

**How Is the University Influenced by Neoliberalism? The
Composition and Practice of Accountability in Taiwan
Higher Education.**

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Abstract

This project aims to illustrate procedures by which academic reality has been established in the neoliberal era rather than treating the neoliberal movement as a black box. Taking universities in Taiwan as a case, this thesis draws on Foucauldian theories and Actor-Network theory to investigate how the neoliberal discourse has been enacted within the academy.

My first empirical chapter focuses on the problematisation of academic practices. By investigating historical and political configurations where policy on academic governance and higher education had emerged, this research suggests that the sector of higher education has always been an object of government in Taiwan, but models of governing universities have changed in various periods. The switch from direct supervision to marketisation represents a transition in the exercise of power from sovereign power to governmentality.

The second empirical chapter aims to elaborate various narratives towards higher education under the one dominant neoliberal discourse. Through discussions on contemporary concerns about globalising higher education, university industry collaboration and university's social responsibility, a variety of narratives are identified, representing the existence of alternative frameworks of seeing higher education and possibility of resistance against the neoliberalising university. By contrast, the third empirical chapter emphasises how the neoliberal discourse gained authority through its circulation within academic organisations. With those institutional practices, the imaginary of the neoliberal university has been actualised by individual scholars, turning it into a reality.

In sum, this research suggests that the dominant position of neoliberal discourse should not be considered the *status quo* but a temporary result of continuous neoliberal practices in which a range of actors take part. It is better to understand the neoliberal movement as heterogeneous attempts at change rather than a single or universal essence. This study also indicates that bibliometric measures play indispensable roles in these changes. First, bibliometrics contribute to the

accumulation of subject knowledge regarding academic behaviour. Second, they provide a ground for individuals to interpret and to build the academic world.

Declaration of Authorship

I, Ming-Te Peng hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Signed: _____ Date:

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Table of Acronyms

| | |
|--------|---|
| 3Es | Effectiveness, Efficiency and Economy |
| A&HCI | Arts & Humanities Citation Index |
| ANT | Actor Network Theory |
| CCP | Chinese Communist Party |
| CDA | Critical Discourse Analysis |
| DPP | Democratic Progressive Party |
| EI | Engineering Index |
| ERC | European Research Council |
| ESRC | Economic and Social Research Council |
| FDA | Foucauldian Discourse Analysis |
| GDP | Gross Domestic Product |
| HEEACT | Higher Education Evaluation and Accreditation Council of Taiwan |
| HEFCE | Higher Education Funding Council for England |
| ICT | Information and Communications Technology |
| IEET | Institute of Engineering Education Taiwan |
| IMD | International Institute for Management Development |
| ISI | Institute for Scientific Information |
| JCR | Journal Citation Reports |
| KMT | Chinese Nationalist Party/Kuomintang |
| KPI | Key Performance Indicator |
| MOE | Ministry of Education |
| MOST | Ministry of Science and Technology |
| MPN | New Public Management |
| NSC | National Science Council |
| NSE | Natural Sciences and Engineering |
| OECD | Organisation for Economic Co-operation and Development |
| OPP | Obligatory Passage Points |
| PRC | People's Republic of China |
| R&D | Research and Development |
| RAE | Research Assessment Exercise |

| | |
|-------|--------------------------------------|
| REF | Research Excellence Framework |
| ROC | Republic of China |
| RPI | Research Performance Indicator |
| RRI | Responsible Research and Innovation |
| RSE | Research Selectivity Exercise |
| SCI | Science Citation Index |
| SSCI | Social Science Citation Index |
| SSH | Social Sciences and Humanities |
| STS | Science and Technology Studies |
| THCI | Taiwan Humanities Citation Index |
| TSSCI | Taiwan Social Science Citation Index |
| UGC | University Grants Committee |
| UN | United Nations |
| USR | University Social Responsibility |
| WoS | Web of Science |

Chapter 1: Introduction

1. Why research Higher Education in Taiwan?

In the past two decades, several academic scandals have taken place in Taiwan, with misconduct and fraud creating considerable negative impacts on Taiwanese prestige in global academic communities. For example, in 2015 *Nature Nanotechnology* withdrew a paper written by a professor at the National Chiao Tung University for failing to reproduce data (Chen et al., 2015). On investigation, the accused professor claimed that he incidentally encountered a temporary laboratory built from shipping containers around a temple, from where he collected data to publish the (now retracted) paper in *Nature Nanotechnology* and the laboratory could never be found again (2014c). There is another dramatic case but its outcomes were more serious. In 2014, the *Journal of Vibration and Control* withdrew 60 articles simultaneously due to a ‘fraudulent peer-review ring’, comments from which had all been written by the same Taiwanese researcher at the National Pingtung University of Education (2014a, Barbash, 2014). The term ‘fraudulent peer-review ring’ refers to the accused researcher who had manipulated the online editorial system by registering himself as a reviewer using 130 fake identities. When this scandal was discovered, the then Minister of Education was a co-author of the retracted papers. As a result, the Minister of Education resigned. When the investigation of this matter ended, the editor-in-chief of *Journal of Vibration and Control* also resigned. Unfortunately, in both quality and quantity, Taiwan had been the source of several prominent records of academic misconduct.

Some cases are even closer to my own life. In 2016, a significant academic scandal took place at the National Taiwan University, College of Medicine, one of the more prestigious institutes in Taiwan. A research team across several institutes under the College of Medicine was accused of producing fraudulent data, and two papers in *The Journal of Biological Chemistry* and *Nature Cell Biology* were retracted (2016b). I did my master's degree at this college. Although no faculty from my institute belonged to the research team accused, we shared the same building and waited for the same lift. When the relevant investigation was ongoing, I saw a familiar name in the enquiry list: a friend who I played an online game with. However, an extremely unfortunate

incident also took place in my institute. In 2012, a junior scholar, Dr Lin took his own life in his office when his paper in *Nature* was encountering challenges. Despite Lin's suicide the controversial paper was nevertheless retracted one year later due to methodologic issues (Lin et al., 2013). I never had a chance to discuss with Dr Lin in person, but Dr Lin was sincerely admired by his supervisees for his gentle personality. When faculty faced intense pressure on publications, impact factors and research projects in Taiwan, the pressure was also transferred to students. As a result, quite a few of my classmates had unpleasant experiences in mentorships. Hence, I was impressed by accounts of Dr Lin's patient supervision before the tragedy.

The increasing anxiety caused by academic precarity can also lead to issues of self-exploitation and deteriorating health. Unfortunately, I witnessed such a case. I did my bachelor's degree at National Tsing Hua University. When I studied at the National Taiwan University in 2010, some of my previous classmates had to find an alternative supervisor. This was because one of the faculty, Professor Wu, passed away by a heart attack, which took place on the campus. According to Professor Wu's colleagues, he had chronically overworked, "taking his laboratory as home" (李青霖, 2010). All the above stories – of academic pressure and the temptation to falsify data – provide me with a motivation to systematically explore conditions of higher education in Taiwan.

Nevertheless, the above cases are not limited to higher education in Taiwan; similar tendencies can be observed around the world. For data fabrication, there are numerous famous examples, such as the cases of Haruko Obokata's stem cell research in Japan (2014b), Hwang Woo-suk's cloning research in Korea (Wade and Sang-Hun, 2006), and Piero Anversa's cardiac stem cell research in the USA (Oransky and Marcus, 2018). Besides singular cases, an overall increase in the rate of retraction and misconduct in academic journals is recognised as a worldwide phenomenon (Steen, 2011, Brembs et al., 2013). While data frauds definitely transgress academic ethics, some issues are located in a grey zone, such as the use of ghost writers (Sismondo, 2007, Sismondo, 2008, Sismondo and Doucet, 2010, Sismondo, 2009), and predatory academic journals (Sorokowski et al., 2017, Laine and Winker, 2017). Growing pressure on short-term academic performance might not necessarily lead individual

researchers to misconduct, as most researchers stick to academic ethics. But such misconduct is strongly connected to deteriorating work conditions and prevailing mental health issues (Loveday, 2018b, Gill, 2010, Berg et al., 2016, Hall and Bowles, 2016). Those tragedies relating to academic insecurity include Professor Grimm of Imperial College (Berg et al., 2016), Dr Anderson of Cardiff University (2018), and Dr Ryo Nishimura in Japan (Komiyama and Kabata, 2019). Even Peter Higgs, a Nobel prize winner, does not consider himself productive enough for today's academic culture (2013).

A study regarding higher education policy is not only about the happiness (or unhappiness) of intellectual life. Because the nature of academic research consists of knowledge production and reproduction – in other words, what we have already seen and what we will see – the influence of academic affairs can diffuse into society as a whole in the long run. Therefore, by elucidating the development and changes in Taiwanese higher education, this thesis aims to contribute to an understanding of what is happening within the academy in a broader sense. This thesis does not aim to make an exhaustive list of academic misbehaviours or unfortunate stories. This thesis does not propose to suggest a practical strategy for reducing rates of academic fraud. I do not mean to identify a ringleader to blame, nor attempt to figure out effective methods to improve scholars' mental health. Instead, this study aims at an understanding of the mechanism behind the competitive atmosphere of academia and the formation of academic standards, such as performance indicators. Undoubtedly, the academy as a career has always been characterised by competition and rapid publishing (Merton, 1973). However, the above cases imply significant changes have taken place in university management as well as power relations within the academy. Thus, this thesis will focus on features of the contemporary model of governing academy. This being the case, Taiwan would be an appropriate place to study this topic. Because Taiwan had undergone a period of rapid economic growth between 1970s and 1980s, followed by democratic transition since the late 1980s, it provides a useful case for studying interactions between social changes and education development.

It is also important to state the potential implications of conducting this kind of research in terms of my participation. As the above mentions, I do not present myself

as an objective observer who selected Taiwan as a field for studying changes in higher education systems without any personal interest. Rather than being an outsider, I have a personal and professional interest in providing a critical study of developments in university education in Taiwan. In terms of my identity, I am a PhD researcher in the UK. This means that I was not directly a part of the higher education system in Taiwan while conducting this project. In carrying out interviews with scholars in Taiwan, I revealed my identity and research interests to academics, who might be my future colleagues (this is especially the case for participants from social science disciplines). In order to avoid potential conflicts, I consciously avoided interviewing scholars whose research topics also focus on higher education policy or sociology of education. It is also true that I built some networks with academics in Taiwan as the result of my field work. I have to acknowledge the above considerations, although some of their impacts on this research project and on myself as a participant might only become clear over time.

2. A Foucauldian approach to understanding academic governance

This research attempts to consider effects of state interference in academia and then go beyond this, exploring how academia has become an object of governance. For finding the mechanism of how an object of power is formalised, Foucault and Foucauldian studies have accumulated rich insights, which will be elaborated in Chapter 2 (literature review) and Chapter 3 (methodology). In the case of academia, major state interference consists of academic assessments and metric devices. This mechanism of power in the case of metric practices is known as 'metric power' (Beer, 2016). Hence, what this thesis looks at is not only the effect of academic evaluations, but also the procedure through which the machinery of metric power is established.

One key Foucauldian analytical conception is 'problematization'. According to Foucauldian perspectives, the exercise of power always begins by constructing a problem (Rose and Miller, 1992, Miller and Rose, 2008, Foucault, 1978). Constructing a problem is done in such a way as to articulate a solution that appears to deal with the problem. For example, constructing problems of madness, sexuality, security and population, lead a government to establish more statistical measures, administrative bureaucracy and apparatuses to govern those problems, known as bio-

policy (Foucault, 1978, Foucault, 2008). However, a problem cannot be defined by the problem population itself; the problem must be outlined by someone else. After that, terms that are used to define the problem are likely to be applied to articulate correspondent solutions. Thus, the first step in tracing the exercise of power is to examine how an issue is formalised, because the procedure of problematisation provides a rationale to govern an emerging subject. Therefore, before examining the effectiveness and influence of state policy on higher education, as a solution, this thesis begins by questioning how academic practices had become an imperative problem which must then be interfered with by the state.

Problematisation is a complex procedure, entailing numerous elements. One essential component is a particular form of knowledge regarding the emerging subject. Relations between power and knowledge will be further illustrated in Chapter 2 and Chapter 3 also. Briefly, the procedure of problematisation accompanies a set of statements about the given problem and subject (Hall, 2001). Hence, it is argued that both the accumulation of information and the existence of knowledge play an indispensable role in the exercise of power (Foucault, 1978, Foucault, 1980). In this case, these statements are dominant narratives about higher education, such as knowledge economy, knowledge society, social impacts, responsible research and innovation, which people use to frame academic values and to govern knowledge production. In other words, the narratives function not only as conceptions but also as knowledge of academic management. Among relevant genres of knowledge, the technique and knowledge regarding quantifying and ranking academic achievement, bibliometrics, plays a prominent role; therefore, the development of bibliometrics will be a focus in this thesis. Taken together, to examine the procedure of how academic practices have been problematised is to enquire how academia has become an object of knowledge.

Another key Foucauldian analytical conception is discourse, which means a group of rules by which 'valid' statements about the given subject are produced (Foucault, 1978, Foucault, 1981, Foucault, 2002a). The emphasis on discourse suggests that when analysing how power is exercised over the given subject, researchers have to identify not only the correspondent knowledge but also to recognise the mechanism

through which the correspondent knowledge is generated. Foucauldian discourse analysis includes two aspects: discursive practices and extra-discursive practices (Foucault, 1991b, Hall, 2001). The analysis of discursive practices includes changes in languages and conceptions behind the languages, like implication, exclusion or inclusion. The analysis of extra-discursive practices includes the position of a speaking subject, the boundary of a field, circulation of discourses, social relations, the settlement of institutions and political conjunctions (Foucault, 1991b). I will further discuss the definition of Foucauldian discourse in Chapter 3. In the case of governing academia, the goal of discourse analysis is to explore material and institutional aspects that were involved in the formation of statements about this new subject: academic practices. For example, where had relevant narratives of desired academic behaviours been produced and reproduced? What kinds of instruments or indicators had been used in measuring data? How had these measurements and evaluations circulated within various organisations? How had individual scholars been encompassed by those measurement devices?

3. An STS approach to interpreting performance indicators as solutions

As the preceding discussion suggests, Foucault highlights the importance of measurement devices, whose procedures of invention, selection and circulation should be considered part of the exercise of power. However, Foucault's legacy did not include too many empirical studies nor research methods, particularly for exploring the role of measurement devices. Nowadays, a range of research approaches, such as sociology of knowledge, anthropology of quantification, and science and technology studies (STS), has contributed either empirical data or theoretically analytical frames to characterise measurement instruments (Porter, 1996, Power, 1997, Strathern, 2000, Beer, 2016, Kornberger et al., 2015). These studies have articulated properties of quantitative devices in terms of agency of numbers. For instance, how has people's perception of reality been redefined and translated by numbers? How have organisations been reconstructed by the introduction of quantitative measures? For the following reasons, I will incorporate STS approaches to research academic performance indicators in this project.

First, like other approaches, the STS approach to studies of quantification also focuses

on the agency of numbers: how reality is translated by indicators. Second, science and technology studies provides a rich literature on how devices are founded and introduced, which meanwhile emphasise other actors' participation in the establishment of networks among actors and the device (Callon, 1980, Callon, 1999). In this way, a notion of networks within the actors and the device accounts for the agency of numbers: how the device succeeds in mobilising the actors. Third, the notion of networks, to a certain extent, is coherent with a Foucauldian interpretation of power relations. For Foucault, because power is a capacity for mobilising and engaging others rather than something to possess, he would employ the phrase power relations rather than power (Foucault, 1978). This ontological viewpoint of power is quite similar to the STS approach (Latour, 1984, Latour, 2005). Fourth, like Foucauldian theories, the STS approach also draws on the notion of issue-problematisation as an analytical tool (Callon, 1999). By focusing on so-called 'obligatory passage points' and networks between devices and actors, STS has gone further in identifying the entangling or coupling of problems and solutions (Neyland and Milyaeva, 2016). This contributes to understanding interwoven natures of knowledge, power, instruments, problems and solutions. For the above reasons, I argue that the STS approach could offer an explicit analysis of the formation of bibliometrics formation, its introduction and circulation within academy; and STS's methodology is furthermore compatible with the Foucauldian approach.

In sum, what this thesis aims to examine is not only the effect of academic evaluations but also the procedure in which the machinery of metric power is established. This research aims to investigate (1) the conditions for the emergence of the knowledge about academic practices, (2) the translation procedures by which the purpose of higher education is modified by the language of the market, and (3) the effect of metric tools on academic practices in everyday life. Chapter 3 will provide an explicit discussion of my main research questions.

4. How can a Taiwanese case study contribute?

There are several advantages to adopting Taiwan as a case study. First, as a non-English-speaking and non-Anglo-Saxon country, Taiwan might be a good model for a developing country, or a nation on the academic periphery, to study how concerns for

'international excellence' and broad foreign readership generate impacts on knowledge outputs via the policy of higher education and criteria used to allocate funding. Second, unlike the cases of the US and Germany, the local government in Taiwan plays a minor role in the policy of higher education. This relatively simple relation of power within central and local administrations makes this case study a simplified model for understanding a complicated event: education practices more generally. Third, the current system in Taiwan that incorporates peer review and bibliometric indicators was also adopted in many states, such as Spain and Italy, indicating that the result of this case study could provide a valuable comparison for other similar metric systems and could therefore be referenced by those who plan to introduce bibliometrics into academic assessment in the future. Similarly, while the model of project-based evaluation is exercised by several funding bodies, such as ESRC and ERC, the result of this case study could be compared to other similar models, and some general impacts of the project-based funding system might be found. Fourth, because the history of development of higher education in Taiwan is relatively short compared with European and North American countries, the distribution of related historical documents is also relatively concentrated, making access to these records easier and the analytic work less complicated. Finally, it could function like a microcosm to show changes in power relations between the state bureaucracy and instructive sectors. Like most states, Taiwan is more likely to adopt and adapt higher education policies from other states than innovate a novel frame. Thus, the case of Taiwan may show how university education has been shaped by this rapid adoption and adaption of policies in a comparatively short space of time.

5. Alignment with the multiplicity of researching universities

The above sections articulate my research interests, main questions, key concepts and theoretical frames. Nevertheless, there are still several topics relating to my project which need outlining. Because university education has been a research focus for a range of social scientists, the sociology of education, critical studies of pedagogy, political studies and the sociology of knowledge provide literatures on academia itself. The next paragraphs will enumerate these important issues and present how I allocate and connect them with this thesis. These key issues will appear repeatedly and then be further explored through empirical chapters.

New Public Management and neoliberal governmentality

Neoliberalism is a key term for this thesis. It explains why the intense competitive atmosphere of academia becomes an impetus. As ideology, the term neoliberalism offers an account for why markets work best; why the market mechanism means competition; and why the market mechanism entails transparency and accountability (Foucault, 2008, Mirowski, 2013). As policy, the term neoliberalism accounts for why auditing public sectors have become a thing that must be done; why resource allocation should be merit-based; how to allocate funds via principles of efficiency, effectiveness and economy; and how to ensure public sectors compete with each other (Power, 1997, Kettl, 2005). Chapter 2 will elaborate on contents of neoliberalism as well as its practices. Empirical Chapter 4 will articulate the composition of so-called neoliberalism in Taiwanese higher education. From this, I will discuss the pros and cons of employing neoliberalism as an analytic model. Eventually, the idea of neoliberalism itself will need to be explained as well.

Does neoliberal policy mean more freedom and autonomy? Or does neoliberal practice and so-called deregulation merely represent another type of governance? Chapter 2 will draw on Foucault's insight on governmentality, the art of governing, to explore power relations in the era of neoliberalism. Empirical Chapter 5 will recognise neoliberal features beyond contemporary major political schemes for university education: the globalisation of higher education, industrial collaboration and universities' social responsibility. From this I will show how academic resources are substantially mobilised without direct domination: governing at a distance. Empirical Chapter 6 will focus on everyday practices at the level of academic organisations, by which neoliberal governmentality is enacted.

Impacts of social impacts

In the past decade the scope of academic contributions has extended from publications to something more instantly visible, such as social changes, policy making, industrial innovation and community renewal. This conception may have various names in different areas, such as Social Impact or Responsible Research and Innovation. This trend invokes some debates from academia, for instance the ethical implications of

being responsible, methodology for certifying impacts and universities' strategies for enhancing their impact (Knowles and Burrows, 2014). Similar phenomena could be identified in Taiwan in the name of industrial collaboration projects and university social responsibility schemes. This thesis will analyse the broad concepts of social impact as part of academic management in Chapter 5.

Changes in ways of knowledge production

Along with the worldwide exercise of academic assessments, there are several negative trends emerging, such as a rise in academic fabrication and a decline in the rate of reproducibility (Steen, 2011, Brembs et al., 2013, Fanelli, 2009). Besides these significant impacts, research evaluation and performance-based fund allocation also produces nuanced influences on epistemic properties of research contents, such as strategies for selecting topics, designing research agenda and publishing (Gläser et al., 2002, Laudel, 2006, Laudel and Gläser, 2014, Rijcke et al., 2016). These have been a concern of policy studies, STS and the sociology of knowledge. As mentioned before, this project does not aim at proposing a more valid model of evaluation which could prevent academic misconducts. Instead, in order to elucidate to what degree the neoliberalising academy has modified scholar behaviour, I will pay attention to these delicate changes in the epistemic properties of research. Chapter 3 will elaborate upon methods for capturing the epistemic changes in knowledge production. Relevant results and discussion will be presented in Chapter 6.

Reproduction of socioeconomic stratification through education practices

Education systems, including higher education, have been a major target for the sociology of education. Rather than a machinery promoting social mobility, the education system in the eyes of the sociology of education is deemed as a vehicle of social control and a machinery by which socioeconomic stratification is reproduced. The machinery of social reproduction could be analysed by several approaches. For example, some studies highlight the correspondences between hierarchical educational systems, labour division and socio-economic strata (Bowles and Gintis, 1977). Some research investigates the machinery of social reproduction via school practices in terms of hegemony that transmits capitalist ideology, and curricular forms that mainly reproduce the particularly technical and administrative knowledge

required for economy and labour division (Apple, 1995, Apple, 2004). Conceptions of symbolic power and cultural capital comprise a core theoretical frame, which emphasises how the composition of curriculum represents the tastes of the dominant class (Bourdieu and Passeron, 1977, Bourdieu, 1986, Bourdieu, 2013, Bernstein, 2003). Living in the age of neoliberalism, scholars of this discipline question which groups of students actually benefit from the neoliberalising of schools (Fuller and Koon, 2013, Apple, 2013, Apple, 2001).

This thesis does not apply concepts of symbolic power and cultural capital to interpret Taiwanese policy on higher education since the 1980s, nor does this study draw on the notion of ideology and curriculum to characterise reproduction of socioeconomic stratification through education practices. In spite of this, changes in the role of the university during the neoliberal era may reflect conflicts among various groups, such as the elite and the mass. By analysing historical documents, Chapter 4 will articulate two competing narratives of social justice and neoliberalism behind important turns in educational policies, such as the massification of higher education and foundation of university accreditation. From this, I will outline how hierarchised higher education systems have been re-justified by meritocracy and accountability, and then link this to hierarchised knowledge production.

Anxiety and Academic labour exploitation

When pressure on productivity rises over academia, there is growing concern about increasing anxiety of faculty. As several scholars argue, because increasing anxiety is systemically induced by neoliberal precarity in academia, critical studies on academic anxiety should not aim at strategies for alleviating it but purpose to build links between anxiety and academic labour exploitation (Berg et al., 2016, Loveday, 2018b, Gill, 2010). The phenomenon of anxiety caused by academic precarity will be presented in Chapter 6. In general, when talking about objects of exploitation, relevant discussion is likely to exclude intellectual labours. This is because scholarly production, like cultural and creative work, is generally considered as a way of expressing self rather than a classically Marxist type of alienated labour. However, under neoliberal governmentality, academic labour has been transformed into alienated labour, as meanings of scholarly production are replaced by a perception of

academic capital, incurring a notion of exploitation within academy (Gill, 2014, Hall and Bowles, 2016). In other words, knowledge producers are not owners of the means of producing knowledge. Although this study does not draw on the Marxist approach, I will analyse how relations between researchers (knowledge producers) and knowledge (product) have been translated by performance indicators and research appraisals in Chapter 6, from which I attempt to link self-discipline with self-exploitation in the neoliberal era.

Teaching assessments

Even if teaching assessments have become a routine part of academia leaving scholars with more administrative burden, teaching will not be the main focus in this thesis. In general, the occurrence of conceptions of quantifying teaching efforts was in parallel to research evaluations. This is not a coincidence, but rather reflects prevailing notions of accountability, transparency, visibility and openness in academy, embedded in the neoliberalism movement (Morley, 2003, Skelton, 2005, Harrison, 1994). In the UK, increasing concern about quality of teaching was accompanied by the massification of higher education in the early 1990s, conferring a tension between the elite and the mass represented in universities (Harrison, 1994, Morley, 2003). Besides domestic contexts, some international organisations meanwhile play an active role in promoting the worldwide standardisation of university education, such as the Bologna Process or the OECD (Ball, 2003, Grek and Lawn, 2009). The above factors compose conditions where the evaluation of teaching emerged. Additionally, it is argued that since the rise of the emphasis on research productivity, scholars might pay less attention to teaching affairs (Wilson and Holligan, 2013). Hence, the exercise of evaluating teaching efforts purposes to balance the overt emphasis on research. This is also an important topic if practices of teaching assessment have succeeded in neutralising any tendency towards focusing on research alone.

Nevertheless, I will mainly focus on research evaluations for two reasons. First, even if both teaching and research evaluations were launched in similar milieus, detailed processes of operations are still distinctive. If teaching appraisals were to be covered in this research, it would be necessary to describe it in more detail and provide contexts for further discussion and comparison. In this way, this thesis might become

too divergent to concentrate on its own arguments. Second, because both teaching and research evaluations emerged from similar conditions, a focus on teaching evaluation is likely to conduct similar arguments with those of research evaluations. However, even though there is no chapter devoted to teaching assessment, to study the rise of the importance of research and innovation in universities may infer how the role of teaching and teaching assessments has been concomitantly degraded.

6. Contextualising Taiwan: historical, geographical and political configurations

This section provides a brief review of Taiwan's history, highlighting two aspects: first, democracy development and social movements; and second, development of higher education. These background perspectives are important because they set out the basis for the rapid adoption and adaptation of policies from elsewhere for universities and the kind of context in which these policies were adopted. These political and social conjunctions are where discourse on Taiwan's higher education emerged, which is the primary topic of Chapter 4. The review of Taiwanese history indicates linkages with these above issues. For instance, because the democratic transition in Taiwan coincided with the rise of neoliberal thought, imaginaries of civic liberties and models of the ideal state government at that time had been influenced by neoliberal conceptions. For university missions, the Taiwanese history of university education gives a flavour of relations between the state and academia, inferring connections between knowledge production and state intentions. By examining who had more opportunity to go to university and which genre of subject knowledge was taught, university education manifests a feature of social control and stratification. Based on these contexts, the following chapters will provide an explicit analysis of these topics.

6.1. International relations and domestic developments in Taiwan

Taiwan's modern history has been involved with several historic events in international relations. In the first half of the 20th century, Taiwan had been a frontier between two Asian hegemonies, Japan and China. During the Cold War, Taiwan had been a frontier against the Communist bloc. From the late 1980s, Taiwan has undergone a procedure of democratisation, whose appearance has been seen as a case of what Samuel Huntington names the 'Third Wave of Democracy' (Jacobs, 2012,

Fell, 2018).

After the First Sino-Japanese War of 1894-1895, the Treaty of Shimonoseki was signed, and the Qing China ceded Taiwan to Japan in 1895. The cession of Taiwan to Japan under the Treaty of Shimonoseki was not a peaceful procedure but consisted of a series of armed confrontations between Taiwanese militia and the Japanese army (Jacobs, 2012). The Taiwanese resistance to Japanese occupation in 1895 lasted five months and ended in a Japanese Colonial period lasting five decades. After the main resistance in 1895, there were several regional armed conflicts against Japanese colonial rule; the last significant incident organised by Han (Chinese) Taiwanese against the Japanese colonial regime was in 1915; and the last significant revolt launched by indigenous people was in 1930.

Taiwanese resistance against the Japanese regime switched from armed actions to political movements gradually when Japan underwent a relatively liberal period of Taisho democracy (大正民主). Inspired by international thoughts of anti-colonialism, anti-imperialism and self-determination, Taiwanese intellectuals had established a political campaign: 'the Petition Movement for the Establishment of a Taiwanese Parliament (臺灣議會設置請願運動)' from 1921 to 1934 (陳翠蓮, 2013). As a result of several negotiations between Taiwanese intellectuals and the Japanese colonial government, the first partial elections were held in 1935 for city and town councillors, while more than half of its members were still assigned by local colonial government. In the meantime, influenced by international thoughts of liberalism and communist revolution, women's liberation and peasant movements began to develop in Taiwan (陳翠蓮, 2013). These activists built networks across Taiwan, Japan, Korea, China and even Russia. On the eve of the Second World War, because of internal splits among Taiwanese activists and surging Japanese Fascism, all these social movements were substantially suppressed. In general, these Taiwanese political movements failed to achieve their goals, but contributed to the introduction of exotic conceptions of democracy and civil liberties into Taiwan (Jacobs, 2012, 陳翠蓮, 2013).

In 1945 Japan announced unconditional surrender to the Allies and ended Japanese rule in Taiwan. After that, the Republic of China (ROC) took over Taiwan on behalf

of the Allies. Whilst the Second World War had just ended, the Chinese Civil War was launched immediately in China between the Nationalist Party (KMT, 國民黨) and the Chinese Communist Party (CCP) in 1946. In the meantime, due to cultural conflicts, corruption and economic chaos, an anti-KMT government incident, also known as the February 28 Incident, broke out in Taiwan in 1947. The Nationalist government sent its army to suppress Taiwan's resistance. As a result, thousands of Taiwanese people were killed and most of the social elite was purged (Jacobs, 2012). In 1949 the CCP took over mainland China and founded the People's Republic of China (PRC), while the rest of ROC's forces, officers, advocates and their families retreated to Taiwan. In 1950 the Korean War was launched in which the USA was deeply involved. As a result, the KMT government in Taiwan gained plenty of support from the USA to stabilise its political status in Taiwan. Since 1956 there had been several conflicts between the Soviet Union and the PRC, leading to the Sino-Soviet split. The tension between these two communist states reached a peak in 1969. As a result of the Sino-Soviet split, the USA began to become reconciled with the PRC to weaken Soviet alliances. In 1971, the position of ROC in the Security Council as well as its United Nations memberships was replaced by the PRC. Since then, diplomatic recognition for the ROC in Taiwan has declined rapidly. In 1979, the USA terminated diplomatic relations with the ROC and established diplomatic relations with the PRC (Jacobs, 2012). These diplomatic difficulties and international pressures are still imperative issues for Taiwan, manifesting in a desire for global visibility. As we will see in later Chapters, this desire for global visibility directly shaped interventions in Taiwanese higher education.

During the Chinese Civil War, the Temporary Provisions against the Communist Rebellion (動員戡亂時期臨時條款) was legalised to circumvent human rights guaranteed by the ROC Constitution in 1948. Based on the Temporary Provisions, the government declared Taiwan Martial Law (臺灣省戒嚴令) in 1949, under which right of assembly, protest, free speech and publication were strictly limited for 38 years. During the whole of the 1950s, the only forum for political discussion in Taiwan was the *Free China Journal* (自由中國), whose initial purpose was to criticise communist ideology. The *Free China Journal* was managed by those Chinese

intellectuals and scholars who retreated from China to Taiwan around 1949. However, the focus of the *Free China Journal* gradually switched from communist ideology to KMT's authoritarian rule in Taiwan. In 1960, an editor-in-chief of the *Free China Journal*—Lei Zhen (雷震)—attempted to cooperate with Taiwanese intellectuals, who had sustained substantial damage from the February 28 massacre in 1947, and to organise a new party against KMT for the forthcoming local election (吳乃德, 2013, Jacobs, 2012). In the same year of 1960, this editor-in-chief was arrested and the *Free China Journal* was banned in the name of transgressing national policies. A wave of democratisation movements surged again from the 1970s. Several new political journals were founded to criticise the KMT dictatorship, such as *Taiwan Political Review* (台灣政論) established in 1975, *China Tide* (夏潮) founded in 1976, *Formosa Magazine* (Meilidao Magazine, 美麗島雜誌) and *The Eighties* (80年代) established in 1979 (胡慧玲, 2013).

In 1979, members of *Formosa Magazine* held a demonstration on Human Rights Day to demand democracy and were arrested – this became known as the Formosa Magazine incident (胡慧玲, 2013, Jacobs, 2012). After the Formosa Magazine incident, the KMT government tried to inhibit the democratisation movement by banning political journals, arresting or even murdering activists. However, this suppression of domestic democracy movements incurred international concerns and more intensive domestic protests against KMT's authoritarian rule. In 1986, opposition politicians founded the Democratic Progressive Party (DPP, 民主進步黨). In 1987, the four-decade-long Taiwan Martial Law period ended, followed by the abolition of censorship. In 1990, university students launched the Wild Lily student movement (野百合學運) to demand National Assembly elections and nullification of the Temporary Provisions against the Communist Rebellion (胡慧玲, 2013). As a result, the Temporary Provisions was abolished and entire National Assembly re-elections took place in 1991, followed by constitutional reform and the first direct presidential elections in 1996.

Along with democratisation movements, a range of social movements also sprung up after martial law had ended, such as labour movements, women's rights movements,

indigenous movements, living justice movements, peasant movements, environmental movements, consumer movements, disability rights movements, student movements and education reform movements (胡慧玲, 2013, 王金壽 et al., 2011, Fell, 2018). The student movement originated from the National Taiwan University and extended to other universities; initial petitions of the student movement focused on university autonomy, including elections for student union representatives, freedom of speech and the abolition of censorship on school press (胡慧玲, 2013). As the concerns of the student movement expanded gradually, this eventually led to the Wild Lily student movement in 1990. Besides the Wild Lily student movement and the petition for university autonomy and democracy, several citizen societies held a forum to discuss education reforms whose interests focused on detailed educational affairs, including pedagogy, curriculum design, student permission, school management and educational budgets. In 1994 these societies, such as the Humanistic Education Foundation (人本教育基金會), the Association for Teacher Human Rights (教師人權促進會) and Homemakers United Foundation (主婦聯盟), and liberal scholars created an education reform movement, whose appeals included increasing the number of universities and high schools; this movement was a collaboration and compromise between appeals for social justice in a left wing sense and deregulation of education in a liberal sense (王金壽 et al., 2011). In response to the movement, the government established the Education Reform Commission in the same year and announced a series of Education Reform policies.

6.2. The development of universities in Taiwan

The previous section outlines the political background in Taiwan. It also states how democratisation movements and social movements engendered profound impacts on education policy. Changes in regime models result in changes in models of governing educational systems, which will be further analysed in this thesis as a main research question. Additionally, it provides a clue to account for an eager desire for international visibility; this theme will be discovered in educational sectors in my empirical research. Along with these historical, political and social contexts, this part focuses on the history of Taiwanese higher education, offering a ground to interpret power relations between state bureaucracy and instructive sectors in following chapters.

The history of higher education in Taiwan had begun by the era of the Japanese regime and was pivoted on colonial policy. In order to show the Western powers its colonial capacities, the Japanese colonial regime established state education system in Taiwan as a crucial part of 'modernisation' (Jacobs, 2012). As Green (2013) indicates, the idea of state education systems was taken as a practical strategy for establishing a 'modern nation' in the 19th century. Hence, the development of education policy had been embedded in national development and industrial progress. According to Fuller (2010), even if it is clear that state mass schooling might not promote immediate economic growth, elite actors in early developing countries still pursue it, hanging on to a clear faith in modernisation and to expand state bureaucracy. In Asia the first successful model of modernisation is the Meiji Restoration in Japan. In other words, the establishment of the whole Taiwanese education system is an intended copy of the Japanese modernisation model (Green, 2013).

