addition, the decision-making authority of departments generally must adhere to the overall university development requirements. Thus the deans of administrative offices are generally more sensitive to the organizational mission and resource allocation.

5.1.7 University Character (Public and Private) and University Dynamic Capabilities

The findings of the main survey highlight how respondents from public and private universities have different perceptions on matters of organizational structure and positioning and the attractiveness and visibility. Because nine of ten surveyed universities are public, such results are not necessarily surprising. And, the participating private university is relatively small, with three to five schools and less than 50 total departments. Moreover, in the Taiwanese society, public

universities hold much greater reputation than private ones. Hence, respondents from private universities and from public ones generally hold differing perceptions regarding the dynamic capabilities concerning organizational structure and positioning and organizational attractiveness and visibility.

However, remarkably, although they are not statistically significant, the average scores for the capabilities concerning the organizational partnerships and resource allocation of private universities are higher than that of public ones ($M = 3.83 > 3.60$ for former, $M = 4.17 > 3.89$ for later). These results may derive from the organizational structure and the flexibility of organizational administration. The private university is comprised of three colleges including medicine, engineering, and management. The faculty in these fields may have more opportunities to collaborate with organizations outside the campus. In addition, compared with public universities, private universities may receive less support from the Taiwan government. These may be reasons for such results.

5.1.8 University Type and University Dynamic Capabilities

In the main survey, respondents categorized the types of their affiliated universities in two ways: by the traditional mission of a university and by academic fields. First, most respondents defined their affiliated universities as research-based comprehensive institutions. This is consistent with Altbach's (2007) observation that WCUs are research intensive institutions. For the organizational structure and positioning, the respondent perceptions defining their affiliated universities as research-based and those categorizing them as both research- and teaching-based are different. Such results are consistent with the findings of many of the interview respondents,

who shared how WCUs cannot neglect the nature of good university education—teaching and social contribution.

In addition, 32 respondents categorized their affiliated universities by academic fields. In the main survey, universities are categorized as humanities/law/business-based, medicine-based, and technology/engineering-based institutions. The results of the main survey analysis include:

- Respondents from technology/engineering-based universities were more perceptive than those from humanities/law/business-based universities to all six dynamic capabilities.
- Except for the capability concerning resource allocation and reconfiguration, respondents from technology/engineering-based universities were more perceptive than those from medicine-based institutions to the other five dynamic capabilities.

The findings may show evidence that the gap between humanities/law/business fields and scientific fields still exists. This is consistent with the findings of the qualitative interviews. Such results are likely to be produced because the Five-Year-50-Billion NT Dollars Budget Project tends to give investment preference on scientific fields.

5.1.9 University History and University Dynamic Capabilities

According to the results of the main survey analysis, respondents who served in universities that had been in existence for more than 81 years were more perceptive to the structure and positioning and the attractiveness and visibility of their affiliated universities than those who served in institutions that had been in existence for less than 40-years. This finding provides evidence that establishing a high institutional reputation takes time. As time goes by in the Taiwan context, universities generally have more experience in university management, more effective resource allocation, and re-organize their structures, whereby they become more attractive.

These results are also related to the locations of the universities. Seven of the ten surveyed universities are located in the north of Taiwan, the place where there is the most convenient public transportation system. Many governmental, for-profit, and non-for-profit organizations are also located in this region of Taiwan. More youths go to work and live in the northern cities in Taiwan. Besides, compared with universities in the middle and south of Taiwan, universities in the north of Taiwan generally have greater opportunities to recruit international scholars and students. In brief, similar to the South Korea's experience proposed by Byun, Jon, and Kim (2013) and Kim and Nam (2007), targeted universities are often located in the primary metropolitan areas.

5.1.10 University Size and University Dynamic Capabilities

In the main survey, the university size variable is divided into two sub-variables, including the numbers of schools and departments in a university. First, respondents from universities with 3-5 schools were less perceptive than those from universities with 6-8 or more than nine schools to the organizational structure and positioning and organizational attractiveness and visibility. And respondents from universities with 6-8 schools were less perceptive than those from universities with more than nine schools to the organizational structure and positioning. In terms of the number of departments, respondents from universities with more than 76 departments were more perceptive than those from universities with less than 50 or 50-75 departments to the organizational structure and positioning and organizational attractiveness and visibility. These findings may be consistent with the number of years a university has been in existence. Generally, the longer the institution has existed, the larger the institution is in Taiwan. Moreover, these findings imply that to some extent, the relation between university size and the

establishment of dynamic capabilities is positive. The smaller university size may reduce its overall organizational competitiveness. In other words, the university size is a necessary, but not sufficient condition for building dynamic capabilities.

5.2 MODIFICATION OF HYPOTHESIS

According to several interviews, the university location variable was excluded from the write-up because “just three universities are located in the middle and south of Taiwan, thus everyone can easily identify what your affiliated university is” (I-01-February 12, 2015). In order to ensure anonymity and avoid respondents’ worries, the university location variable and the seventh hypothesis were removed.

5.3 IMPLICATIONS FOR THEORY AND PRACTICE

The results from this research study provide a number of theoretical and practical implications for the application of the dynamic capabilities scale, the strategic management of universities, and related policy-making in higher education.

5.3.1 Theoretical Implications

This research study—the application of the dynamic capabilities theory for university organizations—serves as a contribution to the resource-based view (RBV) approach often employed to analyze a firm’s strategic management in the industry. This study showed the

support of the argument proposed by Navarro and Gallardo's (2003) work: developing universities' core capabilities and creating social capital are important to university development. Hence, this study further strengthens the application and robustness of the RBV approach because it reveals a possible alternative to use this approach to the non-profit sector.

This study also contributes to strategic management practice of university organizations. As previously discussed, few empirical studies except Todorovic's (2004) work have documented dynamic capabilities in university organizations. Moreover, in support of Eisenhardt and Martin's (2000) argument, the findings of this study suggest that the more emphases on these dynamic capabilities, the better performance a university has. Such positive correlation between dynamic capabilities and universities' performance implies a potential contribution to performance improvement of educational organizations, both public and provide.

Another contribution of this study is to provide additional support for studying senior administrators' perceptions and behaviors regarding WCUs and strategic management practice of universities. As the argument made by Teece, Pisano, and Shuen (1997), developing dynamic capabilities of an organization depends on managers' perceptions, thinking, and actions. Senior administrators have a crucial role to play in developing the strategic management practice of their affiliated universities. Although their individual perceptions cannot be completely used to explain and create the dynamic capabilities of their affiliated universities, their opinions can depict the opportunities and challenges of university management in current Taiwan society. This study, therefore, provides an opportunity to showcase senior administrators' voices and empirically analyze their perceptions.

5.3.2 Implications for Dynamic Capabilities Scale Application

The dynamic capabilities scale as a guide. The dynamic capabilities scale developed in this study can be a guide to assess the possibility of being identified as a targeted university with global standing and to improve university development. Many scales have been developed to assess the progress and performance of universities, such as the scales for knowledge management, organizational learning, and leadership and university performance. These scales are incomprehensive, whereby the overgeneralization is likely to lead to a crisis in evaluating organizational development. However, the six dynamic capabilities scale this research study used serves as a more comprehensive assessment. It can be a starting point for administrators and leader teams to objectively assess the strategic management practice of their affiliated universities. For instance, to understand organizational attractiveness and visibility, administrators and leader teams can investigate and compare the differences between their affiliated universities and others in the numbers of international scholars and students, the internationalized activities, and international collaborations that exist. Through the periodic review by using this scale, administrators and leader teams can understand the strengths and weaknesses of their affiliated universities and how far they still need to go to avoid the disconnection with the highly competitive and changing higher education environment.

Dynamic capabilities scale should be used with caution. The scale includes six dimensions with 22 questions. Although the reliability of each dimension is acceptable, it still needs to be improved. Eliminating items from 52 to 22 may lose potential indicators suitable to assess a comprehensive university development. Moreover, three of six factors obtain their AVE scores below .50, indicating that the model the research study provides still has some errors.

Thus, in order to make the scale more reliable and responsive to the changing environment, revising given questions and developing new items is necessary.

5.3.3 Implications for University Strategic Management

***Establishing core values and distinctive features is the priority of university management*.** Core values and competitive advantages are at the heart of the organizational philosophy that directs organizations toward their goals. Literature review on dynamic capabilities theory and the findings of the quantitative and qualitative data analyses in this study support this argument. Existing in the global society, universities may be overwhelmed by and sheltered in the international higher education trends and gradually lose their uniqueness. In order to achieve sustainable development, universities should build their own core values and clear positioning. Thus, by using this dynamic capabilities scale developed by this study, leaders and senior administrators can understand whether their affiliated universities have clear, unique strategic plans and better their performance with relevant resources and activities.

***Possessing professional leadership and the cohesion within universities enhances the pursuit of university goals*.** Leadership is significant for university management although it is not included among the six extracted dynamic capabilities, the primary result of the main survey analysis of this study. The exclusion of leadership may result from the biases of samples because just one respondent of the main survey was the president. However, through the rich data provided in the many interview narratives, the vision and attitudes of administrators and leader teams greatly affect university development. They need to avoid or decrease cognitive gaps between administrators and academic faculty in the strategic management practice of their affiliated universities. Moreover, cohesion is rooted in trust and mutual accountability.

Administrators and leader teams should transform faculty competition toward collaboration, spend quality time with faculty members and students, and ensure all organizational members are on the right track. In addition, it is noticed that professional leadership is a big challenge for university administration in Taiwan. One interviewee said,

> The lack of professional managers for university management is a common challenge for most universities in Taiwan. Except for the presidents, most senior administrative positions, such as vice presidents and deans of administrative offices, are served by full-time academic faculty members. Since they cannot do all well, they may pay less attention to administrative affairs than on personal research projects. This is a serious crisis. (A-02-March 12, 2015)

This study does not provide sufficient evidence to better understand the straggles in senior administrators' minds. Nevertheless, the findings in this study present evidence that there are additional challenges regarding leadership and university administration that need to be further explored.

Establishing solid partnerships and social networks helps universities to perform their social responsibilities. The findings of the research study indicate that competitive advantages of universities largely depend on their connections with society (Jacob et al. 2015). Universities not only receive resources from social organizations but also learn from them. Partnerships are a kind of social positioning capital, which are important to enhance the reputation and the attractiveness and visibility of universities. Moreover, collaborating with other organizations, no matter whether they are for-profit or non-for-profit, refers to reciprocal sharing and learning, a way of sustaining competitive advantages that help universities to understand and improve the rigidities of organizational capabilities and to be more suitable for their needs.

Valuing teaching and the diversity of faculty and students can facilitate the excellence and specificity of Taiwanese universities. As the literature review indicates, many scholars criticize that the trend of pursuing WCUs leads many universities across the globe to become

isomorphic (Amsler and Bolsmann 2012; Deem, Mok, and Lucas 2008; Lang 2005) and overvalue their faculty members' research performance. In order to develop individual university's competitive advantage and sustainability, Taiwanese universities should focus more on educating people. Teaching and establishing a learner-based environment are fundamental tasks for Taiwanese universities according to the findings of the interviews. Teaching is the fundamental task of university education because good teaching produces brilliant students and then these students can contribute to excellent performance in research and social contribution. Also, diverse faculty and students can further benefit the many needs of universities. Although recruiting international scholars and students is a strategy to promote the diversity of human resources within a university, it is of paramount importance in the long term to recruit Taiwanese from various socioeconomic classes, which serve as a major ingredient of university education in Taiwan.

5.3.4 Implications for Policy Reform

An appropriate mechanism of stable support from the Taiwan government needs to be established. The lack of stable support was a major critique about the Five-Year-50-Billion NT Dollars Budget Project initiated by Taiwan government. This project positions itself as a specific, competitive funding mechanism for promoting a few universities' global standing, but as Table 2.5 shows (and Section 4.2 discusses), government grants of this project are decreasing and universities face the uncertain challenge regarding the potential to receive continuous grants in the consequent stages of this project. This uncertainty and unstable financial context may lead to operating difficulties of research laboratories and the interruption of research programs. Thus

the appropriate complementary mechanism (e.g., to postpone the research years and/or to provide basic funding until the research is completed) needs to be discussed and implemented.

Labelling effect as a side-effect of this project needs to be considered. Because the Five-Year-50-Billion NT Dollars Budget Project supports only a few universities, the recipients of funding often market themselves with the fact that they receive government grants and *have potential* to become WCUs. However, most recipient institutions are public Taiwanese universities. Theoretically, they should have a common opportunity to share the funding. Hence, it is of great worth to discuss a proper way for resource allocation (e.g., by student head-counts). In addition, when making policies in the future, policy-makers should consider the appropriateness of higher education policies in the Taiwan culture, the labelling effect resulted from the policies, and how to allocate funding more equally.

Humanities and social sciences can produce academic highlight. Due to the significant contribution of humanities and social science-based institutions, they are worthy of the government investment of the Five-Year-50-Billion NT Dollars Budget Project. The literature review on the distribution of government funding of this project (Table 2.5) indicates that although the Taiwan government grants several social sciences-based universities and research centers money from this project, many granted fields and research centers are scientific fields, such as the natural sciences, medicine, engineering, and technology. Both the quantitative and qualitative analyses of this study also support this argument of overvaluing scientific fields in Taiwan higher education. For instance, according to the main survey data, more than 70 percent of the respondents agreed that in their university, the fields needing new technologies and equipment for experiments (e.g., medicine, science, technology, engineering, and mathematics) receive the funding more easily, which comes from the grants of the Five-Year-50-Billion NT

Dollars Budget Project. However, the continual neglect of humanities and social science programs may lead to long-term ramifications that will ultimately hurt higher education in Taiwan. Some interviewees suggested that the Taiwan government and the granted universities should appropriate some funds of this project toward the humanities and social sciences because sometimes, compared with the scientific fields, these fields can contribute more to Taiwan society, such as in providing greater access to minorities, educational development and mobility, and language and culture preservation.

5.3.5 Implications for Future Research

Compared to the literature on the analysis of policy discourse, most literature and research studies regarding WCUs and pertaining to dynamic capabilities theory and its application to university management is relatively young. This research study serves as an empirical study to explore what capabilities universities should have when they pursue the goal of WCU status. There are five primary recommendations for future research. First, the sample of the research study focuses on twelve universities which received grants of the second-stage Five-Year-50-Billion NT Dollars Budget Project. Future research should include longitudinal studies by discussing other universities which were and will be winners of this project.

Second, the research study explored senior administrators' perceptions of targeted Taiwanese universities which received Five-Year-50-Billion NT Dollars Budget Project funding. In terms of a comparative perspective, future research should include the stakeholders such as faculty without administrative positions, college students, policy-makers, and so on.

Third, the content of the survey questionnaire used in the research study focused on the current management practices of the surveyed universities. Future research should include

"questions about the *future* development planning of universities" (F059) and other factors (e.g., transformative leadership, social desirability, and organizational conflict, etc.).