The first university in Taiwan was founded in 1928, and was named the Taihoku (Taipei) Imperial University. The Taihoku Imperial University consisted of five colleges: agriculture, medicine, nature science, literature and politics, and engineering; and two institutes: tropic medicine and Southeast Asia study. Considering the fact that another essential task of modernising Taiwan was to improve public health by eradicating tropical diseases (Jacobs, 2012), those institutes represented the Japan Empire's colonial interests towards Southeast Asia. However, the Taihoku Imperial University was meant to offer opportunities for higher education for Japanese residents in Taiwan. More than three quarters of the students in Taihoku Imperial University were Japanese. For Taiwanese students who wanted to obtain a higher education degree, studying in Japan was an alternative option. Over the Japanese colonial period of 5 decades, around 200,000 Taiwanese had studied in Japan. This seems to mimic the procedure of 'pilgrimage' to the motherland in Benedict Anderson's sense (Anderson, 2006). In fact, Taiwanese students' pilgrimage to Japan accounted for bonds between Taiwanese activists and Japanese activists (陳翠蓮, 2013). Besides one university, there were two colleges founded in this period: Taichung Agriculture and Forestry College and Tainan Technology College. After the Second World War, the Taihoku Imperial University was renamed as the National

Taiwan University (1945); the Taichung Agriculture and Forestry College was upgraded as Taiwan Provincial Chung Hsing University in 1961 and renamed the National Chung Hsing University in 1971; the Tainan Technology College was upgraded as the Taiwan Provincial Cheng Kung University in 1956 and renamed the National Cheng Kung University in 1971.

After the War there was growth in Taiwan's higher education until 1973. Those new universities and colleges were meant to cultivate professional manpower for the state and train bureaucratic staff for government office. In terms of public universities, after the KMT government had retreated to Taiwan, several universities which were originally founded in China before 1949 were 're-established' in Taiwan, such as the National Chengchi University in 1954 (also translated as National University of Governance), the College of Nuclear Science of National Tsing Hua University in 1956 (which once attempted to develop nuclear weapons during 1960s), the Institute of Electronics of National Chiao Tung University in 1958 and the Graduate Institute of Geophysics of National Central University in 1962. During this time several public vocational colleges and vocational junior colleges were also founded. For private studies, two Christian universities were 're-established' by churches which also retreated from China to Taiwan. With government encouragement, numerous private vocational colleges, vocational junior colleges and medical colleges were established. In the beginning of the 1970s, public universities and colleges numbered more than 20, while the number of private universities, colleges and junior colleges was more than 70 (Ministry of Science and Technology, 2015). From 1973 to 1984, the state stopped licensing private universities and colleges, and established new public universities or colleges cautiously. Nevertheless, due to industrial promotion into high-tech industry, the state loosened the policy of licensing new universities and colleges again from 1985. By the eve of the education reform demonstration in 1994, there were more than 20 universities, 30 colleges and 70 junior colleges in Taiwan (Ministry of Science and Technology, 2015).

After the Education Reform demonstration, the government founded the Education Reform Commission in 1994, consisting of pedagogic experts, 'liberal scholars', government officers, school principals, university deans and relevant citizen societies.

Those commissioners represented diverse actors with different or even contradictory ideologies and interests. The affairs of the Education Reform Commission covered primary education, secondary education and higher education. Approved by the Education Reform Commission, junior colleges were upgraded to colleges and colleges were transformed to universities. In 2000, the number of universities arrived at 53; the number of colleges increased to 74, whereas the number of junior colleges reduced to 23 (Ministry of Science and Technology, 2015). I will provide an explicit analysis of the Education Reform in Chapter 4.

The above statements provide an outline of the development of higher education in Taiwan. In this thesis, I will explore its detailed procedures and implications, such as rationales of university massification, incorporation between universities and industries, increasing notions of university social responsibility, the globalisation of higher education, resource distribution, financial dependence and academic autonomy, the foundation of academic assessments and the introduction of bibliometric indicators

7. Thesis structure

Chapter 2: Literature review

This chapter offers an overview of the topic of an increasing audit culture in the academy. It seeks to demonstrate why this issue of neoliberalising higher education is important, and to critique the gap between current theoretical accounts of neoliberalism and neoliberal practices in the sector of higher education. The chapter begins by introducing the neoliberalism movement and its follow-on, new public management. This general account of neoliberalism is based on theories of Michael Power, David Harvey, Michel Foucault and Philip Mirowski. After that, the chapter moves to the history of bibliometric indicators, such as the invention of qualitative comparison of academic journals, the foundation of Journal Citation Reports (JCR) and Science Citation Index (SCI), and the main types of common bibliometric indicators and databases. Next this chapter focuses on the spread of the neoliberalism movement into academia and the combination of bibliometrics and academic audit culture. This section also discusses the changing role of universities in different

periods including late 19th century, the Cold War and the age of neoliberalism.

In the next part of the literature review I will provide a theoretical framework, drawing on Foucauldian concepts and Actor Network Theory (ANT). The theoretical framework constitutes two aspects: power and knowledge. Power is an indispensable idea in sociological studies, but ways of defining power can vary in different theoretical approaches. Here I will provide an explanation for how I interpret power. Based on this framework I am going to explore the mechanism of power in the era of neoliberalism via the case of neoliberalising higher education.

Chapter 3: Methodology

This chapter discusses ontological and epistemological aspects of this thesis. It consists of three topics: reality, the reality of power, and relations between reality and power. On the basis of ANT and Foucauldian insights into power/knowledge/truth complex, this thesis does not draw on the assumption that there is an inherent societal structure or objective world waiting to be discovered. Otherwise, through the case study of neoliberal practices in the university this thesis aims to explore the procedure of how a truth is constructed. This discussion of ontology and epistemology provides theoretical explanations for how my research questions are developed.

Based on this theoretical framework, this chapter continues to explain how the combination of document analysis and semi-constructed interviews could be an appropriate way to produce data. The following part of this chapter focuses on detailed procedures to carry out empirical research of this thesis.

Chapter 4: Conditions of truth regarding higher education: academic practices as a problem

The purpose of this chapter aims to inquire into the particular moment when the function of universities started to be seen as an object of knowledge; that is, a new genre of knowledge about the space where knowledge is generated. In general, the development of the problematisation of higher education may be explained as an example of New Public Management in the context of the neoliberalism movement. However, there are two problematic points for this approach. First, this generalised

explanation for the rise of audit culture in academy needs to be verified with more empirical studies. Second, this contemporary argument for the rationale of academic evaluation might represent the reproduction of contemporary narratives about what the university should be. I argue that changes in the university's function reflect tension among the elite, the masses, the state and the industry. Under these circumstances neoliberal practices were taken as a strategy to reconcile the above conflicts. My assumption will be examined by analysing historical documents, such as official reports, white papers and expert texts. In summary, this chapter will explore the mechanism of metric power in terms of the establishment of relevant statements and knowledge; and secondly, it will examine 'the explanatory status of neoliberalism' (Peck, 2013).

Chapter 5: Multiplicity of academia under the neoliberal discourse

This chapter will explore contemporary accounts of higher education by interviewing scholars from four academic disciplines in Taiwan. The various narratives are summarised from discussion on three practical topics: the globalisation of higher education, university-industry cooperation and university social responsibility, which are ongoing schemes on campus. These narratives represent how academics see themselves. From this, I will first compare contemporary narratives with the past. Second, I will recognise heterogeneousness within different disciplines, which implies potential insistence on autonomy and resistance against the great narrative: state progress. Third, I will delineate interactions between political environments and individuals' conceptions of the purpose of universities.

Chapter 6: Governing through metrics: neoliberalism in academic everyday life

Through the analysis of interviews, this chapter's focus turns to impacts of the deployment of discourse — such as statements of excellent and responsible research, bibliometric indicators as instruments, and funding bodies as institutions — on academic practices. This chapter consists of two parts. The first part will review institutional practices of promotion evaluations, internal regular assessments and honour principles, which are operated by universities, producing direct impacts on individuals. From this, I will delineate the diffusion of neoliberal discourse within academic organisations. The second part moves to influences on individuals'

subjective experience of anxiety and academic practices. These changing behaviour patterns include a selection of research topics, research agenda, strategies for grant applications and publications.

Chapter 7: Conclusion

This last chapter summarises and assesses this thesis. It begins by reviewing key points of argument and to what extent the main research questions have been answered, followed by implications of this study, questions that have not been addressed yet and potential future research. The main implications and contributions are reflectivity on neoliberalism as an analytic concept, the singularity of the Taiwanese case, an alternative approach to critical studies on university education, and a bridge between knowledge production and socioeconomic reproduction.

Chapter 2: Literature review

1. Introduction

In this chapter I engage in-depth with the literature on bibliometrics and associated issues. A bibliometric indicator is the product of a quantitative calculation system which labels the importance, relevance or value of academic journals or publishers by numbers. A citation-based bibliometric measure is the major format of bibliometrics, conducted by calculating the ratio of citation frequency and numbers of articles in an academic journal. For a journal to be considered high-ranking requires that papers in this journal have been cited by other authors more frequently than papers in a lower-ranking academic journal. In other words, papers in the high-ranking journal could be said to have more impact than those in low-ranking journals in terms of citation numbers. As a result, the journal ranking system is regarded as a criterion by which to judge not only the value of an academic journal but also the quality of a research outcome. On this basis, the importance of journal ranking systems in academic careers has been increasing for several decades. Today several terms, such as the Science Citation Index (SCI), Journal Citation Reports (JCR), h-index and impact factors, have become part of academic life. The amount of published literature in high-ranking academic journals has become one of the criteria used to evaluate the performance of scholars, programs, institutions, even schools; at the same time many researchers are concerned about the publication list in their resumes.

This chapter begins by reviewing the idea and development of neoliberalism as social background. Although the origin of neoliberalism and the beginning of bibliometric measures are two independent events, the role of bibliometric measures has been significantly influenced by the movement of neoliberalism which has reshaped the ways through which we evaluate the academic sector. After this, I will provide an overview of bibliometrics in terms of history, types and mechanism, followed by the incorporation of the evaluation metrics and research resource distribution system in the practice of New Public Management. In response to being measured, scientists might in turn modify their research proposals and publishing strategies to become more productive and effective scholars by maximising the impact factors under their control. This chapter therefore will attempt to assess existing research on possible

impacts induced by the introduction of bibliometric measures in various cases.

The following section of the chapter explores frameworks that can help us understand the role of bibliometric indicators to assess ‘academic excellence’. This section starts by discussing mechanisms of power and procedures to establish discourse which render subjects governable. From this approach I will offer an outline to interpret the emergence of bibliometrics: how a bibliometric indicator has reached an indispensable position in academic audit. After this, I will explain why previous studies are not comprehensive enough to account for this topic. From here I will attempt to indicate what my thesis can contribute to research in higher education policies as well as in sociology.

2. The rise of Neoliberalism and New Public Management

The term neoliberalism has been deemed so ambiguous that whether neoliberalism indeed exists in the real world can even be regarded as a live issue. According to Mirowski (2013), the origin and core of neoliberalism is the Mont Pelerin Society, founded at the end of the 1940s and consisting of three heterogeneous schools: Austrian-influenced Hayekian legal theory, the Chicago School of neoclassical economics, and the German Ordo liberals. As a result of this, it is not surprising that arguments of neoliberalism can sometimes seem inconsistent. For instance, neoclassical economics consider that the market mechanism may fail in some conditions due to unexplained factors, while neoliberals believe that the ideal market can protect itself from failure, due to its ability to self-evolve and produce spontaneous orders (Mirowski, 2013). Neoliberalism is also different from classical liberalism and the idea of ‘laissez-faire’. For example, in terms of the role of the state, classical liberalism would like to decrease and replace authority by society to guarantee individual liberty, whereas neoliberalism is inclined towards relatively strong states that can maintain a stable market mechanism as well as small states that would not intervene in the market, by which individual liberty is guaranteed (Mirowski, 2013, Harvey, 2005). In practice, neoliberalism is often aligned with neoconservatism or other right wing movements, whose nationalist orientation contradicts the neoliberal pursuit of globalised markets (Harvey, 2005, Apple, 2013). As Mirowski points out (2013), even neoliberals seldom try to make the definition

of neoliberalism crystal clear. This policy of vagueness may be due to the avoidance of serious inner contradictions.

The central doctrine of neoliberalism is protection of the individual's dignity from invasions of communism, fascism and all state intervention that could be seen to replace individual choice by collective action; while capitalism and the freedom of markets are assumed to counteract paternalism by guaranteeing individual freedom (Harvey, 2005, Friedman, 1962). Hence by linking the freedom of individuals with markets, neoliberal principles focus on 'market freedom' in practice. While the market mechanism plays a passive role in protecting individual freedom, it also plays an active role in the promotion of effectiveness and efficiency on the basis of the function of competition. In terms of neoliberalism, because the market is a 'transcendental superior information processor' compared to incomplete human knowledge, all economic and even associated problems, such as pollution and inadequate healthcare, have a market solution if the market is sufficiently ideal (Mirowski, 2013, Friedman, 1962). The role of government is to prevent the ideal market from political interference, even that initiated by the democratic process. In fact, neoliberalism is in favour of technocratic government and replaces the relationship between states and citizens with a model of consumers and providers (Harvey, 2005, Mirowski, 2013, Saad Filho and Johnston, 2004). On the other hand, for sectors in which the market model is not yet established, it is the government's duty to construct conditions such as technology, training and education, and a legal system to marketise the sector, rather than regulating it directly (Foucault, 2008). In this way, freedom and deregulation as central shibboleths become conditional freedom and reregulation; this is what Mirowski calls 'double truths' (Mirowski, 2013).

What is the position of knowledge in the discourse of neoliberalism? According to Hayek (1948), an economic problem is not only a problem of how to distribute resources, but rather a problem of how to convey knowledge; and therefore the best ways to use the resource, in a way which is communicated to every member of society. Like all other kinds of goods, the best knowledge can only be produced in a free market of ideas. Hence, if the higher education sector is controlled by the

government it should be regarded as a monopolised market, which may impede the diversity of knowledge. In other words, only the marketisation of education can guarantee the appearance of correct knowledge as the result of competitive process (Friedman, 1962). In this way, the status of knowledge, and the production of intellectuals, is reduced to a kind of information without any inherent superiority; the market 'knows' better. Conversely, the main purpose of education is to deliver a common or standard value, which is seen to be more necessary for founding the market than for producing truth (Mirowski, 2011, Hayek, 1960).

At the end of the 1960s, when Keynesian fiscal and monetary policies could not deal effectively with budget deficits, fiscal crises and surging unemployment and inflation (known as a crisis of stagflation), the application of embedded liberalism began to be challenged and replaced by neoliberalism. As a result, the ideology of neoliberalism arrived as a doctrine from the 1970s and then a series of policies were launched to reshape the structure of government and the public sector, which became known as the movement of New Public Management (NPM), or New Managerialism from the 1980s, with the increasing dominance of neoliberal governments. The trend of New Public Management originated in the UK and the US – especially during the period when Thatcher and Reagan were in power – extended rapidly as a paradigm in a globalised world and was stimulated by international finance institutions, including the IMF (Drechsler, 2005, Lane, 2000, Lane, 1994, Harvey, 2005).

In line with the neoliberal doctrine of the free market, the role of government - including public policies, regulation and expenditure - should be reduced as much as possible to avoid interference in the market, regardless if citizens are demanding increased and better services from the government. Furthermore, even the public sector is not deemed an exception to the market mechanism; in order to improve government efficiency, competitiveness and productivity, the public sector should function as a part of the market by transforming itself to 'mimic a real market'. As Foucault points out, the mechanism of 'self-marketisation' leads to "a state under the supervision of the market rather than a market supervised by the state" (Foucault, 2008, p. 116) . According to Kettl (2005), this reformation of the public sector in practice works on the basis of six major principles: (1) marketisation, which

substitutes for bureaucratic inclination towards top-down control strategies; (2) accountability for outcomes, which stresses the role of quantitative approaches in assessing results and production; (3) productivity, meaning that the government should provide more services for people using the same, or even a reduced, budget; (4) formulating policy, which means that the government role of service provider is replaced by the role of service purchaser through contracting with other agencies; (5) decentralisation, which enables the public sector to modify its strategies flexibly and efficiently in response to the demands of citizens; and (6) service orientation, which emphasises a dogma of ‘consumer first’ within government institutions.

Overall, the movement of New Public Management aims to replace hierarchical bureaucracy with markets, a self-regulating and self-organising system by the introduction of ‘quasi-market’ mechanisms to induce market behaviour in the public sector, even though the purposes of the public and the private sector are different: distributing resources for the former but profit maximisation for the latter (Drechsler, 2005, Lane, 2000). Several scholars suggests that all the above neoliberal principles and policies on marketisation aim to foster a competitive atmosphere through transparency, visibility and accountability (Gane, 2012, Beer, 2016, Foucault, 2008). Taken together, in the light of NPM each expenditure in the public sector should be accountable, whilst the wasting of resources is regarded as a critical problem to be solved; hence, the promotion of transparency and accountability for public sector institutions has been regarded as a paradigm within diverse organisations in various nations, although the cost of evaluation might be quite high, too (Elzinga, 2012, Strathern, 2000, Power, 1997, Muller, 2018). As a result, the distribution of responsibility from the government to communities and individuals, and the process of pursuing economic, efficient and effective (3Es) ways of governance leads to the trend of the audit society (Power, 1997).

The idea and exercise of evaluation and accounting are not innovations in modern society but have existed as practical techniques for a long time. Nevertheless, the role of evaluation had not been considered this important until changes in public conceptions of what the ideal relation between the state and economics is (Power, 1997). In this way, the function of audit is not just as a tool of verification but as a

vehicle for managing the aims of NPM. As previous studies show, the application of quantitative measures to administrations is a strategy employed to change the advantageous position of expert judgement, to neutralise policies and to limit public investment due to a lack of trust in government (Porter, 1996, Muller, 2018, Espeland and Lom, 2015). Finally, given these arguments and frameworks, to fit the standard of auditability, transparency and accountability has become a kind of moral responsibility for both individuals and organisations (Strathern, 2000).

The practices of auditing consist in judgement and experience; it is a form of craft knowledge rather than science. One of the core process of auditing is sampling: what counts as evidence and effective actions, where operational frameworks are shaped by a practitioner's consensus instead of pure mathematical approaches (Power, 1997). Moreover, the formation of credible evaluation techniques is usually on the basis of empirical practices rather than theories (Power, 1997). However, the linkage between outputs and outcomes is often too ambiguous to be defined, and sometimes even to measure. In addition, when new specific committees are established in organisations to deal with measuring, this adjustment makes the outcome of measurement merely representative of the quality of the control system rather than the quality of what actually takes place in the real world (Strathern, 2000, Neyland, 2007a). As a result, "auditors claim to be looking at effectiveness but they are really emphasising economy and efficiency" (Power, 1997, p. 51).

In summary, the rise of neoliberalism renders the model of the free market into a dogma to enhance competitiveness in the name of safeguarding individual freedom from national intrusion. Therefore, the government is reformed on the basis of a neoliberal concept of governmentality. With the application of neoliberalism, the detailed exercise of New Public Management includes financial transparency and restraint, cost control, the decentralisation and autonomisation of organisations, the creation of markets (or at least quasi-markets), separation of purchasing and providing functions, and the promotion of accountability, leading to the audit society. When the movement of New Public Management is extended to the sector of higher education, bibliometrics starts to take centre stage in an academic audit, as an instrument for quantifying intellectual outputs.

3. A brief review of bibliometric indicators

Bibliometrics, as a means for recognising the value of knowledge, was not created for academic audit, nor was it related to the development of neoliberalism. Since 1927 the concept of bibliometric measures has been gaining importance for librarians and bibliometricians in American universities due to an increasing need for an indicator for purchasing valuable and relevant academic journals for students and instructors (Gross and Gross, 1927, Archambault and Larivière, 2009). According to Gross and Gross (1927), who published the first ranking of chemistry journals on the basis of citation counts, the aims of the first journal ranking were formed as a response to a lack of precise and objective records in relevant scientific journals, to prepare advanced teaching materials for students while the “demand of the colleges for instructors with the doctorate degree” was increasing (p. 386). In this work, Gross and Gross adopted the *Journal of the American Chemical Society* as their source, and then counted and analysed all references in the 1926 volume of *Journal of the American Chemical Society* to rank 247 journals that contributed to 3,633 citations in the journal. After that, the idea of developing a rational and quantitative method rather than merely making a whole list of all relevant journals was founded.

The idea of quantifying the importance of academic journals by calculating the average ratio between the number being cited and the numbers of published articles in a journal (now the most common citation impact indicator), was first created in 1939, but was not widely adopted until two decades later (Hackh, 1936). The idea of the ratio of citations to the source articles in journals was again utilised and named an “index of research potential realized” or “journal impact factor” (Raisig, 1960, Garfield, 1955). In Garfield’s words, the formula of how an impact factor works as a tool to bridge the gap between authors and information seekers “may be much more indicative than an absolute count of the number of a scientist’s publications” (Garfield, 1955, p. 109). Next, the first *Science Citation Index* (SCI) was funded by the US National Institute of Health (NIH) and released in 1963 by the private commercial sector Institute for Scientific Information (ISI), which was founded by Garfield; after that, the first journal ranking was then published by ISI in terms of journal impact factors in 1969 (Garfield, 1963, Garfield, 1972, Garfield, 2006). The

SCI Journal Citation Reports (JCR) has been released each year since 1975, accompanied with statistical analysis (Garfield, 2010). The number of academic literatures in all kinds of journals has increased gradually, as has the frequency of citations. However, because computers in the 1960s and 1970s were not as powerful as they are today, it was almost impossible to include all citations that occurred in magazines, newspapers, books or government publications in the process of calculation. As a result, simple citations from academic papers in SCI-indexed journals have been considered effective citations in the light of JCR impact factors.

After this century-long development, there are five kinds of citation-based bibliometric indicators: total number of citations; average number of citations per publications, such as Journal Impact Factor; the h index; the number of highly cited publications; and the proportion of highly cited publications (Wilsdon et al., 2015b, Van Noorden, 2010). Among these citation-based indicators, the number of highly cited publications and the h-index are size independent indicators, which mean that these scores will not decrease, while accounting for additional publications (Wilsdon et al., 2015b). Because the custom to cite and the frequency of citation varies significantly in various disciplines, citation counts from various disciplines should not be compared directly (Archambault and Larivière, 2009). Hence some researchers have developed novel normalisation models of citation impact indicators to resolve the problem of comparing academic efforts in different fields (Waltman et al., 2011). Additionally, with the increase in multi-author publications, especially in the field of biomedicine and high energy physics, finding a way to allocate credits to each author of a publication has also become a critical issue (Cronin, 2001, Gazni et al., 2012).

Along with these five ways of calculating impact factors, databases where academic journals are registered also play an indispensable role in bibliometric measures. Nowadays there are three major databases for exercising the bibliometric measure: the Web of Science (WoS), including the Science Citation Index (SCI), the Social Science Citation Index (SSCI) and the Arts and Humanities Citation Index; Scopus, owned by Elsevier; and Google Scholar (GS). All of these cover books, serials and conference papers, but each bibliographic database might have a better coverage than others in different fields. For example, Google Scholar stands out in the index of non-English

journals as opposed to WoS and Scopus (Meho and Yang, 2007). Scopus has better coverage in social sciences, humanities and engineering than WoS (Bartol et al., 2014). For conference proceedings, the coverage of Scopus is also higher than that of WoS (Larsen and Von Ins, 2010). However, there are still some difficulties in covering all publications in conference proceedings, which is one of the major publication forms in the fields of computer science and engineering. In addition, because social sciences and humanities (SSH) research is published more often in book form, and sometimes features a national or regional orientation, the coverage of SSH research is limited in bibliographic databases (Archambault et al., 2006, Nederhof, 2006). Moreover, bibliographic databases are not able to include all kinds of outputs, especially in the disciplines of art and architecture, where literatures may not be the main form of output.

Excluding these three 'international' databases, some national or local indexes have been developed to cover more journals published in the vernacular, such as the *Érudit* database in the province of Québec, VABB-SHW index in Flanders, IN-RECS in Spain, Taiwan Social Science Citation Index in Taiwan, FRIDA (Norwegian Scientific Index) in Norway, and the Polish Sociological Citation Index in Poland. Not all of these regional databases are citation-based indicators; there are alternatives, like the Norwegian model, which has been adopted in Norway, Finland and Denmark. The Norwegian model consists of a national database which includes books, book chapters and journal articles. The impact points of each publication is not calculated by citation number but by publishers, who are regularly sorted into two groups by specific panels: a normal level and a prestigious level, with points for monographs significantly weighted in this system (Schneider, 2009). Notably, while in the beginning the citation-based bibliometric indicators were designed to help readers search important literatures or valuable journals, the Norwegian model's indicator is created to be a clear, transparent and quantitative formula for research funding distribution. This difference reflects an essential shift in the role of bibliometrics, which is influenced by the spread of audit culture into the academic sector.

4. The spread of audit culture in higher education and the new application of bibliometrics

The university's function, finance and relations with society have changed over different periods, and are influenced by regional contexts. In general, by the 1950s, the university was regarded as a place for the cultivation of diverse thought and scientific research, but also for the self-replication of the upper class (Evans, 2004, Anderson, 1995, Guinier, 2015). During this period, private and church donations played a central role in university finance. After WWII, there was a significant turn in the function of universities. First, increasing access to universities has been considered as a kind of social justice (Evans, 2004). Second, a highly educated population has been assumed to enhance economic and administrative functions in an advanced industrial age (Evans, 2004, Wolf, 2002). Therefore, with the support of governments, there has been a rapid increase in both the number of universities and the number of students, with the result that universities became increasingly financially dependent on the state. However, when the Cold War ended and the perceived pressure from the Soviet Union faded, the financial dependency of the university on the state at last led to pressure for greater accountability and regulation on a national level (Sayer, 2014, Mirowski, 2011). Nevertheless, this description is merely a simplified overview of higher education; regional contexts should not be ignored. To take financial dependency as an example, in the UK only Oxford and Cambridge universities obtained endowments of over 1 billion pounds sterling in 2012; whereas 82 schools in North America obtained endowments of over 1 billion US dollars in 2013 (Sayer, 2014). Some Universities are more state-dependent than others.

The linkage between universities and other sectors also varies in different times. In the areas of natural science and engineering, previous studies have shown that the rise of modern laboratories in the later 19th century was supported by industrial patrons in the US as well as in Germany, resulting in the flourishing of new industries, such as pharmaceuticals, chemicals and electrical machinery (Mirowski, 2011, Pickering, 2005). Under these circumstances, the setting of laboratories could be considered as an element resembling multidivisional corporations among universities and private firms, and inevitably the research agenda became influenced by corporate interests.

Nevertheless, when people during the period spoke of the idea of ‘pure science’, they did not refer to a disembodied science, where practical purposes were entirely excluded but “rather to a pedagogical idea for a hands-on higher education where teaching and research are combined in a setting relatively sheltered from commercial considerations” (Mirowski, 2011, p. 97). In the period of WWII and the regime of the Cold War, state demand for a stricter science policy arose from the interests of national security. After that, there was an emergence of new discourses, such as the linear model of innovation which divides economic growth into several clear steps: federal investment, basic science research, applied research, industry development with new techniques and feedback on society; the account of science as public good, which argues that the essence of knowledge is a kind of non-excludable and non-rivalrous public good that should be supplied or maintained by the government for the benefit of citizens, in the same way that the government provides things such as lighthouses, highways, fresh air and national defence; and Mertonian norms on scientific communities (Mirowski, 2011). The combination of these discourses enabled the government to adopt top-down regulation to ‘purify’ the scientific community from corporate interference and to redefine the meaning of ‘academic freedom’. In practice, these Cold War policies of science regulation included an increase in national funding for higher education, restrictions on the acquirement of intellectual property in frontier technologies and the promotion of state control over high-technology companies (Mirowski, 2011). A similar trend could also be observed in national members of NATO. Due to the ideology of the Cold War, “purity had become conflated with freedom and democracy; science stood as the embodiment of all three states of virtue” (Mirowski, 2011p. 114). The image of 'the old good days' in academia was delineated in this era.

At the end of the Cold War, the model of top-down science regulation had been challenged and gradually replaced by globalised privatisation for several reasons. Firstly, with the fall of the Berlin Wall the rationale of national security for strict regulation also decayed (Mirowski, 2011). Secondly, after the oil crisis and stagflation crisis in the 1970s, the slowing down of economic growth made increasing government expenditure unaffordable, including a higher budget for education; as a result, the demand for accountability of public funding increased (Mirowski, 2011).

Moreover, with a rise in international trade and the sector of Information and Communications Technology (ICT), came a demand for greater protection for intellectual property (Mirowski, 2011). Within the discourse of neoliberalism, the sector of higher education in the US has undergone the procedure of marketisation, and similar phenomenon also occurs in Europe as well as in China and Japan (Mirowski, 2011).

The development of an audit explosion into universities is related to the movement of New Public Management. Universities as part of the public sector are listed in the procedure of reformation for several reasons. Firstly, with the pressure of financial control or budget cuts, a model of pseudo markets in higher education is supposed to improve cost-effectiveness in order to avoid a loss of quality (Strathern, 2000, Skelton, 2005). Secondly, while there is an increase in concern about the accountability and transparency of public organisations, traditional autonomic models of peer review mechanisms in academia are regarded as less open and less tolerable (Weingart, 2005). In addition, while knowledge-based economics plays a more important role than previously, the university - where novel knowledge is produced - is deemed an indispensable economic resource that must be measured and managed by the government to promote productivity (Strathern, 2000). As a result, academic audits such as the Research Assessment Exercise and Teaching Quality Assessment have been employed to assure the competitiveness and visibility of universities (Strathern, 2000, Skelton, 2005).

In the language of New Public Management, “performing institutions should receive more income than lesser performing institutions, which would provide performers with a competitive edge and would stimulate less performing institutions to perform” (Herbst, 2007, p. 90). With this rationale, national research evaluation systems have been founded for allocating funding, rewards and prestige. At the same time, there is a demand for a universal criterion by which diverse outputs of researchers can be reduced to comparable data. Hence, apart from their original functions, bibliometric indicators have been deemed as objective and accountable measures for monitoring and quantifying scholars’ efforts and then adopted widely in the performance-based funding system. After the role of bibliometrics was embedded in academic audit,

today's aims might include a guide for librarians for purchasing journals, as well as a list for authors to publish with a view to gaining more credits, a reference for research valuation, and information used to make staffing decisions, such as hiring, promotion and tenure review (Morris et al., 2011).

In the UK, the first evaluation metric, the Research Selectivity Exercise (RSE) was launched in 1986 by the University Grants Committee and the evaluation was based on the level of subjects. In the first RSE, the research profile included numbers of students and staff, financial support for research, statements of current and future research, and no more than five best publications since 1980 per researcher per department (Knowles and Burrows, 2014, Burrows, 2012). This exercise of academic evaluation continues, and was revised in 1989, 1992, 1996, 2001, 2008 and 2014 (Knowles and Burrows, 2014, Burrows, 2012). In 1992, the evaluation was renamed the Research Assessment Exercise (RAE) and operated by the Higher Education Funding Council for England (HEFCE), itself reconstituted from previous funding councils. In the sixth version of evaluation in 2008, the research quality profile was composed of three parts: outputs, up to four works for each active researcher; environment; and esteem. In the seventh exercise, the Research Excellence Framework (REF) of 2014, the research quality profile was modified yet again and was now composed of research outputs, environment, and the impact of research results outside of academia, such as contributions to the economy or to society, although the definition of 'impact' also invokes numerous debates (Wilsdon et al., 2015c, Knowles and Burrows, 2014). Even in the case of peer review based research quality evaluation (because it is almost impossible for a few examiners to score thousands of academic outputs), examiners on some panels are permitted to use citation data as additional information (Wilsdon et al., 2015c). Therefore, some studies infer that the bibliometric indicator may play a shadow role in the procedure of REF (Kelly and Burrows, 2011).

In parallel to the peer review based model, there is a bibliometric-based evaluation model, such as the Norwegian model, originated in Norway in 2006 and which has since spread to Finland and Denmark (Schneider, 2009, Hicks, 2012). In order to avoid the language bias in favour of literature published in English, a national database,

FRIDA (Norwegian Scientific Index), was founded to cover both international academic publishers who publish literature mainly in English and regional academic publishers who publish works in Norwegian. Three formats of publications are counted in this database: monographs; book chapters; and journal articles with various weighted formulas (Schneider, 2009). Citation frequency is not calculated in this kind of evaluation metric model; instead, the contribution of each work is based on the publishers or serials that publish the work (Schneider, 2009). All publishers and serials are sorted into two levels with different points, and this classification is regularly processed by a specific committee (Schneider, 2009). According to the sum of points collected per year at university level, annual research resource is distributed proportionally.

In sum, this section briefly reviews trends in academic management and changes in universities' role since the 20th century. Admittedly, it is impossible to analyse the topic of university missions without mentioning aspects of power relations with the state, financial dependence, social stratification and industrial development. Relevant theories and discussions will be further discussed in following empirical chapters. The next section will explore impacts of audit culture and entrepreneurial atmospheres on academics as a means to set-up the subsequent empirical Chapters.

5. Potential issues invoked by the exercise of evaluation metrics and their consequence

Studies have highlighted multiple issues that stem from dependence on peer review type metric systems in funding allocation decisions, the judgement of manuscripts and research assessments, such as REF in the UK. First of all, for some, the process of peer review is slow, expensive and inefficient (Wilsdon et al., 2015c, Stern, 2016). Moreover, while more qualitative factors can be considered instead of mere numbers via the procedure of peer review, the process might be either subjective or biased, with a lack of transparency and objectivity (Wilsdon et al., 2015c). For example, in the 2008 RAE, a sociology panel of 16 peers was responsible for grading a total of 3729 outputs, and a business and management study panel of 18 peers was responsible for scoring 12575 outputs (Kelly and Burrows, 2011, Rowlinson et al., 2013). This ratio makes the quality of peer review-based research evaluation

questionable.

There are also some methodological issues and undesirable consequences from using citation-based bibliometric measures in research assessments, due to bibliometric indicators. For the model of *Journal Citation Reports* (JCR) including SCI and SSCI, one of the major issues is the half-life of the cited references and the two-year citation window, which means that only citations and publications within two years are allowed to be calculated for impact, because most citations are assumed to occur within two years (Pudovkin and Garfield, 2004, Archambault and Larivière, 2009, Glänzel and Moed, 2002). However, there is neither theory nor statistical data supporting this assumption. Over 50 percent of citations happen two years *after* publication and the half-life of citation frequency varies significantly in different disciplines (Liu, 2003, Pudovkin and Garfield, 2004, Nederhof, 2006, Glänzel and Schoepflin, 1999). According to Glänzel and Moed's finding (2002), applying various period windows substantially changes the values of citation rates between two journals: *The Lancet* and the *American Sociology Review*. The notion that the half-life of citation frequency is discipline-dependent is not a new issue (Moed et al., 1985). Nevertheless, the two-year framework has already become a kind of path dependence which is difficult to change.

Apart from the issue of citation half-life, for international databases such as the Web of Science (WoS), the use of the English language and being USA-centric are other potential issues. Since the Institute for Scientific Information (ISI) was established and the WoS, including SCI, A&HCI and SSCI, was developed in the USA, the criteria for journal selection has favoured those written in the English language. In fact, most of the ISI-indexed journal are written in English and published in the USA, while most non-English literature, such as French, German and Scandinavian, is not included in the ISI-index (Archambault and Larivière, 2009, Nederhof, 2006, Archambault et al., 2006). For example, in the discipline of public health in Europe, only 3.5 % of ISI-index literature was published in a non-English language between 1995 and 2004 (Clarke et al., 2007). Two case studies of Spanish sociology and Australian sociology show that there is a gap between the trend of citations and the works that domestic scholars consider important, which suggests that citation-based

indicators may only reflect the interests of a foreign audience, or even viewpoints which could be considered particularly American, but may not be appropriate tools to value nationally or locally specific topics (Gläser, 2004, Piñeiro and Hicks, 2014).

The classification of 'valid citations' is a lasting problem in the model of citation-based bibliometric indicators, especially for JCR impact factors. Although items that are listed in the WoS now include journals, books and conference proceedings, only the frequency of being cited by other articles on WoS-index journals is counted in the calculation of journal impact factors, with quotations from other media, such as textbooks, monographs, non-WoS-index journals, conference proceedings or websites, ruled out of the calculation of impact factors, which therefore results in an 'asymmetrical count' (Archambault and Larivière, 2009). On the other hand, in social science and humanities disciplines (for instance, political science, geography, sociology and economics), some non-WoS publications may account for highly cited references (Nederhof et al., 2009, Glänzel and Schoepflin, 1999). In addition, the diversity of range among various databases also leads to various results of citation numbers. For instance, Nightingale and Marshall (2012) show that the citation number of the same article ranges from just one to 14 in different databases. In summary, differing definition of citations and their range of outputs puts a question mark over the validity of citation-based metric as a criteria to distribute research funding (Lane, 2010).

There are several further methodological problems in citation-based bibliometric analysis: self-citations; skewed distribution; and various citation customs. The emphasis on citations may be a temptation for an editor to manipulate impact factors, or for an individual to promote the score of h-index by referring to his or her own previous articles (Smith, 1997, Archambault and Larivière, 2009, Macdonald and Kam, 2011). However, since the phenomenon of self-citations can occur via individuals, groups, departments and journals, it is difficult to design a framework to exclude self-citations entirely. Moreover, for journal impact factors, there is the skewed distribution in which a small number of papers in a journal usually contribute the highest number of citations (Garfield, 2010, Garfield, 2006, Adam, 2002, Seglen, 1997). Hence, even though all papers in the same journal have the same impact factor,

their 'importance' is not the same in terms of citations. In addition, because there are various norms to cite reference in different disciplines, it is inappropriate to compare productivity across regions by citation patterns or journal impact factors (Weingart, 2005, Archambault and Larivière, 2009, Pudovkin and Garfield, 2004, Wilsdon et al., 2015a). All these debates challenge the validity of the citation metric model.

The final technical issue is interdisciplinary comparison. It has been shown that the productivity of research outputs in terms of publication varies in different fields (Piro et al., 2013). Therefore when the research assessment is processed in the unit of universities that may consist of different departments, the diverse patterns in productivity across various fields make the validity of the evaluation questionable (Piro et al., 2013).

In general, the exercise of research assessment may lead to similar consequences in scholars' activities across different countries. Firstly, when scholars pay more attention to work on research outputs, it is not surprising that less resources will be allocated to teaching jobs and tutoring students, in opposition to the purpose of education (Back, 2016, Cheng et al., 2014). Secondly, the application of bibliometric indicators stimulates researchers to publish in English language journals, even in countries where a national database is utilised; this then increases the position of journal articles among all formats of outputs (Hammarfelt and de Rijcke, 2014, Li and Flowerdew, 2009). A case study of Hong Kong also indicates that rising concerns about international English journals and its readership's interests may reshape research strategies and limit the diversity of study topics in the fields of humanities and social science, where research topics might be expected to be more regionally oriented (Li and Flowerdew, 2009). Thirdly, the increasing pressure from being evaluated might create a conservative environment where researchers would prefer to conduct a less risky and a shorter term study (Butler, 2007). Fourthly, an emphasis on the numbers of publications may drive researchers to divide their works into a 'minimum publishable unit' so that they are able to maximize the value of publications with the same work (Peter A Lawrence, 2003; Weingart, 2005). For example, when the older version of research evaluation that weighted numbers of publications had been exercised in Australia, the value of publications rose, but the

quality of research outputs did not increase in terms of journal ranking (Butler, 2003b). Finally, along with the growing competition for productivity and publication bias, which refers to the inclination of editing boards towards positive, attractive and novel results, there is an increase in both the rate of misconduct and retraction since the 2000s (Brembs et al., 2013, Steen, 2011, Fanelli, 2009, Yong, 2012, Møller and Jennions). There has also been a decline in replication studies and negative results (Kelly, 2006, Fanelli, 2012). In particular, the low rate of research reproducibility in biomedicine has incurred some issues in terms of economic and industry development (Freedman et al., 2015).

This section explores current research upon impacts of academic assessments on academic behaviours. Using this backdrop I will next turn to theoretical frameworks and I will articulate what has been overlooked as well as what I plan to contribute to relative studies.

6. Theoretical frameworks

6.1. The procedure of the exercise of power

What is the power by which the state can drive people to act in well-designed ways without constant reminders? We need to understand the possible answers to this question to see why bibliometrics have risen to prominence and been taken up. According to Foucault, contemporary power is different from traditional sovereign power, whose structures, effects and agents are clear and visible. Instead, contemporary power is a result rather than cause wherein: “power is employed and exercised through a net-like organisation...Power must be analysed as something which circulates or rather as something which only functions in the form of a chain...Individuals are the vehicles of power, not its points of application” (Foucault, 1980, p. 51). As Latour (2005) observes, the label or conception of power itself cannot be a source of explanation for the occurrence of behaviours or action; instead, the implementation of power is the result of a successful mobilisation of several actors whose behaviours are shaped by networks rather than external authority. That does not mean that power does not exist; otherwise, the existence of power rests on everyday actions and media that make these actions happen. In Latour’s terms, all words can be sorted into two categories: ostensive and performative terms; the former are real

objects in the world (such as a table, a cat, a tree), which are always 'out there' even without the linguistic definitions given to them by humans; the latter are performances (such as dance, music, society, culture and social structure), which consist of continuous activities and which disappear if the actors stop playing their parts (Latour, 2005). The word 'power' is a performative word and the practise of power is a collection of activities; in this way, to explore the essence of power is to study mechanisms as networks through which people act (Latour, 2005). As Rose and Miller (1992) argue, because the substance of power and the state is performative, the essence of government should not be explored within the realm of institutions but in terms of power exercised in daily life. In practice, this power, the art of governance, is an invisible but uninterrupted and constant process of meticulous control, exercised by subtle practices and special techniques in the supervision of detail (Foucault, 1979).

One of the keys to explicate how power reshapes ways of understanding the world, leading to changes in behaviour, is to trace the problematising activity, which refers to a shift in or redefinition of the perception of imperative problems, and then to observe following strategies that make the 'emerging problem' thinkable, auditable and manageable (Rose and Miller, 1992). Problematisation is the primary step in the procedure of subjectification. As Miller points out, "problems are not pre-given, lying there waiting to be revealed. They have to be constructed and made visible" (Miller, 2008, p. 14). In terms of a Foucauldian perception, the operation of power begins by the machinery of attraction which aims to render people conscious of risk and then to create a constant incentive to watch and talk about risk; by provoking a notion, an unknown subject starts to be transformed into a reality (Foucault, 1978). In short, the development of the conception of what the matter of things is, should be seen as a key for exploring the exercise of power.

Following the rise of an imperative notion, the programme of problematisation needs to develop a series of techniques for the accumulation of knowledge, consisting of "methods of observation, techniques of registration, procedures for investigation and research, apparatuses of control" (Foucault, 1980, p.102). As Foucault mentions, there is no purely disinterested scientific inquiry without potential objects of power; if

something is constituted as a field of exploration, this is “only because relations of power had established it as a possible object” (Foucault, 1978, p.98). On the other hand, “if power was able to take it as a target, this was because techniques of knowledge and procedures of discourse were capable of investing it” (Foucault, 1978, p.98). By setting the legitimate model of asking questions, collecting information and verifying assertions, rules for producing knowledge, such as measures, inquiry and examination, are also means of exercising power (Foucault, 2000). In a similar spirit, Latour uses the term ‘centre of calculation’ to grapple with the essence of what is named as science, technology, economy, politics and power: “to transform whatever people do, sell and buy into something that can be mobilised, gathered, archived, coded, recalculated and displayed” (Latour, 1987, p. 227) . The mechanism of the centre of calculation consists of three procedures: a cycle of accumulation; a mobilisation of the world; and the construction of space and time. For Latour, increases in knowledge, are about “how to bring things back to a place for someone to see it for the first time so that others might be sent again to bring other things back” (Latour, 1987, p. 220). By way of explanation, to investigate something is to encounter something unknown and to explore it repeatedly. However, it is impossible for observers to bring the found objects in their entirety into the centre of calculation. Hence, the complicated phenomenon, or complex things, need to be transformed, reduced, and recoded into samples, tables, graphs and numbers. In this way, things are rendered into mobile, stable and combinable information; numbers travel well. Finally, with the emergence of new disciplines of knowledge, techniques, instruments and metrologies, new dimensions of space and time are introduced into the unfamiliar area, making it more thinkable and manageable than before. As a result, by solidifying the subject, the function of the centre of calculation allows the centre of calculation to dominate at a distance.

Following inquiries, measures and collection of data and documents, a novel discipline of knowledge and narrative is able to be formatted, and a new truth about a subject is then ‘produced’. This procedure of ‘uncovering’ the truth is another critical point for analysing the practice of power. In the feudal era the legitimacy of power was held by the authority of kings, while in the modern era the legitimacy of power is authorised by the name of truth, which seems to be unquestionably convincing and

correct (Foucault, 1980). While one discourse is spoken as a truth, its notion, claim and requirements seem more morally acceptable. In this way, the law is secured and actually functions as ethical norms (Foucault, 1978). In addition, during the establishment of facts, within all these institutions and disciplines (where new knowledge is produced and a new practice is launched), the procedure forms a broad domain of alliance which obliges individuals to live in a new reality and renders them unable to escape from its ground, without exception; for instance, in the case of the development of sexuality, these devices include medicine, pedagogy, psychoanalysis, hospitals, clinics, schools and families (Foucault, 1978). With the moral property of the truth and the deployment of alliance, the discourse finally gains significant acceptability and becomes a principle according to which individuals identify themselves in the society and evaluate their relations to others and groups. This is why Foucault emphasises that the existence of power is beyond the judicial system. Therefore, we can observe that accompanied with the extension of power to encompass individuals' acts, attitudes, bodies and behaviours, numerous kinds of new knowledge also emerged, such as fields of public health, medicine, demography and psychology.

Taking Bentham's panopticon as the paradigm of governmentality, Foucault (1979) argues that there are two factors playing major roles in the exercise of power: surveillance and normalisation. The panopticon is an ideal apparatus that can audit everything constantly but its subjects do not know if they are being observed from one moment to another, which guarantees the automatic and impersonal functioning of power as a permanent field (Foucault, 1979). In Beer's words, "governance here is not something that happens after they (things and people) are measured, it is built into the design and structure of the very systems that produce those measurements" (2016, p. 152). For normalisation, while the constant audit functions successfully, all activities are automatically recorded and simultaneously sorted into two categories: evil and good, making it possible to quantify an individual's performance. On the basis of this criteria and assessment, punishment or rewards are utilised to lead individuals towards the supposed model of behaviours (Foucault, 1979). In this way, governance becomes invisible, automatic, functional and anonymous, and makes individuals self-disciplining instead of needing to be subject to direct command; that is to say,

governmentality. In addition, the case of the panopticon indicates that it is not always necessary for the process of knowledge accumulation to proceed in the name of science.

In summary, it has been shown in previous sections that truth is an outcome based on the accumulation of knowledge and the establishment of discourses (but not always in forms of science) rather than a natural object (Foucault, 1980). Whilst power is involved in the production of truth by setting the criterion by which people are able to distinguish true and false statements, the establishment of truth also confers on power the right to define moral acceptability. Only with the formation of knowledge and discourses, is it possible to found new techniques and innovation in programmes, including real instruments and systems of thinking, to monitor, measure, analyse and manage the object (Miller and Rose, 2008, Rose and Miller, 1992). These processes are how power operates.

6.2. Understanding the properties of knowledge

As Foucault (2000) argues, all knowledge is founded within the system of inquiry, registration, communication, standardisation and displacement, where the form of power exists and functions; conversely, the exercise of power also involves procedures for the application of knowledge, such as extraction, management or distribution. Hence, he claims that neither the dichotomy of knowledge and society, nor that of state and science, is necessary. He thus regards the essence of both power and knowledge as the form of power-knowledge (Foucault, 1979, Foucault, 1980). On this basis, scholars in the field of Science and Technology Studies (STS) offer numerous detailed empirical observations of the properties of knowledge. In this part I will review the process of the transformation of information, the formation of artefacts and the validity of knowledge.

For the procedure of the accumulation of knowledge which transforms obscure backgrounds into definite words and numbers, studies from the field of STS have explored further details and offered some insight. According to Latour (1999), conventional instruments and standardisation are the key elements for collapsing a complex phenomenon into numbers, tables or charts. By following the protocol in

hand, a few elements of the object under observation are selected as a sample, and most of the details are discarded. Because the standard protocol is adopted at all stages, the reference is considered to have the capacity to be traceable to the original object. This property of traceability guarantees the authority of the replacement process as a valid representative. However, all of these instruments and protocols are not spontaneous but are intentionally established, and here power might play a role. In addition, since the object is transformed into a universal form, it becomes possible to compare this data with other data in quantitative ways; that is, it becomes compatible. Based on compatibility, these new collections of data can be linked, compared or incorporated with other previously established knowledge, which contributes to a proliferation of literatures; that means more things are solidified within the uniform format of symbols. Taken together, Latour (1999) argues that there is not just one meeting point or correspondence across the gap between the world and language, but rather a series of transformations during which every step plays an indispensable role in mediations from matters to form. Furthermore, because all protocols and instruments are built on previous studies, the process of referring can be extended infinitely. This character of how the world is transformed into the word is what Latour describes through his term ‘circulating reference’ (Latour, 1999).

From previous discussions, it has been shown that knowledge is constructed, in contrast to the assumption that there is knowledge waiting to be discovered. On this basis, Actor-Network Theory (ANT) offers a practical approach for exploiting procedures of how an artefact – whether in the name of scientific knowledge or technical innovation – is introduced into society (Callon, 1999, Callon, 1980, Latour, 1987, Latour, 1983). As formats of description, what is the difference between fictions and scientific papers? What kinds of criteria do we use to verify a statement? Because literatures themselves are not able to change people’s behaviours, according to Latour (1987), what we call knowledge is the effective literatures that are able to reshape the collective model of actions. In terms of ANT, a shift in the way that people perceive their positions in society is named as ‘translation’. For the process of translation, there are four stages: problematisation; interessement; enrolment; and mobilisation (Callon, 1999). During the moment of problematisation, a leading actor may define or point out the obstacles presented by each actor that blocks their aims, and then suggest that

these problems cannot be resolved by themselves until they forge an alliance as an 'obligatory passage point' (Callon, 1999). At the same time, there may be alternative ways for some actors to achieve their aims. In order to stabilise the initial alliance, the term *interessement* means "the group of actions by which an entity attempts to impose and stabilize the identity of the other actors" through the introduction of a device or product that separates the alliance from others (Callon, 1999, p. 8). After a series of multilateral negotiations by which detailed conditions of resolving the obstacles are constructed and determined by representatives of the actors (whilst the actors at last succeed in achieving their interests), they also get enrolled in the network (Callon, 1999). The final stage is *mobilisation*, which questions whether the spokespeople are sufficiently representative to apply the result of previous negotiations to members. Because it is impractical for all related actors to participate in discussions, only a few members of each category play a role in the process of *interessement* and enrolment; in other words, a diverse population is replaced by a few delegates. If the mass accepts the consensus and follow the designated spokespeople, a new social or natural 'reality' is generated. Taken together, the essence of knowledge does not exist in its literatures but in the network of actors. To put it another way, knowledge is also one of the architectures whose functions are to materialise and stabilise the network.

On the basis of ANT, the validity of knowledge is not intrinsic to the content itself but is a consequence of established networks within which various actors are widely mobilised. A claim with strong connections that is able to succeed in mobilising each individual would be deemed as objective; otherwise, a statement with poor connections would be regarded as subjective opinion, leading to controversy (Latour, 1987). Deciding whether a statement is deemed objective or subjective depends on whether the controversy is settled or not. By way of explanation, neither objectivity nor subjectivity provides the intrinsic value of the literature; neither can determine if the statement is valid or not; objectivity or subjectivity is the consequence, not the cause. By building a firm network, successful scientists also play the role of spokespeople for nature. Similarly, the degree of logic can not be used as a criterion with which to judge the impact of a statement because 'logic' is just one way to map the linkage between cause and effect. In Latour's words, "the only thing we want to know about these sociological pathways is where they lead to, how many people go

along them, with what sort of vehicles and how easy they are to travel; not if they are wrong or right” (Latour, 1987, p.205).

When knowledge or discourse is established, how active or passive can actors be? It seems as if there are some potential conflicts between the ANT approach and the Foucauldian approach within this question. With the ANT approach, the foundation of an effective statement rests on networks among various actors, which are in turn based on a consensus that meet the different interests of the actors. As Hindess (1984) points out, actors' concepts of interests are not consistent; the interest of actors is likely to be modified on the basis of different locations. In this way, the engagement of all relevant actors plays an active and indispensable role in the foundation of new knowledge. However, are actors as active as ANT scholars suppose? When the actors interpret their own interests, is it possible for them to comprehend their position without being influenced by the pre-established deployment of discourse? Conversely, in terms of a Foucauldian perception, it seems that subjects only accept the introduction of new knowledge in very passive ways. Although Foucault also pinpointed that discourse can also be adopted as “a starting point for an opposing strategy” (Foucault, 1978, p.101), in general he pays more attention to the process of how subjects are dominated by discourse. Taken together, I suggest that the development of bibliometrics could be interpreted as an empirical study for investigating how passive or active agents take part (or not) in the formation of knowledge as well as the exercise of power.

7. Review and criticism of previous studies

From this approach, I argue that the function of bibliometric indicators can be considered either a ‘centre of calculation’ or a state instrument. With the practice of bibliometrics, on the one hand, it is possible to make intellectual activities commensurable; on the other hand, based on these definite indicators, gradually it becomes the moral responsibility of scholars to increase their productivity. The increasing role of bibliometric indicators reflects attempts to extend governmentality over academia, as well as the transforming role of universities from being places where diverse (but not always directly pragmatic) knowledge exists, to engines for economic development. Both these trends are sustained by the application of

bibliometrics. As Foucault (2008) noticed in the late 1970s, in the discourse of neoliberalism the role of the market has shifted from an institution for economic activity to a critique of state power, and has become a new regime of truth by which the mechanisms of the public sector are revised. Although Foucault did not make a list of public sector organisations, he would have considered the higher education sector to be one affected by the discourse of neoliberalism. Nevertheless, some current studies of higher education policy only pay attention to design and the consequences of performance-based funding systems, such as the validity of bibliometrics, intended and unintended (undesirable) results, but ignore the issue of power relations or academic autonomy (Butler, 2003b, Schneider, 2009, Hammarfelt and de Rijcke, 2014, Wilsdon et al., 2015c, Weingart, 2005). For example, debates on the preference between the bibliometric method and peer review, represent one of these discussions (Warner, 2000, van Raan, 1996). In a similar vein, some metric researchers may look for a 'breakthrough' from citation-based metrics, such as the number of page views or downloads in cyberspace (Van Noorden, 2010). This trend reflects not only that the discourse of neoliberalism has been taken for granted, but also that academic practices have been widely affected by state power.

Some researchers attempt to connect the introduction of bibliometric measures with the issue of power relations between the government and academia, but they do not consider the establishment of neoliberal discourse as a context (Hicks, 2012). Some scholars supply a historical review of the evolution of universities, including impacts which arose from the rise of neoliberalism and the movement of New Public Management (Elzinga, 2012, Evans, 2004, Mirowski, 2011). However, even if these authors mention the significance of performance-based funding distribution, they have paid insufficient attention to the practice of neoliberal discourse in everyday life via bibliometric measures. In a Foucauldian sense, what happens in everyday life is the root of the mechanism of power, by which a set of statements becomes a dominant discourse. Although it might be reasonable to claim the existence of audit culture in academy, detailed observations on how this procedure is operated would be necessary to support the argument. When the discourse of neoliberalism dominates how people perceive the role of the university, some scholars supply different statements about what the ideal university should be (Back, 2016, Collini, 2012, Evans, 2004, Berg and

Seeber, 2016). Although these ideas might sound a little romantic or nostalgic in today's economic climate, the existence of the argument raises two points.

First, the discourse of neoliberalism is not the only image of academia; nevertheless, it seems that in these arguments, it is only the image of neoliberalism in the sector of higher education that is able to take centre stage. I suggest that this difference in influence may be due to the existence of instruments, such as bibliometric indicators, that make the exercise of neoliberalism in academia more available than others.

In the case study of university ranking in law schools, Sauder and Espeland (2009) utilise the Foucauldian perception of discipline to analyse the function of quantitative university rankings. Their work clearly illustrates how an audit tool makes researchers self-manage via the mechanism of surveillance and normalisation in daily practices. However, in their work they paid less attention to the link between the audit tool and the discourse of neoliberalism; the former is an instrument designed especially for the latter. Some scholars, such as Power (1997) and Strathern (2000), reflect on relations in the shift of state interests, the emergence of New Public Management, the application of quantitative indicators as devices, and changes in practices. Nevertheless, it is necessary to build more empirical investigation to verify this insight. In a similar vein, Beer (2016) applies the discourse of neoliberalism as context to illustrate the mechanism of power in the deployment of metric devices in different aspects of everyday life and names it 'metric power'. Beer also argues that this general account of metric power needs to be justified by more empirical case studies.

Second, the conceptual framework of neoliberalism itself also has to be examined by more empirical studies. Critical studies articulate the inner complexity and contradictions in neoliberalism (Mirowski, 2013, Harvey, 2005, Saad Filho and Johnston, 2004). However, while diagnosing political tendencies, neoliberalism, as an analytical conception, is somehow utilised as a first cause to account for all changes in society and policy in an economy (Peck, 2013). In other words, neoliberalism is taken as a macrostructural driving force over individuals and countries. According to Latour, the label of neoliberalism is performative; neoliberalisation is a result of

successfully assembling actors, rather than a determining cause (Latour, 2005). A critical study of neoliberalism should also focus on the geo-historical configuration where actors are enrolled in neoliberalisation.

Taken together, I suggest that changes in the academic environment reflect an endeavour to spread neoliberal governmentality. In order to explicate techniques of neoliberal governmentality in academia, the role of bibliometrics as a government instrument can be considered an entry point in terms of daily practices. By this approach, it is possible to explore how and to what degree the discourse of neoliberalism permeates the academy.

8. Conclusion

The proliferation of governmentality, which disciplines individuals in subtle ways, is relevant to the increasing demands of state economics and policies. In Foucault's words, "bio-power was without question an indispensable element in the development of capitalism; the latter would not have been possible without the controlled insertion of bodies into the machinery of production and the adjustment of the phenomena of population to economic processes" (Foucault, 1978, p.140). In the era of neoliberalism, the way that people understand the world and themselves is substantially infiltrated by the discourse of economic language, through terms such as market mechanism, efficiency, quality, value for money, cost-effectiveness, entrepreneurial spirit and productivity. Thus, we can observe the emergence of a new conception of problems: the unsatisfied need for competitiveness. When the movement of New Public Management is applied to the sector of higher education the same framework is also transplanted from the financial and industrial sectors to academic institutions. In the case of academia, if research funding cannot be transformed into outputs as far as possible, the perceived waste of resources would decrease the competitiveness of a research unit, or even the whole state. If scholars do not contribute to academic efforts to the fullest possible extent, the perceived waste of their time and potential would diminish their individual competitiveness in the higher education market. Overall, the enhancement of efficiency and reduction in waste have become a critical issue in the public sector, including academia; the definition of the problem has been reshaped. Apart from the principle of being economical, the

university is assumed to play an economic role in industrial growth in the age of the 'knowledge economic' (Strathern, 2000, Mirowski, 2011, Fuller, 2009). The change in higher education policy and the increase in governmentality through the academy reflect the shift in the image of the function of a university.

For the procedure of subjectification, pointing out a new issue to change the perception of problems is not sufficient; new instruments and techniques need to be founded to trace and accumulate documents and data, which render the object thinkable and accessible. During the process of marketising the public sector, while the principles of accountability and transparency are widely applied in order to create a proper milieu for competitiveness, the principle also induces the rise of an audit culture with concomitant demands to monitor activities in the public sector quantitatively. In the case of the sector of higher education, from all academic activities including research, attending workshops and conferences, teaching, speech and publications only some are chosen as valid academic efforts to count for measurability. This choice is a political issue and involves the practice of power. For a publication where the bibliometric indicator has played the role of the instrument to measure and count the invisible intelligent labour, the process of selecting which genres from all formats of publications (such as monographs, chapters of a book, journal articles, comments and conference proceedings) are valid and countable is always a political issue, and a field for the exercise of power. By using the formula of citation analysis, the value of publications is further transformed into numbers, by which a notion of academic performance or excellence is replaced. Only with these statistical data compiled by bibliometrics, does it become possible to compare productivity among researchers. Since an 'objective' and universal criteria to evaluate members is available, the mechanism of rewards and punishment can be introduced to normalise them into more economic models than before. In terms of Foucauldian approaches, the existence of bibliometrics here may function as the panopticon in the academic community, where more and more activities of its members are monitored and recorded automatically by an impersonal evaluation system.

The introduction of bibliometrics into research assessment is a new application of bibliometrics, whose original purpose was to enable librarians to purchase journals. In

terms of STS, the case of new applications offers a practical way in which to observe the process of the establishment of a new network, as well as the shifts in interpretation of interests, such as the case of Mendel's theory where the position shifts from that of an agriculture report to a foundation stone in genetics (Brannigan, 1981), and the case of scallops where a sea-farming technique is applied from one species to another (Callon, 1999). Thus, I suggest there may be some points that we can learn from this kind of empirical study. Firstly, the evolution of the role of bibliometrics provides an approach to tracing changes in notions of the interests of actors, such as the government, policy makers or industry shareholders. Secondly, this case study offers an opportunity to investigate, using the language of ANT, the mechanism of 'translation', where actors keep, recognise or modify their interests, as well as the meaning of bibliometrics. From this analysis, we may be able to examine how active or passive actors could play a part in establishing the procedure of the establishment of knowledge. Meanwhile, we can examine the capacity of bibliometrics: objects as an actant. Finally, this case study may offer a chance to observe how the neoliberal discourse is implemented in everyday academic practices via instruments.

Chapter 3: Methodology

1. Introduction

This chapter provides a framework to conduct empirical research, building on the literature review. In this introduction I first review briefly the theoretical basis that I am adopting. In the next part, I outline my research questions relating to the mechanisms of metric power and define the main objectives and rationale of this thesis. I then present the theoretical framework and my ontological and epistemological position. From there, I develop the methodological framework of this thesis, designed to achieve insights into mechanisms of bibliometric power, then focus on some methodological challenges. The following section considers the detailed process of empirical research, including the selection of cases, approaches to collecting data, and methods of data analysis.

As Carter and Little (2007) point out, methodology aims to provide "justification for the methods of a research project" (p.2) and "for the project's relationship to theory" (p. 13). Because specific theoretical bases and assumptions profoundly affect the development of each methodology, the selection of methodology substantially shapes research questions, theoretical frameworks, methods, and interpretation of data. However, the determination of methodology is also modified by taking an ontological position; in other words the way researchers circumscribe the relationship between themselves and the world, as well as their epistemological position, which defines a set of criteria for producing and evaluating knowledge (Law et al., 2011). Methodological inconsistency in the application of ontology, epistemology, theory, research objects, methods, and criteria to justify the knowledge produced by this study could be problematic.

As mentioned in the literature review, I will explore power through bibliometrics on the basis of Foucauldian theory and Actor-Network Theory (ANT). Briefly, as Miller and Rose (2008) argue, effective governance is operated by norms that do not need to tell people what to do every day but actually shape how people conduct their lives and relations with others and themselves – that is, the arts or techniques of government. Living in the age of neoliberal governmentality, citizens are less directly governed by

bureaucratic administrations and more by communities in which they are enwrapped and through which they become self-governing (Miller and Rose, 2008). However, this does not mean that individuals are entirely free from state intervention; by supplying frameworks and the freedom to choose a well-designed choice, the government subjects individuals to the exercise of power in delicate ways (Miller and Rose, 2008, Rose and Miller, 1992, Gane, 2012). Therefore, in the context of this study, bibliometrics would be considered one of the government's devices to monitor, measure, and standardise individuals, or even to produce norms for scholars, contributing to the implementation of governmentality and self-governance.

With the notion of what Beer (2016) names 'metric power' and the neoliberalism movement, this thesis does not aim to develop a more meticulous calculation device. Instead, the focus of the thesis turns to the networks by which these calculation devices were created. While some people are keen to develop a more objective criterion to estimate academic efforts, for instance weighted formulas or alternative databases (Wilsdon et al., 2015c, Schneider, 2009), this seems to require a presupposition: academic output must necessarily be measured in terms of accountability and transparency (Muller, 2018). However, previous discussion implies that the presupposition of accountability and transparency is not intrinsic to academy but might rather be a consequence of the application of neoliberal language in the sector of higher education. Hence, in this study, firstly I assume that the adoption or adaption of bibliometric indicators in academic research assessment might be the result of the procedures of problematisation (by which academic practices have been identified as a problem), and subjectification (by which scholars become an object of knowledge and power). Moreover, I suppose that even this explanation— that the movement of neoliberalism is involved in the birth of academic audit culture—could be a reproduction of current discourse and should not be taken for granted. In the following sections I elaborate my assumptions, the reason why I make these assumptions, the purpose of these assumptions, and the method I use to test my assumptions.

2. Research questions

A) How have academic practices become an object of knowledge and power?

If the need for academic research evaluation is not considered as a given and we start to question this default setting, a series of questions springs up. How do people consider the role of universities in different periods? How do people imagine what a responsible researcher should be nowadays as compared to the past? How do economic languages, such as market machinery, efficiency, and competitiveness, dominate the ways in which we think about higher education? How does the discourse of academic excellence make academia subject to audit culture? In the light of a Foucauldian approach, all the above questions infer that there is a set of discourse delineating what academia should be.

In Foucault's idea, the word 'body' does not just mean the natural body but a production of discourse. The boundary and meaning of the body reflect the regime of knowledge about it. Although there are several terms used to describe the event through which academic practice becomes a subject to be operated efficiently, such as academic audit, marketisation of higher education, new public management, and metric power, I think that these terms do not exactly encompass the meaning of becoming an 'object of knowledge'. Hence, in this thesis, I name the academic practice that is subject to the object of knowledge and power as 'the Academy'. The goal of the first research question is the condition in which the Academy has been formed. In addition, although there are several current explanations for the emergence of academic audit culture, such as economic crisis, the end of the Cold War, the rise of neoliberalism, cuts in budgets for education, globalisation, and improvement in competitiveness of students, universities or whole countries, these explanations might be reproduced by current forms of discourse and then become parts of the discourse. Here I assume that there might be two factors involved in the condition of the Academy's emergence; the first possible factor is the state's intention to govern the university precisely, while the university is one of the main apparatuses for producing discourse; the second is the tension between the public and the elite.

B) How have bibliometric measures become a resolution for the problem of how to assess academic excellence?

How is invisible and heterogeneous academic performance displaced with comparable scores? How is the discipline of bibliometrics, a system of knowledge about governing knowledge, formalised? This next topic turns to the process of translation, where the bibliometric measure becomes the 'obligatory passage point', in Callon's term. During the process of translation, there are a series of negotiations by which actors' goals continue to be transformed and replaced, and some devices might be introduced to stabilise networks among actors. The aim of the second research question is to trace the procedure of negotiations and to elucidate how bibliometrics are adopted as a solution to the problem. While this issue is still ongoing as a controversy and the black-box is not yet closed, this case study could provide an empirical opportunity to research procedures of how power functions by observing dynamic interaction between actors.

C) Can the neoliberalised university best be understood through notions of governmentality?

To what extent does the neoliberalised university exist? The Literature Review chapter suggests a range of neoliberal characters. Hence, this empirical study aims to examine whether neoliberal principles are embodied in universities – and if so, how. Furthermore, this thesis will illustrate whether the neoliberalised university represents properties of governmentality. In other words, how have power relations between the state bureaucracy and the academy changed? With the notion of power relations with the state, this research question also elaborates contents of academic autonomy.

D) Are bibliometric measures an aspect of governmentality?

On the basis of Foucauldian insight to governmentality, the exercise of power is via practices in everyday life along with the deployment of discourse and instruments. In addition, the idea of discourse includes not only discursive practices but also institutional practices. The image of the panopticon is not merely a metaphor but also indicates a material implement. Hence, in this empirical study, I examine whether bibliometrics is an instrument to exercise power in academia, whether bibliometrics can be deemed a norm in the Foucauldian sense, how the Academy is reshaped by

being observed consistently, and whether the existence of the bibliometric measure can account for changes in academic practices. The goal of the fourth research question is to explore the impacts of bibliometrics on everyday practices.

In order to investigate and explore the impacts of bibliometrics, I will pay attention to changes in scholars' ways of knowledge production mediated by bibliometrics. The university is one of the major places where knowledge is delivered and produced. If the neoliberalised university represents the neoliberal power relation, which means academic behaviours are comprehensively monitored by the subjectification of the Academy, how does the neoliberalised university change patterns of knowledge production? By studying influences of bibliometrics on knowledge production, I will show how bibliometrics switch in its role, from media to mediators.

3. Ontology and epistemology

In this section I attempt to define the position of this thesis on ontology and epistemology in light of ANT and Foucauldian approaches and then to show how this position relates to theoretical frames and research questions. There are several different approaches, made on the basis of various fundamental assumptions, for conducting social research, and they result in diverse procedures to produce knowledge and different criteria to evaluate knowledge. Because these different research processes are developed in the light of how a researcher views the phenomenon, the selection of research methods is not simply a choice of methods alone but implies a choice "between modes of engagement entailing different relationships between theory and method, concept and object, and researcher and researched" (Morgan, 1983, p.19) . In other words, a decision on a particular strategy, or a paradigm, means favouring a specific position in a presupposition that links a researcher to the situation being studied, instead of adopting other stances whose viewpoints regarding observers and objects could be entirely different, that is, the way in which a researcher perceives a subject. This fundamental difference in assumptions is concerned with the existence of reality, the way of seeing power, the relationship between reality and knowledge, and an appropriate procedure to gain knowledge.

3.1 Reality

There are two radically different assumptions about the existence of reality. In terms of Realism, there exists an external world to be investigated whose characteristics are altogether independent from human interpretation, theory, and behaviour (Bryman, 2012, Neyland, 2007b). In Hacking's words (1999, p. 83):

The world may, of its own nature, be structured in the ways in which we describe it. Even if we have not got things right, it is at least possible that the world is so structured. The whole point of inquiring is to find out about the world. The facts are there, arranged as they are, no matter how we describe it.

In the sphere of social sciences there is another argument which posits against the idea that inherent structure is already predetermined by the world itself. According to Interpretivism, the property of humans as an object of social science is different to objects of natural science, because human beings may interact with ways of recognising and classifying themselves, no matter if they accept or reject these ideas, whereas non-human objects do not change their behaviours in response to being observed (Gee, 2014, Morgan, 1983). For instance, electrons do not have the capacity to read and be influenced by chemistry research, but people may read psychology studies which may cause them to modify their behaviours and identities (Hacking, 1999). As a result, the fact that individuals interact and affect this hidden structure erodes the foundational assumption of a predetermined world and then decreases the credibility of knowledge produced by social sciences. As another example, in the case of pedagogy and education, there are two models for raising children: the cultivation model and the natural growth model (Gee, 2014). The cultivation model is utilised mostly by upper-middle or middle-class parents, who offer their children practice in the ability to argue, explain and organise meticulous study modules, such as out-of-school activities, special lessons, or museum trips, while the natural growth model is adopted by non-middle-class parents who do not intervene continually in their children's lives (Gee, 2014). However, because the properties of the cultivation model are profoundly linked to characters of 'success' in school, where children are rewarded and socialised, children who grow up with the natural growth model may be labelled as deviant or deficient. Hence, a theory of the 'successful model' is not only shaped by social contexts but, in return, reinforces the reproduction of cultural capital for the

middle and upper-middle class (Gee, 2014). Therefore, the assumption that there is an external social world independent from human interpretation is refuted by Interpretivism.