Fourth, the research study explored senior administrators' opinions by using surveys and interviews. In order to better understand a thorough mapping regarding targeted Taiwanese universities' strategic management processes, other methods such as document analyses and focus groups should be used in the future research. And finally, the dynamic capabilities scale developed by the research study is for targeted Taiwanese universities. Future research could further develop this scale for other universities which did not receive the Five-Year-50-Billion NT Dollars Budget Project funding.

APPENDIX A

A PILOT STUDY OF DEVELOPING DYNAMIC CAPABILITIES OF UNIVERSITIES

(ENGLISH VERSION)

INSTRUCTIONS

Dear participant,

I am Ya-Wen Hou, a doctoral student from University of Pittsburgh, U.S.A. Currently I am working on my dissertation research titled, "Toward World-Class Universities: Administrators' Perceptions Related to Develop Dynamic Capabilities in Targeted Taiwanese Universities." This study aims to explore dynamic capabilities development of the targeted universities rewarded by the Five-Year-50-Billion NT Dollars Budget Project. The survey is sent to you by mail.

Firstly, thank you for taking the time to complete this questionnaire. This survey aims to understand your individual perception of dynamic capabilities and strategic management practice of your affiliated university.

This questionnaire approximately takes 30-40 minutes to be filled in. When you start this survey, you will be asked about some background information (e.g., age, gender, position) as well as basic facts about your affiliated university. There are no foreseeable risks associated with this survey, nor are there any direct benefits to you. This survey is anonymous, and all you responses are confidential and only used within the project and not disclosed to unauthorized person or group, and it will not include any identifying information. Your participation is voluntary, and your valuable responses and feedback will contribute to help me better understand how Taiwanese universities transform themselves and respond to global competitive pressures. If you have any questions or concerns, please do not hesitate to contact me at: joycedolphin@gmail.com or yah19@pitt.edu.

Thank you again for your participation!

Sincerely,

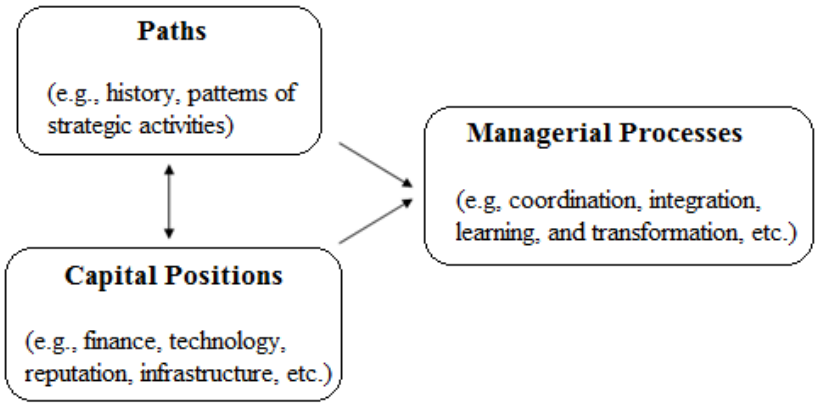
Ya-Wen Hou
Ph.D. student,

Department of Administrative and Policy Studies,
School of Education,
University of Pittsburgh

Advisors
Dr. W. James Jacob
University of Pittsburgh, USA
Dr. Sheng Yao Cheng
National Chung Cheng University, Taiwan

◈What are dynamic capabilities?

The concept of *dynamic capabilities* was proposed by Teece, Shuen, and Pisano in 1997. It is complementary to the resource-based view of organization (RBV) and viewed as a source of competitive advantage. They defined dynamic capabilities as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece, Shuen, and Pisano 1997, 516), whereby universities can strategically sense, seize, and transform their capabilities to clarify their visions and future directions. They also argued competitive advantage emerges from an organization's distinctive processes shaped by asset positions and paths; below is the illustration of the relations among these three dimensions. Based on literature review, this questionnaire consists six dimensions, including positioning, organizational history and culture, coordination and integration, learning, reconfiguration and transformation, and innovation and leadership; and the other one is several statements of each dimension.



PART I: Background Information

Please put a✓ in the box according to your individual background and the characteristics of your affiliated university.

1. Gender ☐ Male ☐Female ☐ Other
2. Age ☐ Under 40 ☐ 41-50 ☐ 51-60 ☐ More than 61

3. Position ☐ President
☐ Vice-president
☐ Dean of academic office (e.g., Dean of academic affairs, Dean of student affairs, or Dean of R&D, etc.)
☐ Dean of school/college
☐ Director of department/ institute

4. Your affiliated university is ☐ Public ☐ Private
5. The type of university ☐ Medical university ☐ Comprehensive university
☐ Normal university ☐ University of technology
☐ Other_____
6. The location of university ☐ Northern Taiwan ☐ Central Taiwan
☐ Southern Taiwan ☐ Eastern Taiwan
7. University history (years) ☐ Under 40 ☐ 41-80 ☐ More than 81
8. Numbers of schools/colleges ☐ 3-5 ☐ 6-8 ☐ More than 9
9. Numbers of department/ institute ☐ under 50 ☐ 51-75 ☐ More than 75

PART II: University Dynamic Capabilities

This part aims to understand your individual perception of dynamic capabilities and strategic management practice of your university. The five-point rating scale is adopted: 1 indicates you *strongly disagree* the statement, 2 indicates you *disagree* it, 3 indicates you *somehow agree* it, 4 indicates you *agree* it, and 5 indicates you strongly *agree* it. Please indicate the extent to which you agree or disagree with the following statement by putting a✓ in the appropriate box.

Statement	Strongly Disagree 1	Disagree 2	Somehow Agree 3	Agree 4	Strongly Agree 5
A. Positioning					
1. The geographic location of our university benefits the establishment of a world-class university.	☐	☐	☐	☐	☐
2. The ratings of our university in the global university rankings (e.g., Shanghai ARWU, *THE*, and QS rankings) are rising annually.	☐	☐	☐	☐	☐
3. The higher ranking of our university in the global university rankings, the more obvious contributions to fundraising.	☐	☐	☐	☐	☐
4. Most government grants from the Five-Year-50-Billion NT Dollars Budget Project are used for infrastructural improvement.	☐	☐	☐	☐	☐
5. Most government grants from the Five-Year-50-Billion NT Dollars Budget Project are for human resource recruitment purposes.	☐	☐	☐	☐	☐
6. Obtaining government grants from the Five-Year-50-Billion NT Dollars Budget Project greatly contributes to enhancing our reputation.	☐	☐	☐	☐	☐

7. Decision-making regarding becoming a WCU mainly depends on superiors' opinions (e.g., presidents, vice-presidents, and deans of administrative offices); other middle managers (e.g., deans of schools and directors of departments) seldom express their opinions.	☐	☐	☐	☐	☐
8. Most financial resources are distributed to key fields, such as medicine, science, technology, engineering, and mathematics.	☐	☐	☐	☐	☐
9. We have more collaboration with domestic partners than with international ones.	☐	☐	☐	☐	☐
10. Most our research projects are interdisciplinary studies.	☐	☐	☐	☐	☐
11. The research projects we conduct with industry greatly increase funding for the university.	☐	☐	☐	☐	☐
B. Organizational history and culture					
1. We have the clear, written vision and mission of becoming a world-class university.	☐	☐	☐	☐	☐
2. We have a well-developed strategic plan/action plan for sustaining our competitive advantage.	☐	☐	☐	☐	☐
3. Each student, faculty, and staff understands that becoming a world-class university is the goal of our university.	☐	☐	☐	☐	☐
4. Because of the long history of our university, we have more opportunities to become the targeted university of the Five-Year-50-Billion NT Dollars Budget Project.	☐	☐	☐	☐	☐
5. The vision of becoming a world-class university is impeded by our anti-marketization-oriented campus culture.	☐	☐	☐	☐	☐
6. Building an entrepreneurial culture is essential for our university to become a world-class university.	☐	☐	☐	☐	☐
7. We encourage our students and faculty to engage in entrepreneurial activities.	☐	☐	☐	☐	☐
C. Coordination and integration					
1. Integrative activities (e.g., to merge, to join University System of Taiwan or Mid-Taiwan University System, etc.) accelerate our university toward the goal of becoming a world-class university.	☐	☐	☐	☐	☐
2. The motivations of our integrative activities focus more on resource sharing than on performance improvement.	☐	☐	☐	☐	☐
3. We usually market our brand via more than five media (e.g., newspapers, televisions, University webpage, online advertising on Facebook, International Education Fair, and open days with campus tours).	☐	☐	☐	☐	☐
4. We have high visibility for international scholars and students.	☐	☐	☐	☐	☐
5. Our target market of recruiting international students and scholars focuses more on East and Southeast Asia	☐	☐	☐	☐	☐

than on other regions (e.g., West Asia, Europe, North America, Latin America, and Africa).					
6. We are more attractive than other universities at the domestic and global levels.	☐	☐	☐	☐	☐
7. Our students have strong university identity and close ties to our university.	☐	☐	☐	☐	☐
8. We emphasize that each of our branch campuses is closely connected to the host campus.	☐	☐	☐	☐	☐
9. In our university, the pace of integrating vacant space and of renewing outdated buildings is much slower.	☐	☐	☐	☐	☐
D. Learning					
1. We greatly emphasize cross-school/department learning activities for our students and faculty.	☐	☐	☐	☐	☐
2. Internship opportunities for our students are actively provided in most administrative offices and academic schools/colleges.	☐	☐	☐	☐	☐
3. The communication between our administrators and faculty members is reciprocal and effective.	☐	☐	☐	☐	☐
4. We have close partnerships with industry.	☐	☐	☐	☐	☐
5. We often collaborate with international for-profit and not-for-profit organizations.	☐	☐	☐	☐	☐
6. We have specialized knowledge repositories to systematically record administrators' experience, faculty's research, and interaction with international scholars.	☐	☐	☐	☐	☐
7. In our university, a part of government grants from the Five-Year-50-Billion NT Dollars Budget Project is used in reward for students' and faculty's participation in international conferences and academic exchange activities.	☐	☐	☐	☐	☐
8. We are very concerned with the loyalty of part-time faculty members at the university.	☐	☐	☐	☐	☐
E. Reconfiguration and transformation					
1. We have developed benchmarking metrics that are proper to our vision of becoming a world-class university.	☐	☐	☐	☐	☐
2. We usually choose high-ranked US and UK research universities as our benchmarks instead of those in other countries (e.g., South Asia, Latin America, Africa, etc.).	☐	☐	☐	☐	☐
3. We often make timely decisions about adding and reorganizing our departments/ institutes to fit social needs.	☐	☐	☐	☐	☐
4. The development of our university is little affected by uncertainty and risks (e.g., ambiguous definition of world-classness and the lack of students and financial resources).	☐	☐	☐	☐	☐

5. Social relations between our faculty and stakeholders outside the campus (e.g., policy-makers, parents, staffs of other universities) benefit us as we pursue the goal of becoming a world-class university.	☐	☐	☐	☐	☐
6. The collaboration with industry mediates and narrows the gap between our academic missions and social needs in reality.	☐	☐	☐	☐	☐
F. Innovation and leadership					
1. Our current university culture focuses more on research innovation than on teaching performance.	☐	☐	☐	☐	☐
2. Our students actively engage in knowledge discovery and innovative activities instead of single-way knowledge acquisition.	☐	☐	☐	☐	☐
3. The pace of updating and adopting new technologies in our university is much slower than that in other universities.	☐	☐	☐	☐	☐
4. Our faculty members are happy to go to different schools/departments and to share their research and innovative activities.	☐	☐	☐	☐	☐
5. As leaders of the university, we need to learn new technologies.	☐	☐	☐	☐	☐
6. As leaders of the university, we are often off-campus for meetings and collaborative activities with industry.	☐	☐	☐	☐	☐
7. Our leader teams sometimes make a business trip to learn from other universities outside Taiwan.	☐	☐	☐	☐	☐

PART III: Significance Assessment of Six Dimensions

This part aims to understand your individual perception related to the significance of the above six dimensions of university dynamic capabilities. Do you think which is the most important? Which is less important? Please order their significance in accordance with your opinions. 1 indicates that the dimension is the most important and 6 indicates that the dimension is the least important.

_____ Positioning	_____ Organizational history and culture
_____ Coordination and integration	_____ Learning
_____ Reconfiguration and transformation	_____ Innovation and leadership

Open-ended questions:

For this study, do you have any comments, opinions, or suggestion you would like to share? Please feel free to write them down.

Thank you so much for your participation.

APPENDIX B

A PILOT STUDY OF DEVELOPING DYNAMIC CAPABILITIES OF UNIVERSITIES

(CHINESE VERSION)

填答指南

敬愛的參與者，您好：

我是美國匹茲堡大學的博士生侯雅雯，正在進行我的博士論文研究「邁向世界級大學：發展台灣指標性大學動態能力之行政者觀點」，旨在探討台灣獲得五年五百億政府補助的指標性大學之動態能力發展。此問卷調查將郵寄給您。

首先，非常感謝您願意填答與完成此問卷。本問卷調查是要瞭解您對於該校動態能力與策略管理實踐的個人看法。

本問卷調查需花約30-40分鐘填答。當您開始填答本問卷時，將會被問及一些個人背景資料(如年齡、性別、職位等)以及該學校的基本資訊。此研究沒有預設之風險，亦無直接利益予您。本問卷調查完全匿名，且您個人回覆將完全保密，僅作為本學術研究之用。本研究亦不會公開給未授權之個人或群體，且不包含任何可認定您身分的訊息。您的參與是自願的，且您珍貴的回覆將有助於我更加瞭解台灣的大學如何轉化自身以回應全球競爭壓力。如果您有任何意見或問題，請不吝與我連繫：joycedolphin@gmail.com或yah19@pitt.edu. 非常感謝您的參與！

耑此 敬頌 道祺

匹茲堡大學教育學院博士生 侯雅雯 敬上

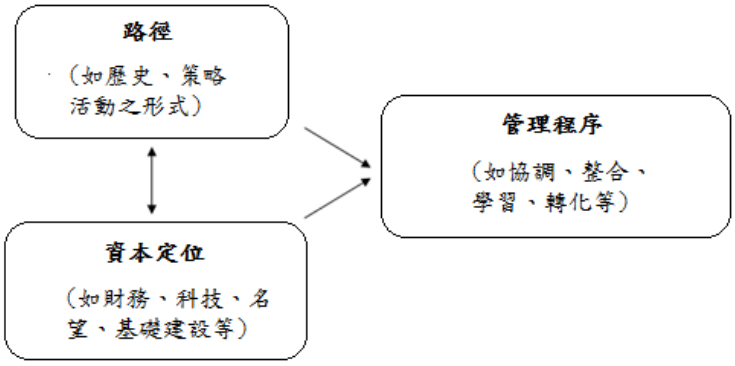
指導教授 匹茲堡大學教育學院W. James Jacob 博士

國立中正大學教育所 鄭勝耀博士

◈何謂動態能力?