ANT scholars develop a different argument for the concept of Realism. According to Latour, considering that a society consists of humans and their actions, how can the mechanism of a society be explained by properties of the society itself (2005, Latour, 1984, Latour, 2000)? Society, in the ANT sense, should be seen as the result of the formation of networks rather than an account of a phenomenon: "society is not what holds us together, it is what is held together" (Latour, 1984, p. 276). Furthermore, ANT scholars would argue that it is not necessary to make the distinction between social reality and natural reality. For example, Callon (1999) shows that the property of a species of scallop's inhabitation is a result of a series of negotiations and translations between scholars, fishers, and marine creatures rather than something predetermined. Hence, both genres of reality and the natural and societal realms are a local accomplishment and a temporary consensus of relevant actors and should not be considered an inherent structure (Latour, 2005, Latour, 1987, Latour, 2000).

For Foucault, although he did not deny that things and actions exist, they are only able to gain meaning and become objects within discourse (Hall, 2001, Burr, 2015). In Foucault's words (1981, p.67), "we must not imagine that the world turns towards us a legible face which we would only have to decipher...there is no prediscursive providence which disposes the world in our favour". There is no inherent meaning from the things-in-themselves.

On the basis of ANT and Foucauldian perception, I would argue that both the objects in this study – bibliometrics and the effects of bibliometrics on academy – should be seen as products of construction rather than something waiting to be discovered. In the literature review, it has been shown that the definition and role of bibliometrics, a genre of knowledge about ways to know the value of knowledge, has varied in different periods (Archambault and Larivière, 2009). Moreover, instead of being a static property, the impact of bibliometric measures is also determined by how people interpret the meaning of bibliometrics (Fleck, 2013). For example, the correlation

between articles' citation rates and journal rankings remained in low degree in the 1900s. However, while the Journal Citation Reports (JCR) has been regularly released by the Institute for Scientific Information (ISI) since the 1960s, the relationship between citation frequency and journal rankings increased quickly but then slowed down again when Internet search tools were created in the 1990s. This trend shows that the increase in citations may be influenced by a kind of self-fulfilling prophecy and also changes in users' preferences (Lozano et al., 2012). During a period when people are concerned about journal rankings or journal impact factors, an article in a prestigious journal is more likely to have a better chance of being cited, not only due its novelty or significance, but also because of the authority of the high-ranking journal itself and the greater media exposure (Brembs et al., 2013, Gonon et al., 2012). This case indicates that the statement of knowledge value itself certainly has produced impacts on how people recognise the value of knowledge as well as influencing their behaviours.

More radically, with scepticism toward the existence of inherent structure, I would assume that the demand for and rationale of academic evaluation is not a predetermined progress, and that the introduction of New Public Management into higher education as a resolution is not inevitable. With scepticism toward current explanations for changes in the role of the university, I assume that all of these statements may also be parts of representations of discourse, which delimits our ways of talking about this topic. There may be some tensions, conflicts, or interests behind the current account. By tracing the origin of this movement of academic audit and reviewing the history of the present, my first research question aims to explore how scholarly activities become the object of knowledge or, in more Foucauldian language, how the 'Academy' is created. In this way, it might be possible to develop a new way to think of relations with academic audit culture.

3.2 The ontology of power

In the section regarding theoretical frameworks, I developed ways through which it is possible to evaluate power. Here I briefly review the question of what power is. According to Latour (1984), there are two models for recognising power: diffusion approach and translation approach. The former considers power as something that can

be hoarded and circulated by someone and focuses on initial forces: who has power and the medium where distortion, friction and resistance take place (Latour, 1984). When power is taken as the root to explain this mechanism, when an order is executed well it is because the leader is powerful; however, if people assumed to hold power are not able to invoke sufficient actions, that means these people are effectively powerless (Latour, 1984, Latour, 2005). For Latour, this model seems tautological. In contrast, Latour points out that the existence of power is determined by the number of people who join this composition (Latour, 1984). Latour does not deny that some actors are more powerful than others, but this is not because they actually hold power but because they practically define what groups other people together. In his words, "[t]his shift from principle to practice allows us to treat the vague notion of power not as a cause of people's behaviours but as the consequence of an intense activity of enrolling, convincing and enlisting" (Latour, 1984, p.273). He also suggests that the notion of 'techniques', in Foucault's sense, is a proper way to understand how the machine of micro-power keeps people in line (Latour, 1984).

On the basis of Foucauldian perceptions, the ontological existence of power does not rest in social structures, apparatus, instruments, narratives, or juridical systems; all of these are the mediums through which power can be achieved (Foucault, 1980). There is no external existence of power; rather it rests in ways humans interpret their relationships among themselves, others, society, and the world (Rose and Miller, 1992). In other words, power is a set of operations acting on people's actions. Further, because human behaviours are more or less guided by this interpretation of themselves, the interpretation is not only a group of thoughts or conceptions but involves practices, by which the interpretation is enacted and continues to last, extend, transform, or interact with other kinds of interpretation (Foucault, 1979, Foucault, 1980). This dynamic matrix or procedure, which shapes the interpretation and is shaped in return by the practice, is named as discourse within Foucauldian terminology. Furthermore, the essence of discourse is so interactive and productive that the existence of power is not something out there, objective, external, or inherently structured in the sense of Realism.

In summary, this study does not merely aim to distinguish some powerful actors from

others in the event of academic audit, but focuses on the process of how these powerful actors enrol others as well as how those other actors are mobilised. The next section will link back to ontology and epistemology: relations between knowledge and reality.

3.3 Relations between knowledge and reality

There are also several different views on the linkage between reality and knowledge. Since Durkheim, the approach of social research to define, acquire, and evaluate knowledge is deeply influenced by the paradigm of natural science: positivism. The aim of positivistic social studies is to find causal explanations of social phenomena and apply these general laws to non-observed populations. On the basis of Realist assumption (an external world is out there), this implies that there is an objective knowledge about the world waiting to be discovered (Bryman, 2012, Morgan, 1983). In addition, because the external reality is deemed an objective fact in this sense, the reality is assumed to be able to provide ultimate empirical tests to justify competing theories or ideas (Morgan, 1983). Because theory, conception, hypothesis, analysis, and framework stand independent of the mundane world, all of them can be examined by the empirical senses and then confirmed as truth (Bryman, 2012, Morgan, 1983). For Empirical Realism, the relationship between reality and knowledge, a collective of statements to describe the reality, is a perfect correspondence (Bryman, 2012). Critical Realism revised this assumption of perfect correspondence between reality and knowledge. For Critical Realism, because observers always see the world from a fixed position, there is no access for humans to complete knowledge or have a true outsider perspective (Scott, 2005). Hence, even if the objective world is out there, knowledge itself simply offers a way to know the reality rather than represent the reality (Bryman, 2012, Scott, 2005).

As mentioned in the literature review, in the eyes of Foucault, the relation between knowledge, truth, and power is inextricably entangled. Without the accumulation of knowledge, objects of power cannot be managed; however, processes to establish knowledge, such as selection of objects, procedures for research, methods of observation, devices of control, and skills of registration, are enmeshed with power relations (Foucault, 1979, Foucault, 1980, Foucault, 1978). Since knowledge is

produced within discourse, subjects of knowledge, such as sexuality or madness, are only meaningful within the discourse; Foucault says, "Nothing has any meaning outside of discourse" (Foucault, 1972 in Hall, 2001, p. 73). Further, when knowledge, along with those techniques and institutions - or named as discourse - is applied, it also produces 'true' impacts on the world and becomes parts of the reality (Hall, 2001). This insight echoes with STS scholars' studies about economics, which indicate that it is an economic theory reshaping the reality in ways the theory expects, rather than an economic theory characterising the reality (Callon and Muniesa, 2005, MacKenzie, 2008). Taken together, conditions of true facts are subject to the current form of discourse, and meaningful reality for humans is created by discourses instead of things-in-themselves.

In summary, considering that reality is a production of the power/knowledge complex, this study's notion shifts from the will-to-truth to the will-to-power. Research that focuses on 'the black-box' or 'the history of present' do not aim to reveal or establish another statement of truth or reality but instead analyse the mechanism by which a fact is formulised. Because epistemology sets relationships between researchers, objects, and standards to justify knowledge, positions in epistemology play a critical role in shaping methodology as well as choices of methods. Hence, I illustrate how I develop research methods in the next section on the basis of my epistemological position.

4. Methodological frameworks

In this section, I focus on how the previous theoretical position outlined guides the choice of research methods. As Carter and Little (2007) argue, methodology is not a statement of methods to implement research but a theory to explain and justify the methods, to resonate with theoretical frames and epistemology. For instance, the utilisation of quantitative research strategies implies the adoption of assumptions that there is an objective social reality waiting to be found, independent from researchers; in other words, the aims of quantitative approaches are inclined to describe the external world as a static picture, where an individual's diverse interpretations of situations are replaced with reduced concepts and indicators in order to access a definitive reality (Bryman, 2012). In contrast to quantitative methods, for researchers

who consider the phenomenon being studied as a result of *how* people understand the world, as well as an ongoing process rather than a static picture, qualitative analysis represents another perspective. In this way, an individual's point of view cannot be simply replaced with indicators; instead, the qualitative approach reflects on contextual understanding of social phenomena, along with the contextual depiction of social settings or environments (Bryman, 2012).

Common qualitative research methods in Foucauldian approaches or ANT include ethnographic observation, and the collection of documents and interviews. For example, in a study of university rankings' impacts on law schools (Sauder and Espeland, 2009), interviews as well as the development of a financial theory were used as data resource (MacKenzie, 2008). In cases of knowledge formation about the earth's composition (Latour, 1999) and the behaviours of scallops (Callon, 1999), ethnographic observation was the main resource used to gain data. Several studies, like Pasteur's discovery of microbes (Latour, 1983), Foucault's works on sexuality (Foucault, 1978), Rose's research about the emergence of psychology (Rose, 1979), and Hunter's research on the emergence of literary education (Hunter, 1988), were developed on the basis of historical documents.

Back to my research questions (A) and (B)—there are two targets: the procedures of problematisation and subjectification of accountability in academy and the process of translation by which bibliometrics are taken as the solution to the chosen question. Because these processes do not take place in a fixed location, ethnographic observation may not be practical for accessing empirical data. Some of these processes took place in the past, while some are still ongoing. For those in the past, the collection of historical documents can be used. For those still ongoing, both documentary data and interviews can be utilised to gain a contemporary account. For research question (C) and (D), aimed at gauging the influence of academic audit on scholars' academic everyday practices, it might be less pragmatic to conduct a long-term ethnographic observation, due to two reasons. The first reason is that a whole research project in academy – from consideration for a proposal to publication – can take a long time. The second reason is because access to the spaces (laboratories, fields, scholars' offices, or committee meetings) where these activities take place may

be unavailable. Otherwise, interviews are suitable for a researcher to access individual beliefs, values, attitudes and recognitions which might not be available by methods of focus groups or surveys. It also allow the research to use time efficiently in studying a broad range of people, especially when the time for interviewees is also limited (Taylor and Bogdan, 1998). Taken together, to investigate how the existence of bibliometrics produces impacts on scholars' practices, semi-structured interviews may be able to provide autobiographical accounts of continued experience over time as an object of administrative measures and the implementation of power. This autobiographical aspect of interviews may offer an appropriate approach to observe how the technique of power modifies a subject's behaviour and identities to self and society.

Overall, to remain consistent with this project's position in ontology and epistemology, qualitative methods are used to conduct empirical data collection. In general, I use the idea of controversy analysis in the ANT sense to model research objects, providing a panoramic view of debate on academic evaluation. Semi-structured interviews and documentary collection are the main methods for acquiring empirical data. To discover conditions of problematising academic practices, frames of Foucauldian discourse analysis will be adopted. To explore the process of translation where the language of neoliberalism is adopted in academy gradually and bibliometrics becomes a criterion to judge scholars' productivity, critical discourse analysis will be used. More details of these methods are presented in the following sections.

4.1. The analysis of controversies

In this section, I attempt to provide a frame to acquire valid knowledge of this topic: the establishment of bibliometrics' power. To answer the first research question (How have bibliometric measures become necessary to assess academic excellence?) is to study procedures of how the discourse of bibliometrics is deployed in aspects of everyday academic life. By a number of previous studies, ANT scholars have developed a framework to explore this mechanism: controversy analysis.

Based on the insight of ANT, since the mechanism of power is rooted in networks

related to ways actors understand their own positions in the world, a successful exercise of power should be seen as a successful formation of networks among participants on the basis of a temporary consensus, which is established by a series of mediators. However, when the successful network works, its passage becomes so smooth that people regard this process as taken for granted, as a background (Moser and Law, 1999). Therefore, a possible way to explicate the mechanism of networks and translation is to follow cases of innovation, controversies, breakdowns, accidents, extension to new contexts, or historical records (Moser and Law, 1999, Latour, 2005, Adams and Thompson, 2011). In a similar vein, because the practice of power is often legitimised by knowledge in the name of truth that then seems self-verified, one practical strategy to observe the exercise of power is to investigate an extreme case where the linkage between power, right, truth, and knowledge is not as strong as others (Foucault, 1980). Hence, the case of controversies can offer a pragmatic opportunity to elucidate how knowledge is settled, as well as how power operates.

From there, a methodological challenge emerges. Is the case of the introduction of bibliometrics into research evaluation a controversy? Is this controversy visible enough to be followed as a feasible occasion for exploring the mechanism of power? To answer this, it is necessary to review what the features of controversy are. According to Venturini (2010), "controversies are situations where actors disagree...controversies begin when actors discover that they cannot ignore each other and controversies end when actors manage to work out a solid compromise to live together" (p. 4). In a controversy, not only are human groups involved in this debate, but also non-human elements participate in this conflict; in addition, while the controversy is ongoing, the composition of alliances and opposition changes dynamically (Venturini, 2010). Moreover, because different actors often disagree with each other's presuppositions, it may be difficult to reduce the controversy to one single resuming question; sometimes even the major issue cannot be distinguished clearly (Venturini, 2010). From this approach, Venturini (2010) provides a practical principle to avoid inappropriate situations of controversies that are less feasible for researchers to explore, such as cold controversies with only a few debates, cases that are already past and resolved as a black-box, boundless cases without specific subjects, or underground cases where debates are not available to the public.

In light of the above criteria, the topic of evaluation metrics can be recognised as a manageable controversy for several reasons. First, this issue is open to the public; most relevant literature, such as comments, government notices, academic research, independent reviews, or personal opinions, are published on very public channels, like news, academic journals, books, Internet websites, and blogs. Second, although this is a not very new topic, related debates are still ongoing, and a stable consensus has not been achieved among actors. For instance, in the UK, for the coming REF2021, a series of consultations took place throughout the nation in late November to collect comments, and HEFCE answered the comments in mid-2017 (HEFCE, 2016). Those topics about research evaluation and metrics, such as responsible research and innovation (RRI), a better bibliometric tool, and a better way to apply better bibliometric tools, are still able to provoke a number of concerns in conferences and continue to be published in formats of either journal articles or books, such as *The Metric Tide* (Wilsdon et al., 2015c), *Research Excellence Framework (REF) review: Building on success and learning from experience* (Stern, 2016), *Metric Power* (Beer, 2016), and *Rank Hypocrisies: the Insult of the REF* (Sayer, 2014). Finally, although the topic may link to issues of higher education policy, industry policy, academic autonomy, finance condition, and neoliberalism, its focus is fairly specific rather than being boundless and complicated. Overall, the case of the rise of bibliometrics in the sector of higher education could be interpreted within the frame of controversies, to observe the technology of power via tracing the conflict, incorporation, and spread of discourse, along with the formation of networks.

In order to utilise the ANT framework to analyse the growing technical role of bibliometrics, the first step is to define all relevant actors involved in this system. For this procedure, ANT scholars consider three principles to define the actor: free association, juxtaposition, and simplification (Callon, 1980, Callon, 1999). In terms of free association, since an action is defined as what changes a current state by making a difference, even an object has the potential to be an actor (Latour, 2005). The word juxtaposition means there is no hierarchy of contribution among actors; even if some actors may play a leading role during the formation of networks, the whole system is able to function only while all actors get involved. In other words, every actor is

equally indispensable (Callon, 1980, Callon, 1999). The principle of simplification means that, while studying a topic, researchers merely need to focus and analyse some of the major entities involved in this procedure. For example, in the case of the promotion of electric vehicles, one related administration—Électricité de France (EDF)—can be regarded as the representation of the whole city council, while other departments of the government can be ignored (Callon, 1980).

However, these prescriptions are not ready-to-apply research guidelines for identifying those actors in pragmatic ways. Nevertheless, Venturini develops a framework of cartography of controversies to map all relevant actors and label their interests and arguments with the help of digital tools (Venturini, 2012, Venturini, 2010). In practice, researchers can begin from statements to literature, and then from literature to actors (Venturini, 2010). When the researcher encounters a controversy, the first glance is a mess of statements, including debate, discussions, replies, and technical documents. In spite of these diverse and abundant statements, none is isolated but, rather, is a part of an ongoing dialogue, no matter if it supports or opposes other statements. Therefore the first step of the cartography of controversies is to outline the web of references. Furthermore, based on the web of statements, the observer can figure out the larger web of relations beyond the web of statements and recognise these indispensable elements, such as humans, organisation, artificial or natural objects, and metaphysical entities. From this approach, both the existence of actors and their positions can be drawn out substantially together. However, although digital tools may be helpful to search related documents and to visualise the networks of controversies, discourse analysis will play the main role in exploring the discourses behind the literature and actors. The focus of the following section is a detailed analysis of processes of discourse analysis.

One of the methodological issues is a preference for how to collect information. In general, adopting digital methods is a convenient approach, but it might lead to people over-relying on digital resources and the Internet, considering the fact that not all data are recorded in digital formats and not all digital data are available on the Internet (Venturini, 2012, Marres, 2015). Clearly, an excess of dependence on the Internet and digital recourse will lead to sampling bias. Hence, to avoid sampling bias, it is

necessary to include information resources in the format of papers, such as newspapers, magazines, state archives, and autobiographies. Another methodological challenge is the personal bias of researchers. Even though the principle of ANT recommends that observers treat all actors impartially, no one is able to escape from their origins entirely. As Venturini (2010) argues, one possible way to gain 'objectivity' and to prevent researchers from personal bias and sampling bias is to utilise multiple methods for data collection, such as interviews, archives and accumulating documents. By multiplying points of observation, more accounts of discourse can be reached. I turn to detailed processes for interviewing in the next section.

In summary, I regard the application of bibliometrics into the sector of higher education as a case of controversy. To illustrate networks behind this phenomenon, I adopt the analytic framework of controversy mapping in the light of ANT. To collect actors' narratives and opinions, literature (such as documents, news and magazines) and interviews are the source of data.

4.2. Discourse analysis

What does 'discourse' mean in this thesis?

Since Foucault's works on the notion of discourse were published, the term discourse has been utilised widely in several academic fields, such as sociology, culture study, psychology, and political science. Considering that Foucault does not leave a strict methodology for discourse analysis, while the concept of discourse is broadly applied in various contexts, ways to implement discourse analysis have become diverse, and the meaning of discourse has also become ambiguous. Hence, before the framework of discourse analysis is settled on, it is necessary to define clearly what kinds of 'discourse' I attempt to explore in this study.

According to Hall (2001), the term discourse, in Foucault's sense, is a set of rules and statements that offers a language, as well as governing ways to talk about a specific topic and representing knowledge about this particular object at a specific period. In other words, "[d]iscourse is about the production of knowledge through language" (Hall, 2001, p.72). Discourse plays a role not only in defining the object of knowledge

but also in offering acceptable ways of conducting the knowledge about the particular topic. In addition, because knowledge is constructed within discourse, the knowledge about the particular object is only meaningful within a terrain of discursive practices. For example, knowledge about madness or hysteria would neither make sense nor be regarded as objective outside the historical contexts of the birth of the modern medical clinic. In Hall's words, "[t]he concept of discourse is not about whether things exist but about where meaning comes from" (2001, p. 73).

On the basis of Hook's understanding of Foucault, discourse, as a conceptual realm where knowledge is produced, functions in ways of constraint and formation, reinforcing and renewing, and inhibition and production; it renders some ways of thinking, talking, and writing impossible or inappropriate, whereas it provides other frames to produce knowledge (Hook, 2007). Through the mechanism of exclusion, selection, and domination, discourse is constituted by – but also simultaneously reproduces – the contemporary social system (Hook, 2007). This property of discursive practices indicates that the role of discourse is strongly related to the exercise of power. In the previous section, it is shown that the exercise of power is involved in procedures to produce knowledge, while the implementation of power to an object is also dependent on the foundation of knowledge about the object as a knowledge/power complex (Foucault, 1980, Foucault, 1978). Hence, discourse, as a group of procedures that constitutes and is composed of "will to knowledge", should be seen not only as something initiating power and action but also as a form of power and action itself (Hook, 2007).

Without denying the existence of grand sovereign power, like the state or the law, what interested Foucault is the practice of power that permeates deeply through society: the micro-physic of power (Foucault, 1979). In practice, the target that the micro-physic of power attempts to manage is the social body (Foucault, 1979, Hall, 2001). Certainly, what the body means within discursive formations is more than the natural body. With knowledge about the object and the deployment of apparatuses, the body becomes a manageable subject through being divided, classified, and normalised. In this way, the discourse I analyse is the set of procedures that produces knowledge about the object of being governed in academy, which I name as the

Academy.

In summary, the contents of discourse, in light of Foucault, are more than the set of language, images, meaning, and statements. The idea of discourse includes material and institutional circumstances that construct a contextual place where statements about an object are produced. Moreover, relations between knowledge and power also play an indispensable role in discursive practices.

What should Foucauldian discourse analysis look like?

Along with the definition of Foucault's discourse, scholars have provided some suggestions about what an appropriate frame of Foucauldian discourse analysis should look like. As Hall (2001) argues, elements for a study of the discourse of X would include (1) statements about X: a certain kind of knowledge about this object, (2) rules that permit and exclude certain ways of talking about X at a specific historical period, (3) the subject with the attributes of X that people expect the subject to have, (4) the process of the knowledge about X acquiring authority and then making itself come true, and (5) institutional practices to manage the subject. In *Using Foucault's Methods*, Kendall and Wickham (1998) explore several aspects for carrying out Foucauldian discourse analysis, including the notion of machinery by which statements are produced, the reorganisation of the rule that delimits what can be said and what cannot, the identification of the spaces where new statements can be produced, and the emphasis on material practices as well as discursive aspects.

According to Hook (2007), one methodological imperative for Foucauldian discourse analysis is to replace the will to truth with the will to power. Because a well-established discourse tends to warrant itself as a true explanation for the development of the knowledge about the subject of X, the primary notion is to re-politicise or eventualise this self-warranting and self-evident account of the discourse in order to make the discourse visible. However, the aim of discourse analysis here is not to establish another counter example, nor to reveal another undistorted truth, but to prove that the truth is just a conditional answer and the production of the exercise of discourse and power (Hook, 2007, Hall, 2001). While discourse here is seen as an event where very different origins of discourse have been merged, a robust discourse

analysis should rediscover connections between discourse and the operation of power-interests. This is the principle of reversal. In a similar vein, along with the post-structuralist concept of discourse and power, Howarth (2010) indicates that a critical study of policy needs to pay attention to the emergence of an issue and focus on the practice of problematisation. Researchers should remain suspicious of current explanations for problem definitions and question the construction of a specific issue in a particular historical moment; that is what Howarth calls "to problematise these problematisations" (2010, p.325).

For example, in Rose's paper *The psychological complex: mental measurement and social administration* (1979), by analysing the publications of intellectuals, he points out that the construction of the psychological is constituted with the notion of being mentally defective (in terms of the discourse of eugenics) in America, which is a part of the political project concerned with the good order of population and strategies of control. Moreover, the Darwinian theory of normal variation and population was engaged in the development of scientific mental measurements to classify and normalise individual differences in more systemic ways. Thus, with the deployment of apparatuses, such as law, education, medicine, and techniques of mental measures, the quality of citizens could be identified accurately, and the future of the nation could be guaranteed from degeneracy. In this sense, the emergence of psychological knowledge is not merely the birth of an academic discipline but a reconstruction of society. For Rose the establishment of psychological knowledge rests on "a complex series of struggles and alliances between distinct discourses organised into various strategic ensembles" (Rose, 1979, p. 58). In another instance, in Hunter's book *Culture and government: The emergence of literary education* (1988), based on Foucault's notion of genealogy, he argues that the emergence of modern literary education, contracting general assumptions, did not lie in the reconciliation between aesthetic culture and the logic of society, and therefore it does not function as a vehicle for people's cultural completion. In contrast, by documentary analysis, Hunter argues that there are two historical events involved in the establishment of literary education from the late 18th century: Christian Sunday school and new administrative apparatuses. On the basis of Christian philanthropy, the former aimed to keep children from the street with pastoral concern for individual souls and new techniques for moral surveillance, such as open-

plan classrooms and playgrounds with good sightlines; the latter was driven by the government's social investigation concerning health, literacy, emotional sentiments, and criminal propensities, and aimed to enhance the well-being of the population (Hunter, 1988). In this context, popular education emerged as a part of social welfare, and modern literary education was formulated as a cultural practice to transform personal attributes for moral improvement.

According to Arribas-Ayllon and Walkerdine (2008), the Foucauldian analysis of discourse would include three dimensions: (1) historical inquiry, aimed at the event that altered relations to X by the formation of the knowledge about X, (2) a power mechanism that acts upon individuals' actions by producing identities and relations, and (3) subjectification with the notion of material practices by which the subject is embodied. In addition, Arribas-Ayllon and Walkerdine (2008) also provide flexible guidelines for Foucauldian work. For the first step, the selection of text samples considering Foucault's historical interests in discontinuity and relations to present temporal variability must be considered, but only when the chosen corpus of statements about subject X is so historically variable that considerable differences in the ways of talking about X from now to the past can be shown. According to Arribas-Ayllon and Walkerdine (2008), the genres of text that can be selected as suitable samples include political discourse, such as policy documents, official reports or white papers, records of parliamentary debates and press releases, expert discourse (for instance, intellectual texts and academic publications) social interaction (including naturally occurring talk), group discussions, and semi-structured interviews. The second stage of discourse analysis turns to an emphasis on the process of problematisation: asking in which kinds of circumstances and by what kinds of material practices has one attribute of humans become problematic, and by what kinds of material practices has the problem become thinkable and manageable? After that, the focus of discourse analysis shifts from text level to technologies of power and apparatuses, such as measuring devices, assemblages of knowledge, institutions, and architectural arrangements.

There are various ways to implement a project of discourse analysis, but not all of these approaches are exactly in line with Foucault's conception of discourse. By the

term discourse, what interests Foucault is the set of systems, rules, and procedures that governs and produces knowledge. Hence, the composition of discourse in Foucault's sense, unlike semiotics, should include both linguistic practices and non-linguistic practices. Foucauldian discourse analysis with its focus on the materiality of knowledge is about more than the use of language. This is methodologically different from those text-oriented approaches of discourse analysis. As Hook (2007) claims, those frames of discourse analysis which turn to texts are inclined to define the concept of discourse as a group of statements, images, meanings, and representations but pay less attention to material conditions and institutional practices. It is true that, through language use, discourse implements power and action, but the essence of discourse itself is an investigation into power and action (Hook, 2007). Some text-based discourse analysis attempts to incorporate practices with linguistic practices. Nevertheless, without due awareness of the exercise of power, text analysis is not able to incorporate the extra-textual practices (Hook, 2007). Taken together, in Foucauldian analysis, discourse should not be reduced to text or language alone and the tendency to prioritise the role of language should be avoided.

In summary, I apply Foucauldian discourse analysis to investigate the procedures that produce statements and knowledge about academic activities and render the academic activities subject to power (Research Question A), and to illustrate the role of bibliometric measures in the subjectification of academic practices (Research Question B). This analysis begins by the selection of related statements, such as political discourse and expert discourse about the ideal image of higher education in different periods in order to trace conditions of what counts as a true explanation for knowledge about the Academy. The goal of documentary analysis here does not focus on the content of this knowledge itself or ways of utilising language. With the notion of problematisation, the birth of knowledge about the academy is not considered linear, inevitable, progressive, or a continued process but a contingent event whose necessary conditions need to be meticulously explored as a core issue. As Foucault (2002a) advises, when studying the history of ideas, thought, concepts and knowledge, researchers should pay attention to the phenomena of rapture, the break from original motivations, new types of rationality, displacements and transformations of conceptions instead of continuous chronology of reason. In Foucault's words, the

notion of discontinuity is meant to individualise “different series, which are juxtaposed to one another, follow one another, overlap and intersect, without one being able to reduce them to a linear scheme” (p. 9, 2002). Therefore, in my chapter featuring documentary analysis, I will trace the developments and discontinuities of ideas behind relevant policies instead of chronological timelines. As mentioned in previous discussion, textual analysis is just a part of the Foucauldian analysis. In parallel with linguistic practices, I also pay attention to non-linguistic practices, such as the deployment of administrative measures, instruments, spaces where relevant statements about universities are generated, and institutions are dealing with the subject of academic behaviour.

How do I adopt the approach of critical discourse analysis?

From the 1990s, several scholars have developed a theory of critical discourse analysis to investigate changes in culture, society, and politics through analysing usage of language (Fairclough, 2001, Fairclough, 1993, Fairclough, 2012, Hyatt, 2013a, Hyatt, 2013b). Several empirical studies about education policies are also conducted on the basis of the critical discourse analysis framework (Hyatt and Meraud, 2015, Wodak and Fairclough, 2010). The theoretical principle of critical discourse analysis is to take language as ‘a site of struggle’ over power, where practices of language reflect the dialectical relations between social structures and agents. The aim of critical discourse analysis is to investigate how texts represent as well as construct social worlds and to study changes in social transformations by analysing the structure of language.

According to Fairclough, a social practice includes the following elements: semiosis, activities, social relations, social identities, cultural values, time, and space. These elements have distinct characteristics, but they are dialectically related and not entirely discrete from each other (Fairclough, 2001, Fairclough, 2012). For example, cultural values, activities, social relations, and social identities are involved in properties of semiosis, but this does not indicate that the role of semiosis can be reduced to cultural values, social relations, and social identities; the character of semiosis cannot be researched in the same ways as the property of social relations (Fairclough, 2001, Fairclough, 2012). Language use, either in spoken format or

written formats, is also one of social practice. This implies that, as a mode of action, the usage of language is dialectically related to other social elements. By the phrase "dialectical relationship to other social facets", Fairclough argues that the practice of language is shaped by but also shapes society in both socially reproductive and socially transformative ways (Fairclough, 1993). These facets of the social here engaged in language use are the system of belief and knowledge, social relations, and social identities (Fairclough, 1993).

What does the word discourse actually mean in the frame of critical discourse analysis? In Fairclough's conception, there are two definitions for the term discourse—the abstract uncountable one and the countable one; discourse as an abstract noun means the usage of language as a social practice, whereas discourse as a countable noun represents particular ways to signify experience based on a specific conception (Fairclough, 1993). According to Fairclough (2012), the meaning of discourse(s) is composed of imaginaries: a representation and belief of how the world works and how things should be, which is also named "figured worlds" by Gee (2014). Discourses as imaginaries can be materialised if the ways people identify, act, and interact are enacted based on these imaginaries.

Following this understanding of discourse(s), the next important concept in this analytic frame is genre: a specific way to use language in a particular social activity (Fairclough, 1993, Fairclough, 2012). There is variability in the semiotic aspect of different discourses, resulting in various diverse genres of structuring texts. However, not all language practices are purely generated by one genre, especially in the case where a dominant discourse is spreading into other fields, resulting in the interdiscursivity of language. The usage of language as a kind of social event is composed of the power of social structures and the effect of agents. Hence, the selection of different genres or styles in language reflects how social structures influence agents' ways of incorporating different genres to produce a text (Fairclough, 2012). Along with the notion of linkage between the semiotic aspect of the social practice and other elements, including social relations and identities, the result of textual analysis also reveals the changing states of the social structure and dynamic interactions between various ideologies. That is, from text to context. In this way, the

interdiscursive analysis plays a central role in critical discourse analysis. On the basis of interdiscursive analysis, the aim of critical discourse analysis, in Fairclough's words, is:

to systematically explore often opaque relationships of causality and determination between (a) discursive practices, events, and texts, and (b) wider social and cultural structures, relations and processes; to investigate how such practices, events, and texts arise out of and are ideologically shaped by relations of power and struggles over power (Fairclough, 1993, p. 135).

The theoretical position of critical discourse analysis is quite different from Foucauldian discourse analysis, although Fairclough cites a number of Foucault's works and adopts several of Foucault's terms, such as discourse, discursive practice, and order of discourse. One of the major differences in the two frames of discourse analysis is their position on ontology. As Fairclough (2012) claims, his theory draws on realist social ontology, which treats social structures as social reality. This ontological position is fundamentally different from Foucault's constructionist basis. However, even Fairclough's argument that social practices are shaped by society but also constitute society seems closer to constructionism than to realism. Social structure in the realist sense should be totally independent of agents and not dialectically related to social practice. Moreover, as Hook (2007) points out, the concept of discourse in light of Foucault is more than a collection of meaning, images, language, or statements. By this criterion, Fairclough's concept of discourse, either as an abstract noun or a countable noun is rather text oriented and differs from Foucauldian understanding of discourse. For instance, in Fairclough's definition, the term "discursive practice" means "the production, distribution and consumption of a text" (Fairclough, 1993, p.138). In the Foucauldian version, this sentence would be "the production, distribution and consumption of a form of knowledge".

Although the ontological aspect of critical discourse analysis may not be very consistent with this thesis' position on constructivism, its notion of interdiscursive analysis could be a useful tool to explore the dynamic process of translation (Research

questions A and B). The mechanism of translation constitutes a series of negotiations between actors, during which actors' goals may be modified or replaced. In the case of advertisements for academic posts in three universities and undergraduate prospectuses at two different times, Fairclough (1993) shows how the language of market and promotional culture were variously combined with language of academic management in different occasions, reflecting cultural shifts in social identities of higher education. In a similar vein, changes in the usage of language may represent shifts in ways actors identify their interests and situations, transformed by a dominant discourse. Foucault (1991b) also suggests that an aspect of interdiscursive dependences, which mean interactions between different discourse, could be a approach to trace discontinuities. Therefore, I will apply the framework of critical discourse analysis to the controversy of academic assessments for exploring how the discourse of neoliberalism spreads into higher education.

4.3. Semi-structured interview as a method

Following previous discussion, there is more than one way to access actors' interpretations. Therefore, apart from documents that offer a historical account, interviews can provide a contemporary account of, first, research about the condition of problematisation and, second, a question about the procedure of translation. In the meantime, the empirical data gained from interviews aims to inquire if bibliometric indicators play a role in the state's instrument or panopticon in the sense of governmentality and reshapes academic practices via self-discipline. In summary, the section of interviews aims for access to both discourse and accounts of academic activities. Because there are already several clear focuses in this study rather than very general notions, the format of semi-structured interviews is selected (Bryman, 2012, Bernard, 2011). After the process of interviews, records were transcribed and translated into English, according to which discourse analysis will be carried out, as mentioned in the previous section.

There is a methodological challenge to couple changes in knowledge production with environmental factors, such as bibliometric indicators, in this case. In other words, even if both changes in academic activities and the bibliometric measures indeed exist, it is necessary to justify the causal relationship between them. I argue

quantitative approaches are not a suitable research method for studying changes in knowledge production. First, because academic communities continue to proliferate, numbers of academic publications as well as journals have also kept growing since the mid-18th century (Liu, 2003, Bornmann and Mutz, 2015). This growth trend had existed before the rise of the neoliberalism movement in the 1980s. This background of chronic growth in volumes of knowledge infers a difficulty in selecting a control group for quantitative studies. Some researchers utilised various universities which adapted different policies under the same pressure, as a form of comparison, to distinguish subtle impacts of evaluations and fund distribution systems by bibliometric analysis (Butler, 2003a, Butler, 2003b). Some scholars applied bibliometric analysis for researching changes in publishing formats and languages after exercise of competitive fund allocation (Hammarfelt and de Rijcke, 2014). Some used citation analysis to explore increasing inequality between highly ranked universities and lower ranked universities, under the circumstance of competition-based research funding systems (Münch and Schäfer, 2014). These studies attempted to justify causal links between publishing patterns and policy environments through bibliometric analysis, but their approaches are less likely to account for changes in the contents of knowledge itself. Even if bibliometric analysis can clarify relations between the quantity of knowledge produced and policy, it is difficult to illustrate epistemic properties of research content by bibliometric analysis. Some researchers attempted to build a link between academic management and epistemic properties of research content by using questionnaires (McNay, 1997, Talib, 2000, Talib, 2001). However, the inherent variety of opinions and epistemic properties cannot be entirely reduced from agreement to disagreement.

To resolve this issue, several researchers attempted to categorise the ‘epistemic properties of research content’, including but not limited to characters of innovation, diversity, mainstream versus non-mainstream, contextualisation versus generalisation, basic research versus applied research, personal interests versus policy needs, risk-taking, methodological approaches and interdisciplinarity (Gläser et al., 2002, Laudel and Gläser, 2014). Gläser and Laudel (2015) develop a diachronic analysis of knowledge production, which incorporates the visualisation of bibliometric analyses with in-depth interviews. In order to identify trends and changes in research trails

during scholars' careers, the first step of this informed interview is to create a graphical representation of a researcher's oeuvre (Gläser and Laudel, 2015). The bibliometric reconstruction of academic practice begins by reviewing the interviewee's CV or websites for the list of publications and then gathering records of these works from the Web of Science (WoS), followed by calculating the strength of relations among these publications via "bibliographic coupling" (Gläser and Laudel, 2015). Because it is very possible for two publications to focus on similar research topics, if an assemblage of the same references is cited in both of the publications, the strength of thematic connections is conducted by comparing the ratio of shared references of two publications (Gläser and Laudel, 2015). Taken together, both the clusters of publications that share similar academic interests and the importance of publications in terms of citation numbers are visualised in chronological order to present the change in research practice of individuals (Gläser and Laudel, 2015). In this way, the above qualitative method would be a suitable way to delineate links between the policy environment and individuals' academic practices.

During the process of interviews, based on the diachronic visualisation of previous publications, interviewees are invited to narrate their history of academic research and careers. To gain accounts of changes in themes, discussions will focus on the separation of project clusters, which implies significant turns in research topics, and will explore all the reasons for these shifts, such as personal interests, career plans, group leaders' interests, requirements for instruments, government policies, or trends of the academic community (Gläser and Laudel, 2015). Even though some of these reasons might not seem obviously relevant to bibliometrics (for instance, personal interests, cooperation, or the graduate requirement for students), through further analysis of these, we may be able to find some subtle linkages to bibliometrics and to explore how the role of the bibliometric is embedded and pervasive in academic life. In this way, it would be possible to account for changes in academic practices within the interview-based approach.

Finally, I have to state my epistemological position toward knowledge produced through interviews. Overall, this analysis takes an interpretivist approach to align interview data in accord with previous theoretical discussion. According to

Foucauldian constructionism, all genres of knowledge are considered representations of the world rather than the world itself. Secondly, Foucauldian discourse analysis aims to illuminate conditions of truth instead of revealing the hidden truth. Hence, I will take narratives collected from interviews as a range of interpretations of academic worlds. The practise of interviews, as a means to access interviewees' beliefs, values and opinions, aims at ways of interpreting higher education and the milieu within which these interpretations are formalised. This thesis does not focus on if these accounts accurately match academic reality. Conversely, it pays attention to linkages between various imaginaries, subjective interpretations and practices. This is because reality is enacted by practitioners when they act according to their understandings of their roles in the world. Therefore, interviews in this study are composed of two phases: images of ideal higher education and interviewees' academic practices.

5. Research process

5.1. Data collection

| | Means | Aims |
|--------|----------------------------|---|
| Phase1 | Collection of documents | Controversy mapping Foucauldian discourse analysis for conditions of a form of knowledge formalising Critical discourse analysis for the process of ongoing translation |
| Phase2 | Semi-structured interviews | Contemporary narratives for images of academy Autobiographical account of academic daily practices |

Figure 1. Table: Data collection and process

The process of data collection in this research consists of two phases: document analysis and qualitative interviews. The first phase of data gathering aims to map a primary web of literature and, thus, to identify relevant actors. After that, I analyse trends in actors' arguments about the role of the university and bibliometrics and changes in actors' understanding of interests of research through the approach of interdiscursive analysis, that is, the procedure of translation. The final goal of the document analysis is to scribe the historical surface where the issue of academic

assessments emerged and the Academy is produced.

Documents for controversy-mapping and critical discourse analysis include debates on the following relevant topics: reasons to use or not to use the bibliometric indicator, such as SCI or SSCI, the importance of academic autonomy that may be eroded by the state, the notion of a more stressful research environment, the inevitability of marketisation of the public sector, the responsibility of the university and academic research for society, the responsibility of the government for the university, demands for accountability and transparency in funding distribution, value for money, the notion of knowledge-based economy, the unintended results of these policies, suggestions to improve current proposals, and conflicts between globalisation and localisation in terms of universities' goals, and so on. The types of historical documents for Foucauldian discourse analysis, as Arribas-Ayllon and Walkerdine (2008) suggest, may include expert discourse, like academic publications or intellectual texts whose topics are related to the role of universities, and political discourse, including policy documents, press releases, government reports, and records of parliamentary debates.

In the work of Foucauldian discourse analysis, documentary analysis is just one aspect of discourse, followed by exploring the role of material conditions and institutional practices, such as the discussion in the previous section of Foucauldian discourse analysis. Informed by the result in a previous phase, semi-structured interviews continue to study contemporary discourses about the functions of higher education. In addition, the in-depth interviews with the diachronic approach, a visualisation of the interviewee's previous publications, will be conducted to further explore how actors' interpretations of academic audit and bibliometric devices affect their scholarly practices.

5.2. Selection of cases

The main field of this study is Taiwan. Hence, it begins with a brief introduction of Taiwanese academic bureaucracies, followed by detailed standards for selecting cases and collecting data. In Taiwan, there are two channels for research evaluation and funding distribution. Nominally, universities are governed by the Ministry of Education, which exercises department evaluation annually and allocates funding for

the cost of maintenance, such as expenditure on staff, water, and electricity. Even though the department or university supplies some research grants to researchers, the main resources to conduct a project or to maintain a laboratory come from the Ministry of Science and Technology, which is in charge of the national development of science and technology. For instance, as Figure 2A shows, in 2014, Taiwan's R&D expenditure on higher education is 1.5 billion US dollars, and government funding represents 83.1% of the total budget (Ministry of Science and Technology, 2015). Among the government budget, as Figure 2B shows, 77% is from research councils, and 23% is from general university funds (Ministry of Science and Technology, 2015). In terms of research council funding, half of the government's direct research budget is controlled by the Ministry of Science and Technology, whose amount is twice the budget of the Ministry of Education and the sum of other research councils, indicating that the Ministry of Science and Technology plays the leading role in the distribution of research resources.

Research proposals are accepted and examined by panels of the Ministry of Science and Technology every year, and the period of each project usually varies from one to three years. Applicants can be either individuals or teams, and application forms are composed of research proposals, resumes, intellectual property lists, publication lists, and a table to illustrate five significant recent publications with explanations and additional information, such as citation numbers and impact factors. There is a high-positive correlation between publication numbers and approval but not a linear formula. Compared to the evaluation frameworks of other countries, one noticeable characteristic of Taiwan is that the basic unit to be evaluated is that of individuals or teams, not departments or universities (Figure 3).

As mentioned in the previous section, documentary analysis and interviews provided the main approaches to collecting data. For document analysis, I searched relevant literature written or translated by Taiwanese scholars or intellectuals. Their formats include blog articles, magazines of education, or pop-science, newspapers, speech records, meeting records, official documents, books and interviews. For interviews, the genre of my interviewees includes researchers, policy-makers, department managers, and members of evaluation panels. Between the government and individual

scholars, academic institutions may mediate to achieve the government's aims by affecting scholars' selection of problems, methods, or collaboration (Gläser et al., 2002). Hence, although assessment in Taiwan is on the basis of individual projects rather than a whole department or university, the influence of organisations on academic activities should still be considered, such as roles of heads or deans. For a group of researchers, to explore the effect of generation, gender, and position, interviewees are selected based on variation of age, gender, and position (post-doctors, assistant professors, associate professors, and professors) to obtain comprehensive accounts.

Interviews with researchers were conducted in four disciplines of natural science, engineering, humanities and social science for comparing the differences and similarities of the impact of bibliometric measures via academic evaluation across different areas. In the group of natural science, biomedicine fields were chosen for two reasons. First, biomedicine fields are flourishing disciplines in Taiwan and are reputed to play an active role in industrial development in many other countries also. Second, although the demand for expensive big-science facilities in biology is not as much as that for high energy physics; the regular cost of maintaining a laboratory (stocking consumables and chemical reagents, for instance), is considerable, so it is very difficult to keep a laboratory working without external funds. With very similar situations, the field of material engineering was chosen to represent engineering disciplines. For the group of social science, researchers from the discipline of sociology were chosen as representatives. Because their concerns for study subjects could vary from domestic issues to international topics, it is worth observing if the application of the bibliometric tools in resource distribution affect the process of choosing the themes and the channels for publication. History scholars were chosen to represent the humanities where the format of intellectual outputs may even be too diverse to be standardised by bibliometrics, but which is nevertheless still subject to the mechanism of academic research evaluation.

It is important to give an account of how my interviewee sample was selected, in order to address the issue of representativeness and validity. As this thesis follows a qualitative approach, this sample does not aim to achieve a statistical

representativeness, but was chosen to illustrate the richness of the social world that I attempt to explore. Hence, my selection of interviewees aims to be representative in terms of gender, career position (professor, associate professor and assistant professor), regions, and university types. By the term ‘university types’, I mean comparisons between state universities and private universities; between private universities funded by the religious sector and by enterprise; between research universities, normal universities, and technology universities; and between established universities and those created after the Education Reform. A snowball method was used. I began my interviews by approaching academics I had known, or who were introduced via my colleagues in academia. Following this, some interviewees suggested other potential interviewees, or introduced me to their contacts when possible. Meanwhile, I also made contacts with scholars to address the aim of representativeness I have outlined above. For instance, if my gatekeepers and interviewees introduced by the gatekeepers consisted of professors, I would attempt to recruit more associate professors and assistant professors for the remainder of the interviews. Nevertheless, this goal of academic diversity and variety in universities may not be always achieved in a static sense. In order to reach a richness of viewpoints, when analysing interview data, I would weight a singular stance, and present one narrative from among those expressing similar views.

5.3. Interview design

In order to answer my major research questions – (A) how have academic practices become an object of knowledge and power? (B) how has the bibliometric measure become necessary to assess academic excellence? (C) Can the neoliberalised university best be understood as through notions of governmentality? (D) Are bibliometric measures an aspect of governmentality? – interviews included four main topics: (1) scholars' images of ideal higher education, (2) factors involved in the process of research design, (3) experiences of being assessed or assessing, and (4) detailed publication strategies. The first topic – scholar's narratives about what the university should be – may partially reflect current discourses about the ideal model of higher education and academic practices by which we may be able to explore how the Academy is constructed currently and how bibliometric measures gain the authority to be embedded in academic assessment. The other three topics: factors that affect research agendas, personal stories of assessments, and mundane publication

strategies might account for the role of bibliometrics as one genre of apparatus in the Foucauldian sense.

Demographic information about interviewees is shown in Figure 7-9. Detailed interview questions were adjusted according to genres of interviewees, such as researchers or assessors. As mentioned in the section of methodology, along with directive discussion, this semi-structured interview includes another part of informed interviews, during which interviewees are shown their own graphical representations to launch narratives and memories (Gläser and Laudel, 2015). These graphical representations of interviewees' publications were used to help interviewees describe what factors were actually involved in their academic careers, especially in the case of topic discontinuity. With this approach, it is possible to demonstrate whether forms of knowledge production are influenced by the application of the bibliometric measurement as an instrument for governmentality.

5.4. Ethical considerations

Before conducting research, it was important to consider how I could reduce potential harm which might otherwise happen to respondents either during or after the interviews. In other words, ethical requirements must be met. During the first and second years of my PhD study, I attended several relevant workshops to become more familiar with ethical considerations. Prior to my fieldwork in 2017, I submitted an ethics form to the ethics committee of Goldsmiths, University of London. This research proposal was carefully evaluated and then approved by the ethics committee in terms of research design, consent forms, information sheets, data storage, safety and interviewee anonymity.

All respondents were clearly informed of the purposes of this study, as well as their rights as participants. Before each interview, an information sheet was shown to participants, which stated that this interview procedure must be engaged in on a voluntary basis, and that respondents had the right to withdraw from the study either during or after the interview. After that, participants were given a consent form, which contained my contact details and affiliation, to indicate their agreement to being recorded. Both the information sheet and the consent form were initially written in plain English in order to be reviewed by the ethics committee of Goldsmiths. Because

all interviewees were professional, the documents were presented in English, but I explained the details carefully in Mandarin to the interviewees. All participants kept a copy of the information sheet and consent form.

As the potential pool of academic interviewees is quite small for this study, I decided to completely anonymise all case studies and to remove identifiable information as much as possible. In order to avoid the possibility that respondents could be traced through their quotes, direct quotes through this thesis do not include real names. Meanwhile, during interviews I avoided mentioning who I had interviewed previously, in order to abide with the principle of anonymity. It could be difficult to offer complete anonymity, because the interviewees might know each other, this is true particularly when using the snowball technique. All transcriptions and audio records are securely stored in my cloud space which can only be accessed by a password known only by me. After this study project is finished, the audio records will be deleted permanently. The above means were utilised to ensure that no harm was done to my respondents.

6. Reflexivity

As this thesis does not adopt the positivist approach, positions of researchers are not deemed as neutral, objective or value-free, engendering no interference with research objects. Instead, knowledge engendered from investigations is considered as a research product resulting from interactions between the researchers and studied targets (interviewees, for instance). Its contents are influenced by both research methods and researchers' sociocultural contexts. Hence, it is necessary for researchers to reflect on their roles in generating such knowledge, which allows readers to interpret the political implications behind the researchers' accounts (Seale, 2004, Davies, 2012). The previous section has articulated the role of research methods in epistemic character of investigations. In this part I will focus on my own role as a participant and interviewer in the process of interviewing.

I completed my bachelor's and master's degree in two so-called top universities in Taiwan. After that, I have worked as a research assistant in two second tier universities. My personal experiences and motivation towards these research topics

are stated in the chapters of introduction and conclusion. As this is a critical research study, I do not mean to pretend that I am a value-free observer removed from society. In spite of this, because interviewees may answer what they think they are assumed to express, I did select some neutral-sounding words in my explanations and statements. For example, I utilised influences instead of consequences or impacts; university growth instead of university exploration. Occasionally, few interviewees in disciplines of social sciences humanities were curious about my position on the issue of academic performance appraising. In this situation, I would acknowledge that this study is meant as an exercise in criticism rather than one of admiration of the current systems. Some scholars refused to be interviewed because they considered me as pro-academic evaluation or pro-audit culture.

My networks in academy played the role of gatekeepers in snowballing my sample of interviewees. Meanwhile, I also attempted to contact potential interviewees via email in order to balance distributions of interviewees in terms of gender, geographical regions, positions and university types. In general, as a PhD student in sociology, I was seen as an insider in the eyes of scholars in SSH fields. Because I had been a research assistant in biomedicine disciplines for more than two years and had published papers in SCI-indexed journals, I was considered as an insider for biomedicine scholars. Under these circumstances, interviewees may be comfortable to share their narratives. However, for scholars in engineering fields, I did not seem like a real insider who shared their concerns. As a result, it took longer to recruit enough interviewees within this field. From the perspective of power relations between interviewees and interviewers, it seems like my interviewees, as knowledge producers, did take a vulnerable position. The primary ethical issue is anonymity, especially given that some are quite prestigious within academia. Thus, I distribute information about interviewees across three tables to hide their identities.

The fact that I am a male researcher may affect the gender distribution in my interviewees. In addition, because all my academic mentors and supervisors in Taiwan are male, it may affect the sex ratio in my networks as well. Overall, the ratio of males to females in interviewees is slightly higher than the average in Taiwan. According to the Department of Statistics (2019), the ratio of males to females in social sciences is

6:4, while the ratio in my own interviewees of sociologists is 7:3. For humanities, the ratio is 5:5, while the ratio in my historian interviewees is 7:3. For engineering, the ratio is 9:1, while the ration in my group of material science is 9:1. For natural sciences, the ratio is 8:2. For medicine disciplines, the ratio of males to females 46:54. The sex ratio in my group of biomedicine fields is 9:2.

A consideration of reflexivity enables me to estimate the strengths and limitations of my analyses. In terms of representativeness, the selection of interviewees contained fewer female than male participants. Meanwhile, the ratio of private universities, normal universities, technology universities and those universities established since the Education Reform is below the average. In other words, my selection of interviewees is inclined to represent voices from well-established, state, elite or research universities. This outcome may have been the result of my personal background and networks, as the above paragraphs indicates. The variety in samples differs across disciplines. Because I was more likely to be considered an insider by sociologists and biologists, I was able to approach more participants outside of my pre-existing networks, which meant I achieved a boarder diversity of academic backgrounds in these fields. Conversely, the snowball technique played a more significant role in recruiting interviewees in the areas of history and material science, leading to a less representative sample.

Beyond these demonstrable aspects of representativeness, I would like to point out another aspect of representativeness: a willingness to express opinions. Once, when I interviewed a scholar (Dr A) in a campus café, another scholar (Dr B) we both knew happened to pass by. After the interview had finished, I visited Dr B in his office. “Oh, I saw you interviewing Dr A. He seemed so impassioned!” commented Dr B. This outlines a possible common characteristic of some interviewees: they were people who had something to say. There is another example. Before my interview with Dr C started formally, Dr C suggested: “to be honest, I do not have strong opinions on the current evaluation system, but I know you need this interview”. As a result, the interview with Dr C is one of shortest. This implies that my other participants, to a degree, represent a group of scholars who have relatively intense – and polarised - views on academic environments and higher education policy, either

they like it or hate it. Otherwise, they might just decline my invitation, with Dr C being an exception. It is difficult to estimate the effect of this silent group who do not hold strong views on my research project.

Alongside these limitations, there are strengths to my data collection. First, the selection of participants includes four academic disciplines, which enables this research project to compare various impacts of academic measures on different disciplines. Second, it includes both junior researchers and senior scholars with administrative experience, such as department heads and deans. This empirical data provides opportunities to observe how changing academic environments influence scholars in terms of age range and positions. Third, even though there may be an issue of representativeness, the composition of participants still considers a variety across different interviewees' orientation to the university. In sum, this set of samples signifies academic diversity in disciplines, age range, positions and university orientations.

It is also meaningful to say something about the issue of language. As all interviews as well as documents that I selected for textual analysis were conducted in Mandarin, I play an additional role of translator in this research project. Admittedly, a range of nuances and subtleties of language used are missed during translation. Some selections of pronunciations, vocabularies and grammars represent strongly characters of specific cultural backgrounds, identities and social groups, showing a variety of capacity to deploy symbolic power and cultural capital in the eyes of Bourdieu or Bernstein. If this thesis aims to explore linkages between socioeconomic strata and interpretations of academic values in the scale of individuals, the information missed in translation could lead to significant effects on research quality. Nevertheless, since my research questions focus on whole literatures, broad political configurations and social contexts rather than individual narratives, the influence potentially caused through translation is relatively limited.

Besides the aspect of cultural habitus shown in used languages, another issue of translation is commensurability. Not all Mandarin vocabularies have an accurate counterpart in English. In general, when Taiwanese interviews talked about university

education, most of their ideas and words could be accurately translated into English. Because the modern educational system in Taiwan was inspired by the Western educational system, the high degree of correspondence in vocabularies used to describe pedagogic practices and academic behaviours between these two languages is plausible. There are few vocabularies whose implications can not be translated into English. The first is the term ‘形式主義’, which is broadly used when people mention practices of academic assessments. This term literally means formalism, but it has nothing to do with artistic or literary styles. It expresses the decoupling between face values and contents, or an over-emphasis on appearances as a ritual. Hence, I translate this term into decoupling or formality. The second case is liberal art education. The concept of liberal art education has an accurate counterpart in Mandarin, but its translation of ‘liberal art’ in Mandarin literally means versatile/general knowledge or broadly knowing (通識, the major translation), or extensive art (博雅, the dated translation). Both translations exactly transfer the core concept of liberal art: knowing all knowledge, but lose the implication of being liberal. The third case is the industry-university collaboration (產學合作), which is a stable term in Mandarin. The letter ‘產’ represents not only industry but also production. This makes the term itself seem productive. The fourth case is university (大學), which literally means ‘the great school’ but loses the implication of something universal. In this context, a university entails several colleges to teach abundant genres of knowledge rather than universal knowledge. The last case where I encountered difficulty in translation is the term ‘人才’. This term literally means talent, but not in a sense of genius. This term refers to smart people or quality manpower (labour) with valuable skills in a sense of human resource, but also implies well-educated people in the sense of civilisation. This ambiguous term is often used when people talk about the purposes of a university’s mission

Sometimes I may simplify the translation if I think their contexts are not necessary for my research topics. The first case is tenure check. In Taiwan there are two steps of promotion from assistant professor to professor. Professorship is tenured in general, but there is no difference between promotion and tenure check in Mandarin. Hence, I use the word promotion to describe both steps of promotion from assistant professor

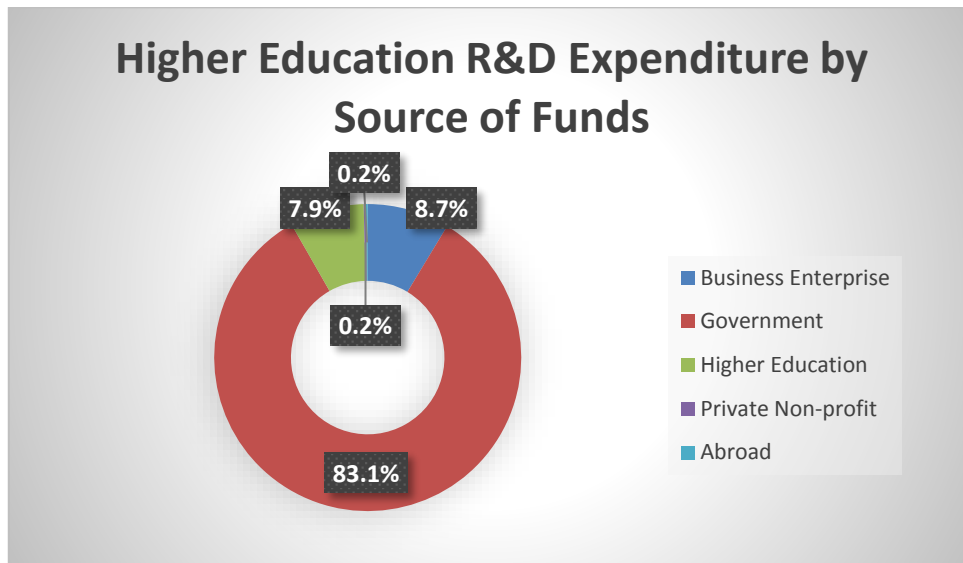
to associate professor and from associate professor to professor. The second case is a monograph. In Mandarin there is no stable term such as monographs, but ‘academic specific books’, ‘special book’ or just ‘books’ which are alternatively utilised in Mandarin. The lack of a term for monographs implies the value of monographs may not be enough to be an independent genre. Nevertheless, I still translate it as monographs. The third example is the term ‘台清交’, which is an abbreviation of three top universities in Taiwan, which corresponds to the British term Oxbridge. This term is frequently used in dialogues when people refer to the first ranked university. I translate it into ‘first tier universities’ as offering this specific context is not necessary.

7. Summary

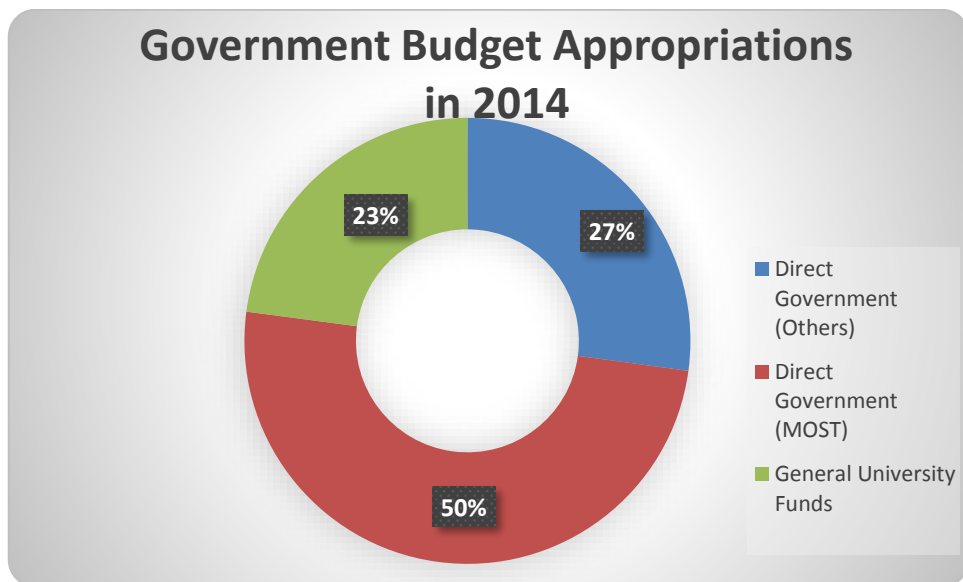
This chapter aims to consolidate theory, research objects, ontology, epistemology, methods, and tools for analysis. In terms of theory, the development of theoretical frameworks is on the basis of Foucauldian conceptions and ANT. As Kendall and Wickham (1998) argue, both ways to see and study the world are problem-oriented, focusing on the notion of problems, procedures of making this problem thinkable, mentionable, and manageable, contingency of emerging solutions, and changes in ways of how people interpret themselves, others, and the world. Along with this analytic approach, my research questions in this thesis emphasise the procedures of how the academy has become an issue and how proposals of academic assessments have been created. In addition, I also pay attention to how the deployment of discourse affects academic practices in everyday life. For practical methods to implement this project, the idea of controversy analysis in terms of ANT is used to model my research objects, and Foucauldian discourse analysis is applied to empirical data from interviews and documentary collection. Finally, one of the empirical study's aims is to deal with a potential conflict between Foucauldian conceptions and ANT. That is the role or agency of actors, which is seen as indispensable and active during the formation of networks in terms of ANT but regarded as less important in terms of employing Foucauldian frames.

Figure 2. Chart: Higher education R&D expenditure

2A



2B



Source: *Indicators of Science and Technology, Taiwan*: Ministry of Science and Technology.

Figure 3. Table: National research funding systems for university

This table refers to Hicks (2012).

| Nation | System | Period | Type | Unit | Agency | Method | Database |
|---------------|------------------------------|--------------------|-------------|------------------------------------|---|--|-------------------------------|
| Taiwan | Project Evaluation | Depends on project | Ex ante | Research unit (individual or team) | Ministry of Science and Technology | Peer review Publication (Impact factors) | WoS |
| UK | REF | 3,4,5,7 | Ex post | Department | HEFCE | Peer review | |
| Spain | Sexenio | 6 | Ex post | Individual | CNEAI (not Ministry of Education) | Peer review Citation | WoS and Non - WoS database |
| Norway | Norwegian Model | 1 | Ex post | University | Ministry of Education | Publication | National database |
| Finland | Norwegian Model | 1 | Ex post | University | Ministry of Education | Publication | National database |
| Denmark | Norwegian Model | 1 | Ex post | University | | Publication | National database: BFI |
| Portugal | Research Unit Evaluation | 3 | Ex ante | Research unit | Science and Technology Foundation | Peer review | |
| Italy | VTR, VQR | 4 | Ex post | Field | ANVUR (not Ministry of Education) | SSH: Peer review Natural Science: Peer review and Citation | |
| Flanders | BOF-Key | 1 | Ex post | University | Ministry of Education | Publication Citation | National database |
| Sweden | | 1 | Ex post | University | Ministry of Education Research counsel | Publication Citation | WoS |
| Dutch | Standard Evaluation Protocol | 6 | | Department | Committee(not in charge of funds) | Peer review | |
| Germany | | | | Department | CHE (not in charge of funds) | Depends on states | |

Chapter 4: Conditions of truth regarding higher education: academic practices as a problem

1. Introduction

In the literature review and methodology chapters, I have shown that neoliberalism can be characterised by reregulation instead of deregulation, and the latter is part of its appeal (Mirowski, 2013). The goal of this indirect governance is achieved by a procedure of defining standards, consistently monitoring and quantifying behaviours, resulting in a form of governmentality (Miller and Rose, 2008, Beer, 2016, Power, 1997). This thesis aims to elucidate if the so-called ‘marketisation of universities’ in Taiwan is characterised by these forms of governmentality. If so, how is this governmentality formalised? In this chapter, through textual analysis I explore how academic practices have become an object of knowledge and power and how bibliometric measures have become a means to assess academic excellence.

In Chapter 2, I reviewed the marketisation of the university in contexts of the neoliberalism movement (Mirowski, 2011). When studying higher education policy in Taiwan, numerous Taiwanese researchers also apply the paradigm of the neoliberalism movement to explain contemporary university management (see 反思會議工作小組, 2005, 戴伯芬 et al., 2015). However, this approach might be problematic for two reasons. First, the neoliberalism movement is a global thought project and a general account. Over relying on this general account may have us undervalue detailed domestic contexts. Even under the global influence of neoliberal thought, local actors are still likely to play an active role in Taiwan's higher education policy. Second, the neoliberal interpretation of contemporary higher education in Taiwan might be a reproduction of contemporary dominant discourse about university. Thus, this chapter aims to trace changes and the development of narratives about university in Taiwan through analysing historically contextualised situations.

This chapter is the first empirical chapter and aims to outline both dominant and minor narratives about university and academy. This analysis covers academic and official documents. Because various narratives might be scattered and even

interwoven with each other over various documents, this chapter aims to categorise systematically these narratives “from statements to literatures” and “from literatures to actors” (Venturini, 2010). Because a given problem is formalised within a specific context, the rise and fall of the narratives not only reveals a panorama of higher education in Taiwan but also reflect the problematisation of academic practices. This comprehensive description of relevant narratives provides a basis for comparing contemporary narratives across four academic disciplines of natural science, engineering, social science and humanities within Chapter 5. This chapter also outlines the introduction of bibliometric tools into Taiwan and their changing roles in various periods, which offers a reference for Chapter 6 where academic governance and institutional practice are further discussed.

It is important to outline the rationale for the creation of the corpus of documents analysed in this chapter. In order to obtain access to these archives, I began my fieldwork by visiting the National Central Library in Taipei, National Taiwan University Library and Academia Sinica Library. After scanning available resources in these institutions, I decided to build my corpus of documents mainly on the basis of serial journals for the following reasons. First, while newspapers only provide short reports and limited narratives, journal articles offer a relatively rich literature on educational affairs and detailed references. Second, while topics in newspapers are quite diverse, the genre of journals focuses on relatively narrow themes, which saved me time collecting materials matching my research themes. Third, as a genre of medium, the serial journal functions like a chronicle for debate on the policies of science governance and education management over various decades, which provides a lens through which we might observe changes in ways of talking about the above affairs. Fourth, there is good coverage in the serial journals within these libraries. In addition to the archive of this project, I have included other media sources, such as books, official presses and conference proceedings. The list of my corpus of documents is shown in Figure 4.

My document analysis focuses on government documents and intellectual literature. For government documents, three regular presses – the National Science Council Monthly, the Higher Education Newsletter, the Educational Reform Newsletter – are

selected, which represent three government bodies: the National Science Council, the Ministry of Education, and the Education Reform Commission. The National Science Council was reorganised into the Ministry of Science and Technology in 2014. The Education Reform Commission was founded by the government in 1994 in response to the Education Reform demonstration. In the case of neoliberalised universities in Taiwan, academics play a dual role: they are both the object of governance and part of the institutes' production of discourse. Thus, intellectual literature constitutes another sphere of my archives. For academic journals, *The Bulletin of Educational Research* and the *Journal of Education & Psychology* are chosen, because the two academic journals represent two historical and influential institutes: the Graduate Institute of Education, Taiwan Normal University and the College of Education, National Chengchi University. These two institutes have played a leading role in pedagogical research and education management. There is a journal which focuses on education evaluation systems: the *Evaluation Bimonthly*, released by the Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT) since 2006. However, numerous authors who have published in the *Evaluation Bimonthly* have also contributed to the *Bulletin of Educational Research* and the *Journal of Education & Psychology*. Hence, the *Evaluation Bimonthly* is not included in my corpus. Some authors who contribute substantially to the *Evaluation Bimonthly* have summarised their arguments in books or monographs, which I have selected as a sample of HEEACT instead of the whole serial. Along with the discipline of education study, sociology of education also provides literature on education practices. However, because my document corpus was already too large to include for analysis in my PhD study, I have had to omit those sociological journals produced in Taiwan. Nevertheless, I have chosen literature produced by the sociology of education as cited in articles in the *Bulletin of Educational Research* and the *Journal of Education & Psychology*. Thus, the viewpoint of sociology of education is not entirely absent from my corpus.

The selected period of these journals is determined by coverage in the libraries, as I attempted to gain full access to coverage of these selected serials across various libraries. The selection of books and conference proceedings, to a degree, is a contingent result of library collections. The date range of the document corpus ends

around the 2000s for two reasons. First, the direction of higher education policy has been relatively stable since the 2000s, as the Education Reform movement faded out. Second, as I will show in the following analysis, after the 2000s, both the thesis and antithesis in Taiwan are pivoted on neoliberalism, which seems similar to contemporary cases around the world. Hence, I set the 2000s as the boundary for when higher education in Taiwan entered the era of neoliberalism.

2. Narratives about university education

In order to grapple with how the university has become a problem in Taiwan, I begin by analysing the ways in which people interpret the role of the university. Overall, according to my textual analysis, relevant literatures in Taiwan can be generalised into four sorts of narratives. The dominant narrative about the university's role draws on the frame of linear national development. Along with one hegemonic discourse, there are three minor narratives based on humanistic concerns, social justice and university autonomy. Those narratives have been produced and reproduced in various fields and over different times. In this section I will present the development of these four narratives since the 1970s, followed by interactions among the narratives in the event of Education Reform during the 1990s.

2.1. The dominant statement: for the sake of national development

In general, the dominant imaginary of university education has been drawn from a conception of state development. Key themes in this narrative are desires for state progress and international recognition. Even if the main themes are consistently reproduced over various decades, there are also minor changes within the narrative. One modification is a shift from the use of patriotic language to economic language. Another modification is an expansion in objects of concern. Originally, the role of a university was to train qualified staff for the state; gradually, it has come to be expected that the university contributes to national progress directly by conducting more research or perhaps even collaboration with industry. Details and nuances will be shown in the following examples.

The article “The Scientific Development and Policy in Our Country” (Appendix 1) is an example which demonstrates this account of national development in the 1970s.

This is the first article in the first volume of *National Science Council Monthly*, published by the National Science Council in 1973. The article was presented in a patriotic tone. It began with a historical review since the late 19th century when China faced a series of diplomatic frustrations. The use of ‘our country’, on the one hand, showed patriotic passion, but avoided the complicated politics between Taiwan (Republic of China, ROC) and China (People's Republic of China, PRC) as the result of the civil war. Hence, the purpose of scientific development was to make ‘our country’ – which inherited these sorrowful stories from China but existed in Taiwan – prestigious again.