「動態能力」此概念乃由 David J. Teece、Gary Pisano和Amy Shuen 於1997年提出。它與組織資源基礎觀點相互補且被視為競爭優勢來源之一。這三位學者將動態能力定義為「組織為了因應快速變動環境而整合、建立與重新配置內外部能力之潛能」，藉此大學組

織可策略性地覺察、利用與轉化他們的能力以闡明其願景與未來方向。他們也認為競爭優勢是從組織資本定位和過去所採用之策略路徑所形構而成的組織獨特管理程序中所浮現。下圖呈現著此三面向的關係。基於此文獻探討，本問卷包含定位、組織歷史與文化、協調與整合、學習、重新配置與轉化、和革新與領導等六個面向，每個面向中都有一些敘述。



第一部分：背景資料

請根據您個人資訊與所服務大學的特質，在下列空格中打勾「✓」。

1. 性別 ☐ 男性 ☐ 女性 ☐ 其他
2. 年齡 ☐ 40歲以下 ☐ 41-50歲 ☐ 51-60歲 ☐ 超過 61歲
3. 職位名稱 ☐ 校長
   ☐ 副校長
   ☐ 行政單位主管 (如教務長、學務長、研發處處長等)
   ☐ 學院院長
   ☐ 系主任
4. 您所服務的學校是 ☐ 公立 ☐ 私立
5. 該大學的類型為 ☐ 醫學大學 ☐ 綜合大學
   ☐ 師範大學 ☐ 科技大學
   ☐ 其他 _____
6. 該大學之地理位置為 ☐ 台灣北部 ☐ 台灣中部
   ☐ 台灣南部 ☐ 台灣東部
7. 該大學之創校歷史為 ☐ 少於 40年 ☐ 41-80年 ☐ 超過81年
8. 該大學之學院數為 ☐ 3-5個學院 ☐ 6-8個學院 ☐ 超過 9個學院
9. 該大學之系所數為 ☐ 少於 50個系所 ☐ 51-75個系所 ☐ 超過75個系所

第二部分：大學動態能力

此部分欲瞭解您個人對於該校動態能力與策略管理實踐的個人看法。此問卷採用五點量表，從「非常不同意」至「非常同意」分別是1、2、3、4、5分，分數愈低表示您愈不同意這項敘述，反之，分數愈高則表示您愈同意此敘述。請指出您同意或不同意此敘述的程度，並在合適的空格內打勾「✓」。

敘述	非常不同意 1	不同意 2	有點同意 3	同意 4	非常同意 5
一、 定位					
1. 本大學的地理位置有助於成為世界型大學。	☐	☐	☐	☐	☐
2. 本大學在世界大學排名中的排名每年愈來愈高，如上海交通大學世界大學學術排名、英國泰晤士高等教育世界大學排名、與QS世界大學排名。	☐	☐	☐	☐	☐
3. 本大學在世界大學排名系統中排名愈高，愈明顯助於本校之資金募款。	☐	☐	☐	☐	☐
4. 本校對於所得之五年五百億計劃政府補助大多用來改善本校基礎建設為主。	☐	☐	☐	☐	☐
5. 本校對於所得之五年五百億計劃政府補助大多運用在人力招募之目的。	☐	☐	☐	☐	☐
6. 能得到五年五百億計劃政府補助大大地提升本校之名望。	☐	☐	☐	☐	☐
7. 本校對於世界型大學的決策制定主要以上層主管意見為主(如校長、副校長、各行政單位之主管)，其他中階管理者(如各學院院長和系主任)則較少表述意見。	☐	☐	☐	☐	☐
8. 本校會分配大多數的財務資源給某些關鍵學科領域，如醫學、科學、科技、工程、與數學等領域。	☐	☐	☐	☐	☐
9. 和國外組織相比，本校較常與國內組織合作。	☐	☐	☐	☐	☐
10. 本校大多數研究計劃是跨領域的研究。	☐	☐	☐	☐	☐
11. 本校和企業合作的研究計劃大大地增加本校資金。	☐	☐	☐	☐	☐
二、組織歷史與文化					
1. 對於成為世界級大學，本校有清楚且成文的願景與使命。	☐	☐	☐	☐	☐
2. 本校已有發展完善的策略計劃或行動計劃以持續維持本校之競爭優勢。	☐	☐	☐	☐	☐
3. 每位學生與教職員都瞭解成為世界級大學是本校的目標。	☐	☐	☐	☐	☐
4. 因為本校悠久歷史，本校比較有機會成為五年五百億計劃中所選取的指標性學校。	☐	☐	☐	☐	☐
5. 成為世界型大學的願景因本校反市場化導向的校園文化而受阻。	☐	☐	☐	☐	☐
6. 建立創業文化對於本校欲成為世界級大學是很重要的。	☐	☐	☐	☐	☐
7. 本校鼓勵學生和教授從事創業活動。	☐	☐	☐	☐	☐

三、協調與整合					
1. 整合性活動(如整併，加入台灣大學聯盟或中部大學聯盟等)可加速本校成為世界型大學。	☐	☐	☐	☐	☐
2. 本校整合性活動之動機比較重視資源分享，而較少著重在改善本校之績效。	☐	☐	☐	☐	☐
3. 本校常常透過五種以上的媒體來行銷本校之品牌，如報紙、電視媒體、大學網頁、Facebook之線上廣告、國際教育展、與開放校園參觀等。	☐	☐	☐	☐	☐
4. 本校在國際學者與學生中有高能見度。	☐	☐	☐	☐	☐
5. 本校招募國際學生與學者的目標市場大多著重在亞洲地區而較少在其他地區，如西亞、歐洲、北美、拉丁美洲、與非洲等地區。	☐	☐	☐	☐	☐
6. 比起其他大學，本校在國內和國外都較有吸引力。	☐	☐	☐	☐	☐
7. 本校學生有強烈認同感且和本校有緊密連結。	☐	☐	☐	☐	☐
8. 本校重視各分校是否和母校有緊密連結。	☐	☐	☐	☐	☐
9. 本校在閒置空間整合與更新過時建築物的速度是非常慢的。	☐	☐	☐	☐	☐
四、學習					
1. 本校非常重視學生和教授的跨學院或跨系所之學習活動。	☐	☐	☐	☐	☐
2. 大多數行政單位和學術單位會主動地提供學生實習的機會。	☐	☐	☐	☐	☐
3. 本校行政人員和教授之間的溝通是互惠且有效的。	☐	☐	☐	☐	☐
4. 本校和企業有緊密的合夥關係。	☐	☐	☐	☐	☐
5. 本校常常和國際營利與非營利組織合作。	☐	☐	☐	☐	☐
6. 本校有特定的知識貯藏庫，可系統性地記錄行政人員的經驗，教授的研究與其和國際學者的互動。	☐	☐	☐	☐	☐
7. 在本校，部分五年五百億計劃的政府補助被用來做為學生和教授參與國際研討會與學術交流活動的補助。	☐	☐	☐	☐	☐
8. 本校非常關注兼職教職員對本校的忠誠度。	☐	☐	☐	☐	☐
五、重新配置與轉化					
1. 本校已發展適合本校欲成為世界型大學願景的標竿學習指標。	☐	☐	☐	☐	☐
2. 我們常選擇美國和英國高排名的研究型大學做為標竿，而非選取其他地區的學校，如南亞、拉丁美洲，或非洲等。	☐	☐	☐	☐	☐
3. 我們常常做出增加或改組本校系所之即時決策，以符合社會需求。	☐	☐	☐	☐	☐
4. 本校之發展很少受到不確定風險之影響，如世界級的模糊定義、缺乏學生來源與財源等。	☐	☐	☐	☐	☐
5. 本校教授與校外的利害關係者(如政策制定者、家長	☐	☐	☐	☐	☐

或他校教職員等)之社會關係有助於本校追求世界型大學。					
6. 與企業之合作居中調解並縮小本校學術使命與實際社會需求之差距。	☐	☐	☐	☐	☐
六、革新與領導					
1. 本校最近的大學文化比較著重在研究創新，而較少著重在教學表現。	☐	☐	☐	☐	☐
2. 本校學生會主動地從事知識發現與創新活動，而非單一面向的知識吸收。	☐	☐	☐	☐	☐
3. 本校在更新與採用新科技的速度比他校來得緩慢。	☐	☐	☐	☐	☐
4. 本校教授樂於到各學科系所去分享其研究和創新活動。	☐	☐	☐	☐	☐
5. 身為學校領導者，我們必須學習新科技。	☐	☐	☐	☐	☐
6. 身為學校領導者，我們常常因校外會議和與企業之合作活動而不在學校。	☐	☐	☐	☐	☐
7. 本校領導/管理團隊有時候會出國考察而從中學習效法國外學校之學校經營。	☐	☐	☐	☐	☐

第三部分：大學動態能力面向之重要性評估

此部分欲瞭解您個人對於上述大學動態能力發展的六大面向之重要性評估。您認為哪一個面向最重要呢？哪一個面向比較不重要呢? 請依您的看法將此六面向進行1、2、3、4、5、6之順序排列，1代表此面向是最重要的，而6代表此面向是最不重要的。

_____	定位	_____	組織歷史與文化
_____	協調與整合	_____	學習
_____	重新配置與轉化	_____	革新與領導

開放式問題：

若您對本研究之大學動態能力架構發展有任何的意見與建議，請於下列空白處寫下您的意見，謝謝!

非常感謝您的參與!

APPENDIX C

INVITATION TO INTERVIEW AND INFORMED CONSENT STATEMENT

(ENGLISH VERSION)

Hello, Dr. ( ),

My name is Ya-Wen Hou, a doctoral student from University of Pittsburgh, U.S.A, and I am conducting a study entitled, "Toward World-Class Universities: Administrators' Perceptions Related to Develop Dynamic Capabilities in Targeted Taiwanese Universities." You are invited to participate in this interview because your affiliated university is rewarded by the second stage of the Five-Year-50-Billion NT Dollars Budget Project. I would like to conduct a face-to-face or telephone interview with you that would last between 1-1.5 hours and consist of some open-ended and quantitative survey questions about your perceptions related to the world-class universities issue and the development of dynamic capabilities and strategic management of your affiliated university. The survey questions and relevant interview questions will be provided in advance if you agree to participate in this interview.

There are no foreseeable risks associated with this study, nor are there any direct benefits to you, however, your valuable feedback will help me and other university leaders better understand how the targeted universities responds to globally competitive environments. The interview will be conducted at either your office or at a designated site on your university campus or by a phone call. All your responses are strictly confidential and will be kept in a secure location or destroyed upon completion of this study. Your participation is voluntary. During the interview, a voice-recording will be taken and only used within the study and you may ask to stop voice-recording at any time. Please feel free to expand on the topic or talk about related ideas. Also, if there are any questions you would rather not answer or that you do not feel comfortable answering, please say so and we will move on to the next question whichever you prefer or stop the interview. After the interview, I will provide the transcript for your review as soon as possible. If you have concerns or questions about this study, please contact me at joycedolphin@gmail.com or yah19@pitt.edu.

I would be happy to answer any questions you might have and look forward to your response.

Sincerely yours,

Ya-Wen Hou
Ph.D. student,
Department of Administrative and Policy Studies,
School of Education,
University of Pittsburgh

Advisors
Dr. W. James Jacob
University of Pittsburgh, U.S.A.
Dr. Sheng Yao Cheng
National Chung Cheng University, Taiwan

APPENDIX D

INVITATION TO INTERVIEW AND INFORMED CONSENT STATEMENT (CHINESE VERSION)

敬愛的( )，您好：

我是美國匹茲堡大學博士生侯雅雯，正在進行我的博士論文研究「邁向世界級大學：發展台灣指標性大學動態能力之行政者觀點」。誠摯地邀請您參與此訪談，您所任職服務的大學得到五年五百億計劃第二階段的補助，因此本研究欲瞭解您對於世界級大學與該校管理實務的看法。我想要進行面對面訪談或電話訪談，此訪談將進行約1至1.5小時，訪談內容包括問卷調查問題與您對於世界級大學議題與所任職服務的大學之動態能力發展與策略管理的看法。若您願意參與此訪談，該問卷題目與訪談題目將事先寄給您過目。

此研究沒有預設之風險，亦無直接利益予您，但您珍貴的意見將幫助我與其他大學領導者更了解台灣指標性大學如何回應世界競爭環境。本訪談將在您的辦公室或您所指定的地方進行，或透過電話進行訪談。您所有個人回覆將完全保密且置於安全的地方，且在此研究完成後將被銷毀。您的參與是自願的。在訪談過程中，本研究將進行錄音，此僅作為本研究學術之用，您可以隨時要求停止錄音。請放心地表達您對於相關問題的看法。若您有任何不想回答的問題或在回答過程中有任何不舒服，請拒絕回答該問題或跳到您欲回答的問題或停止訪談。訪談結束後，我將儘快提供文字記錄或逐字稿讓您審閱。如果您有任何意見或問題，請不吝與我連繫：joycedolphin@gmail.com或yah19@pitt.edu。我很願意回答您所提的相關問題並期待您是否同意參與此訪談。非常感謝您的參與，謝謝！

耑此 敬頌 道祺

匹茲堡大學教育學院博士生 侯雅雯 敬上
指導教授 匹茲堡大學教育學院W. James Jacob 博士
國立中正大學教育所 鄭勝耀博士

APPENDIX E

INTERVIEW QUESTIONS (ENGLISH VERSION)

1. What are your thoughts concerning your university is rewarded by the Five-Year-50-Billion NT Dollars Budget Project?
2. In your opinion, what are the core values of being a world-class university?
3. How does your affiliated university repose to these above core values?
4. What capabilities/criteria do you think a world-class university should have?
5. What above capabilities/ criteria does your affiliated university have or not have?
6. In your opinion, what kind of world-class universities does your affiliated university want to be? In other words, how does your affiliated university position itself in the domestic and global higher education environment?
7. In your opinion, how does your affiliated university sustain its competitive advantage in the domestic and global competitive higher education environment?
8. How do you lead your organizational members toward the goal of being a world-class university?
9. What challenges have you met when you advance the goal of being a world-class university in your organization?
10. What are your thoughts about the survey questions, such as the appropriateness of the dimensions and statements?

APPENDIX F

INTERVIEW QUESTIONS (CHINESE VERSION)

1. 您對於貴校獲得五年五百億計劃的補助有何看法？
2. 依您的觀點，要成為一所世界型大學的核心價值為何？
3. 請問，您所任職服務的大學如何回應上述的核心價值？
4. 您認為，想要成為世界級大學應該具有哪些能力或準則？
5. 您認為，貴校有或沒有上述的能力或準則？
6. 依您的看法，您認為貴校想要成為什麼樣的世界級大學？換句話說，貴校如何在國內與全球高等教育環境中尋求定位？
7. 依您的觀點，貴校如何在國內與全球高等教育環境中持續其競爭優勢？
8. 請問，您如何帶領組織同仁邁向世界級大學的目標？
9. 當您在貴組織或貴校中推動成為世界級大學之目標時，您曾遭遇過何種挑戰？
10. 您對於該問卷題目有什麼樣的看法？例如，問卷題目各個面向與敘述的合適性。

APPENDIX G

A SURVEY OF DEVELOPING DYNAMIC CAPABILITIES OF UNIVERSITIES

(ENGLISH VERSION)

INSTRUCTIONS

Dear participant,

I am Ya-Wen Hou, a doctoral student from University of Pittsburgh, U.S.A. Currently I am working on my dissertation research entitled, "Toward World-Class Universities: Administrators' Perceptions Related to Develop Dynamic Capabilities in Targeted Taiwanese Universities." This study aims to explore dynamic capabilities development of the targeted universities rewarded by the Five-Year-50-Billion NT Dollars Budget Project. The survey is sent to you by mail.

Firstly, thank you for taking the time to complete this questionnaire. This survey aims to understand your individual perception of dynamic capabilities and strategic management practice of your affiliated university.

This questionnaire approximately takes 15-30 minutes to be filled in. When you start this survey, you will be asked about some background information (e.g., age, gender, position) as well as basic facts about your affiliated university. There are no foreseeable risks associated with this survey, nor are there any direct benefits to you. This survey is anonymous, and all you responses are confidential and only used within the project and not disclosed to unauthorized person or group, and it will not include any identifying information. Your participation is voluntary, and your valuable responses and feedback will contribute to help me better understand how Taiwanese universities transform themselves and respond to global competitive pressures. And please send this completed questionnaire back with the attached stamped, addressed envelope. If you have any questions or concerns, please do not hesitate to contact me at: joycedolphin@gmail.com or yah19@pitt.edu.

Thank you again for your participation!

Sincerely,

Ya-Wen Hou

Ph.D. student,
Department of Administrative and Policy Studies,
School of Education,
University of Pittsburgh

Advisors
Dr. W. James Jacob
University of Pittsburgh, USA
Dr. Sheng Yao Cheng
National Chung Cheng University, Taiwan

◈What are dynamic capabilities?

The concept of *dynamic capabilities* was proposed by Teece, Shuen, and Pisano (1997). It is complementary to the resource-based view of organizations (RBV) and viewed as a source of competitive advantage. They defined dynamic capabilities as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (p. 516), whereby universities can strategically sense, seize, and transform their capabilities to clarify their visions and future directions. They also argued competitive advantage emerges from an organization's distinctive processes shaped by asset positions and paths; below is the illustration of the relations among these three dimensions. Based on literature review, this questionnaire consists of two parts: one is six dimensions, including positioning, organizational history and culture, coordination and integration, learning, reconfiguration and transformation, and innovation and leadership; and the other one is several statements of each dimension.

Reference
Teece, David J., Gary Pisano, and Amy Shuen. 1997. "Dynamic Capabilities and Strategic Management." *Strategic Management Journal 18* (7): 509–533. doi: 10.2307/3088148.

PART I: Background Information

Please put a check (✓) in the box according to your individual background and the characteristics of your affiliated university.

1. Gender ☐ Male ☐Female ☐ Other

2. Age ☐ Under 40 ☐ 41-50 ☐ 51-60 ☐ More than 61

3. Position
☐ President
☐ Vice-president
☐ Dean of academic office (e.g., Dean of academic affairs, Dean of student affairs, or Dean of R&D, etc.)
☐ Dean of school/college
☐ Director of department/ institute

4.	Your affiliated university is	☐ Public	☐ Private	
5.	The type of your affiliated university (More than one answer)	☐ Research-activity-based comprehensive university ☐ Teaching-activity-based comprehensive university ☐ Service-activity-based comprehensive university ☐ Teacher-education-based/ Normal university ☐ Humanity/ social science-based university ☐ Medicine-based university ☐ Technology/Engineering-based university ☐ Other_____		
6.	The history of your affiliated university (years)	☐ Under 40	☐ 41-80	☐ More than 81
7.	Numbers of schools/colleges in your affiliated university	☐ 3-5	☐ 6-8	☐ More than 9
8.	Numbers of department/ institute in your affiliated university	☐ under 50	☐ 51-75	☐ More than 76

PART II: University Dynamic Capabilities

This part aims to understand your individual perception of dynamic capabilities and strategic management practice of your university. The five-point rating scale is adopted: 1 indicates you *strongly disagree* the statement, 2 indicates you *disagree* it, 3 indicates you *somehow agree* it, 4 indicates you *agree* it, and 5 indicates you *strongly agree* it. Please indicate the extent to which you agree or disagree with the following statement by putting a check (✓) in the appropriate box.

Statement	Strongly Disagree 1	Disagree 2	Somehow Agree 3	Agree 4	Strongly Agree 5
1. We have a well-developed strategic plan/action plan for sustaining our competitive advantage.	☐	☐	☐	☐	☐
2. Each student, faculty, and staff understands that becoming a world-class university is the goal of our university.	☐	☐	☐	☐	☐
3. We have the clear, written vision and mission of becoming a world-class university.	☐	☐	☐	☐	☐
4. Our students have strong university identity and close ties to our university.	☐	☐	☐	☐	☐
5. We have specialized knowledge repositories to systematically record administrators' experience, faculty's research, and interaction with international	☐	☐	☐	☐	☐

scholars.					
6. We emphasize that each of our branch campuses is closely connected to the host campus.	☐	☐	☐	☐	☐
7. We are attractive to international scholars and students.	☐	☐	☐	☐	☐
8. We are more attractive than other universities at the domestic and global levels.	☐	☐	☐	☐	☐
9. Most our research projects are interdisciplinary studies.	☐	☐	☐	☐	☐
10. We often collaborate with international for-profit and not-for-profit organizations.	☐	☐	☐	☐	☐
11. The research projects we conduct with industry greatly increase funding for the university.	☐	☐	☐	☐	☐
12. Obtaining government grants from the Five-Year-50-Billion NT Dollars Budget Project greatly contributes to enhancing our reputation.	☐	☐	☐	☐	☐
13. Most government grants from the Five-Year-50-Billion NT Dollars Budget Project are for research support and equipment update purpose.	☐	☐	☐	☐	☐
14. In our university, the fields needing new technologies and equipment for experiments (e.g., medicine, science, technology, engineering, and mathematics) receive the funding more easily, which comes from the grants of the Five-Year-50-Billion NT Dollars Budget Project.	☐	☐	☐	☐	☐
15. In our university, a part of government grants from the Five-Year-50-Billion NT Dollars Budget Project is used in reward for students' and faculty's participation in international conferences and academic exchange activities.	☐	☐	☐	☐	☐
16. The leaders of our university often learn new technologies.	☐	☐	☐	☐	☐
17. The distribution of the grants from the Five-Year-50-Billion NT Dollars Budget Project often replies on the leaders' decisions in our university.	☐	☐	☐	☐	☐
18. The attitudes and visions of leaders have profound impacts on whether our university becomes world-class.	☐	☐	☐	☐	☐
19. The leaders of our university effectively lead the faculty and students toward the goal of becoming a world-class university.	☐	☐	☐	☐	☐
20. We greatly emphasize cross-school/department learning activities for our students and faculty.	☐	☐	☐	☐	☐

21. The benchmarking metrics, which are proper to our vision of becoming a world-class university, has been developed.	☐	☐	☐	☐	☐
22. Our university actively learns from benchmarking universities in order to increase the competitiveness.	☐	☐	☐	☐	☐
23. Our university has tangible connections with benchmarking universities (e.g., research cooperation and student exchange program).	☐	☐	☐	☐	☐
24. The development of our university is easily affected by uncertainty and risks (e.g., ambiguous definition of world-classness and the lack of students and financial resources).	☐	☐	☐	☐	☐
25. The ratings of our university in the global university rankings (e.g., Shanghai ARWU, THE, and QS rankings) are rising annually.	☐	☐	☐	☐	☐
26. The geographic location of our university benefits the establishment of a world-class university.	☐	☐	☐	☐	☐
27. Our university locating in the metropolitan area and having convenient transportation systems has more opportunities to recruit high-caliber talents in the domestic and around the world.	☐	☐	☐	☐	☐
28. Our university has an excellent reputation and raises funds from (non-)for profit organizations easily.	☐	☐	☐	☐	☐
29. Because of the long history of our university, we have more opportunities to become the targeted university of the Five-Year-50-Billion NT Dollars Budget Project.	☐	☐	☐	☐	☐
30. We have high visibility in the international higher education market.	☐	☐	☐	☐	☐
31. The size of our university benefits the establishment of a world-class university.	☐	☐	☐	☐	☐
32. With unique characters and distinctive features, our university has more opportunities to become world-class.	☐	☐	☐	☐	☐
33. Integrative activities (e.g., to merge, to join University System of Taiwan or Mid-Taiwan University System, etc.) accelerate our university toward the goal of becoming a world-class university.	☐	☐	☐	☐	☐
34. Resource sharing is the fundamental motivation of our integrative activities.	☐	☐	☐	☐	☐
35. Building an entrepreneurial culture is essential for our university to become a world-class university.	☐	☐	☐	☐	☐
36. We encourage our students and faculty to engage in entrepreneurial activities.	☐	☐	☐	☐	☐

37. Because of the vision of becoming a world-class university, our campus culture tends to the marketization-orientation.	☐	☐	☐	☐	☐
38. We have close partnerships with industry.	☐	☐	☐	☐	☐
39. The pace of updating and adopting new technologies in our university is much slower than that in other universities.	☐	☐	☐	☐	☐
40. Our students actively engage in knowledge discovery and innovative activities instead of single-way knowledge acquisition.	☐	☐	☐	☐	☐
41. Our faculty members are happy to go to different schools/departments and to share their research and innovative activities.	☐	☐	☐	☐	☐
42. The vision of becoming a world-class university contributes to re-organize our university more systematically.	☐	☐	☐	☐	☐
43. We quickly respond to the needs of Taiwan Ministry of Education in order to continuously receive government grants from the Five-Year-50-Billion NT Dollars Budget Project.	☐	☐	☐	☐	☐
44. The structure and size of our university are gradually transformed in order to increase the competitiveness.	☐	☐	☐	☐	☐
45. Our university has a good faculty merit pay system, which encourages the faculty to publish and engage in research and innovation.	☐	☐	☐	☐	☐
46. Social relations between our faculty and stakeholders outside the campus (e.g., policy-makers, parents, staffs of other universities) benefit us as we pursue the goal of becoming a world-class university.	☐	☐	☐	☐	☐
47. The collaboration with industry mediates and narrows the gap between our academic missions and social needs in reality.	☐	☐	☐	☐	☐
48. We are very concerned with the loyalty of part-time faculty members at the university.	☐	☐	☐	☐	☐
49. With good social relations, we often receive the donations from our alumni and industry.	☐	☐	☐	☐	☐
50. Governmental index of assessing whether universities receive the grants from the Five-Year-50-Billion NT Dollars Budget Project focus more on research publication.	☐	☐	☐	☐	☐
51. The limitation of Taiwan government policies regarding the international student recruitment is a disadvantage for the internationalization of our university.	☐	☐	☐	☐	☐

52. For our university, Taiwan government regulation concerning the professor's salary obstructs the international scholar recruitment.	☐	☐	☐	☐	☐

Open-ended Question

What other comments, opinions, or suggestions would you like to share related to this study not already covered in this questionnaire? Please write your response in the space below.

Thank you so much for your participation.

APPENDIX H

A SURVEY OF DEVELOPING DYNAMIC CAPABILITIES OF UNIVERSITIES

(CHINESE VERSION)

填答指南

敬愛的參與者，您好：

我是美國匹茲堡大學的博士生侯雅雯，正在進行我的博士論文研究「邁向世界級大學：發展台灣指標性大學動態能力之行政者觀點」，旨在探討台灣獲得五年五百億政府補助的指標性大學之動態能力發展。此問卷調查將郵寄給您。

首先，非常感謝您願意填答與完成此問卷。本問卷調查是要瞭解您對於該校動態能力與策略管理實踐的個人看法。

本問卷調查需花約15-30分鐘填答。當您開始填答本問卷時，將會被問及一些個人背景資料(如年齡、性別、職位等)以及該學校的基本資訊。此研究沒有預設之風險，亦無直接利益予您。本問卷調查完全匿名，且您個人回覆將完全保密，僅作為本學術研究之用。本研究亦不會公開給未授權之個人或群體，且不包含任何可認定您身分的訊息。您的參與是自願的，且您珍貴的回覆將有助於我更加瞭解台灣的大學如何轉化自身以回應全球競爭壓力。且請將您已填答完後的問卷，利用回郵信封擲回即可。如果您有任何意見或問題，請不吝與我連繫：joycedolphin@gmail.com或yah19@pitt.edu.非常感謝您的參與！

耑此敬頌道祺

匹茲堡大學教育學院博士生侯雅雯敬上
指導教授匹茲堡大學教育學院W. James Jacob 博士
國立中正大學教育所鄭勝耀博士

◈何謂動態能力?

「動態能力」(dynamic capabilities)此概念乃由David J. Teece、Gary Pisano和Amy Shuen於1997年提出。它與組織的資源基礎觀點相互補，且被視為競爭優勢來源之一。這三位學者將動態能力定義為「組織為了因應快速變動環境而整合、建立與重新配置內外部能力之潛能」(p. 516)，藉此大學組織可策略性地覺察、利用與轉化他們的能力以闡明其願景與未來方向。他們也認為競爭優勢是從組織資本定位和過去所採用之策略路徑所形構而成的組織獨特管理程序中逐漸浮現滋長。

參考文獻

Teece, David J., Gary Pisano, and Amy Shuen. 1997. "Dynamic Capabilities and Strategic Management." *Strategic Management Journal 18*(7): 509–533. doi: 10.2307/3088148.