Besides the aspect of national pride, international factors were another face of the same coin. This international factor has been embedded in the field of scientific development. Scientific development began with international encounters. The foundation of disciplines in the university rested on scholars who previously studied abroad (line 7), but it was another issue altogether if those scholars kept studying abroad (“Our salary lets faculty attempt to go abroad and makes people who stay abroad reluctant to come back”, line 48). The criteria for excellent research depended on international recognition, such as “The human capital in our country is insufficient, in terms of the following two aspects: international academic standards... (line 45)” and “At this moment, our scientific research in geology and archaeology was internationally prestigious (lines 15-16).” In other words, when Taiwanese people evaluated themselves, they imagined how foreigners saw them. It was according to this image, that the criteria of successful research were formed. The establishment of academic disciplines in Taiwan reflected on two viewpoints: what we had seen and learned from foreign countries, and how foreigners would view our performance. An intention to compare the domestic with the foreign was a characteristic of scientific development in ‘our’ country. A desire for international recognition is the core theme of this narrative, a consequence of the fact that ROC had just lost its diplomatic recognition from the UN in 1971.

What is science, or how did Taiwan see science? The first paragraph of this article pointed out a crucial debate, “Chinese episteme as the spirit, Western episteme as practical uses” (line 6). This article attributed China’s previous failures of the state to

this narrow focus on practical values. However, according to the following quotation,

“Economic power is the basis of society and national defence. Economic power is based on science and technology. Taken together, the aims of our scientific development are gradually to make our academia independent and to provide sufficient talents for national progress” (lines 56-58).

Western knowledge was still for practical uses, in terms of economic power, sovereign status and national strength. This imaginary of science reconfirmed that only scientific practices with the potential for practical applications were valuable, and excluded those without the potential for contributing to national development in the foreseeable future. In this way, both science and knowledge were very function-oriented. This utilitarian account offered an imperative for the government to govern science and researchers.

Under this assumption, the university was a part of a comprehensive scheme for national development and progress. Higher education was expected to provide sufficiently qualified staff able to carry on more research works. Compared to current narratives, the central concern was the existence of human capital rather than knowledge or research themselves. The word ‘talents’ was often used in the article (line 26, 45, 47, 49, 55, 58, 61 and 63) whilst the word ‘knowledge’ was absent. Research grants here functioned as a fund for researchers rather than a reward for research outputs.

During the 1980s, the state development-based discourse was reproduced either in official narratives or in academic literatures. However, language usage shifted from patriotic to economic terms. In the name of economic growth and social needs, demands for assessing higher education emerged. Through discussions about what the university could do for the state, a set of desirable academic practices was formalised. As a result of these new standards, academic practice in real life has gradually become an object of state power.

An example to demonstrate these changes in the narrative is “An investigation of

higher educational evaluation in the Republic of China” (Appendix 2) from 1983. This article was published in *Bulletin of Educational Research* which was operated by National Taiwan Normal University, representing an academic account of university management. What was the university for? The word ‘contribution’ implied the university’s main missions were “the development of economy, society and culture, the cultivation of experts, and youth education” (line 8). It seemed like this stance attempted to balance concerns about state development and individual development. However, the article also stated that “higher education’s curricula had to be reformed in response to changing social needs and economic structure instead of adhering to academic tradition (line 5-6)”. This indicated that, as in previous narratives, the central concern was the economy.

Along with concern about state economic development, the article listed four problems for the university. The first issue is imbalance between demand and supply of manpower (line 10). Here the role of the university was described as production of human capital described in the language of economics. Oversupply was a “waste of educational investment” (line 11), whereas a result of undersupply was to “impede the national development” (line 12). The second main problem was the quality of faculty (line 13). The third problem was that “curricula might not fit real needs but adapt to faculty’s expertise” (line 14). This raised the question: whose ‘needs’? With reference to the statement, “curricula had to be reformed in response to changing social needs and economic structure” (line 5), it seems that these needs may not be students' needs, but in fact represented, economic needs. The final problem was insufficient research performances and loose criteria for evaluations of faculty (lines 15-16). This showed that academic staff performance had begun to become an object of concern. Taken together, all these concerns indicated that the exercise of university education started to be regarded as problematic in terms of national development and economic growth from the 1980s. In addition, these academic affairs were discussed in the language of business and management, with references to the curve of supply and demand, and investment.

These emerging problems provided rationales for the implementation of university evaluations. Along with continued practices of university evaluation, more

manageable and concrete criteria that define ideal academic performances have been formalised. In return, these new standards of measurement reshape the imaginary of what constitutes an excellent university and excellent academic performance. The role of measurement tools will be further analysed in a section on bibliometrics.

In these literatures, a belief in a linear model of national progress had been reproduced and patriotic intention had been ingeniously hidden behind a narrative of national development. Another example illustrating this trend is the article of “A research on objects of technological development policy” (Appendix 3) from 1986. The affiliation of the two authors to the Institute of Management Sciences, indicated that the discipline of management sciences, as an academic actor, was one of the institutions involved in the production of discourse about national development and governing knowledge. Their primary ideology could be observed in the following sentences:

“Since Schumpeter used economics to analyse technological innovation in 1934, technological innovation has been regarded as a main factor for national economic growth and enterprise’s productivity. This is the main source to create benefits...Hence, the policy of technological development has become a crucial issue for governments around the world (lines 9-24).”

In this narrative, innovation was seen as a clear economic benefit: the source of economic growth and productivity in enterprise. In addition, because of the intensive “arms race”, “international economic competition” (lines 17-18) and “high-risk technology” (line 21), it was a crucial issue for the government to guide technological innovation rather than rely on the “spontaneous progression” (line 13) conducted by researchers themselves. That is, an imperative for governing innovation. Technology innovation was incorporated into an inseparable entity of “STEP”: society, technology, economy and politics (lines 25-29). Therefore technological development policy had to be embedded in national development “to avoid a waste of resources” (line 40). By linking innovation to national benefit, the state gains the rationale to govern knowledge and the ability to define which kinds of knowledge can produce valuable and desirable economic benefits. This viewpoint echoed previous articles. In terms of

this use of language, the references cited in this paper (for instance Schumpeter, Brooks Harvey, Johnston and Gummett), come from scholars in the fields of political economics, public policy and national development. This trend means that the narrative of governing knowledge attempted to gain more authority by utilising academic language instead of making a patriotic appeal.

More neoliberal vocabularies, such as the 3Es (effectiveness, efficiency and economy), have been used to describe higher education since the 1990s. One example is a report, “The Minister pointed out that in terms of personnel matters, academy, finance and curricula the university will become autonomous” (Appendix 4) from 1993. This report was released in *Higher Education Newsletter*, which was an official publication of the Ministry of Education. In this talk, the Minister mentioned several aspects. Here I focus on the aspect of national development and I will analyse other aspects in the following section ‘alternative narratives’. In this speech there were two key concerns: “efficiency” (line 55) and “international excellence” (line 58). The theme of international recognition was repetitive but the idea of efficiency meant something new.

The selection of neoliberal language is not just a rhetorical preference nor an international fashion. Rather, I suggest that the function of neoliberal language in the context of 1990s Taiwan is to balance appeals for autonomy and equity of educational opportunity. In 1993 there were already 21 universities and 30 colleges in Taiwan, meaning that allocating resources was becoming more controversial. Hence, in the light of the 3Es, the principle of “equality” became problematic (lines 56-57), even if the principle of equality had never actually been achieved. Moreover, to grapple with international excellence, top (public) universities should enjoy more educational funds than before, while “alternative aid” (line 61) was for those considered less excellent. The idea of excellence offered a rationale for (re)concentration of education resources. This definition also assumed that only a university which was good at academic research was an ideal university. Similar phenomena could be observed in the UK; while university education had undergone a rapid procedure of massification during the 1980s and 1990s, the emphasis on academic performance and its links with national competitiveness had amplified as well (Harrison, 1994, Morley, 1997, Sayer,

2014). According to Harrison and Morley, this trend indicates a tension between elite universities and mass universities, while the number of educational grants did not increase in line with the increase in student numbers and universities.

In short, the dominant framework to talk about and to imagine the university is pivoted on national development. The concept 'nation' in Taiwan is also relevant with regard to its complicated relations with China. Even if there was a shift in the genres of language used, two core themes, national progress and international recognition, are consistent. The adoption of neoliberal discourse into educational affairs is a practical strategy to balance other narratives during the event of Education Reform. In the late 1990s, the dominant narrative of national development was embodied in the name of knowledge economy.

According to Somsen (2008), since the emergence of nation states in the 19th century, scientific innovation had been framed in nationalist accounts. Scientific achievements had been considered a symbol of national glory. International academic communities, which Somsen names the Olympic model, combined nationalist passion and international cooperation. However, this dominant narrative in academic spheres had a counterpart in Europe: socialist internationalism, which manifested the values of cosmopolitanism and was in conflict with ideas of nationalist glory. In other words, the narrative of national progress had been continuously challenged by intellectuals themselves in the West (Somsen, 2008). However, this left-leaning reflectivity had been absent in Taiwan during the period of the Cold War. Even if socialist thoughts had once been introduced to Taiwan during the Japanese colonial age, it was strictly banned during the KMT (the Nationalist Party of China) totalitarian rule since the late 1940s. Hence, a particular frame of state development has remained in a more prominent position in Taiwan than the West.

2.2. Alternative narratives: university autonomy, social justice and humanistic notions

Within the national development-based narrative, the purpose of university education is external: it contributes to the state by providing either quality staff or knowledge. There are alternative imaginaries about what an ideal university should be, in spite of

a lack of socialist internationalist thought. A narrative based on the notion of university autonomy emphasised that the university should not work as a device of government. There is a narrative based on a spirit of humanism, emphasising that the existence of humanity itself is its own purpose. Hence, educational practices should not serve the state. A narrative based on social justice describes relations between the state and individuals in a reverse direction and questions how the state influences personal socioeconomic status via the education system. These three narratives had co-existed in academy and paralleled the hegemony as minority viewpoints until the end of the 1980s. When social movements flourished in the late 1980s and early 1990s, these minority viewpoints arose and led to the Education Reform movement.

An example to elucidate the human-centred narrative is “The contemporary destiny of universities in our state” (Appendix 5) from 1978, released in the *Bulletin of Educational Research*. As its title shows, this article aimed to define the functions of the university and to identify deficiencies in contemporary university education. According to this paper, there were three main major missions of the university: research, professional education and liberal education. Among these, humanistic accomplishment or holistic education was the ultra-purpose of higher education (line 6, p. 7). This definition excluded direct connections between the university and economic growth. When discussing the orientation of research institutes, the article focused on relations between undergraduate and postgraduate colleges but did not consider the potential for application of knowledge/research. In the section on professional education, the author did not emphasise the importance of professional education but criticised it as a form of scientific ‘invasion’ (line 21, p. 5) into the university, implying that the existence of professional education was alien to the original concept of university. This article cited Newman and Spranger’s words to present concerns about personality, liberal art and culture. This viewpoint could be summarised in Newman’s original words: “a university training...aims at raising the intellectual tone of society, at cultivating the public mind, at purifying the national taste, at supplying true principles to popular enthusiasm and fixed aims to popular aspiration, at giving enlargement and sobriety to the ideas of the age, at facilitating the exercise of political power, and refining the intercourse of private life” (p. 157, Newman, 1947). In this imaginary of higher education, a spiritual aspect rose above

practical aspects, such as industrial development or economic growth. The university played a role in social progress via “teaching all branches of knowledge” (p. 147, Newman, 1947), not by innovation, new knowledge, application studies or industrial cooperation.

Even if the university has been seen as an official apparatus for state progress from the standpoint of national development-based narratives, scholars, as an entity, may own their viewpoints on themselves which are different to the main narrative. For example, the National Taiwan Normal University was founded in 1946 for training secondary teachers. The National Taiwan Normal University is therefore function-oriented and subordinate to the government. The name ‘normal university’ and its French root ‘École normale supérieure’ might imply connections between normalisation, discipline and educational practices in a Foucauldian sense. Nevertheless, the staff might not consider themselves as mere functionaries of an official apparatus. An intention to grasp their narratives forms the preface of the first volume of the *Bulletin of Educational Research* in 1958, “The research purpose of this institute” (Appendix 6). This article attempted to clarify the position and mission of its home institute, the Graduate Institute of Education. This article began by outlining the history of European universities from the end of the Middle Ages. Via this comparison, the author argued that the role of the university had been and should continue to be distinct from other education systems, such as primary and secondary education, with its most distinct role being academic research. Even though the university had been gradually incorporated into the Western education system, academic research was still “the essence of the university” (line 14). On the other hand, the function of education in the university was not an intrinsic but an additional “responsibility” (line 9-10). In the author’s words,

“...the essence of the university always rests in academic research. Even if the university has been given the meaning of ‘education’ in this century, the value of ‘research’ is still more than ‘education’ (lines 14-15).”

“Academic research is for the sake of academic research...For sure, results of academic research sometimes may benefit people, but pragmatic values do not

matter during the process of pure academic research. The improvement in technology derives from academic research, but we can not say academic research is equal to the improvement in technology (lines 20-22).”

Along this criterion, the National Taiwan Normal University gained legitimacy only when its focus shifted from teaching practical skills to researching educational theories. In the imaginary of the university and scholarly life, researchers conducted research for “the sake of academic research” (line 21). The potential for application was merely a by-product and must be subject to academic research. The value of knowledge production did not need to be certified by its potential for practical usage. Ironically, while the National Taiwan Normal University functioned as vocational education, this statement excluded practical purposes from the essence of universities. Additionally, the viewpoint arguing that university autonomy rests on the pure pursuit of knowledge and research, slightly contradicts the above humanistic stance, which underscores teaching rather than research in university education. Nevertheless, both these statements disagreed with the utilitarian frame of state progress.

Although some scholars had developed alternative narratives of university education, affairs of university management in Taiwan – including budget distribution, curriculum design and faculty promotion – had been directly supervised by the highest organ of state education administration, the Ministry of Education, until the 1990s. In the late 1980s, people began to consider some practices in the academy problematic. Hence, the university had undergone a process of problematisation through emerging issues of a lack of autonomy. Meanwhile, democratisation movements in Taiwan were at their peak and their influence extended to universities (胡慧玲, 2013). Protesters and students demanded university democracy and academic freedom. This conjunction of history and politics has been reviewed in Chapter 1.

In this context, the “A study of teacher promotion system of university and college” (Appendix 7), released in the *Bulletin of Educational Research* in 1987, aimed at the mechanism of faculty promotion evaluations in universities and colleges, and paid attention to relations between the government and university. A comparison with

other countries (“...promotion evaluations of university faculty are managed by each university in the rest of the world”, line 15), rendered what used to be considered normal to now be seen as the bureaucratic administration’s “ignorance” of the university (line 19). However, even though this paper manifested a desire for the independence of universities from the Ministry of Education’s supervision, that did not mean individual researchers should gain freedom from the university’s supervision. Actually, the proposed promotion evaluation system conducted by each university consisted of more detailed and stricter criteria than the previous version used by the Ministry of Education. The criteria of the previous version “requires one publication within three years (line 27)”, but “one publication can not account for whole research performances (line 28)” nor “tell the real academic ability of a staff (line 28)”. In addition, because “responsibilities of faculty are very diverse (lines 30-31)”, “some argue that the evaluation should cover aspects of teaching, research and service (line 31)”. This meant that not only research but also service and teaching were considered as formal duties for faculty. This idea of a more comprehensive approach to measure scholars' performance echoed with the article “An Investigation of Higher Educational Evaluation in Republic of China” (Appendix 2) published in 1983, which indicated that the problematisation of university autonomy was enmeshed with the problematisation of academic productivity, and the criteria for evaluating universities were duplicating into individual evaluations.

The final alternative narrative is based on social justice and equity of educational opportunity. This narrative emerged in the late 1970s and began with the notion of composition of university students. Since this change, people might see universities in a new lens: a mechanism of hierarchy reproduction rather than social mobility. Discussions of this could be found in a paper, “The relationships between major family differential factors and the opportunity of university attendance” (Appendix 8) in 1978 in the *Bulletin of Educational Research*. This article represented a minor narrative about higher education in the language of the Sociology of Education.

What is the university for? The author listed two aspects, one traditional, one new. In the “traditional society” (line 4 and line 5), university education was a privilege and a symbol of social status, a “luxury” (line 8). In the 20th century, university education

was for people who wished to develop their abilities informed by thoughts of democracy (line 7). By the choice of these words, the author implied his position favouring the aspect of equity of educational opportunity. With this notion, variety in family backgrounds had not been regarded as just a background but a crucial social factor, which was parallel to intellectual factors. Therefore, relations between the factor of family background and access to university became a valuable topic. The expansion of higher education was depicted as a method to enhance the equity of educational opportunity. Notably, at this moment, the expansion of higher education had not yet happened in Taiwan and was depicted as an answer to inequity of educational opportunity in the 1970s. After 2000, the expansion of higher education has been depicted as a problem. Even within the narrative of social justice, the appeal for individual development still had to be justified by “contribution to the country (line 13)”.

In terms of social justice, another crucial issue was the uneven distribution of educational resources between private and public universities. In the beginning of the 1990s, the Ministry of Education had to admit that the imbalance in educational resource was an imperative issue and looked for a new ‘rational’ model of assigning grants. In “A rational re-arrangement of educational resources” (Appendix 9), published in 1992, this official letter stated that “(n)owadays there is a gap in educational resources between public and private universities (line 4)”. According to this official report, students of public universities enjoyed almost three times as many resources as students of private universities, while more than 60% of university students belonged to private universities. However, this did not mean the mission of national development was no longer a priority. As the subtitle “A series report on university education and human resource planning” showed, the purpose of university education was to accumulate human capital for the benefit of the state.

In summary, the arguments outlined above provided alternative narratives of university education with three themes: university autonomy, social justice and humanistic notions before the 1990s, whereas the hegemonic discourse was based on a linear frame of national development. When social movements gained momentum and reforms seemed possible, people noted these minor narratives and problematised

the operation of higher education. In other words, because people interpreted the existence of university in various ways, the existence of university was not taken for granted. The movement of Education Reform in the 1990s is a particular period when the black box of university was temporarily open.

3. Narratives around the Education Reform Movement in the 1990s

3.1. Problematisation: defining the right problem

During the peak of democratisation movements in Taiwan from the late 1980s to the early 1990s, established higher education systems encountered challenges from two ideologies. One was liberalism, which was tightly related to the democratisation movement and student movements. This liberalist movement considered government regulation of university as an authoritarian practice and aimed to reduce KMT government interference in university in the name of university democracy, university autonomy and academic freedom. Another challenge against the established higher education system was based on social justice, fairness and equity of educational opportunity. However, a hegemonic position of state development-based narratives, an assumption resistant to doubt, had not been replaced by these alternative narratives. In this way, narratives of a demand for autonomy or social justice could not exclude the discourse of state development. In addition, the appeal for national development and global excellence continued to engender influence by incorporating frames of audit culture, such as the 3Es, accountability and value for money. In sum, a strategy for the state to keep guiding higher education in less directive ways was to switch the government's role from active governor to objective supervisor via the establishment of a mechanism for university evaluation. Procedures for establishing a mechanism of university evaluation were composed of producing narratives about rationales for academic assessments, establishing practical indicators and establishing a specific institute for evaluating universities. Along with the government, the discipline of education study played an active role in establishing the machinery of university evaluation. Nevertheless, the establishment of university evaluation systems was not a top-down process. Conversely, it was the result of a series of negotiations among various participants. Indeed, the purposes of university assessments had been modified continually until these three arguments reached a consensus.

Narratives of university autonomy were influenced by both narratives of state development and social justice. For instance, in a report “The Minister pointed out that in terms of personnel matters, academy, finance and curricula the university will become autonomous” (Appendix 4), one main theme was the narrative of national development, as analysed in the previous section. Alternatively, because the university itself was considered a serious problem due to a chronic lack of autonomy, the Minister of Education admitted that “the university autonomy is an inevitable trend” (lines 7-8 and line 71). In terms of administrative practices, university autonomy included personnel matters and finance. However, whereas the distribution of educational budgets would not be led merely by the bureaucratic administration, it was linked to performance evaluations, with “objective” quantitative indicators (lines 86-87).

Another example to show interwoven narratives is the article, “Deregulation of Education: Ideal, Principle and Affair” (Appendix 10). This article discussed the contents and purposes of the deregulation of education in Taiwan, offering a chance to observe how people interpreted the idea ‘deregulation’ at that time. Because education was a sort of branch of public affairs and relied on state budgets, the necessity for national regulation was “unavoidable” for qualified education (lines 26-27). However, in a diverse and democratic society, the previously practiced educational codes were regarded as inappropriate “interferences” (line 9), because some educational codes were “designed for non-educational purposes, such as implanting a preference for a specific political party, economic-central educational policy, all kinds of cultural chauvinism, and military training” (lines 30-33). All these non-educational purposes and propaganda in educational practices can be linked to the authoritarian regime in Taiwan from the 1950s to the 1980s. In order to balance government over-regulation, the neoliberal idea of deregulation was introduced in a prudent way.

On the other hand, as a contrast to regulation, people were aware that the idea of deregulation “is borrowed from economics” (line 7). Along with this acknowledgement, a free and competitive market for education was not considered a desirable goal of this deregulation policy (lines 17-18). The idea of deregulation was adopted as a means to reduce state influence, but an ideal of ‘laissez-faire’ or

marketisation was excluded from this blueprint (“The deregulation of education does not aim at complete laissez-faire”, line 34). Equity of educational opportunity had priority over deregulation of education. In the authors' words,

“Distribution of educational resources is still irrational. Therefore, the procedure of deregulation must avoid damaging equity of educational opportunity. (lines 54-55)”

Even if the authors were aware of economic frameworks and adopted them into their concept of educational affairs conditionally, neoliberal spirits still infiltrated through their arguments, such as “self-discipline” (line 50) and “efficiency of financial management” (line 78). Besides neoliberal language, a humanistic notion could also be found in the same paper. For instance,

“Student’s right to education and subjectivity should be guaranteed. The values and dignity of human must be assured. (lines 56-57)”

The above analysis indicates that although the narrative of university autonomy played an indispensable role in the Education movement, the core debate focused on equity of educational opportunity and skewed distribution of resources which favoured a few public universities. In the beginning of the 1990s, the condition of higher educational opportunity was recognised as a severe problem which must be improved by education reform (s see Appendix 9). Another example is:

“...the uneven distribution of resources between public universities (including colleges) and private universities is more than unbearable. The fairness of the distribution of education resources determines righteousness of educational policy. (lines 36-38, Appendix 11)”

This quotation is from “A research on causality among equity of educational opportunity, educational development and needs for university education” (Appendix 11) from 1993. This research paper was released in the *Journal of Education & Psychology*, an academic journal operated by the College of Education, National

Chengchi University. Hence, this article represents a viewpoint from an academic discipline of education. There are two narratives about higher education entangled in this paper. One is a repetitive statement of “economic growth”, “human resources” (line 31), “research and innovation”, and “exploring global” markets (line 34). Another idea was the equity of educational opportunity, “derived from democracy and civil right” (line 27) to achieve the goal of “social justice and economic equality” (line 28). In the light of equity of educational opportunity, higher education ensured a positive mechanism of “social mobility” (line 30). The equity of educational opportunity was “a core value of educational reforms” (line 24) and a “premise” (line 15) of all educational policy. “(M)assification of higher education” (line 25) was regarded as one practice to implement the equity of educational opportunity. In sum, the uneven practice of university education included two aspects: admission to higher education and a skewed distribution of resources between public and private universities.

After the Education Reform demonstration in 1994, the government founded the Education Reform Commission, which lasted from 1994 to 1996 and released *Educational Reform Newsletter* monthly to disseminate internal discussions and public opinions. In the first meeting of the Education Reform Commission, the Prime Minister gave an opening speech (Appendix 12), published in the first volume of *Educational Reform Newsletter*. In the official narrative of education reform three main themes appeared alternately: democracy and university autonomy, state development and economic growth, social justice and educational equity. The first theme was one of state progress, echoing with all those previously dominant narratives since the 1970s. The purposes of education, in general, was the root of the “development of politics, economy, society and culture” (lines 8-9). Massification of education was recognised as a cause of “scientific and technological developments, economic growth and political progression” (lines 10-11) in the past three decades. Meanwhile, the ongoing Education Reform aimed “to fit national development, social changes and world trends” (line 13). Social changes and inequality were just one issue, whilst national development and world trends were seen as equally or even more important. Taken together, I argue that this reproduced narrative of “excellence” and “efficiency” (line 25) is also a strategy to frame and dilute alternative narratives about

academic autonomy and educational equity, such as replacing deregulation by “diversity” (line 30).

Besides national development, this official viewpoint admitted that the Education Reform was one of a series of political reforms (“after a reform of the Constitution, a reform of education is the most imperative work”, lines 23-24). Additionally, it still failed to mention that the core controversy was distribution of educational resources. The imbalance included “a gap between urban areas and countryside” (line 17), a gap between private universities and public universities, and a gap between universities and technical colleges. The imbalance was not an external mission that the university was meant to resolve, like socioeconomic needs, but an internal problem of education itself. In this speech, three different discourses became enmeshed. We can observe the Education Reform of the 1990s as being characterised by a delicate tension between concerns about national excellence and the appeal for equality.

One of the imbalances in the distribution of educational resources was a stress between vocational education and higher education. Consider the fact that only a small number of students could gain admission to university, and most prestigious universities were public and generously funded by the state. By contrast, remaining students had less choice but went on to vocational education, like junior colleges or technical colleges, while most of these institutions were private and received less grant money from the state. The tension between vocational education and higher education, and the negotiations and resolution of this tension is explored in the article, “University diversity: reorganization of meritorious junior colleges into technical colleges” (Appendix 13), written by a member of the Education Reform Commission in 1995 and released in the *Educational Reform Newsletter*.

In the first section of this article, “distortion of vocational education”, the author reviewed and criticised how people viewed vocational education as a stigma: “Because our society over emphasises the diploma, acquirement of a diploma becomes the only approach for students to promote their socioeconomic status” (lines 21-22), and “(i)t is said that only those disqualified and inferior go to the system of vocational education, because they are not able to get a degree” (lines 25-26). To

reconcile this knot, a policy of “reorganization of meritorious junior colleges into technical colleges” was advised. This proposal aimed “to establish the dignity of vocational education” (line 40), “push the university to diversity” (line 44) and “manage the whole educational resources efficiently” (line 45) by transforming junior colleges into technical colleges and reorganising technical colleges into technical universities. Compared to those ‘academic universities’, these new technical colleges and universities design curricula on the basis of career development and industrial collaboration (line 61-62). In this way, “the technical college is exactly a university” (line 72). This proposal was then approved as one of the education reform policies. As a result, the number of universities increased from 23 in 1994 to 53 in 2000. Meanwhile, the number of colleges increased from 35 to 74, whilst the number of junior colleges decreased from 72 to 23. Most of these newly established colleges and universities are private.

| | 1994 | | | 2000 | | |
|---|------|--------|---------|------|--------|---------|
| | Sum | Public | Private | Sum | Public | Private |
| University | 23 | 8 | 15 | 53 | 25 | 28 |
| College | 35 | 17 | 18 | 74 | 24 | 50 |
| Junior college | 72 | 13 | 59 | 23 | 4 | 19 |
| Source: 2015. <i>Indicators of Science and Technology, Taiwan</i> , Ministry of Science and Technology. | | | | | | |

Figure 5. Table: Numbers of universities, colleges and junior colleges

3.2. Introduction of university evaluations as a solution

After the tension between vocational education and higher education had been alleviated by promoting vocational junior colleges into technology colleges or universities, the next key issue was the imbalance between historical elite universities and the newly established universities, and between public universities and private universities. In order to address these issues, a solution was proposed: the establishment of financial autonomy and university evaluations. By the establishment of university autonomy including finance, personnel matters and curricula, the university was empowered to manage themselves. With the right to self-govern, the university could take full responsibility for their performances. Only if each university could account for their performance, could university evaluations be seen as

meaningful. For private universities, the mechanism of university evaluations allowed them to compete for project-based research funds with public universities, and guaranteed them basic grants on the basis of student numbers. This settlement was a compromise and a consensus among all actors. Details and relevant references are shown in the following discussions.

Higher education evaluations were not a novel conception in the 1990s, but the meanings of higher education evaluation had been modified and amplified. A new function was an 'objective' mechanism to justify distribution of educational resources. This changing process can be shown by comparing two articles: "An Investigation of Higher Educational Evaluation in Republic of China" (Appendix 2) from 1983 and "An Empirical View on Performance Indicators on Higher Education in Taiwan." (Appendix 14) from 1994. In the former, a primary purpose of higher education evaluations was to contribute to national development by mobilising academic resources effectively. Faculty evaluations aimed to enhance the quality of higher education (line 13, Appendix 2). On the level of university evaluations, its purposes were to provide students with information for selecting programmes (line 26, Appendix 2) and to promote the quality of university education by making universities compete with each other (line 27, Appendix 2). However, university evaluations were described in a slightly different way in the latter.

The key difference was an emphasis on justification for educational resources. In the latter, there were two rationales for a solid university evaluation. First, "each university will need to show its performance and to justify its expenditures to attract students" (lines 9-10, p. 62, Appendix 14). This corresponded with previous viewpoints in "An Investigation of Higher Educational Evaluation in Republic of China" (Appendix 2) from 1983. Second, "when all universities are desperate to become an excellent university, each university has to justify why it deserves a particular resource instead of other universities" (lines 4-5, p. 62, Appendix 14). When the purpose of university evaluations was for justification of educational grants, detailed criteria used in university evaluations also engendered practical effects on the distribution of funds. For example,

“(T)hese criteria incurred criticisms, especially from those historical and prestigious universities. They criticise that the criterion selected by the Ministry of Education only favours newly established universities and colleges. (line 24-26, p. 63)”

This indicated that practices of university evaluations did not just reflect the need to justify the distribution of educational resources, but also the tension between various types of universities. In addition, the appeal for academic excellence might function as a rationale for educational grants (“Being an excellent (comprehensive) university has become a slogan when a new university is established or a new dean assumes office”, line 2, p. 62). This shows how the role of higher education evaluations changed when equity of educational opportunity became an urgent issue. The selection of indicators reflected conflicts between various actors’ interests rather than expertise.

Selection of language is also noteworthy. While discussions about the selection of performance indicators already reveal the subjectiveness of indicators, its rhetorical strategy appealed for objectiveness. The objectiveness in this context was roughly equal to quantitative measures, which were “measurable, observable and accountable” (line 14, p. 63). Otherwise, qualitative methods, such as presentations, visits and symposiums (line 14, p. 63) were described as “not objective” (line 13, p. 63) or a “waste” of resources (line 14, p. 63). In this way, subjective intentions were replaced by objective rhetoric. More neoliberal vocabularies, such as “accountability, effectiveness and efficiency” (line 31, p. 62), were used in this narrative. With this neoliberal rhetoric, quantitative measurements were described as professional and as expertise (“this programme aims to enhance member country’s higher education management and make it professional”, lines 21-22, p. 62). The role of numbers and objectiveness will be further elaborated in the fourth section.

All debates, tension, conflicts and negotiation about higher education can be summarised in the article “Tuition and distribution of higher educational resources” (Appendix 15), released in the *Educational Reform Newsletter*. There were two main themes mentioned in this paper: (1) university position and uneven distribution of

grants between public and private universities, and (2) value for money and accountability. The first issue is the position of universities. Two imaginaries about university education were represented in this discussion. The basic frame is the narrative of national development (lines 9-10, p. 4). The reason for ensuring economic needs had given the government a rationale to invest in and regulate universities as a public good. However, when social contexts changed, “non-economic educational purposes” (line 14, p. 9) began to be noticed and launched debates on ways of distributing grants. With the appeal for social justice, both admission to university and skewed distribution of educational resources among various types of universities had been problematised. This conflict was a core of the controversy (“The expansion of higher education makes the distribution of educational resources becomes one of the important problems of educational policy”, lines 9-10, p.2).

Another concern is value for money and accountability. In the name of effectiveness, financial management in public universities was regarded as “obviously less” effective “than the private” (line 37, p.5). This lack of effectiveness in university financial management was attributed to direct supervision under the “government budget inspection system” (line 38, p.5). When the state could not afford rapid growth in educational budgets, ‘ineffectiveness’ in university financial management was taken as a problem.

To answer these issues, a solution was proposed: the introduction of a market mechanism into higher education. This marketisation of higher education consists of several aspects. First, public universities and colleges were empowered to “get independent from the national treasury administration” by “foundation of *school development fund* in each university” (line 73, p. 5). The second aspect is the formation of an institution for evaluations. This article referred to the model of the British “University Grants Committee” (line 30, p. 6). This ideal University Grants Committee was assumed to be in charge of evaluating universities and colleges, and distributing government grants to these institutions (lines 32-33, p. 6). The Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT), was founded in 2005 to administer the affairs of university evaluation. However, HEEACT is not in charge of distributing educational resources directly. Rather, HEEACT’s role is to

inform policy makers in the Ministry of Education. The mechanism of university evaluations not only allowed private universities to compete with public universities for project-based research funds (lines 37-38, p. 6) but also guaranteed them a basic income (“Within the allowed quota, general grants are assigned to the private university according to student numbers”, lines 39-40, p. 6). By competitive “project-based grants” (line. 38, p. 6), both private and public universities have to take “policy needs” (line 22 and line 38, p. 6) seriously. The final aspect was mild deregulation of university tuition for the sake of user charge principle, which means that users (students) pay for the use of a product or service (education).

3.3. Interpreting the massification of higher education through an ANT lens

This section applies an ANT model of translation to examine two components of the Education Reform in Taiwan: university massification and academic assessments. As Callon (1999) argues, procedures of translation consists of four stages: problematisation, interessement, enrolment and mobilisation. For problematisation, my analysis shows that there were three narratives to interpret the university in the 1990s Educational Reform in Taiwan: (1) national development and economic growth, (2) social justice and (3) university autonomy. The implementation of university education was regarded as problematic within all three narratives due to (1) inefficiency, (2) unfairness and (3) a comparative lack of freedom. The central controversy was the distribution of educational resources. This discussion is a demonstration of the process of how the university had become problematised. The next step is to define relevant actors. According to previous analysis, relevant actors include:

(a) Government:

The Ministry of Education

The Education Reform Commission

National Science Council

(b) Academics

Historical and prestigious public universities

Private universities and colleges

Technical universities and colleges

Disciplines of education study and education administration

Individual scholars

(c) Citizen societies and liberal intellectuals

Various actors had their own interests. State interest was in maintaining supervision of the academy and to mobilise academic resources for industrial development and economic growth. From the academic sphere, mass universities and vocational systems aimed to enlarge niches, resources and reputation of universities and colleges, whereas elite universities wanted to retain their advantages. According to interviewee S8, at that moment, those senior professors in the traditional elite universities also expected more academic positions for their supervised PhD students. Thus, the idea of university massification could be an option for the prestigious universities. Citizen societies aimed to reduce the state's direct influence on the academy but to create more higher education opportunities via state education policy. During the 1990s Education Reform, all these actors forged an alliance as an 'obligatory passage point' to resolve the problems of higher education. However, just establishing more universities did not match the interests of those universities already well-established. Therefore, for the stage of interestment, the mechanism of university evaluations was introduced as a device to stabilise this alliance. After a series of negotiations, a consensus and a resolution were formulated: institutional practices of university evaluations with defining terms. One compromise was that universities and colleges were empowered to govern themselves; another compromise was a minimum number of grants for each university and college based on student numbers. In this way, the role of university evaluations shifts from a survey to a performance-based funding distribution. With this deal, all actors were enrolled in this network.

The final stage of 'translation' is mobilisation: if representatives can apply this consensus to their members and engender a stable network. In this case, the effort of mobilisation is influenced by re-interpretation and re-definition of university evaluation, which at last has the capacity to turn university evaluation into a controversy. That is, an unstable network. I will explore procedures of the re-interpretation and re-definition in a following section. In addition, the establishment of academic evaluations rests on selection of indicators which define and quantify

valid performance. I will focus on the role of indicators in the next section.

This case of university massification offers a chance to examine a hypothesis: mass education as a cultural project. By analysing historical data, several studies show that correlations between development of education, including university education, and economic growth/industrial promotion are not always significant (Green, 2013, Boli et al., 1985, Meyer et al., 1992, Wolf, 2002). For example, in the UK the idea of modern university as undergraduate professional school is more a post- Industrial Revolution 20th century phenomenon (Halsey, 1965b). Until the 20th century, vocational skills, a spirit of industrialism and utilitarian values had been largely incompatible with the gentrified culture of universities (Halsey, 1965a, Anderson, 1995). This indicates that the linear model of state development is either explained by a form of functionalism, or a political narrative endorsing the policy of promoting mass education. If the linear model of state development can not account for the origin of mass education, how could it be explained? Several scholars utilise conceptions of symbolic value and cultural goods to interpret the growth of mass education as a cultural project or one which performs a quasi ‘religious’ ceremony within a so-called modern society (Fuller, 2010, Boli et al., 1985, Meyer et al., 1992). When higher education has undergone a rapid transformation of massification, are we obliged to interpret the growth of universities from a cultural perspective?