第一部分：背景資料

請根據您個人資訊與所服務大學的特質，在下列空格中打勾「✓」。

10. 性別 ☐男性 ☐女性 ☐其他

11. 年齡 ☐40歲以下 ☐ 41-50歲 ☐ 51-60歲 ☐超過 61歲

12. 職位名稱 (若您兼任多重行政職位，請複選)
☐校長
☐副校長
☐行政單位主管 (如教務長、學務長、研發處處長等)
☐學院院長
☐系/所/學程/中心主管

13. 您所服務的學校是 ☐公立 ☐私立

14. 貴校之學校類型為(可複選)
☐研究型之綜合大學
☐教學型之綜合大學
☐服務型之綜合大學
☐以師範教育為主的大學
☐以文法商為主的大學
☐以醫學領域為主的大學
☐以科技、工程為主的大學
☐其他 _____

15. 貴校之創校歷史為　□少於 40年　□ 41-80年　□超過81年

16. 貴校之學院數為　□ 3-5個學院　□ 6-8個學院　□超過 9個學院

17. 貴校之系所數為　□少於 50個系所　□ 51-75個系所　□超過76個系所

第二部分：大學動態能力

此部分欲瞭解您個人對於該校動態能力與策略管理實踐的個人看法。此問卷採用五點量表，從「非常不同意」至「非常同意」分別是1、2、3、4、5分，分數愈低表示您愈不同意這項敘述，反之，分數愈高則表示您愈同意此敘述。請指出您同意或不同意此敘述的程度，並在合適的空格內打勾「✓」。

敘述	非常不同意	不同意	有點同意	同意	非常同意
	1	2	3	4	5
	□	□	□	□	□
1. 本校已有發展完善的策略計劃或行動計劃以持續維持本校之競爭優勢。	□	□	□	□	□
2. 每位學生與教職員都瞭解成為世界級大學是本校的目標。	□	□	□	□	□
3. 對於成為世界級大學，本校有清楚且成文的願景與使命。	□	□	□	□	□
4. 本校學生有強烈認同感且和本校有緊密連結。	□	□	□	□	□
5. 本校有特定的知識貯藏庫，可系統性地記錄行政人員的經驗，教授的研究與其和國際學者的互動。	□	□	□	□	□
6. 本校重視各分校是否和母校有緊密連結。	□	□	□	□	□
7. 本校在國際學者與學生中有高能見度。	□	□	□	□	□
8. 比起本國其他大學，本校在國內和國外都較有吸引力。	□	□	□	□	□
9. 本校大多數研究計劃是跨領域的研究。	□	□	□	□	□
10. 本校常常和國際營利與非營利組織合作。	□	□	□	□	□
11. 本校和企業合作的研究計劃大大地增加本校資	□	□	□	□	□

	金。					
12.	能得到五年五百億計劃政府補助大大地提升本校之名望。	☐	☐	☐	☐	☐
13.	本校所獲得的五年五百億計畫補助多以更新研究設備、支持研究為主。	☐	☐	☐	☐	☐
14.	需要實驗設備或儀器的科系(例如科學、數學、工程、醫學等)較容易獲得本校五年五百億經費的補助。	☐	☐	☐	☐	☐
15.	在本校，部分五年五百億計劃的政府補助被用來做為學生和教授參與國際研討會與學術交流活動的補助。	☐	☐	☐	☐	☐
16.	本校領導者/團隊常常學習新科技。	☐	☐	☐	☐	☐
17.	本校獲得的五年五百億經費之分配狀況多依領導者/團隊的決定為主。	☐	☐	☐	☐	☐
18.	領導者/團隊的態度與視野對於本校是否能成為世界級大學影響很大。	☐	☐	☐	☐	☐
19.	本校的領導者/團隊能有效帶領本校的教職員工及學生往世界級大學目標邁進。	☐	☐	☐	☐	☐
20.	本校非常重視學生和教授的跨學院或跨系所之學習活動。	☐	☐	☐	☐	☐
21.	本校已發展適合本校欲成為世界型大學願景的標竿學習指標。	☐	☐	☐	☐	☐
22.	本校會積極學習標竿學校之辦學優點，以提升競爭力。	☐	☐	☐	☐	☐
23.	本校與標竿學校之間有具體的連結(例如有共同的合作案、學生交換等)。	☐	☐	☐	☐	☐
24.	本校之發展很容易受到不確定風險之影響，如世界級的模糊定義、學生來源與財源等。	☐	☐	☐	☐	☐
25.	本校在世界大學排名中的排名每年愈來愈高，如上海交通大學世界大學學術排名、英國泰晤士高等教育世界大學排名、與QS世界大學排名。	☐	☐	☐	☐	☐
26.	本校的地理位置有助於成為世界型大學。	☐	☐	☐	☐	☐
27.	本校位於大都市，交通生活機能方便，容易吸引到國內外優秀人才。	☐	☐	☐	☐	☐
28.	本校擁有良好的口碑與聲望，使得本校較容易吸引到(非)營利機構的資金挹注。	☐	☐	☐	☐	☐
29.	本校的悠久歷史有助於本校成為五年五百億計	☐	☐	☐	☐	☐

	劃中所選取的指標性學校。					
30.	本校在國際高等教育場域的曝光率很高。	□	□	□	□	□
31.	本校的規模有助於本校成為一所世界級大學。	□	□	□	□	□
32.	本校已發展出不同於他校的獨特特色，更有機會能成為世界級大學。。	□	□	□	□	□
33.	整合性活動(如整併，加入台灣大學聯盟或中部大學聯盟等)大大地幫助本校成為世界型大學。	□	□	□	□	□
34.	資源分享是本校進行整合性活動最主要的動機。	□	□	□	□	□
35.	建立創業文化對於本校欲成為世界級大學是很重要的。	□	□	□	□	□
36.	本校鼓勵學生和教授從事創業活動。	□	□	□	□	□
37.	因追求世界級大學之願景，本校校園文化偏向市場競爭導向。	□	□	□	□	□
38.	本校和企業有緊密的合夥關係。	□	□	□	□	□
39.	本校在更新與採用新科技的速度比他校來得緩慢。	□	□	□	□	□
40.	本校學生會主動地從事知識發現與創新活動，而非單一面向的知識吸收。	□	□	□	□	□
41.	本校教授樂於到各學科系所去分享其研究和創新活動。	□	□	□	□	□
42.	本校的治理與運作因欲成為世界級大學之願景而變得更有系統性。	□	□	□	□	□
43.	本校能掌握與及時回應教育行政主管機關的需求，以持續獲得政府之五年五百億計畫補助。	□	□	□	□	□
44.	本校正積極轉化組織結構與規模，以增進競爭力。	□	□	□	□	□
45.	本校有良好的激勵措施(例如彈性薪資)，以鼓勵本校教授多研究發表與進行創新活動。	□	□	□	□	□
46.	本校教授與校外人士 (如政策制定者、家長或他校教職員等)之社會關係有助於本校追求世界級大學。	□	□	□	□	□
47.	本校與企業的合作能縮小本校學術使命與實際社會需求之差距。	□	□	□	□	□
48.	本校非常關注兼職教職員對本校的忠誠度。	□	□	□	□	□
49.	本校有良好的社會關係，常常獲得校友和企業的捐獻。	□	□	□	□	□
50.	政府所訂定的五年五百億計畫指標偏重研究與	□	□	□	□	□

發表。					
51. 政府對於國際生招生的規定不利本校進行國際化活動。	☐	☐	☐	☐	☐
52. 政府對大學教授薪資的規定阻礙本校招募國際學者。	☐	☐	☐	☐	☐

開放式問題

您是否有任何與此研究相關的評論、意見與建議或認為本問卷有疏漏之處呢？請於下列空白處寫下您的意見，謝謝!

非常感謝您的參與與協助!

BIBLIOGRAPHY

Agasisti, Tommaso, and Giuseppe Catalano. 2006. “Governance Models of University Systems—Towards Quasi-Markets? Tendencies and Perspectives: A European Comparison.” *Journal of Higher Education Policy and Management* 28 (3): 245–262. doi: 10.1080/13600800600980056.

Aguillo, Isidro F., Judit Bar-Ilan, Mark Levene, and Jose´ Luis Ortega. 2010. "Comparing university rankings." *Scientometrics* 85 (1):243–256. doi: DOI 10.1007/s11192-010-0190-z.

Alfred, Richard L. 2006. *Managing the Big Picture in Colleges and Universities: From Tactics to Strategy*. Edited by American Council on Education/Praeger series on higher education. Westport, CT: Praeger Publishers.

Altbach, Philip G. 2004. “The Costs and Benefits of World-Class Universities.” *Academe* 90 (1): 20–23.

Altbach, Philip G. 2007. “Empires of Knowledge and Development.” In *World Class Worldwide: Transforming Research Universities in Asia and Latin America*, edited by Philip G. Altbach and Jorge Balán, pp. 1–28. Baltimore, MD: Johns Hopkins University Press.

Altbach, Philip G., and Jamil Salmi, eds. 2011. *The Road to Academic Excellence: The Making of World-Class Research Universities*. Washington, DC: World Bank.

Amit, Raphael, and Paul J. H. Schoemaker. 1993. “Strategic Assets and Organizational Rent.” *Strategic Management Journal* 14 (1): 33–46. doi: 10.1002/smj.4250140105.

Amsler, Sarah S., and Chris Bolsmann. 2012. “University Ranking as Social Exclusion.” *British Journal of Sociology of Education* 33 (2): 283–301. doi: 10.1080/01425692.2012.649835.

Anderson, James C., and David W. Gerbing. 1984. “The Effect of Sampling Error on Convergence, Improper Solutions, and Goodness-of-Fit Indices for Maximum Likelihood Confirmatory Factor Analysis.” *Psychometrika* 49 (2): 155–173.

Babbie, Earl. 2010. *The Practice of Social Research*. 12 ed. Belmont, CA: Wadsworth.

Baer, Linda L., Ann Hill Duin, and Judith A. Ramaley. 2008. “Smart Change.” *Planning for Higher Education* 36 (2): 5–16.

Bagozzi, Richard R., and Youjae Yi. 1988. “On the Evaluation of Structural Equation Models.” *Journal of the Academy of Marketing Science* 16 (1): 74–94. doi: 10.1007/BF02723327.

Bandalos, Deborah L., and Sara J. Finney. 2010. “Factor Analysis: Exploratory and Confirmatory.” In *The Reviewer's Guide to Quantitative Methods in the Social Sciences*, edited by Gregory R. Hancock and Ralph O. Mueller, pp. 93–114. New York, NY: Routledge.

Barney, Jay B. 1986. “Strategic Factor Markets: Expectations, Luck, and Business Strategy.” *Management Science* 32 (10): 1231–1241.

Barney, Jay B. 1991. “Firm Resources and Sustained Competitive Advantage.” *Journal of Management* 17 (1): 99–120. doi: 10.1177/014920639101700108.

Bastedo, Michael N. 2012. “Organizing Higher Education: A Manifesto.” In *The Organization of Higher Education: Managing Colleges for a New Era*, edited by Michael N. Bastedo, pp. 3–17. Baltimore, MD: Johns Hopkins University Press.

Bess, James L., Jay R. Dee, and D. Bruce Johnstone. 2012. *Understanding College and University Organization: Theories for Effective Policy and Practice: Volume 1: The State of the System*. Sterling, VA: Stylus Publishing.

Bierema, Laura L. 1999. “The Process of the Learning Organization: Making Sense of Change.” *NASSP Bulletin* 83 (604): 46–56. doi: 10.1177/019263659908360407.

Birnbaum, Robert 1988. *How Colleges Work: The Cybernetics of Academic Organization and Leadership*. San Francisco, CA: Jossey-Bass.

Black, Thomas R. 1999. *Doing Quantitative Research in the Social Sciences: An Integrated Approach to Research Design, Measurement and Statistics*. London, UK: Sage.

Bollen, Kenneth A., and Robert A. Stine. 1992. “Bootstrapping Goodness-of-Fit Measures in Structural Equation Models.” *Sociological Methods and Research* 21 (2): 205–229.

Brewer, Peggy D., and Kristen L. Brewer. 2010. “Knowledge Management, Human Resource Management, and Higher Education: A Theoretical Model.” *Journal of Education for Business* 85 (6): 330–335. doi: 10.1080/08832321003604938.

Bui, Hong T.M., and Yehuda Baruch. 2012. “Learning Organizations in Higher Education: An Empirical Evaluation within an International Context.” *Management learning* 43 (5): 515–544. doi: 10.1177/1350507611431212.

Byrne, Barbara M. 2010. *Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming*. New York; London: Routledge.

Byun, Kiyong, Jae-Eun Jon, and Dongbin Kim. 2013. “Quest for Building World-Class Universities in South Korea: Outcomes and Consequences.” *Higher Education* 65 (5): 645–659. doi: 10.1007/s10734-012-9568-6.

Chan, Sheng-Ju. 2007. “Mergers in Taiwanese Higher Education: With Special Reference to the Efficiency Effects.” *Compare* 37 (2): 257–265. doi: 10.1080/03057920601165637.

Chang, Dian-fu. 2013. “The Challenges for Establishing World-Class Universities in Taiwan.” In *Institutionalization of World-Class University in Global Competition*, edited by Jung Cheol Shin and Barbara M. Kehm, pp. 185–201. Dordrecht, Netherlands: Springer.

Chang, Dian-fu, Cheng-ta Wu, Gregory S. Ching, and Chia-wei Tang. 2009. “An Evaluation of the Dynamics of the Plan to Develop First-Class Universities and Top-Level Research Centers in Taiwan.” *Asia Pacific Education Review* 10 (1): 47–57. doi: 10.1007/s12564-009-9010-7.

Chang, Dian-Fu, and Chao-Chi Yeh. 2012. “Teaching Quality After the Massification of Higher Education in Taiwan.” *Chinese Education and Society* 45 (5–6): 31–44. doi: 10.2753/CED1061-1932450503.

Chang, Flora Chia I. 2010. “The Financial Management of Higher Education: Key of Matching toward World-Class Universities.” *Journal of Educational Resources and Research* 94: 41–66.

Changyang, Ying, Kuo-Shih Yang, and Hsiu-Hsi Liu. 2014. “Indicators of Equity in Higher Education (高等教育公平指標).” In *Equity in Education: Indicators and their Applications*, edited by Po-Chang Chen and Ru-Jer Wang, pp. 149–173. Taipei, Taiwan: Higher Education.

Chen, Cheng-Chuan. 2013. *The Comapartive Study on Academic Competitive Capacity of Top Universities between China and Taiwan*. Unpublished Dissertation, College of Education, National Chi Nan University, Nantou, Taiwan.

Chen, Dorothy I-ru. 2012. “Higher Education Reform in Taiwan and Its Implications on Equality.” *Chinese Education and Society* 45 (5–6): 134–151. doi: 10.2753/CED1061-1932450510.

Cheng, Sheng Yao (Kent), and W. James Jacob. 2012. “Expansion and Stratification of Higher Educational Opportunity in Taiwan.” *Chinese Education and Society* 45 (5–6): 112–133. doi: 10.2753/CED1061-1932450509.

Cheng, Sheng Yao (Kent), W. James Jacob, and Shen-Keng Yang. 2014. "Reflections from the Social Science Citation Index (SSCI) and Its Influence on Education Research in Taiwan." In *The SSCI Syndrome in Higher Education: A Local or Global Phenomenon*, edited by Chuing Prudence Chou, pp. 97–107. Rotterdam, Netherlands: Sense Publishers.

Cho, Young Ha, and John D. Palmer. 2013. “Stakeholders’ Views of South Korea’s Higher Education Internationalization Policy.” *Higher Education* 65 (3): 291–308. doi: 10.1007/s10734-012-9544-1.

Chou, Chuing Prudence , and Li-Tien Wang. 2012. “Who Benefits from the Massification of Higher Education in Taiwan?” *Chinese Education and Society* 45 (5–6): 8–20. doi: 10.2753/CED1061-1932450501.

Churchill, Gilbert A. Jr. 1979. “A Paradigm for Developing Better Measures of Marketing Constructs.” *Journal of Marketing Research, Vol. 16, No. 1 (Feb., 1979), pp. 64-73* 16 (1): 64–73. doi: 10.2307/3150876.

Clark, Burton R. . 1998. *Creating Entrepreneurial Universities: Organizational Pathways of Transformation*. Oxford: International Association of Universities and Pergamon Press.

Clark, Kim B. 1989. “What Strategy Can Do for Technology.” *Harvard Business Review* 67 (6): 94–98.

Comm, Clare L., and Dennis F. X. Mathaisel. 2003. “Less is More: A Framework for a Sustainable University.” *International Journal of Sustainability in Higher Education* 4 (4): 314–323. doi: 10.1108/14676370310497543.

Comm, Clare L., and Dennis F. X. Mathaisel. 2005. “An Exploratory Study of Best Lean Sustainability Practices in Higher Education.” *Quality Assurance in Education* 13 (3): 227–240. doi: 10.1108/09684880510607963.

Curran, Patrick J., Stephen G. West, and John F. Finch. 1996. “The Robustness of Test Statistics to Nonnormality and Specification Error in Confirmatory Factor Analysis.” *Psychological Methods* 1 (1): 16–29. doi: 10.1037/1082-989X.1.1.16.

Darden, Mary Landon, and Jay Box. 2009. “Technology Today and Tomorrow.” In *Beyond 2020: Envisioning the Future of Universities in America*, edited by Mary Landon Darden, pp. 99–112. Lanham, MD: Rowman & Littlefield Education (Published in partnership with the American Council on Education).

Darden, Mary Landon, and James J. Duderstadt. 2009. “Overview of the Future University Beyond 2020.” In *Beyond 2020: Envisioning the Future of Universities in America*, edited by Mary Landon Darden, pp. 1–12. Lanham, MD: Rowman & Littlefield Education (Published in partnership with the American Council on Education).

Darden, Mary Landon, Claire Van Ummersen, Helen Astin, and William Underwood. 2009. “Significant Continuing and Emerging Issues Facing Tomorrow's University.” In *Beyond 2020: Envisioning the Future of Universities in America*, edited by Mary Landon Darden, pp. 25–45. Lanham, MD: Rowman & Littlefield Education (Published in partnership with the American Council on Education).

Dawson, Shane, Bruce Burnett, and Mark O'Donohue. 2006. “Learning Communities: An Untapped Sustainable Competitive Advantage for Higher Education.” *International*

Journal of Educational Management 20 (2): 127–139. doi: 10.1108/09513540610646118.

Deem, Rosemary, Ka Ho Mok, and Lisa Lucas. 2008. "Transforming Higher Education in Whose Image? Exploring the Concept of the 'World-Class' University in Europe and Asia." *Higher Education Policy* 21 (1): 83–97. doi: 10.1057/palgrave.hep.8300179.

Delgado, Jorge Enrique, and John C. Weidman. 2012. "Latin American and Caribbean Countries in the Global Quest for World Class Academic Recognition: An Analysis of Publications in Scopus and the Science Citation Index between 1990 and 2010." *Excellence in Higher Education* 3: 111–121. doi: 10.5195/ehe.2012.73.

Department for Business Innovation and Skills (BIS). 2009. *Higher Ambitions: The Future of Universities in a Knowledge Economy*. London.

DeVellis, Robert F. 2003. *Scale Development: Theory and Applications*. 2nd ed. Thousand Oaks, CA: Sage Publications.

Dill, David D. 1997. "Higher Education Markets and Public Policy." *Higher Education Policy* 10 (3/4): 167–185. doi: 10.1016/S0952-8733(97)00011-1.

Dill, David D., and Maarja Soo. 2005. "Academic Quality, League Tables, and Public Policy: A Cross-National Analysis of University Ranking Systems." *Higher Education* 49 (4): 495–533. doi: 10.1007/s10734-004-1746-8.

Ding, Lin, Wayne F. Velicer, and Lisa L. Harlow. 1995. "Effects of Estimation Methods, Number of Indicators Per Factor, and Improper Solutions on Structural Equation Modeling Fit Indices." *Structural Equation Modeling: A Multidisciplinary Journal* 2 (2): 119–143. doi: 10.1080/10705519509540000.

Drucker, Peter F. 1995. *Managing in a Time of Great Change*. New York, NY: Truman Talley Books/Dutton.

Drucker, Peter F., and Joseph A. Maciariello. 2008. *Management*. Rev. ed. New York, NY: Collins.

Duarte, Paulo O., Helena B. Alves, and Mário B. Raposo. 2010. "Understanding University Image: A Structural Equation Model Approach." *International Review on Public and Nonprofit Marketing* 7 (1): 21–36. doi: 10.1007/s12208-009-0042-9.

Duke, Chris. 2002. *Managing the Learning University*. Buckingham, England; Philadelphia, PA: SRHE & Open University Press.

Easterby-Smith, Mark, Mary Crossan, and Davide Nicolini. 2000. "Organizational Learning: Debates Past, Present and Future." *Journal of Management Studies* 37 (6): 783–796. doi: 10.1111/1467-6486.00203.

Eisenhardt, Kathleen M., and Jeffrey A. Martin. 2000. “Dynamic Capabilities: What Are They?” *Strategic Management Journal* 21 (10/11): 1105–1121. doi: 10.2307/3094429.

Enarson, Harold. 1960. “Innovation in Higher Education.” *The Journal of Higher Education* 31 (9): 495–501.

Eng, Cheng Joo. 2005. *The Dynamic Capabilities in Taiwan's Senior High Schools (學校組織動態能耐評量指標建構與實證之研究)*. Unpublished Dissertation, Department of Education, National Chengchi University, Taipei, Taiwan.

Etzkowitz, Henry, and Loet Leydesdorff. 2000. “The Dynamics of Innovation: From National Systems and ‘‘Mode 2’’ to aTriple Helix of Uiversity-Industry-Government Relations.” *Research Policy* 29 (2): 109–123. doi: 10.1016/S0048-7333(99)00055-4.

Etzkowitz, Henry, Andrew Webster, Christiane Gebnardt, and Branca Regina Cantisano Terra. 2000. “The Future of the University and the University of the Future: Evolution of Ivory Tower to Entrepreneurial Paradigm.” *Research Policy* 29 (2): 313–330. doi: 10.1016/S0048-7333(99)00069-4.

Evans, J. Stuart. 1991. “Strategic Flexibility for High Technology Manoeuvres: A Conceptual Framework.” *Journal of Management Studies* 28 (1): 69–89. doi: 10.1111/j.1467-6486.1991.tb00271.x.

Feng, Yi. 2013. “University of Nottingham Ningbo China and Xi’an Jiaotong-Liverpool University: Globalization of Higher Education in China.” *Higher Education* 65 (4): 471–485. doi: 10.1007/s10734-012-9558-8.

Flynn, Leisa Reinecke, and Dawn Pearcy. 2001. “Four Subtle Sins in Scale Development: Some Suggestions for Strengthening the Current Paradigm.” *International Journal of Market Research* 43 (409–423).

Fornell, Claes, and David F. Larcker. 1981. “Evaluating Structural Equation Models with Unobservable Variables and Measurement Error.” *Journal of Marketing Research* 18 (1): 39–50.

Foskett, Nick. 2012. “Marketization and Education Marketing: The Evolution of a Discipline and a Research Field.” In *The Management and Leadership of Educational Marketing: Research, Practice and Applications*, edited by Izhar Oplatka and Jane Hemsley-Brown, pp. 39–61. Bingley, UK: Emerald Group Publishing.

Frey, Bruno S., and Katja Rost. 2010. “Do Rankings Reflect Research Quality?” *Journal of Applied Economics* 13 (1): 1–38.

Furr, R. Michael. 2011. *Scale Construction and Psychometrics for Social and Personality Psychology*. London/ Thousand Oaks/ New Delhi/ Singapore: Sage.

Gai, Che-Sheng. 2004. “An Analysis of the Perceived Need for Increasing Market Orientation in Taiwan’s Policy on Higher Education (臺灣高等教育市場化政策導向之檢視).” *Bulletin of Educational Research* 50 (2): 29–51.

Gay, L.R. , and Peter Airasian. 2003. *Educational Research: Competencies for Analysis and Applications*. 7 ed. Upper Saddle River, NJ: Merrill Prentice Hall.

Gayle, Dennis John, Bhoendradatt Tewarie, and A. Quinton White. 2003. *Governance in the Twenty-First-Century University: Approaches to Effective Leadership and Strategic Management, ASHE-ERIC Higher Education Report*. San Francisco,CA: Wiley Periodicals.

Geiger, Roger L. 2004. *Knowledge and Money: Research Universities and the Paradox of the Marketplace*. Stanford, CA: Stanford University Press.

Geiger, Roger L. 2006. “The Quest for ‘Economic Relevance’ by US Research Universities.” *Higher Education Policy* 19 (4): 411–431. doi: 10.1057/palgrave.hep.8300131.

Gerbing, David W., and James C. Anderson. 1988. “An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment.” *Journal of Marketing Research* 25 (2): 186–192. doi: 10.2307/3172650.

Glennerster, Howard. 1991. “Quasi-Markets for Education?” *The Economic Journal* 101 (408): 1268–1276. doi: 10.2307/2234442.

Grant, Robert M. 1996. “Prospering in Dynamically-Competitive Environments: Organizational Capability as Knowledge Integration.” *Organization Science* 7 (4): 375–387. doi: 10.1287/orsc.7.4.375.

Gray, Brendan J., Kim Shyan Fam, and Violeta A. Llanes. 2003. “Branding Universities in Asian Markets.” *Journal of Product and Brand Management* 12 (2): 108–120. doi: 10.1108/10610420310469797.

Guo, Hai, and Zhi Cao. 2014. “Strategic Flexibility and SME Performance in an Emerging Economy: A Contingency Perspective.” *Journal of Organizational Change Management* 27 (2): 273–298. doi: 10.1108/JOCM-11-2012-0177.

Hair, Joseph F. Jr., William C. Black, Barry J. Babin, and Rolph E. Anderson. 2006. *Multivariate Data Analysis* 6ed. Upper Saddle River, NJ: Pearson Prentice Hall.

Hambrick, Donald C. 1981. “Strategic Awareness within Top Management Teams.” *Strategic Management Journal* 2 (3): 263–279. doi: 10.2307/2486224.

Harman, Grant, and Kay Harman. 2008. “Strategic Mergers of Strong Institutions to Enhance Competitive Advantage.” *Higher Education Policy* 21 (1): 99–121. doi: 10.1057/palgrave.hep.8300172.

Hassan, Zaharah, Abu Daud Silong, Ismi Arif Ismail, and Soaib Asmiran. 2011. "Developing New Generation of Educational Leaders for World Class University." *Procedia Social and Behavioral Sciences* 15: 812–817. doi: 10.1016/j.sbspro.2011.03.190.

Hatch, Nile W., and Jeffrey H. Dyer. 2004. "Human Capital and Learning as a Source of Sustainable Competitive Advantage." *Strategic Management Journal* 25 (12): 1155–1178. doi: 10.1002/smj.421.

Hazelkorn, Ellen. 2009. "Rankings and the Battle for World-Class Excellence: Institutional Strategies and Policy Choices." *Higher Education Management and Policy* 21 (1): 55–76.

Hazelkorn, Ellen. 2014. "Reflections on a Decade of Global Rankings: What We've Learned and Outstanding Issues." *European Journal of Education* 49 (1): 12–28. doi: 10.1111/ejed.12059.

Helfat, Constance E., and Margaret A. Peteraf. 2003. "The Dynamic Resource-Based View: Capability Lifecycles." *Strategic Management Journal* 24 (10): 997–1010. doi: 10.2307/20060594.

Henson, Robin K. 2001. "Understanding Internal Consistency Reliability Estimates: A Conceptual Primer on Coefficient Alpha." *Measurement and Evaluation in Counseling and Development* 34 (3): 177–189.

Hitt, Michael A., R. Duane Ireland, and Robert E. Hoskisson. 1995. *Strategic Management: Competitiveness and Globalization: Concepts*. St. Paul, MN: West Publishing Company.

Ho, Jow-Fei. 2009. *A Study on the Strategic Management and Performance Evaluation of "Development Plan for World Class Universities and Research Centers for Excellence" in Taiwan*. Unpublished Dissertation, Graduate Institute of Management Sciences, Tamkang University, Taipei, Taiwan.

Horta, Hugo. 2009. "Global and National Prominent Universities: Internationalization, Competitiveness and the Role of the State." *Higher Education* 58 (3): 387–405. doi: 10.1007/sl0734-009-9201-5.

Hou, Angela Yung-Chi, Martin Ince, and Chung-Lin Chiang. 2012. "A Reassessment of Asian Pacific Excellence Programs in Higher Education: The Taiwan Experience." *Scientometrics* 92 (1): 23–42. doi: 10.1007/s11192-012-0727-4.

Hou, Angela Yung-Chi, Martin Ince, and Chung-Lin Chiang. 2013. "The Impact of Excellence Initiatives in Taiwan Higher Education." In *Building World-Class Universities: Different Approaches to a Shared Goal*, edited by Qi Wang, Ying Cheng and Nian Cai Liu, pp. 35–53. Rotterdam, Netherlands: Sense Publishers.

Hrabowski III, Freeman A. 2014. "Institutional Change in Higher Education: Innovation and Collaboration." *Peabody Journal of Education* 89 (3): 291–304. doi: 10.1080/0161956X.2014.913440.

Hsu, Ming-Ju 2003. *Taiwanese Higher Education Reforms and Innovation in the Globalization (全球化時代, 台灣高等教育之改革與創新*). Taipei, Taiwan. Retrieved from http://old.npf.org.tw/PUBLICATION/EC/092/EC-R-092-008.htm.

Huang, Mu-Hsuan. 2011. "A Comparison of Three Major Academic Rankings for World Universities: From a Research Evaluation Perspective." *Journal of Library and Information Studies* 9 (1):1–25.

Hutcheson, Graeme D., and Nick Sofroniou. 1999. *The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models*. Thousand Oaks, CA: Sage.

Iacobucci, Dawn. 2010. "Structural Equations Modeling: Fit Indices, Sample Size, and Advanced Topics." *Journal of Consumer Psychology* 20 (1): 90–98. doi: 10.1016/j.jcps.2009.09.003.

Indiresan, P.V. 2007. "Prospects for World-Class Research Universities in India." In *World Class Worldwide: Transforming Research Universities in Asia and Latin America*, edited by Philip G. Altbach and Jorge Balán, pp. 95–121. Baltimore, MD: Johns Hopkins University Press.

Jacob, W. James, Stewart E. Sutin, John C. Weidman, and John L. Yeager (Eds.) 2015. *Community Engagement in Higher Education: Policy Reforms and Practice*. Boston, Taipei, London, Rotterdam: Sense Publishers.

Jang, Deok-Ho, and Leo Kim. 2013. "Framing 'World Class' Differently: International and Korean Participants' Perceptions of the World Class Uiversity Project." *Higher Education* 65 (6): 725–744. doi: 10.1007/s10734-012-9573-9.

Kenny, David A., and D. Betsy McCoach. 2003. "Effect of the Number of Variables on Measures of Fit in Structural Equation Modeling." *Structural Equation Modeling: A Multidisciplinary Journal* 10 (3): 333–351. doi: 10.1207/S15328007SEM1003_1.

Keohane, Nannerl O. 2013. "Higher Education in the Twenty-First Century: Innovation, Adaptation, Preservation." *PS: Political Science & Politics* 46 (1): 102–105. doi: 10.1017/S1049096512001734.

Kerr, Greg, and Peter Hosie. 2013. "Strategic Avoidance: Can Universities Learn from Other Sectors?" *Australian Universities' Review* 55 (1): 59–65.

Khine, Myint Swe, ed. 2013. *Application of Structural Equation Modeling in Educational Research and Practice*. Rotterdam; Boston; Taipei: Sense.