In terms of ANT, the occurrence of massifying university education could be explained without applying an additional axis of cultural explanation. It is true that a diploma was considered a desirable cultural good, as the analysis of Appendix 13 shows. But this just represents one way to interpret university education. There are other kinds of interests, such as research freedom, university autonomy, sponsorship, power relations and deregulation. A desire for increased production and availability of (more) cultural goods might not be enough momentum to gather other actors. Moreover, in the version of mass education as a cultural project, the state usually plays an active role in establishing new educational organisations. Nevertheless, in this case, the agenda of massifying higher education, as a part of the Education Reform of Taiwan, was more like a passive response to the education reform movement. According to the previous analysis, the government was more enthusiastic

over building a mechanism of performance evaluation than licencing more universities. Therefore, I suggest the massification of universities (incorporated with evaluation practices) provided a route by which the above actors were enabled to achieve their interests. The massification of universities became a fact because this route succeeded in gathering all actors and then formulating a new group. Without a cultural project, networks themselves in the massified university can keep the interested group in line (Latour, 1987, Latour, 2005).

4. Deployment of bibliometric measures

The existence of bibliometrics was initially noted in Taiwan by the National Science Council in the late 70s. As the original function of the bibliometric was to show the importance and value of academic journals, bibliometric indicators were used to evaluate values of domestic journals and soon to normalise the domestic journal, such as the process of production, contents and formats of outputs. After that, the function of the bibliometric indicator was extended from governing the domestic journal to governing academic communities. When the demand from government for quantitative international comparison increased in the age of the ‘knowledge economy’, bibliometric measurement targets moved beyond the academic sphere to the national capacity for research and development.

4.1. Flexibility in the role of bibliometric measures

Several studies in STS point out that the purposes of an artefact are not determined by the artefact itself but by human interpretation, which may be quite flexible due to a variety in interests (Bijker, 1987, Pinch and Bijker, 1984). As an artefact, this interpretative flexibility also applies to bibliometric indicators; functions of bibliometric indicators varied in different periods during which various actors adopted it. In addition, because bibliometric indicators were not invented in-situ but imported to Taiwan, a process of transplantation may change its meanings. This section aims to illustrate the changing role of bibliometrics by analysing historical documents from Taiwan.

The first article I chose is “A Discussion on Domestic Biological Journals” (Appendix 16) in 1982 for several reasons. First, the author was a member of the National

Science Council in Taiwan, implying that this account could represent an official account. Second, this is one of the initial discussions mentioning bibliometrics as a tool. In this paper, the quality of domestic academic journals was considered as an issue and the National Science Council, a government department, was assigned to deal with the issue. This paper includes several themes. Here I focus on the aspect of the changing role of bibliometric indicators. How did people in Taiwan interpret bibliometric indicators in the beginning? In the author's words:

“The sum of academic journals is so considerable that no institute can afford to collect all important journals in the world. Hence, there are several abstracts of journals, such as *Chemical Record*, *Index Medicus*...Because these abstracts follow an appropriate standard to select journals, a position in these indexes turned to a thing of matter in academy. (lines 82-96)”

This statement showed flexibility in applying bibliometric indexes. The original purpose of the bibliometric index to aid institutions to purchase valuable journals was acknowledged (lines 82-83). Because these indexes selected academic journals by their “appropriate standards”, the bibliometric indexes had been regarded as a mechanism of professional endorsement. Hence, the role of bibliometric indexes went beyond an indicator for collecting journals to one which certified the value of academic journals. The government interpreted the bibliometric device as an approach to gaining worldwide academic recognition.

In the next article, “A Discussion about the Application of Science Citation Index” (Appendix 17), released in the *National Science Council Monthly* in 1983, the function of bibliometric measures went beyond the certification of academic journals or articles to evaluate academic disciplines and individual researchers. The initial purpose of bibliometric indexes was for “researchers” to “save time and money” because growing literatures take “more expenditure of money on purchasing and time on reviewing” (lines 16-17). This extended to new applications: “importance of each topic and research trends in future” (lines 33-34), which were more interesting for policy makers and funding bodies.

The function of bibliometric measures went beyond the academic sphere and into

administrative institutions; a trend which can be traced in a later article from 1988, “A Discussion about Domestic Scientific Development Indicators in Terms of Science Citation Index” (Appendix 18). In this narrative:

“Hence, this set of information (*SCI, noted by Ming-Te*) is quite useful not only for academy but also for administrators of science affairs...In fact, science policy makers in several countries are using this database to understand their positions in academy and to make science policy. (lines 29-33, p. 558)”

This statement showed how the state interpreted bibliometric measures: a digital tool to monitor academic efforts. Unsurprisingly, discourses on bibliometrics often came with narratives of national development. For example,

“(T)he time gap between academic research and industrial applications gets shorter gradually. Hence, it is more imperative for each country to realise its ability for scientific research. (lines 42-44, p. 558, Appendix 18)”

In another instance, in the article “The Importance of Indicators of Science and Technology and The Improvement of National Science and Technology Survey (Appendix 19)” from 1995,

“It is said that research and development in science and technology is one of major factors to measure national economic growth and social progress. Especially in industrialised and developed countries, the research and development in science and technology is deemed a representative indicator of national competitiveness as well as a key factor that determines if a developing country can promote to a developed country. (lines 5-9, Appendix 19)”

Consistent with the dominant statement, academic research was not only academy’s own business but an upstream section of the whole R&D chain. Therefore, the government had to investigate “a whole scene of investment in development and research, research activities in each field and the research effects” (lines 21-23) through the indicator of science and technology. In this big picture, research in

academy was not only academy's own business but an upstream section of the whole R&D chain. There were various indicators of science and technology for different stages of industrial progress. In the sphere of academic institutes, the tool considered appropriate was the bibliometric indicator. Hence, the bibliometric indicator played a role in the circulation of information in Latour's sense, by which the government, as a distant observer, was able to measure the distribution of academic resources.

Finally, the librarian's story was entirely dropped from the history of bibliometrics in the narrative of "An Analysis of National Competitive Strength of Science and Technology in the Age of Knowledge Economy" (Appendix 23), released in the National Science Council Monthly in 2000.

"In the beginning, the purpose of SCI is to study trends in science development. Nowadays, SCI has already become the major reference to assess the quality of scientific papers" (lines 20-21, p. 783, Appendix 23).

The interpretive flexibility in bibliometrics in Taiwanese indicators displays several features. The narrative of national development provided conditions for interpreting bibliometric measures and intended to justify the importance of the indicator for science and technology. On the other hand, the introduction of bibliometric measures also provided a more practical and manageable frame to think of academic performance. Finally, the tendency of how bibliometrics functions in Taiwan represents a nutshell of bibliometric development. The history of bibliometrics, which began by aiding a librarian to make decisions about acquisitions and which then switched to higher education and science policy, has been discussed in the literature review chapter. Since the conception of SCI and the Impact Factor was invented by Garfield in the 1960s, it had not become a concern until the 1990s. During these three decades, Garfield had attempted to promote the role of bibliometrics by engaging policy makers and academics, such as applying SCI to predict Nobel Prize winners and cooperating with Robert Merton (Fleck, 2013). This poses a question: how did the process accelerate as it was imported in Taiwan? Based on the preceding analysis, I think this is because both Taiwan and the USA encountered a similar economic situation in the 1990s: the rapid growth of universities with relatively stable

educational budgets. The situation infers a need for internal competition, which entails a set of common standards. The next section will focus on standardisation of scholarly activities via bibliometric tools.

4.2. Standardisation of scholarly activities and governmentality in academy

The introduction of bibliometric tools in Taiwan generates two significant impacts: a manageable standard of international recognition in academy and a quantitative measure of academic performance. As shown in the first sample (Appendix 1), a great passion for international prestige is a significant theme across various periods. However, the idea of global reputation had been quite abstract and could be defined in several ways. There was no clear-cut boundary of global recognition to aspire to until the emergence of bibliometrics in Taiwan. While bibliometric indexes have become a convincing criterion to certify the values of an academic journal or article, the concept of global recognition also becomes an imaginable and tangible frame. Procedures of standardisation of scholarly activities began by normalising academic journals and then extended to institutes and individuals.

Taking “A Discussion on Domestic Biological Journals” (Appendix 16) from 1982 as an example, the main issue in this paper was a lack of “an internationally recognised journal” (line 9). On the surface, a rationale for pursuing the internationally recognised journal was that “valuable results should be shared with all human beings” and the “spread of the research result should not be limited by types of journals” (lines 23-25). What was a definition of an internationally recognised journal? Several bibliometric indexes were utilised as a criterion of international excellence. Therefore, getting enrolled in these bibliometric indexes was taken as a practical task for domestic academic journal series. Moreover, when the lack of prestigious academic journals in terms of bibliometric tools became an issue, the autonomy of each academic associate and institute also became an issue, because each could be seen to have acted “in its own way” (line 11 and 32). The choice of the phrase, “in its own way”, was a rhetoric of negation, implying a lack of coordination, because their ‘ways’ of operating journals could not “squeeze into the world mainstream” (line 62). This paper shows that with the introduction of bibliometric tools, since the 1980s the goal of worldwide recognition turned to a practical task. The real impetus was international

recognition for Taiwan instead of altruistic knowledge-sharing with other human beings.

Following a procedure of problematisation of academic activities in the 1980s, in the beginning of the 1990s, worries about the absence of domestic journals in the SCI database and the lack of ‘coordination’ within academy became a practical problem. Rationales for governing academic journals by bureaucracy are presented in these two papers: “The Incorporation of Domestic Academy Journals of Earth Science” (Appendix 20), released in the *National Science Council Monthly* in 1993 and “The Foundation of the Journal of Biomedical Science” (Appendix 21), released in the *National Science Council Monthly* in 1994. In the case of the field of earth science, after the National Science Council launched a series of negotiations among relevant academic institutes and associations, several academic journals of earth science were integrated into one journal, *Terrestrial, Atmospheric and Oceanic Sciences*, which was operated jointly by related academic associations. In the case of biomedicine sciences, the National Science Council established and operated a new journal, the *Journal of Biomedical Science*.

According to “The Incorporation of Domestic Academy Journals of Earth Science”, because “a country manifests its academic capacity in prestigious academic journals” (lines 40-41), the meaning of academic journals was translated to an indicator for measuring the competitiveness of an academic discipline, and even a country, which echoes previous discussions. Nevertheless, not all journals were equally important; only those enlisted in international indexes are considered valuable. Hence, the set of SCI standards for evaluating journals was taken as a national standard to define a journal of excellence. In sum, to create an SCI-acknowledged journal of earth sciences became a “common goal” and a method to promote the national level of research quality (lines 60-62).

The article “The Foundation of the Journal of Biomedical Science” (Appendix 21) manifested such desires for “international position” (line 29, 40 and 44), “international visibility” (line 25 and 34), “international attention” (line 29) and “international recognition” (line 26). A lack of international visibility was stated as a

severe struggle or difficulty (lines 35-36). Like the case of earth science, the set of SCI standards was adopted as the national criterion to define an international journal of excellence. The tone was closer to anxiety than concern. In addition, the language of business, “marketing” (line 24 and 33), was used in a discussion on academic management.

Behind journals, the introduction of bibliometrics also reshaped a frame of desired academic outputs either in the level of institutes or individuals. According to “A Discussion about Domestic Scientific Development Indicators in Terms of Science Citation Index” (Appendix 18),

“In global academic community, the method in the past of measuring national investment in scientific development and following results was to count and compare numbers of active researchers and amounts of funds in various countries. This comparison allows us to understand some superficial issues in the international academic community. (lines 35-38, p. 558, Appendix 18)”

In the past, the difference between investments and outcomes was not clear-cut. Numbers of researchers and grant amounts could account for both inputs and outputs. However, when bibliometric indicators became available, this past method was regarded as “superficial”. Alternatively, numbers of patents, publications and citations were considered as reliable indicators (line 40-41, p. 558). Although the desire for international recognition was a permanent theme, the practice of international comparison was not presented in such a quantitative approach until the end of the 1980s. Similar pursuit of quantitative measures can be found in “A Discussion about Application of Science Citation Index” (Appendix 17) in 1983 and “An Empirical View on Performance Indicators on Higher Education of Taiwan” (Appendix 14) from 1994.

“The Ministry of Education had devoted effort to evaluating universities and departments. Along with on-site inspections, if they refer to this objective indicator, they can get a more correct conclusion.... In addition, research fund bodies can realise an applicant’s performance in an objective and accurate way

by reviewing the applicant's publications in the past of five or ten years with the Science Citation Index database. They can refer to this data when they distribute funds to projects. (lines 85-92, Appendix 17)"

"The Ministry of Education took the affair of higher education evaluations...Aspects of the evaluation included faculty, curriculum, library collections, instruments and educational outputs. Even if this evaluation was based on a good intention, evaluation procedures usually followed the model of presentations, paper evaluations, visits and symposiums...Chen (1992) indicates that unclear evaluation standards lead to unconvincing results. Ma (1990) indicates that less objective evaluation tools are a waste of resources and demoralise higher education. (lines 3-14, p. 63, Appendix 14)"

In domestic evaluations, either qualitative approaches: curriculum, on-site inspections, visits and symposiums, or quantitative approaches: library collections and size of faculty and grants, were deemed as "less objective". Otherwise, the usage of bibliometric data was considered "correct" and "objective". Governing the academy was not a new practice, but bibliometric measures provided a digital tool to monitor academic efforts effectively, and redefined valid evaluations and academic activities. In this way, the contents of research, training for future scholars, research environments and investment in instruments were downgraded in the narrative of pursuing academic excellence.

Due to changes in the interpretation of academic performance modified by bibliometrics, the ranges of acceptable academic practices have been narrowed down to publications in the format of bibliometric-authorized journal articles, which usually means SCI-indexed journals. Selection of bibliometric indicators will be discussed in the next section. Therefore, publishing in SCI-indexed journals has become a primary task for scholars. For example, "it is a thing of matter for researchers to publish meaningful and valuable research results quickly" (lines 5-7, Appendix 20). The speed of publishing was now also defined as an issue, implying that a researcher who published slowly may not fit the new academic norm.

The distinction between purposes and methods became a blur. In the beginning, the purpose of using bibliometric tools was to measure the capacity of scientific research and innovation. Gradually, instead of scientific capacity, the calculation of SCI became a crucial concern. For instance, in “A Discussion about Domestic Scientific Development Indicators in Terms of Science Citation Index” (Appendix 18), there was a discussion about three domestic journals which might be dropped from the SCI database.

“If all these three SCI-indexed journals are disqualified, we will lose one hundred authors who own SCI-indexed papers. This will generate significant impacts on our rank in international academic community. (lines 40-43, p. 567)”

This worry indicated that the idea of national development and academic prestige was replaced by a digital standard, and the purpose of enhancing scientific development was replaced by promoting SCI-based rankings.

With formation of this ‘objective’ benchmark for academic practices, the usage of bibliometrics extended to the evaluation of individual researchers, departments and disciplines. In this paper “A Reform in the Guideline for the Type-1 Award of Research in the Department of Biology, National Science Council, and the Following Result of Evaluations”, released in the *National Science Council Monthly* in 1999, a new formula for calculating performance of a researcher and the productivity of a subdiscipline was invented in Taiwan. Overall the rationale for the new method was value for money and results were produced over the short term. The even-handed principle and balanced development among all subdisciplines were delineated as a problem: “pseudo fairness” or “the counter mechanism of selection by competition” (lines 11-12). The value of academic investment was assessed exclusively by productivity of publications. Therefore, the permission ratio of research awards among subdisciplines had to be normalised by their performances. This literature also showed an enthusiastic trust in numbers. It was said that both the role of quality and quantity mattered, but the way of defining research quality was based on a quantitative approach: SCI citation analysis.

It is said that in the beginning the SCI-based formula of Research Performance Indicator (RPI) was only for internal references, so there is no discussion in the *National Science Council Monthly* on the foundation of RPI. This paper is one of few occasions where the RPI formula is displayed publicly. The formula for individual scholars is Research Performance Indicator (RPI) and the formula for each subdiscipline is Z transformation. The formula of Z transformation is:

$$Z=(X-\mu)/\sigma$$

X: the average of publication numbers per people in a given subdiscipline

μ : the average of average publication numbers per people (X) in all subdisciplines

σ : the standard deviation of average publication numbers per people (X) in all subdisciplines

The formula of RPI is:

$$RPI=(C*J*A)*N/M$$

C: Classification of publications (Full article: 3 credit; Review article: 2 credit; Letter: 2 credit; Case report: 1 credit)

J: Journal ranks

| SCI and SSCI journal rankings | | Non SCI- or SSCI-indexed journal | |
|-------------------------------|---|----------------------------------|-------|
| Top 20 % | 5 | Journal of Biomedical Science | 2.5 |
| 20% - 40% | 4 | NSC-certified journals | 1-1.5 |
| 40% - 60% | 3 | Others | 0.5 |
| 60% - 80 % | 2 | | |
| Under 80% | 1 | | |

A: Authorship (Single author: 6 credits; First or corresponding author: 5 credits; Second author: 3 credits; Third author: 1 credit; From the fourth author: 0.5 credit)

Non-journal-type outputs: PhD thesis (15 credits), patent (20 credits), technology transfer (20 credits), patent and technology transfer (30 credits)

N: the number of outputs counted in this calculation, which depends on the length of career.

M: the maximum of $(C*J*A)*N$. The maximum of each work $(C*J*A)$ is 90 in the case of a single author (6 credits) of a full article (3 credits) in a top 20% journal (5

credits). However, because only less than 2 % papers belong to a single author, the maximum of each work is taken as 75.

| Length of career | N | M |
|-------------------|----|------|
| More than 5 years | 15 | 1125 |
| 4 - 4 years | 12 | 900 |
| 3 - 4 years | 10 | 750 |
| 2 - 3 years | 8 | 600 |
| 1 - 2 years | 6 | 450 |
| Less than 1 year | 4 | 300 |

In this case, RPI was applied to evaluation for research awards but was used in the evaluation for project-based fund applications in the National Science Council also. The formula of RPI might be modified in different universities after the universities adopted it in internal evaluations. For example, if a university operates an academic journal, the journal might get upgraded in the J weight to encourage staff to publish in it. The foundation and circulation of this SCI-based formula from the National Science Council to the university reflects the deployment of apparatus and the spread of institutional practices in the case of bibliometrics.

4.3. Selection of bibliometric indicators and formation of objectivity

There are numerous bibliometric indicators, but only a few are assigned a prominent position. Selection of bibliometric indicators reflects changing ways of interpreting bibliometrics. In the end, interdisciplinary bibliometric indicators rise above those bibliometric indicators only for particular disciplines. I argue two reasons that might explain this phenomenon. First, the interdisciplinary bibliometric indicator provides administrations with a universal benchmark to measure all academic disciplines. Second, some academic disciplines which are productive in publishing journal articles take the interdisciplinary bibliometric to justify themselves and then to claim more resources.

In the initial stage (“A Discussion on Domestic Biological Journals” in 1982, Appendix 16), SCI was just one of the bibliometric indicators and had not yet arrived in the dominant position. There were alternative options, such as *Chemical Abstracts*, *Biology Abstracts*, *Zoological Record*, *Index Medicus*, indicating networks were open

to all potential actors at this moment. In “To see domestic medicine journals in the eyes of international indexes”, published on the *National Science Council Monthly* in 1988, several international bibliometric indexes were used to evaluate domestic medicine journals, like SCI, *Biological Abstract*, *Index Medicus* and *Excerpta Medica*. The author was not a member of the *National Science Council* but a professor in a university, representing an academic viewpoint. Most of these bibliometric indexes focused on biomedicine-relevant areas, except SCI which included journals across natural sciences and engineering fields. The two articles discussed international recognition of domestic academic journals. Hence, although these bibliometric indicators, except SCI, merely focused on specific areas (biology, zoology or medicine), they were able to account for worldwide recognition.

On the other hand, in the article “An Analysis of Domestic Scholars' Publications in the Field of Biology Sciences: A survey of citation frequency between 1978 and 1983”, released in the *National Science Council Monthly* in 1986, and “A Discussion about Domestic Scientific Development Indicators in Terms of Science Citation Index” (Appendix 18), only SCI was used. As per previous analysis, bibliometrics' functions now switched to measuring investments and outputs for administrators of science affairs. Thus, I argue this is because for a governor of science affairs, a bibliometric tool capable of interdisciplinary comparison was more practical than discipline-specific bibliometric indexes. As a result, the role of SCI had become more dominant than other indexes. In the case of managing journals of earth science (Appendix 20) and biomedicine (Appendix 21), SCI was almost the only standard of internationally recognised journals. In the case of Research Performance Indicator (RPI), the formula was on the basis of SCI. However, SCI only covered disciplines of natural sciences and engineering. While the Arts & Humanities Citation Index (AHCI) and Social Science Citation Index (SSCI) were too American-centric, there was a lack of such an interdisciplinary bibliometric database for humanities and social sciences in Taiwan. Hence, with an emphasis on interdisciplinary comparison and governance, the National Science Council established the Centre for Humanities Research and Centre for Social Science Research in 1999 to operate the Taiwan Humanities Citation Index (THCI) and Taiwan Social Science Citation Index (TSSCI) which have been released annually since 2000 (陳光華, 2009).

The success story of SCI provides a chance to explore the mechanism by which objectivity is formalised. As Latour (1987) argues, objectivity rests on whether an artefact can mobilise other actors effectively. In practical terms, what enables a quantitative indicator to engage other actors? The case of SCI articulates three methods. First, because quantitative indicators could reduce complicated issues into commensurable matters, utilisation of the quantitative measure allows more laypeople to take part in discussions without correspondent expertise (Espeland and Lom, 2015, Porter, 1996). This numerically-based feature accounts for the selection of SCI over qualitative evaluation, such as curriculum, on-site inspections, visit and symposium, listed in Appendix 14 and 17. Second, among a range of quantitative indicators, the one which has a higher degree of compatibility allows broader comparison and competition (Beer, 2016). This characteristic accounts for the selection of SCI over others, such as subject specific bibliometrics and sums of library collections. Third, the introduction of an object may fundamentally transform conceptions of reality and identity, and then redefine a more imperative problem, by which a broader network replaces the previous one (Latour, 2005, Mol, 2002, Mol, 1999). This explains why other genres of numbers, such as numbers of researchers and funding inputs, lost their position of defining parameter (Appendix 18). “(B)ecause the phenomenon are produced by fundamentally different techniques” (Hacking, 1992, p.57), an incommensurability is engendered between the new and former models. The success story of SCI elucidates how a number (a numerically-based bibliometrics index) can gain objectivity over other numbers by associating with more actors.

The foundation of RPI illustrates how networks within an artefact turns to a black box. First, because, the RPI formula is entirely a process of calculating SCI, its traceability ensures authority of this translation (Latour, 1999). Second, because the RPI formula condenses a range of publications’ SCI values into just one number, this renders individuals’ diverse capacity for publishing more commensurable (Latour, 1999, Espeland and Lom, 2015). Due to the increasing compatibility, the RPI formula is able to build more connections with actors, who apply the RPI formula to broader practices, such as hiring, promotion evaluations, department appraising and research proposal reviewing. In other words, on the basis of the RPI formula, more actors are

engaged, and more networks are formed. As a result of the second translation, SCI turns into something that seems like pre-established, taken for granted, or a black-box.

Parallel to bibliometric indicators, more indicators were discussed in “An Analysis of National Competitive Strength of Science and Technology in the Age of Knowledge Economy” (Appendix 23) in 2000. This paper showed how the selection of indicator was linked to the narrative of national development and competitiveness. Narratives about knowledge economy will be further explored in the next section. Comparison with literatures from the 1970s, 1980s and 1990s, show there was a marked enthusiasm for quantitative international comparison. For instance, “a meaningful science and technology indicator should be capable of international comparison” (line 36, p. 780). Therefore, besides SCI and the Engineering Index (EI), OECD indicators and IMD indicators were used to analyse national competitiveness in this paper. In sum, procedures of selecting interdisciplinary and international indicators reflects the interests of policy makers and science administrators.

The gaps in these literatures is also worthy of attention. The National Science Council is in charge of granting funding to natural science and engineering research as well as social science and humanity projects. However, social sciences and humanities had been absent from the development of bibliometric measures in Taiwan from the late 1970s until the establishment of THCI and TSSCI at the end of the 1990s. In the fields of social sciences and humanities, monographs used to be the main format of publishing rather than journal articles. Even in areas of natural sciences and engineering, each department has various patterns of publishing and quoting (Weingart, 2005). In the case of Taiwan, the deployment of bibliometric indicators began with biomedicine disciplines, then extended to the whole of natural sciences and engineering and finally included social sciences and humanities; while the usage of bibliometric indicators shifted from single-disciplinary indexes to inter-disciplinary indexes. This order corresponds roughly with productivity in journal articles across disciplines, inferring tension and competition within various academic disciplines which is not coincidental.

In summary, the object of bibliometric measurement has shifted gradually from

academic journals to scholars and academic institutions, and from the academy to national performance. The meaning of the bibliometric measurement is extended from the value of academic journals to national competitiveness. The application of bibliometrics includes journal ranking, university ranking and evaluations, and the ranking of national competitiveness.

5. Narratives about university after the Education Reform: knowledge economy

After the Education Reform movement, dominant narratives about higher education shifted back to a new version of national development: knowledge economy. Under this framework, the purpose of university is majorly focused on economic growth. When the notion of social justice faded out, the role of university evaluation was transformed into a mechanism of re-concentration of educational resources in the name of the 3Es.

How did people interpret this term ‘knowledge economy’? According to “An Analysis of National Competitive Strength of Science and Technology in the Age of Knowledge Economy” (Appendix 23), the age of knowledge economy was when “environments of the global market change quickly” (line 8, p. 780) and “changes in the capacity of science and technology influence national competitiveness deeply” (line 9, p. 780). The age of knowledge economy was when “global competition” (line 35, p.780) becomes intensive and every country increases “investment in education, R&D and innovation” (line 41, p. 780). The age of knowledge economy was when “designs of science and technology policies, distribution of funds and human resources, research directions and priorities” (lines 10-11, p. 780) were subject to a big scheme of national development. These narratives of knowledge economy seemed quite similar to those previous narratives of national competitiveness and development in Taiwan.

Another example is “A preface to the White Paper on University Educational Policy” (Appendix 24), released in the *Higher Education Newsletter* in 2001. In the name of knowledge economy, academic prestige had been translated to economic growth and “competitiveness of universities is a crucial indicator of national competitiveness”

(line 8). In general, this viewpoint was a reproduction of previous discourses where the university was deemed as one aspect of socioeconomic development. A nuance between the new and previous versions was an increasing emphasis on the production of knowledge. In the 1970s, the main ways in which the university contributed to national development was producing qualified manpower. In the 1980s, knowledge production as an output started to gain attention, but the university's role in producing human resources still took centre stage. In the White Paper, "the university has become an arena for innovation and manpower" (line 7), meant an expansion in targets of higher educational policy from outputs of human resources towards outputs of knowledge.

The emerging notion of knowledge economy generated several impacts. In the past, the narrative of state progress and economic growth had favoured those practical disciplines of natural sciences and engineering. The highlighting of economic knowledge strengthened the exclusion of social sciences and humanities by underlining the economic practicality of knowledge. Second, it offered a new rationale for distribution of educational resources. During the movement of educational reform in the 1990s, the uneven distribution of resources between public and private universities, and research-type and technical universities had been problematised in terms of social justice, which was admitted by the White Paper (line 23). However, in the age of global competitiveness, if national progression was determined by a few excellent universities, it seemed irrational to pursue the even distribution of educational resources. In this way, concentration of higher education resources became acceptable again. Third, it transformed the purposes of university evaluations. In the educational reform of the 1990s, the establishment of university evaluations promised to ensure university diversity and aid those less prestigious universities. Nevertheless, in the name of knowledge, academic excellence had become a central criterion for evaluating university's performances.

6. Discussion

6.1. International competitiveness and reputation: from individuals to the whole state

As discussed in the chapters 'literature review' and 'methodology', an imperative

problem is not something over there waiting to be discovered but is rather constructed; therefore, to elucidate procedures of problematising, is a key to explore how power is exercised (Foucault, 1978, Foucault, 1980, Rose and Miller, 1992). The purpose of Foucauldian discourse analysis does not aim at unearthing a hidden truth but revealing the conditions of the given truth (Hall, 2001, Hook, 2007). To make it clear, I define that in this case, the subject of subjectification is academic practices: a formalising Academy; the truth is the set of statements and standards for desirable academic activities. Hence, to study ‘research question 1: how academic practices have become an object of knowledge and power’ is to research how academic practices have become problematic. Are academic practices deemed as problematic in Taiwan? The answer is yes, so there is a need for educational reforms and evaluations. Then, the next question is what are the exact problems of academic practices, and where are these problems from: the conditions of the problem.

As my analysis shows, there is a prominent theme that keeps being reproduced in narratives across several decades in Taiwan: (inter)national competitiveness and reputation. Compared with other cases, is there any contextual factor in Taiwan which makes this case different to other cases? Needless to say, no country would say no to increasing its international competitiveness and reputation. However, in Taiwan concepts of international competitiveness, reputation and recognition are tightly enmeshed so that they seem like almost the same affair. As endorsements of international recognition, appeals for international competitiveness became an irresistible impetus in Taiwan, more so than for other countries. This anxiety for international visibility might be strongly related to a fact that from 1971 Taiwan lost both its position in the United Nations and its diplomatic recognition. The passion for international visibility is embodied not only in academy but also in all forms of international competition, from numerous sports events, to the International Mathematical/Biology/Physics Olympiad, the Oscars, extending to engaging in cocktail or coffee-making competitions. The phrase the ‘pride/glory of Taiwan’ is widely used to describe people, companies or products which have succeeded in gaining positive international attention. Under these circumstances, the narrative of national development and competitiveness in higher education becomes irresistible in Taiwan, and academic performances are described as a genre of international

competition for achieving global visibility. Exclusion from global communities is a contingency for emerging problems and finding – and following – possible solutions towards managing higher education in Taiwan.

Great eagerness for international recognition makes universities in Taiwan vulnerable to procedures of problematisation of academic practices. Here I compare statements about higher education in the UK and Taiwan,

“Societies which invest in ideas and research are generally more creative, more productive, more resilient, more open, more profound and more equipped to face and understand challenge. They are better places to work, to live and to think: stronger, deeper and more dynamic communities. Whilst creativity, ideas and questioning are of value in their own right, economies and societies which invest more in research generally show faster rates of growth in output and human development. (p. 6, Research Excellence Framework review: Building on success and learning from experience, 2016)”

“Education is a root of national establishment. Developments of politics, economy, society and culture are tightly linked to education. In the past of two or three decades, scientific and technologic developments, economic growth and political progression are outcomes of massification and promotion of education. However, education has to reform endlessly in order to fit national development, social changes and world trend. (A speech for the first meeting of the Education Reform Commission, 1994)”

“The 21st century is a period when knowledge economy takes a central stage. The university has become an arena for innovation and manpower around the world. Competitiveness of universities is a crucial indicator of national competitiveness. (A preface to the White Paper on University Educational Policy, 2001)”

In the first statement, academic practices “are of value in their own right” with additional benefits to economies and societies. In the second and third statements,

academic practices are subject to national development and competitiveness. Without the assumption of academic value on their own, either individuals' research projects or departmental developments are a part of a big scheme and must contribute to national competitiveness. In this way, the hegemonic narrative of national development plays a substantial role in problematising the university and academy in Taiwan, encompassing domestic journal management, department management, individual research projects and personal promotion evaluations. Through textual analysis in this chapter, I have shown that within this discourse the imperative problem of academic practice can be stated as 'because the university lacks competitiveness, it might not be able to promote national competitiveness and international prestige magnificently'.

Beyond the notion of a given problem, the procedure of problematisation consists of techniques of investigation, continuous measures, institutional practices and establishing knowledge (Foucault, 1978, Foucault, 1980). For Foucault, the relation between politics and knowledge is interwoven; it is neither a change in social or economic situations transforming knowledge immediately, nor a shift in episteme transforming society directly (Foucault, 1991b). Rather than direct impacts, political practices engender influences through transforming the condition of formation. The system of formation includes administrative records, establishment of archives, institutions and social relations. In this case, bibliometric tools function as the condition of formation.

6.2. Bibliometric power

Shown in the chapter 'literature review' and 'methodology', power can take a subject as a target only if knowledge and techniques are capable of investing in the subject (Foucault, 1978). According to Latour (1987), the ability of governing something at a distance rests on the foundation of the centre of calculation, by which a complex phenomenon is transformed, coded and reduced into compatible data and information which can then be mobilised as a resource. This procedure of accumulating knowledge requires numerous practical tools and protocols to inquire, collect, codify and register. Hence, Foucauldian discourse analysis includes not only linguistic practices but also extra-textual practices: material conditions and institutional

practices (Hook, 2007). In this case study, these extra-textual aspects include (a) institutions where relevant narratives and knowledge are produced, such as The Ministry of Education, The Ministry of Science and Technology (National Science Council), academic disciplines of business, management, education study and education administration and their publications; (b) administrative institutions in charge of governing the academy, such as The Ministry of Education, The Ministry of Science and Technology, Higher Education Evaluation and Accreditation Council and university bureaucracy; and (c) instruments, such as bibliometric tools, the RPI formula and other key performance indicators. Among these material conditions, bibliometric measures as an instrument play a significant role. When social and political contexts provided conditions to interpret bibliometric indicators, the introduction of bibliometrics into Taiwan also enabled the state to frame academic activities in more comprehensive ways, leading to standardisation of scholarly activities and governmentality in academy. In sum, the foundation of bibliometric knowledge contributes to the subjectification of the Academy and leads to effects of surveillance and normalisation in a Foucauldian sense (Foucault, 1979, Foucault, 1978).

The above discussion underlines how power exercised, is enacted by the deployment of bibliometric devices. The following section emphasises the role of bibliometrics, as an object. From there, I will deal with a crucial theoretical issue: objects as an actant. It is true that there are subjective factors, intentions and motives behind a selection or design of investigative instruments. However, how does one instrument, such as SCI, become dominant over other potential objects? The following statement, ‘one object gets more influential because of the deployment of discourse’, would seem a touch tautological to me. Therefore, it is necessary to scrutinize the explicit mechanism by which a bibliometric indicator emerges. It begins with a first question: how can one object gain objective authority?

While a complete phenomenon is too complicated to be mobilised, numbers travel well. Thus, standardisation and replacement play a crucial role in reducing scholarly practices into portable data. According to Latour (1999), this procedure is characterised by traceability to ensure authority of this replacement. Design of

bibliometrics is characterised by traceability which makes people consider bibliometric measurements more 'objective' than other qualitative inquiries. Another property of the procedure of standardisation and replacement is comparability which means the capacity of being compared with other data. The importance of comparability might account for selection of bibliometric indicators in Taiwan. Bibliometric indicators with the capacity for interdisciplinary comparison became dominant eventually instead of those which work only in particular fields. The usage of bibliometric measures was further incorporated into national economic and development indicators for international comparison. In this way, intellectual activities are translated into SCI which is further translated into GDP. Because SSI succeeds in entangling, with more actors and formalising an assemblage, it is no longer an object, but a thing: a matter of concern (Latour, 2004). Objectivity is constituted by its assemblage rather than the object itself.