Khoon, Koh Aik, Roslan Abd. Shukor, Osman Hassan, Mohd. Zainuddin Saleh, Ainon Hamzah, and Abd. Rahim Hj. Ismail. 2005. "Hallmark of a World-Class University." *College Student Journal* 39 (4): 765–768.

Kim, Ki-Seok. 2007. “A Great Leap Forward to Excellence in Research at Seoul National University, 1994–2006.” *Asia Pacific Education Review* 8 (1): 1–11. doi: 10.1007/BF03025829.

Kim, Ki-Seok, and Sunghee Nam. 2007. “The Making of a World-Class University at the Periphery.” In *World Class Worldwide: Transforming Research Universities in Asia and Latin America*, edited by Philip G. Altbach and Jorge Balán, pp. 122–139. Baltimore, MD: Johns Hopkins University Press.

King, William R. 2009. “Knowledge Management and Organizational Learning.” In *Knowledge Management and Organizational Learning*, edited by William R. King, pp. 3–13. Dordrecht; Heidelberg; London; New York: Springer.

Kline, Paul. 1994. *An Easy Guide to Factor Analysis*. London/ New York: Routledge.

Kline, Rex B. 2005. *Principles and Practice of Structural Equation Modeling*. 2 ed. New York, NY: Guilford Press.

Knight, Jane. 2002. “Trade Talk: An Analysis of the Impact of Trade Liberalization and the General Agreement on Trade in Services on Higher Education.” *Journal of Studies in International Education* 6 (3): 209–229. doi: 10.1177/102831530263002.

Kogut, Bruce, and Udo Zander. 1992. “Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology.” *Organization Science* 3 (3): 383–397. doi: 10.1287/orsc.3.3.383.

Kraaijenbrink, Jeroen, J.-C. Spender, and Aard J. Groen. 2010. “The Resource-Based View: A Review and Assessment of Its Critiques.” *Journal of Management* 36 (1): 349–372. doi: 10.1177/0149206309350775.

Lance, Charles E., Marcus M. Butts, and Lawrence C. Michels. 2006. “The Sources of Four Commonly Reported Cutoff Criteria: What Did They Really Say?” *Organizational Research Methods* 9 (2): 202–220. doi: 10.1177/1094428105284919.

Lane, Jason E. 2012. “Higher Education and Economic Competitiveness.” In *Universities and Colleges as Economic Drivers: Measuring Higher Education’s Role in Economic Development*, edited by Jason E. Lane and D. Bruce Johnstone, pp. 1–30. Albany, NY: State University of New York Press.

Lane, Jason E., and Taya L. Owens. 2012. “International Dimensions of Higher Education's Contributions to Economic Development.” In *Universities and Colleges as Economic Drivers: Measuring Higher Education’s Role in Economic Development*, edited by Jason E. Lane and D. Bruce Johnstone, pp. 205–237. Albany, NY: State University of New York Press.

Lang, Daniel W. 2005. “ ‘World Class’ or the Curse of Comparison?“ *Canadian Journal of Higher Education* 35 (3): 27–55.

Lee, Jeongwoo. 2013. "Creating World-Class Universities: Implications for Developing Countries." *Prospects* 43 (2): 233–249. doi: 10.1007/s11125-013-9266-x.

Lei, Pui-Wa, and Qiong Wu. 2007. "Introduction to Structural Equation Modeling: Issues and Practical Considerations." *Educational Measurement: Issues and Practice* 26 (3): 33–43. doi: 10.1111/j.1745-3992.2007.00099.x.

Leonard-Barton, Dororthy. 1992. "Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development." *Strategic Management Journal* 13 (8): 111–125. doi: 10.2307/2486355.

Levy, Gary D., and Sharron L. Ronco. 2012. "How Benchmarking and Higher Education Came Together." *New Directions for Institutional Research* 2012 (156): 5–13. doi: 10.1002/ir.20026.

Li, Jun. 2012. "World-Class Higher Education and the Emerging Chinese Model of the University." *Prospects* 42 (3): 319–339. doi: 10.1007/s11125-012-9241-y.

Li, Mei, Sriram Shankar, and Kam Ki Tang. 2011. "Catching Up with Harvard: Results from Regression Analysis of World Universities League Tables." *Cambridge Journal of Education* 41 (2): 121–137. doi: 10.1080/0305764X.2011.572865.

Lindsay, Beverly. 2012. "Articulating Domestic and Global University Descriptors and Idices of Excellence." *Comparative Education* 48 (3): 385–399. doi: 10.1080/03050068.2011.613279.

Liu, Kuo-Chao. 2013. *A Critical Discourse Analysis On "Stepping Towards Top University" Policy in Taiwan*. Unpublished Dissertation, Department of Education, National Taiwan Normal University, Taipei, Taiwan.

Liu, Nian Cai, and Qi Wang. 2011. "Building World-Class Universities in China: A Dream Come True?" *Chinese Education and Society* 44 (5): 3–7. doi: 10.2753/CED1061-1932440500.

Liu, Nian Cai, Qi Wang, and Ying Cheng, eds. 2011. *Paths to a World-Class University: Lessons from Practices and Experiences*. Rotterdam, Netherlands: Sense Publishers.

Lo, William Yat Wai. 2009. "Reflections on Internationalisation of Higher Education in Taiwan: Perspectives and Prospects." *Higher Education* 58 (6): 733–745. doi: 10.1007/sl0734-009-9209-x.

Lockwood, Geoffrey. 1985. "Universities as Organizations." In *Universities: The Management Challenges*, edited by Geoffrey Lockwood and John L. Davies, pp. 24–45. Windsor-Berkshire, UK; Philadelphia, PA: Society for Research into Higher Education and NFER-NELSON.

MacCallum, Robert C., Michael W. Browne, and Hazuki M. Sugawara. 1996. "Power Analysis and Determination of Sample Size for Covariance Structure Modeling." *Psychological Methods* 1 (2): 130–149. doi: 10.1037/1082-989X.1.2.130.

Mardia, By K. V. . 1970. "Measures of Multivariate Skewness and Kurtosis with Applications." *Biometrika* 57 (3): 519–530.

Marginson, Simon. 2011. "Global Perspectives and Strategies of Asia-Pacific Research Universities." In *Paths to a World-Class University: Lessons from Practices and Experiences*, edited by Nian Cai Liu, Qi Wang and Ying Cheng, pp. 3–27. Rotterdam, Netherlands: Sense Publishers.

Marginson, Simon, Sarjit Kaur, and Erlenawati Sawir. 2011. "Regional Dynamism and Inequality." In *Higher Education in the Asia-Pacific: Strategic Responses to Globalization*, edited by Simon Marginson, Sarjit Kaur and Erlenawati Sawir, pp. 433–461. Dordrecht; Heidelberg; London; New York: Springer.

Marginson, Simon, and Marijk van der Wende. 2007. "To Rank or To Be Ranked: The Impact of Global Rankings in Higher Education." *Journal of Studies in International Education* 11 (3/4): 306–329. doi: 10.1177/1028315307303544.

Marsh, Herbert W., John R. Balla, and Roderick P. McDonald. 1988. "Goodness-of-Fit Indexes in Confirmatory Factor Analysis: The Effect of Sample Size." *Psychological Bulletin* 103 (3): 391–410. doi: 10.1037/0033-2909.103.3.391.

Marsh, Herbert W., Bengt Muthén, Tihomir Asparouhov, Oliver Lüdtke, Alexander Robitzsch, Alexandre J. S. Morin, and Ulrich Trautwein. 2009. "Exploratory Structural Equation Modeling, Integrating CFA and EFA: Application to Students' Evaluations of University Teaching." *Structural Equation Modeling: A Multidisciplinary Journal* 16 (3): 439–476. doi: 10.1080/10705510903008220.

Marshall, Stephanie, ed. 2007. *Strategic Leadership of Change in Higher Education: What's New?* London; New York: Routledge.

McGettigan, Andrew. 2013. *The Great University Gamble: Money, Markets and the Future of Higher Education*. London: Pluto Press.

McGuinness, Aims C. Jr. 2011. "The States and Higher Education." In *American Higher Education in the Twenty-First Century: Social, Political, and Economic Challenges*, edited by Philip G. Altbach, Patricia J. Gumport and Robert O. Berdahl, pp. 139–169. Baltimore, MD: Johns Hopkins University Press.

McQuitty, Shaun 2004. "Statistical Power and Structural Equation Models in Business Research." *Journal of Business Research* 57 (2): 175–183. doi: 10.1016/S0148-2963(01)00301-0.

Ministry of Education, Republic of China (Taiwan). 2011. *Aim for the Top University Program (邁向頂尖大學計畫)*. Taipei, Taiwan. Retrieved from http://140.113.40.88/edutop/index_1.php.

Ministry of Education, Republic of China (Taiwan). 2014a. *Education in Taiwan 2014/2015*. Taipei, Taiwan. Retrieved from https://stats.moe.gov.tw/files/ebook/Education_in_Taiwan/2014-2015_Education_in_Taiwan.pdf.

Ministry of Education, Republic of China (Taiwan). 2014b. Main Statistic Summaries. Taipei, Taiwan. Retrieved from https://stats.moe.gov.tw/files/main_statistics/u.xls.

Ministry of Education, Republic of China (Taiwan). 2014c. Mid-Term Evaluation of the Aim at Top University Project and the Results of New Applications (邁向頂尖大學計畫期中考評結果與新申請學校審議結果公布). Taipei, Taiwan. Retrieved from http://www.edu.tw/news1/detail.aspx?Node=1088&Page=22954&Index=1&WID=c0746986-1231-4472-abce-5c5396450ba9.

Mohrman, Kathryn 2013. "Are Chinese Universities Globally Competitive?" *The China Quarterly* 215: 727–743. doi: 10.1017/S0305741013000672.

Mohrman, Kathryn, Wanhua Ma, and David Baker. 2008. "The Research University in Transition: The Emerging Global Model." *Higher Education Policy* 21 (1): 5–27. doi: 10.1057/palgrave.hep.8300175.

Mok, Ka Ho. 2014. "Promoting the Global University in Taiwan: University Governance Reforms and Academic Reflections." In *The SSCI Syndrome in Higher Education: A Local or Global Phenomenon*, edited by Chuing Prudence Chou, pp. 1–23. Rotterdam, Netherlands: Sense Publishers.

Mok, Ka Ho, and Ying Chan. 2008. "International Benchmarking with the Best Universities: Policy and Practice in Mainland China and Taiwan." *Higher Education Policy* 21 (4): 469–486. doi: 10.1057/hep.2008.21.

Mok, Ka Ho, and Anthony B. L. Cheung. 2011. "Global Aspirations and Strategising for World-Class Status: New Form of Politics in Higher Education Governance in Hong Kong." *Journal of Higher Education Policy and Management* 33 (3): 231–251. doi: 10.1080/1360080X.2011.564998.

Molesworth, Mike, Scullion, Richard, and Nixon, Elizabeth (Eds.). (2011). *The Marketization of Higher Education and the Student as Consumer*. New York, NY: Routledge.

Mumper, Michael, Lawrence E. Gladieux, Jacqueline E. King, and Melanie E. corrigan. 2011. "The Federal Government and Higher Education." In *American Higher Education in the Twenty-First Century: Social, Political, and Economic Challenges*, edited by Philip G. Altbach, Patricia J. Gumport and Robert O. Berdahl, pp. 113–138. Baltimore, MD: Johns Hopkins University Press.

Muthén, Bengt, and David Kaplan. 1985. "A Comparison of Some Methodologies for the Factor Analysis of Nonnormal Likert Variables." *British Journal of Mathematical and Statistical Psychology* 38 (2): 171–189.

Navarro, José Ruiz, and Francisca Orihuela Gallardo. 2003. "A Model of Strategic Change: Universities and Dynamic Capabilities." *Higher Education Policy* 16 (2): 199–212. doi: 10.1057/palgrave.hep.8300016.

Nazarko, Joanicjusz, Katarzyna Anna Kuzmicz, Elzbieta Szubzda-Prutis, and Joanna Urban. 2009. "The General Concept of Benchmarking and its Application in Higher Education in Europe." *Higher Education in Europe* 34 (3-4): 497–510. doi: 10.1080/03797720903356677.

Nevitt, Jonathan, and Gregory R. Hancock. 2004. "Evaluating Small Sample Approaches for Model Test Statistics in Structural Equation Modeling." *Multivariate Behavioral Research* 39 (3): 439–478. doi: 10.1207/S15327906MBR3903_3.

Ngok, Kinglun. 2008. "Massification, Bureaucratization and Questing for 'World-Class' Status: Higher Education in China since the Mid-1990s." *International Journal of Educational Management* 22 (6): 547–564. doi: 10.1108/09513540810895453#sthash.01eeI3a9.dpuf.

Ngok, Kinglun, and Weiqing Guo. 2008. "The Quest for World Class Universities in China: Critical Reflections." *Policy Futures in Education* 6 (5): 545–557.

Nicolaides, Aliki, and David C. McCallum. 2013. "Inquiry in Action for Leadership in Turbulent Times Exploring the Connections Between Transformative Learning and Adaptive Leadership." *Journal of Transformative Education* 11 (4): 246–260. doi: 10.1177/1541344614540333.

Nunnally, Jum C., and Ira H. Bernstein. 1994. *Psychometric Theory*. 3 ed. New York, NY: Psychometric theory.

O'Brien, Robert M. . 2007. "A Caution Regarding Rules of Thumb for Variance Inflation Factors." *Quality & Quantity* 41 (5): 673–690. doi: 10.1007/s11135-006-9018-6.

Organization for Economic Co-Operation and Development (OECD). 1996. *The Knowledge-Based Economy*. Paris. Retrieved from.

Orton, J. Douglas, and Karl E. Weick. 1990. "Loosely Coupled Systems: A Reconceptualization." *The Academy of Management Review* 15 (2): 203–223. doi: 10.5465/AMR.1990.4308154.

Patterson, Glenys. 1999. "The Learning University." *The Learning Organization* 6 (1): 9–17. doi: 10.1108/09696479910255675.

Peteraf, Margaret A. 1993. "The Cornerstones of Competitive Advantage: A Resource-Based View." *Strategic Management Journal* 14 (3): 179–191. doi: 10.1002/smj.4250140303.

Podsakoff, Philip M., Scott B MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff. 2003. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies." *Journal of Applied Psychology* 88 (5): 879–903. doi: 10.1037/0021-9010.88.5.879.

Porter, Michael E. 1979. "How Competitive Forces Shape Strategy." *Harvard Business Review* 57 (2): 137–145.

Porter, Michael E. 1990. *The Competitive Advantage of Nations*. New York: Free Press.

Porter, Michael E. 2008. *On Competition*. Updated and expanded ed. Boston, MA: Harvard Business School Publishing.

Prahalad, C. K., and Gary Hamel. 1990. "The Core Competence of the Corporation." *Harvard Business Review* 68 (3): 79–91.

Priem, Richard L., and John E. Butler. 2001. "Is the Resource-Based 'View' a Useful Perspective for Strategic Management Research?" *The Academy of Management Review* 26 (1): 22–40.

Proulx, Roland. 2007. "Higher Education Ranking and Leagues Tables: Lessons Learned from Benchmarking." *Higher Education in Europe* 32 (1): 71–82. doi: 10.1080/03797720701618898.

Quacquarelli Symonds. 2014. QS World University Rankings. Accessed October 4th, 2014. http://www.topuniversities.com/qs-world-university-rankings.

Ramakrishna, Seeram. 2012. "Building a World-Class University System Singapore's Experience and Practice." *Journal of International Higher Education* 5 (2): 79–82.

Roberts, Norman, and Gary J. Stockport. 2014. "Defining Strategic Flexibility." In *The Flexible Enterprise*, edited by Sushil and Edward A. Stohr, pp. 37–45. New Delhi; Heidelberg; New York; Dordrecht; London: Springer.

Rothschild, Michael, and Lawrence J. White. 1993. "The University in the Marketplace: Some Insights and Some Puzzles " In *Studies of Supply and Demand in Higher Education*, edited by Charles T. Clotfelter and Michael Rothschild, pp. 11–42. Chicago; London: University of Chicago Press.

Rowley, Gillian. 1997. "Mergers in Higher Education: A Strategic Analysis." *Higher Education Quarterly* 51 (3): 251–263. doi: 10.1111/1468-2273.00043.

Rowley, Jennifer. 2000. "Is Higher Education Ready for Knowledge Management?" *International Journal of Educational Management* 14 (7): 325–333. doi: 10.1108/09513540010378978.

Rust, Val D., and W. James Jacob. 2005. "Globalisation and Educational Policy Shifts." In *International Handbook on Globalisation, Education and Policy Research: Global*

Pedagogies and Policies, edited by Joseph Zajda, pp. 235–252. Dordrecht, Netherlands: Springer.

Ryan, Gery W., and H. Russell Bernard. 2003. "Techniques to Identify Themes." *Field Methods* 15 (1): 85–109. doi: 10.1177/1525822X02239569.

Salmi, Jamil. 2009. *The Challenge of Establishing World-Class Universities*. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/2600 (License: CC BY 3.0 IGO).

Salmi, Jamil. 2011. "The Road to Academic Excellence: Lessons of Experience." In *The Road to Academic Excellence: The Making of World-Class Research Universities*, edited by Philip G. Altbach and Jamil Salmi, pp. 323–347. Washington, DC: World Bank.

Sanchez, Ron. 1995. "Strategic Flexibility in Product Competition." *Strategic Management Journal* 16 (8): 135–159.

Santo, Susan A. 2005. "Knowledge Management: An Imperative for Schools of Education." *Tech Trends* 49 (6): 42–49.

Schonlau, Matthias, Ronald D. Fricker, and Marc N. Elliott. 2002. *Conducting Research Surveys Via e-Mail and the Web*. Santa Monica, CA: RAND.

Schumacker, Randall E., and Richard G. Lomax. 2010. *A Beginner's Guide to Structural Equation Modeling*. 3 ed. New York, NY: Routledge.

Senge, Peter M. 2006. *The Fifth Discipline: The Art and Practice of the Learning Organization*. Rev. and updated ed. New York: Doubleday/ Currency.

Shahmandi, Elham, Abu Daud Silong, Ismi Arif Ismail, Bahaman Bin Abu Samah, and Jamilah Othman. 2011. "Competencies, Roles and Effective Academic Leadership in World Class University." *International Journal of Business Administration* 2 (1): 44–53. doi: 10.5430/ijba.v2n1p44.

Shanghai Jiao Tong University. 2014. Academic Ranking of World Universities. Accessed October 4th, 2014. http://www.shanghairanking.com/ARWU2014.html.

Sheu, Tian-Ming. 2009. "Becoming a World-c1ass University: From the US Universities' Financial Perspective (躋身國際一流大學之財務策略—以美國大學為例)." *Contemporary Educational Research Quarterly* 17 (2): 103–148.

Shih, Tse-Hua, and Xitao Fan. 2008. "Comparing Response Rates from Web and Mail Surveys: A Meta-Analysis." *Field Methods* 20 (3): 249–271. doi: 10.1177/1525822X08317085.

Shin, Jung Cheol. 2009. "Building World-Class Research University: The Brain Korea 21 Project." *Higher Education* 58 (5): 669–688. doi: 10.1007/s10734-009-9219-8.

Shin, Jung Cheol, and Barbara M. Kehm, eds. 2013. *Institutionalization of World-Class University in Global Competition*. Dordrecht, Netherlands: Springer.

Shin, Jung Cheol, and Robert K. Toutkoushian. 2011. "The Past, Present, and Future of University Rankings." In *University Rankings: Theoretical Basis, Methodology and Impacts on Global Higher Education*, edited by Jung Cheol Shin, Robert K. Toutkoushian, and Ulrich Teichler, pp. 1–16. New York, NY: Springer.

Shook, Christopher L., David J. Jr. Ketchen, G. Tomas M. Hult, and K. Michele Kacmar. 2004. "An Assessment of the Use of Structural Equation Modeling in Strategic Management Research." *Strategic Management Journal* 25 (4): 397–404. doi: 10.1002/smj.385.

Slaughter, Sheila, and Gary Rhoades. 2004. *Academic Capitalism and the New Economy: Markets, State, and Higher Education*. Baltimore, MD: Johns Hopkins University Press.

Soh, Kay Cheng. 2011. "Mirror, Mirror on the Wall: A Closer Look at the Top Ten in University Rankings." *European Journal of Higher Education* 1 (1):77–83. doi: 10.1080/21568235.2011.577179.

Song, Mei-Mei, and Hsiou-Hsia Tai. 2007. "Taiwan's Responses to Globalisation: Internationalisation and Questing for World Class Universities." *Asia Pacific Journal of Education* 27 (3): 323–340. doi: 10.1080/02188790701594067.

Steiss, Aln Walter. 2003. *Strategic Management for Public and Nonprofit Organizations*. New York, NY: Marcel Dekker.

Stolz, Ingo, Darwin D. Hendel, and Aaron S. Horn. 2010. "Ranking of Rankings: Benchmarking Twenty-Five Higher Education Ranking Systems in Europe." *Higher Education* 60 (5): 507–528. doi: 10.1007/s10734-010-9312-z.

Su, Shao-Wen. 2014. "To Be or Not To Be: Impacts of 'I' Idolization from the Perspective of Humanities and Social Sciences Faculty in Taiwan." In *The SSCI Syndrome in Higher Education: A Local or Global Phenomenon*, edited by Chuing Prudence Chou, pp. 51–80. Rotterdam, Netherlands: Sense Publishers.

Sutin, Stewart E., Daniel Derrico, Rosalind Latiner Raby, and Edward J. Valeau, eds. 2011. *Increasing Effectiveness of the Community College Financial Model: A Global Perspective for the Global Economy*. New York: Palgrave Macmillan.

Tai, Hsiou-Hsia. 2003. "Integration/ Merger in Higher Education: A Comparative Study (高等教育整併之國際比較)." *Bulletin of Educational Research* 49 (2): 141–173.

Tai, Hsiou-Hsia. 2006. *World Class Universities: Excellence and Innovations (世界一流大學之卓越與創新)*. Taipei, Taiwan: Higher Education Publishing.

Teece, David J. 2007. "Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance." *Strategic Management Journal* 28 (13): 1319–1350. doi: 10.2307/20141992.

Teece, David J. 2011. *Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth*. 2nd with new preface ed. Oxford; New York: Oxford University Press.

Teece, David J., Gary Pisano, and Amy Shuen. 1997. "Dynamic Capabilities and Strategic Management." *Strategic Management Journal* 18 (7): 509–533. doi: 10.2307/3088148.

Teo, Timothy, Liang Ting Tsai, and Chih-Chien Yang. 2013. "Applying Structural Equation Modeling (SEM) in Educational Research: An Introduction." In *Application of Structural Equation Modeling in Educational Research and Practice*, edited by Myint Swe Khine, pp. 3–21. Rotterdam; Boston; Taipei: Sense Publishers.

Thomson Reuters. 2014. THE World University Rankings. Accessed October 4th, 2014. http://www.timeshighereducation.co.uk/world-university-rankings/2014-15/world-ranking.

Tierney, William G. 1999. *Building the Responsive Campus: Creating High Performance Colleges and Universities*. Thousand Oaks, CA: Sage Publications.

Tilak, Jandhyala B. G. 2011. *Trade in Higher Education: The Role of the General Agreement on Trade in Services (GATS), Fundamentals of educational planning ; 95*. Paris: UNESCO, International Institute for Educational Planning.

Todorovic, Zelimir William. 2004. *The Entrepreneurial Orientation of University Departments and its Relationship to the Incidence of Commercial Activity*. Unpublished Dissertation, Management Sciences Department, University of Waterloo, Ontario, Canada.

Todorovic, Zelimir William, and Nichaya Suntornpithug. 2008. "The Multi-Dimensional Nature of University Incubators: Capability/Resource Emphasis Phases." *Journal of Enterprising Culture* 16 (4): 385–410. doi: 10.1142/S021849580800020X.

Tofallis, Chris. 2012. "A Different Approach to University Rankings." *Higher Education* 63 (1):1–18. doi: 10.1007/s10734-011-9417-z.

Toma, J. Douglas. 2010. *Building Organizational Capacity: Strategic Management in Higher Education*. Vol. Johns Hopkins University Press: Baltimore, MD.

Toma, J. Douglas. 2012. "Institutional Strategy: Positioning for Prestige." In *The Organization of Higher Education: Managing Colleges for a New Era*, edited by Michael N. Bastedo, pp. 118–159. Baltimore, MD: Johns Hopkins University Press.

Torres, Carlos A., and Daniel Schugurensky. 2002. "The Political Economy of Higher Education in the Era of Neoliberal Globalization: Latin America in Comparative Perspective." *Higher Education* 43 (4): 429–455. doi: 10.1023/A:1015292413037.

Townley, Charles T. 2003. "Will the Academy Learn to Manage Knowledge?" *EDUCAUSE Quarterly* 26 (2): 8–11.

Trim, Peter R. J. 2003. “Strategic Marketing of Further and Higher Educational Institutions: Partnership Arrangements and Centres of Entrepreneurship.” *International Journal of Educational Management* 17 (2): 59–70. doi: 10.1108/09513540310460252.

Van Vught, Frans A. 1989. “Creating Innovations in Higher Education.” *European Journal of Education* 24 (3): 249–270.

Verger, Antoni. 2009. “GATS and Higher Education: State of Play of the Liberalization Commitments.” *Higher Education Policy* 22 (2): 225–244. doi: 10.1057/hep.2008.28.

Waldo, Dwight, ed. 1971. *Public Administration in a Time of Turbulence*. Scranton, PA: Chandler Publishing Company.

Wang, Catherine L., and Pervaiz K. Ahmed. 2007. “Dynamic Capabilities: A Review and Research Agenda.” *International Journal of Management Reviews* 9 (1): 31–51. doi: 10.1111/j.1468-2370.2007.00201.x.

Wang, Qi, Ying Cheng, and Nian Cai Liu, eds. 2013. *Building World-Class Universities: Different Approaches to a Shared Goal*. Rotterdam, Netherlands: Sense Publishers.

Wang, Ru-Jer. 2003. “From Elitism to Mass Higher Education in Taiwan: The Problems Faced.” *Higher Education* 46 (3): 261–287. doi: 10.1023/A:1025320312531.

Wang, Ru-Jer. 2010. “The Rankings of Research Funding among Universities in Taiwan.” *US-China Education Review* 7 (3): 1–17.

Wang, Yingjie. 2001. “Building the World-class University in a Developing Country: Universals, Uniqueness, and Cooperation.” *Asia Pacific Education Review* 2 (2): 3–9. doi: 10.1007/BF03026285.

Wedman, John, and Feng-Kwei Wang. 2005. “Knowledge Management in Higher Education: A Knowledge Repository Approach.” *Journal of Computing in Higher Education* 17 (1): 116–138. doi: 10.1007/BF02960229.

Weick, Karl E. 1976. “Educational Organizations as Loosely Coupled Systems.” *Administrative Science Quarterly* 21 (1): 1–19. doi: 10.2307/2391875.

Weihrich, Heinz 1982. “The TOWS Matrix—A Tool for Situational Analysis “ *Long Range Planning* 15 (2): 54–66. doi: 10.1016/0024-6301(82)90120-0.

Welch, John F. 2002. “Assessing the Transfer Function: Benchmarking Best Practices from State Higher Education Agencies.” *Assessment & Evaluation in Higher Education* 27 (3): 257–268. doi: 10.1080/0260293022013861 5.

Wildavsky, Ben. 2010. *The Great Brain Race: How Global Universities Are Reshaping the World*. Princeton, NJ: Princeton University Press.

Williams, Ross, and Nina Van Dyke. 2008. "Reputation and Reality: Ranking Major Disciplines in Australian Universities." *Higher Education* 56 (1):1–28. doi: 10.1007/s10734-007-9086-0.

Wu, Wen-Hsing, Shun-Fen Chen, and Chen-Tsou Wu. 1989. "The Development of Higher Education in Taiwan." *Higher Education* 18 (1): 117–136. doi: 10.1007/BF00138963.

Xavier, Christine Anita, and Lubna Alsagoff. 2013. "Constructing 'World-Class' as 'Global': A Case Study of the National University of Singapore." *Educational Research for Policy and Practice* 12 (3): 225–238. doi: 10.1007/s10671-012-9139-8.

Xiong, Qingnian, Duanhong Zhang, and Hong Liu. 2011. "Governance Reform at China's '985 Project' Universities." *Chinese Education and Society* 44 (5): 31–40. doi: 10.2753/CED1061-1932440503.

Yang, Rui, and Anthony Welch. 2012. "A World-Class University in China? The Case of Tsinghua." *Higher Education* 63 (5): 645–666. doi: 10.1007/s10734-011-9465-4.

Yonezawa, Akiyoshi. 2003. "Making 'World-Class Universities': Japan's Experiment." *Higher education management and policy* 15 (2): 9–23.

Yonezawa, Akiyoshi. 2007. "Japanese Flagship Universities at a Crossroads." *Higher Education* 54 (4): 483–499. doi: 10.1007/sl0734-006-9028-2.

Yonezawa, Akiyoshi. 2011. "The 'Global 30' and the Consequences of Selecting 'World-Class Universities' in Japan." In *Paths to a World-Class University: Lessons from Practices and Experiences*, edited by Nian Cai Liu, Qi Wang and Ying Cheng, pp. 67–81. Rotterdam, Netherlands: Sense Publishers.

Zhou, Kevin Zheng, and Fang Wu. 2010. "Technological Capability, Strategic Flexibility, and Product Innovation." *Strategic Management Journal* 31 (5): 547–561. doi: 10.1002/smj.830.

Zollo, Maurizio, and Sidney G. Winter. 2002. "Deliberate Learning and the Evolution of Dynamic Capabilities." *Organization Science* 13 (3): 339–351. doi: 10.1287/orsc.13.3.339.2780.