The second question is: what kinds of impacts does the introduction of the object produce? As Mol (2002) argues, if identity is deemed as a kind of performance, practising identity in the mundane world must involve material aspects. For instance, it is impossible to perform sexual identities without deploying clothes and bodies, such as hairstyles, muscle, skirts and accessories; that is, the object. The same is true for academic identities. An ideal imaginary of academic excellence is an academic identity or the Academy. While performing identity, the introduction of an object may offer practitioners a new way to perceive the world, leading to multiple realities (Mol, 1999, Mol, 2002). With this capacity of enacting a reality, an object acts like an actant. This chapter articulates several turns in academic identity which are ontologically modified by the bibliometric indicator. Bibliometric indicators changed ways of appraising quality journals, by which a lack of SCI-indexed journals has become a task to be performed and achieved for both individuals and institutions. It modified standards of outstanding institutes and scholars. Thus, former frameworks, such as inputs and curriculum, have become less objective, while a lack of SCI journal articles has turned into a problem. It renewed the definition of national competitiveness, by which publishing behaviours has become an event of a kind of academic Olympic Games. In addition, there is also an interpretive switch in National Science Council funds from pensions to reward and competition-based grants. In sum,

my analysis indicates that by constructing a new academic reality, bibliometrics manifests the agency of numbers. This analysis also shows entanglements between problems and solutions; the term which depicts the problem is usually utilised to frame the solution, whereas the solution also becomes a source of the problem in return (Neyland and Milyaeva, 2016).

The explicit analysis of an object as an actant in terms of multiplication of reality is relative to a core theoretical debate: the ontological status of discourse (Mol, 2002, Law, 1994). As Foucault's theories take the position of anti-essentialism, causes of behaviours would not be explained by structural forces in the Foucauldian perception. Based on this assumption, if discourse is not this kind of presupposed structural force, what is the force which binds a discourse together as a whole? According to Mol (2002), it is because of “networks that gradually come to hang together by means of small forces – forces that the analyst cannot presume to be there, but must be able to point out: associations” (p. 70). Will this ANT perception be coherent with a Foucauldian position on the ontological constitution of discourse? Fundamentally, the ANT approach disagrees with technological determinism and materialism; knowledge, technology and instruments do not have power to impose themselves. When analysing the agent of objects, it highlights that the object’s agency does not come from attributes of the object itself, but rather from networks: and, crucially, how actors associate with it. In other words, the concept of assemblage is characteristic of what Foucault calls contingency: one possibility from a set of given conjunctions. In sum, the feature of associates accounts for how a discourse hangs together as a whole. The feature of multifaction of reality, enacted by the instrument as an actant, explains how discourse mobilises individuals to act in an assumed direction. By this empirical study of bibliometric instruments in Taiwan, I attempt to reconcile the Foucauldian theory with the ANT approach, and then suggest that ANT’s concern with associates might extend the scope of Foucauldian how-type questions.

6.3. Academic assessment in Taiwan: democratisation, globalisation or neoliberalisation?

Could changes in higher education policy and university management in Taiwan be interpreted within the frame of neoliberalism? This empirical analysis recognises a

contextualised situation; the formalisation of university evaluations in Taiwan was a contingent result of the education reform of the 1990s, which in turn was influenced by democratisation movements. In educational reform, one crucial debate was around social justice: equity of educational opportunity and distribution of educational resources, which is a typical focus of the Sociology of Education. Hence, the global movement of neoliberalism can not completely account for this ‘marketisation’ of higher education in Taiwan.

In the general narrative of the global neoliberalism movement, it seems like regional actors simply follow this thought and trend in a passive top-down way (Harvey, 2005, Mirowski, 2011). However, this chapter suggests that there might be a bottom-up procedure in neoliberal processes. The movement of education reform was launched by citizen societies and the settlement of university evaluations relied on compromise and consensus among all actors in Taiwan rather than an out-there force. My analysis articulates the historical configuration through which actors became engaged. Academy obtained an autonomous status. Private and vocational universities got a chance to compete with public universities for more grants. The state could govern the performance of the university without direct supervision and achieved the appeal for ‘university democracy’. This empirical case shows local actors’ agency still plays an indispensable role in so-called neoliberalisation, globalisation or marketisation of higher education. Mirroring Latour’s viewpoint on the ontological existence of power (2005), the implementation of neoliberal power rests on the successful mobilisation of local actors via establishing networks, rather than a top-down order or external authority.

In a similar vein, some scholars argue that when studying influences on international education reform agendas, domestic actors and their reinterpretation of external narratives upon local education reforms are worthy of more attention than the advice and contents of international organisations; relevant empirical case studies also indicate the process of globalising higher education is neither uniform nor linear (Dakowska, 2017b, Dakowska, 2017a, Dakowska and Harmsen, 2015). As Peck (2013) suggests, the label neoliberalism could be a preliminary lens to connect a range of historical experiences, but it should not be taken as an “all determining mega

cause”. If so, it would misrepresent how things actually begin assembling. Both these scholars’ research and my case study in higher education show that the power of so-called global neoliberalism rests on how actors apply it to launch collective works locally, leading to multiple – and sometimes contradictory – neoliberal practices.

However, the language of neoliberalism, such as the 3Es, did play an active role in replacing those narratives of equity and academic freedom. In other words, the purpose of university assessments in Taiwan was transformed by neoliberal discourse; the domination of neo-liberal discourses of university education provided a rationale for re-concentration of educational resources. This identifies that the interpretation of an artefact is a continuous and dynamic process. Nevertheless, this re-interpretation of academic evaluations also engenders strong dissent from several actors, placing higher education policy in dispute. Whilst the account of the neoliberal movement can not entirely explain the development of higher education in Taiwan, the application of neoliberal discourse facilitates the neoliberalisation of the university. In the sense of ANT, this is the performativity of neoliberalism (Callon, 2007, Callon and Muniesa, 2005).

7. Conclusion

This chapter aims to answer main research question (A): how academic practices have become an object of knowledge and power, and (B): how bibliometric measures have become a resolution to assess academic excellence via an approach of Foucauldian discourse analysis. Beginning with historical documents, this chapter reviewed four main narratives about university in Taiwan and illuminated a craving for prestigious national reputation. With the notion of interpretative flexibility, this chapter showed how conceptions of research funds, bibliometrics and academic excellence are formalised and modified gradually. Beyond textual practices, I also explored extra-textual aspects, such as institutions where relevant narratives were produced and investigation tools used such as bibliometric measures.

This chapter provides a ground for further research. In Chapter 5, I will explore contemporary imaginaries of university in four disciplines: natural science, engineering, social science and the humanities. As demonstrated in this chapter, both

textual narratives of academic excellence and the selection of measurement devices are relative within a few natural science disciplines, while perspectives from other academic disciplines are less visible. I will present imaginaries of higher education beyond documents, via interviews with scholars from various disciplines and compare the findings with the discussion in this chapter. In Chapter 6, I will explore how the criteria for academic practices elucidated in this chapter have been spread and duplicated into universities and departments. Through these institutional practices, scholars' everyday activities and knowledge production are radically reshaped.

Figure 4. Table: Corpus of documents

| Serial Journal | | | |
|---|--|--|--|
| Title | Institution | Period and volume (update: 29/Jun/2018) | Selected Period |
| National Science Council Monthly (1973-2002); Science Development (from 2003) | National Science Council (1959-2014); Ministry of Science and Technology (from 2014) | Vol. 1(1) (1973)-No. 545 (2018) | Vol. 1 (1973)-Vol. 29 (2001) |
| Higher Education Newsletter | Ministry of Education | No. 1 (1989)- No. 189 (2006) | No. 8 (1991)-No.45 (1994); No. 83 (1998)-No. 189 (2006) |
| Educational Reform Newsletter | Education Reform Commission (Executive Yuan) 1994-1996 | No. 1 (1994)- No. 27 (1996) | No. 1 (1994)- No. 27 (1996) |
| Bulletin of Educational Research | Graduate Institute of Education, Taiwan Normal University | Vol. 1 (1958)-Vol. 64 (2018) | Vol. 1 (1958); Vol. 13 (1970); Vol. 20 (1978)-Vol. 49 (2003) |
| Journal of Education & Psychology | College of Education, National Chengchi University | Vol. 1 (1977)-Vol. 41 (2018) | Vol. 1. (1977)-Vol. 27(2004) |

| Book and Monograph | | |
|--|---|-------------|
| Title | Institution of editors or authors | Year |
| Higher Education | Graduate Institute of Education, Taiwan Normal University | 1979 |
| A research on improvement in promotion system of university faculty | Executive Yuan | 1989 |
| A preliminary study of higher education problems | Graduate Institute of Education, Taiwan Normal University | 1992 |
| The ideal of higher education | Graduate Institute of Education, Taiwan Normal University | 1994 |
| The reform of higher education | Graduate Institute of Education, Taiwan Normal University | 1994 |
| University's responsibility and autonomy | Graduate Institute of Education, Taiwan Normal University | 1997 |
| The massification and marketization of higher education | Institute of Education, National Chiao Tung University | 2000 |
| The marketization of higher education : a comparative study of Taiwan, Hong Kong and China | Institute of Education, National Chiao Tung University | 2002 |

| Official Press | | |
|--|--|-------------|
| Title | Institution | Year |
| White paper on university education policy | Ministry of Education | 2001 |
| White paper on scientific education | Ministry of Education and National Science Council | 2003 |

| Conference Proceeding | | |
|---|----------------------------|-------------|
| Title | Institution | Year |
| NTU forum on higher education | National Taiwan University | 2006 |
| Internationalization of university: national forum on higher education | Ministry of Education | 2008 |

Chapter 5: Multiplicity of academia under the neoliberal discourse

1. Introduction

In Chapter 4 I elucidated four main narratives about university education in Taiwan by analysing documents. However, these documents are just one kind of media, and many narratives of Taiwanese education proliferate beyond texts. My analysis also suggests that these documents may only represent a few visible and public accounts of higher education that might ignore other marginal actors. In this chapter, I aim to explore in more depth the contemporary narratives of higher education in Taiwan through interviews with scholars in four different academic disciplines: the humanities, social science, natural science and engineering.

As discussed in the chapter on methodology the word ‘discourse’ is ambiguous. This thesis will stay coherent with Foucauldian frames. In Foucauldian discourse analysis, discourse consists of both a linguistic aspect and a material aspect; the latter includes instruments, administrative registration, institutions which generate literatures and institutions which produce and reproduce social relations (Foucault, 2002a, Foucault, 1991b, Hall, 2001, Arribas-Ayllon and Walkerdine, 2008, Hook, 2007, Foucault, 1978). In short, discourse is a set of procedures which enacts subjectification. In this thesis I look to describe a discursive imaginary about what higher education should be and consist in.

Exploring scholars’ accounts of higher education is an important task for this thesis. A discourse of university education is not only a description of how an ideal university should be and of what it should also consist, but also a framework by which individuals evaluate their values, position, status and relations with others, especially within society. In Chapter 4, I have not only delineated narratives of Taiwanese higher education but have also shown how relevant narratives were produced, deployed and reproduced by various institutions. Have these statements influenced academics’ own conceptions about the academy, or are these narratives incorporated into the ways individuals frame and interpret themselves? Has the discourse become conditions of truth which define the ‘right problems’ of higher education?

Accordingly, to research scholars' ways of interpreting the university is to analyse the mechanism of governmentality, as well as possible resistance to state interferences in the case of higher education.

As Apple (2011) points out, the phrase 'relations between universities and society' is not a proper usage, because it implies that the university is something external to society; educational sectors themselves, including the universities, are a part of society. I agree with this position. Hence, when I discuss universities' relations with other social sectors, I do not mean that the university is external to society. Occasionally I might use the phrase 'relations between universities and society', but this is just to keep coherence with interviewees' viewpoints. As an example of one social sector, what are universities' given functions? Who are academics responsible to? Which social sectors build connection with academics, for instance the government, religious groups, civic communities or industry? In this chapter I will focus on the relations between academics and other social sectors.

As I demonstrated in Chapter 4, the dominant narrative in documents on Taiwanese higher education focuses on state process and international recognition. This dominant narrative suggests that universities in Taiwan have been very function-oriented. This is important, because it means there are close connections between the academy and the government. The first minor narrative I identified can be summarised as human-centred or humanistic accounts. The second minor narrative I identified focused on the notion of academic autonomy in terms of power relations between the state bureaucracy and the academic. The third narrative draws on the notion of social justice and (in)equity in education. These minor narratives represent alternative ways to frame the position of universities in society and provide a criticism of the current relations between academics and social sectors.

This chapter is the first phase of interview data analysis (interviews were conducted in 2017). In total, 41 interviews were conducted and transcribed (shown in Figure 7-9). The interviewees were scholars from 12 public universities, 5 private universities and 1 private college. For anonymity, some personal information is hidden. In order to protect interviewees from being identified, their personal administrative experience is

listed separately in Figure 8. Items of administrative experience are not exclusive. For example, one scholar may have experience of working on an editorial board as well as being a department director. Methods of conducting semi-structured interviews were discussed in Chapter 3 ‘methodology’. Briefly, the interviews were composed of two parts: direct discussions and graphical representation of interviewees’ previous publications. The direct discussion topics covered interviewees’ opinions towards university education and experiences of being assessed, publishing and applying for research funds. The graphical representation was utilised to remind interviewees of the details of their research projects and published articles (Gläser and Laudel, 2015). All interviews were recorded and transcribed. Transcriptions were coded for further analysis. After I had elaborated on mapping up these codes, six main motifs were identified via the primary analysis. An original list of trends and mindsets is shown as Figure 10. Themes of the function and responsibility of the university; academic management; impacts on researcher behaviours; and the impacts on a journal’s activities will be further analysed in Chapter 6. In order to be consistent with my research questions, the contents of interviews are categorised into three main themes: narratives of higher education; university governance; and impacts on individual academic practice. In this chapter, I will explore different arguments through the narratives of Taiwanese higher education

This chapter comprises four topics through which to investigate and categorise interviewees’ opinions on the purposes of a university, its position in society and relation to the state. I will elaborate on interviewees’ accounts of university education via three activities that the university in Taiwan is involved in: internationalising higher education, industrial collaboration and university social responsibility, followed by the final theme of academic autonomy. As international competitiveness and recognition are key components of the hegemonic narratives, affairs of internationalising higher education provide a lens for viewing relevant statements. As Chapter 4 shows, the phrase ‘state progress’ in the context of Taiwan usually means industrial development and economic growth. Thus, the activities of university-industry collaboration are a lens through which to observe how scholars see their relations with the industrial sector. The schemes of university social responsibility provide an opportunity for interviewees to answer who exactly the university

(considers itself to be) responsible *for*. Finally, the theme of autonomy focuses on relations between academics and organs of government.

In this chapter I aim to investigate individual researchers' accounts of Taiwanese higher education, to compare these with accounts in documents, and to elucidate relations between academics and other social sectors. I will make explicit how interviewees' conception of academy is influenced or shaped by institutional practices in Chapter 6 which looks in more detail at academic management. By the phrase 'institutional practices' I refer to bureaucratic affairs which individual scholars have to deal with in everyday life, such as internal evaluations, university ranking, promotion assessments and applications for research projects.

2. The first lens: Globalisation of Higher Education

2.1. The rising notion of university globalisation

“For the past few years, due to the tide of globalisation, universities in Taiwan have noted an imperative to develop internationalisation. The university is an important place for offering quality human resources, research and innovation. The university's capacity for international competitiveness is an important indicator of national competitiveness. A university with international competitiveness should contain excellent accountability, teaching quality and research. In terms of internationalisation, along with recruiting more international students and scholars, it is necessary to cooperate with top universities internationally to promote international reputation.

The Ministry of Education's "The Aim For The Top University Project" engenders considerable effects on the internationalisation of universities. Taking our university as an example, with funds from The Aim For The Top University Project, the numbers of international students has increased from 27 to 262 by four years...(quoted from the preface of *Internationalisation of University: National Forum on Higher Education*, p. 1, 2008)”

The above quotation is from a record of the National Forum on Higher Education in

2008, which several university deans attended. This data indicates that practices of internationalising universities in Taiwan are subject to national policy and embedded in the dominant narrative of state progress. This frame defined the function of a university in a utilitarian way, “offering quality human resources, research and innovation”. The state’s competitiveness was linked to universities’ competitiveness, which rested on “excellent accountability”. Another aspect of universities’ competitiveness is internationalisation or globalisation, such as recruiting more foreign scholars and students, and cooperation with ‘top’ foreign universities. These affairs were expressed as imperative and worthy of great investment. In Chapter 4, I have shown that the dominant narrative of university education is based on national progress, where the core concern is international competitiveness. The practice of internationalising universities manifests the same feature.

In interviews, the note of international or national competitiveness also emerged. Several interviewees thought that the university played an indispensable role in promoting national competitiveness (M9, M10, H3 and B9). Some (H1 and H10) argued that the university had to promote Taiwan’s international visibility via academic performance. Competition means to compete with others. Hence, S10 was concerned if students were equipped enough to compete with foreigners, while some (M1, M10, B9, S2 and S6) worried that salaries in Taiwan’s academy might fail to attract excellent scholars in the global market. M10 worried that domestic universities may lose domestic students due to globalisation of higher education. For example,

“I reckon it is for the promotion of national competitiveness, especially in the aspect of economy...This is from a practical view of natural sciences and a background in engineering. (Interviewee M9)”

“At a specific moment, the state considered that this institution can offer that kind of (skilful) people to help growth in economics and industry. This is one of higher education's purposes. From the historical angle, the university in the past indeed provided this kind of human resources...Modern countries, like Taiwan, the USA and UK, all need higher education to offer experts and professionals...Because our society or state think it fits demands for national

development, the state uses its power to establish higher education. (Interviewee H3)”

“To be honest, in the current condition of Taiwan, for example, humanities, there is a need to create the best research in universities. We hope to compete with other countries, to be seen in international communities, and to make others hear our voices, but these tasks can't be achieved without teachers and students in the university. (Interviewee H1)”

In comparison with Chapter 4, the above accounts represent and repeat consistent themes: national progress, economic growth and international reputation across generations, professional position, gender, disciplines and universities. Similarly, the three themes are tightly connected, to the point where they are almost the same idea. This viewpoint is expressed as universal; if it works in the USA, the UK and all modern countries, it will work in Taiwan. It is expressed as practical, unavoidable and graceful, like a truth. As a result, people who disagree with it make themselves seem nonsensical. In terms of Foucauldian discourse analysis, international competitiveness is a discourse: the only valid way to talk about higher education and universities (Foucault, 1981, Foucault, 1978, Hall, 2001).

Along with the concept of international competitiveness, there are indicators and practices to fulfil the aim. As discussed in Chapter 4, without tangible indicators, international competitiveness is an obscure idea. In the case of higher education, the main indicators are bibliometrics and university ranking. M1 offered an example: the establishment of internal evaluations for promoting his discipline's world ranking, which will be further explored in the next chapter. The bibliometric index is another major indicator. As mentioned in Chapter 4, RPI formula was designed on the basis of SCI to calculate academic performances. B9 (a former Vice Minister of Science and Technology) reviewed the development of RPI formula and indicated that this was for communicating with foreign scholars. The invention and spread of the RPI formula will be further discussed in the next chapter. In the age of the globalising academy, several scholars (B9, M2 and M4) emphasised that domestic SCI-indexed journals are important means to compete internationally. Choice of languages for publishing, and

the impacts of bibliometrics on journal management will be discussed in the next chapter.

Few scholars were aware of the procedures for globalising higher education in Taiwan due to its top-down nature. H7 criticised the details and procedures of student exchange schemes as too well established, working as a routine and lacking the ‘spirit of adventure’. B11 criticised several policies in his university which were in place just in response to the Ministry of Education’s observation that university managers lacked awareness of its position in global academic communities. M4 argued that the current criteria of university ranking or internationalisation were founded in a USA-centric context. M4 questioned whether these USA-based indicators could benefit Taiwan higher education, if people pursue globalisation for the sake of globalisation. All these arguments indicate that practices of globalising universities in Taiwan is more like a top-down policy rather than a spontaneous procedure emerging from the work of academics. The exercise of globalisation in universities is for external purposes and subject to a bigger national picture. In this case, the university functions like a device of the state. As shown in Chapter 4, the appeal for national glory in Taiwan is difficult to refuse for academics. This example of university’s globalisation confirms the priority of national pride over academic autonomy, while only a few scholars retained a critical attitude towards it.

2.2. The absence of social justice in contemporary narratives

Worries about international visibility are related to other two topics: university explosion in growth (M1, M2, M6, B3, B10, S8, S10, H4, H8 and H10) and resource centralisation (B5, B9, M9, S1, S4, S8). As shown in Chapter 4, the concentration of educational resources was seen as a problem in the light of social justice during the Education Reform movement in the 1990s. However, nowadays it is said that the explosion in higher education growth leads to a decrease in available resources for each university. In the light of global university ranking and industrial innovation, decentralisation of educational resources is considered a crucial issue. This is why the massification of higher education is described as a problem, and as an ‘explosion’ – which implies that centralisation of higher education resources is the solution to the problem. For instance,

“The first issue is that there are too many universities and colleges, nearly one hundred and sixty something in such a tiny island country. Resources are split so that each university can't keep developing their goals. Almost all universities suffer this problem. (Interviewee B10)”

“Inequality in universities or resource centralisation is a natural phenomenon. If resources are equally distributed to everyone, no one can do research. Unavoidably, this is a worldwide thing, that excellent researchers take most of the resources. (Interviewee B9)”

The role of university education in reproduction of social statuses and capital has been a crucial topic in the sociology of education, and has been well elaborated by sociologists. As Bourdieu points out, university degrees are one of the main formats of cultural capital and symbolic power, which can be converted into other forms of capital, such as economic capital and social capital (Bourdieu, 2013, Bourdieu, 1986). While the reproduction of social stratifications and capital is mediated by the education system, the education system is not something objective, neutral or ideology-free. Rather, the design of the education system, including selection of curricula and standards for grading students, is deeply influenced by dominant groups and favours students from dominant socioeconomic backgrounds (Bourdieu and Passeron, 1977). Therefore, in studies of neoliberalising higher education, some scholars highlight issues of educational inequity or conflicts between elite universities (like the Russell group in the UK) and mass universities are a focus (Morley, 1997, Harrison, 1994, Sayer, 2014, Anderson, 1995). As shown in Chapter 4, in Taiwan the issue of educational equity and representation of socioeconomic stratifications in university had been noted since the late 1970s (張明輝, 1978). In the 1990s education reform, narratives of social justice became one of the main arguments, affecting policies of universities and funding distribution between elite universities and vocational colleges, which were later transformed into technology universities (黃鎮台, 1995). The concern for social justice lasted until the early 2000s. For example, in the article “Who are NTU Students? Differences across Ethnic and Gender Groups and Urban/Rural Discrepancy” (駱明慶, 2002), an economics scholar attempted to

demonstrate the inequality of universities by analysing the composition of the backgrounds of students from the National Taiwan University.

In Chapter 4, I indicated how the narrative of state progress replaced the notion of social justice in the name of economic knowledge since 2000. By analysing the issue of the globalisation of higher education, here I identify the absence of social justice-based narratives. While all types of evaluations are potentially incorporated within quantitative indicators, it is less possible to think of higher education beyond these dominant concepts as outlined. This viewpoint of social justice was only occasionally mentioned during interviews in terms of social mobility (B2, a middle-aged male professor). This shift in ‘problems’ is significant. It seems that only a few academics consider that the distribution of higher education resources, might lead to an issue of social justice. This phenomenon manifests in entanglements between problems and solutions. Various paradigms define different problems, coupling to produce correspondent solutions (Neyland and Milyaeva, 2016). For example, in the humanistic model, according to Newman (1947), research is not even considered a mission for universities, so a lack of research outputs is not an issue. In the model of educational justice, resource concentration is a problem. But in the model of Research & Development (R&D), resource concentration is a solution.

The only exception to the general absence of a discussion on educational equity is the ‘Star Plan’, which is an alternative university access plan to enable students from rural areas to go to the top university as a direct solution to the gap in educational resources between urban and rural areas. The ‘Star Plan’ was proposed and launched in M1’s university and then spread to other prestigious universities. M1 reviewed the invention and development of this alternative as a successful bottom-up reform model. Some explicit quantitative research shows exercises of the ‘Star Plan’ has significantly improved inequality for top universities in Taiwan (駱明慶, 2018, 葉高華, 2018, 李浩仲 et al., 2016). Nevertheless, discussion about educational equity was rarely mentioned in contemporary accounts. In the media, when the ‘Star Plan’ is discussed, people are likely to focus on whether students from the ‘Star Plan’ are competent enough to compete with students from normal entry channels, rather than discussing issues of rural-urban economic disparity or social disparity.

In sum, the absence of social justice narratives shows how Neoliberal thought modifies people's frames when thinking about university education. As Apple (2013) indicates, the Neoliberalist movement does not only engender relevant policies but also entails substantial changes in ideologies; under Neoliberal thought what we call a social bond, solidarity, integration or collective civic identity has undergone a process of replacement by individualisation and self-entrepreneurship. Nevertheless, the spread of the neoliberal tide is not homogeneous. While education reforms in the West since the 1990s, such as those in the UK and the USA, were profoundly influenced by Neoliberalism or the New Right (Apple, 2013, Morley, 1997), education reform in Taiwan in the 1990s was not entirely embedded in Neoliberalism, as the previous chapter shows. However, from the 2000s perspectives on higher education in Taiwan tended to be seen through a neoliberal frame. As a result, ideas of the democratic university and equity in educational opportunities faded out. People still criticise educational practices, but in the languages of neoliberalism.

This section explores how individual scholars interpret themselves through the lens of university globalisation. I will elucidate how researchers understand their relations with other social sectors via the issue of university-industry collaboration.

3. The second lens: university-industry collaboration

Should the university take responsibility for industrial and economic growth? The topic of industry-university collaboration engendered a range of intensive opinions among interviewees, ranging from agreement to disagreement. I categorise interviewees' statements into three types of opinions to explore different imaginaries of universities' positions in society, through discussion about industry-university cooperation, and to analyse distributions of the narratives across and within various disciplines.

3.1. The position of the University in industrial development and society

Is it rational to request the university to carry out industry-university cooperation? There is a radical answer to this question which I name as the first type of academic-centred narrative, which is composed of humanistic values and the pursuit of

knowledge. Humanistic values consider education as university's primary mission. Knowledge in its pure form stresses that the purpose of knowledge production is for the sake of knowledge alone. Even if knowledge may lead to industrial innovation and economic growth, it is external to the academy and university. According to this non-utilitarian narrative, scholars should have autonomy over their research and remain independent from state policy. The core value could be summarised by S8's words (a senior scholar).

“An ideal scholar should pursue knowledge for the sake of knowledge...If someone treats knowledge production as a tool to pursue other goals, such as money, awards, promotion, power or prestige, it contradicts the principle and ethic of academics. In other words, it is immoral and unethical to treat knowledge as a tool.”

This statement denies strongly the rationale of national progress for mobilising academics as a resource. Radical disagreement with utilitarian values of higher education seldom appears in formal publications, such as official releases or academic publications. This implies that the narrative is excluded from valid frames to produce relevant statements. Interviewees who maintained this stance are: B8, S4, S8, H1 and H9. For people who considered knowledge production as an ambition of universities without any utilitarian purpose, the answer to the rationale of university-industry collaboration was “I do not think the academy should be in charge of industrial development; I do not think this is what we call social responsibility (B8, a junior male researcher)”.

The second type of statement considers the university as a part of the whole society and argues that the university should play a role in improving society. The rationale for this view of universities' social responsibility is based on the fact that its costs are substantially supported by state budgets; that is, tax (B3, B10, M8 and H3). However, a positive contribution to society is more than economic growth or industrial development – yet these impacts on society are indirect and only visible in the long run; it is quite difficult to measure these functions. For example, the university may enhance national progress by cultivating responsible citizens and intellectuals who are

keen to take part in public affairs (H2 and H4). These universities' missions also include social mobility (B2), cultural diversity (H3), popularising knowledge (B8, B10, M5 and M8) and democracy and human rights (H10, S5 and S10). In the second type of narrative, essences of the university are like public goods or infrastructures. While NSE (Natural Sciences and Engineering) scholars focus on knowledge delivery, SSH (Social Sciences and Humanities) scholars underline political aspects, such as human rights and cultural diversity.

Within the second type of narrative, attitudes toward the appeal for industry-university collaboration is ambivalent. On one hand, when the university pays attention to enhancing society, knowledge production can be seen as one way to benefit all human beings. On the other hand, the values of knowledge should be interpreted in broad ways rather than purely economically-driven. Because no one can predict the future exactly, an over emphasis on immediate application might reverse or limit the potential application of knowledge over the longer term. For the long run, academic research should not be guided by the state. Interviewees who obtained this stance are B2, B3, B4, B10, B11, M1, S1, S3, S5, S6 and H10, across generations, genders and professional positions.

The third type of statement considers the university as a part of research and development for the whole national economic system, so the university has to contribute to the economy via direct efforts. In general, this genre of statement about higher education echoes with the dominant narrative delineated in Chapter 4. For people who agreed with it, the issue is where university's most appropriate position is. Because the cost of R&D is unaffordable for most enterprises in Taiwan, some argued that scholar may focus on basic research (B7, B9, M10, S10 and H4), while some NSE scholars considered applied studies more useful (B5, B7, M3, M4 and M8). Besides knowledge production, whose main output is publications, some favoured other outputs, such as patents (B1, B11 and M1, all male researchers), technology transfer (M1 and M8, both males) or industrial collaboration (M1, M2, M5, M8, M10, H6 and H7). These preferences reflect an individual's interests, personalities or affiliations. For example, the importance of technology transfer and industrial collaboration is more likely to be stressed by scholars in the fields of engineering or

technology universities. The institutional factor will be further explored in the following section.

As discussed in Chapter 4, along with all formats of intellectual outputs, another university mission for economic growth is training quality staff. Students are assumed to be equipped with practical skills and professional abilities at university in preparation for entering the job market. In this sense, career training for students and producing human resources for the state are two sides of the same coin. This notion of career training generated intense debates.

Scholars disagreed with career-orientation as the university's main mission for several reasons. One common reason is the notion that what students should learn is the ability of critical thinking or self-learning rather than a set of practical skills (B3, M1, M10, S1, S7, S10 and H7). However, the contents of 'critical thinking' or 'self-learning' need to be further clarified. What is the ability of critical thinking and self-learning for? There are two narratives behind it. For people who think the university has to contribute to social progress in broad ways, career-orientated education is problematic. This is because university education is different from vocational education (B3, M4, H7, S1 and S10). Technology universities or polytechnics were taken as a counterpart to traditional universities. For example, M4, a senior professor, argued that the university was meant to train academic experts, whereas the technology university was meant to train technicians. Meanwhile, the practical skills that the industry requires are not too difficult to acquire (B3 and M1). Therefore, the ability of critical thinking and self-learning is a condition of elite manpower, serving national agendas.

Second, according to the humanistic viewpoint, university education should aim to achieve holistic education. Hence, the ability of critical thinking and self-learning is a condition for the production of cultural citizens. Besides critical thinking and self-learning, university students should be practiced in skills to enhance virtue and personality (B4, M2, M6 and S7), pondering the purpose of life and self-development (B4, M10, S3 and H7), and knowledge inheritance and delivery (B2, B8 and S2). For example, M10, a middle-aged male professor, worried that career-driven higher

education could limit a student's horizons. In particular, two interviewees (S7 and S10, female scholars) underlined the importance of 'liberal art' as a core value. It is the first time the term liberal arts was mentioned across the four disciplines and it was presented as a contrast to professional expertise, in the way that Newman has argued. S7 also offered a brief introduction of the development of liberal arts in their university.

Scholars emphasised the importance of career training based on two aspects. In terms of society, some scholars (B1, B2, B4, B10, H3, H9 and H10) considered that by offering well-trained human resources, the university made social progress, including economic growth. For students, some (H7 and S3) argued that it was faculty's responsibility to help students to identify their position in society. S7, as a previous programme director, stated how an official system of license certification shaped curricula. Sometimes, industry-university cooperation is incorporated within students' career training, for instance in the form of internships. Some scholars (M3 and M8) treated industrial collaboration as a practical approach for career training, whereas some scholars (S3 and B6) worried about industrial collaboration as labour exploitation, which contradicts the original purpose of industry-university collaboration.

To sum up, this section categorises a range of narratives about higher education. What seems to be the more radical narrative emphasises the value of academic purity of knowledge and humanistic accomplishment. A second narrative emphasises that the university can be considered as an instrument which will benefit society over the longer term. There are diverse ways for universities to contribute to society and assessments of their effectiveness should not be limited to their role in promoting industrial activities. A third narrative takes the university as part of the chain of R&D for economic growth and industrial development.

Compared to the topic of university globalisation, narratives in the topic of university industry collaboration are more diverse. I argue that this is because, compared to the policy for promoting university globalisation, university-industry-collaboration-related policy engenders more direct impacts on individual scholars' interests.

Frameworks to interpret interests are crucial in the exercise of power (Callon, 1980, Latour, 1987). Hence, it is meaningful to study whether or how leading actors influence other actors' ways of framing interests. In other words, to what degree can actors retain agency? This empirical case shows that individual scholars, retain their viewpoints on what universities' missions should be, in parallel with the dominant narrative. The existence of a flexible interpretation of university education represents tension among academics, government and industries. The variety in interpretation also implies possible resistance to state interference in Universities.

These diverse narratives suggest that scholars should not be deemed one homogeneous actor. I will explore distribution of the narratives among and within disciplines in the next section in order to identify various academic narratives, as I proposed in the chapter on methodology (Venturini, 2010).

3.2. Distribution of various narratives among and within disciplines

First of all, academic backgrounds are a significant factor in how scholars form a preferred narrative of university education. In the field of material science, as an example of engineering disciplines, the majority hold the view of the third type of narrative, where the university is assumed to lead national progress and economic development like a locomotive (a common metaphor for the role of universities in Taiwan). A range of anxieties about the competitiveness of individuals, institutions and the state may be a common theme. Few interviewees argued that an academic might influence society in a broader sense, rather than in purely economic aspects. Human-centred narratives, involving discussion of personality and self-development, were rarely mentioned. In general, narratives about university in the discipline of engineering are quite harmonious and embedded in the frame of state progress.

Narratives in the academic field of history mainly conform to the first type of statement: the primary mission of the university is education and knowledge production. The purpose of knowledge production is not for potential future application, but for the sake of a passion for knowledge. The purpose of education in history is to produce intellectuals and researchers. Besides the first type, on the basis of historical contexts and facts, few interviewees admitted that the establishment and

existence of the university was assigned practical missions for either national progress or regional development. Overall, imaginaries among historians are harmonious and academic-oriented, which is on the opposite axis to those view held by material scientists.

Narratives in the discipline of sociology, as an example of social sciences, assemble among the first and second type. Some emphasised human-centred values and a pure pursuit of knowledge, whilst some focused on social impacts in a broader sense. Most interviewees in this group disagreed strongly with the third type of narrative, such as the idea of career training and university-industry collaboration. Only S10 (a senior professor) argued that the research-type university had played and should keep playing a leading role in R&D like “a locomotive for social development”. Otherwise, several radical statements emerged, such as “the aim of the (staff-student) relation is to develop students’ potential” (S3, a middle-aged male scholar), “it is immoral and unethical to treat knowledge as a tool” (S8, a senior male scholar), and “university means something universal instead of the language of economy or capitalism” (S5, a junior male researcher). According to these narratives, those ‘external’ missions could only be achieved by personal choices, not by systematic and compulsory demands. This consensus is across positions, institutions and generations.

Finally, narratives in biomedicine, as a sample of natural sciences, is the most diverse across all disciplines. All major types of narratives are represented almost equally, so that it is not easy to distinguish a dominant narrative. The diversity in narratives might reflect flexibility within this discipline, which can be either academically-oriented or industry-oriented. The responses relied on the characters of the institute itself.

Overall, trends of narratives among disciplines can be summarised by Figure 6. As my research followed a qualitative approach, this figure is not meant to offer accurate ratios of various types of narratives upon university education across four disciplines, but rather it represents a relative trend. The perspective of humanistic values and the pure pursuit of knowledge is underscored in areas of sociology and history, followed by fields of biomedicine, and is occasionally noted in material science. Conversely, the account of state progress and economic development, which emphasises practical

contributions, such as quality manpower, research and innovation, and industrial collaboration, displays as a mainstream viewpoint in the field of material science, followed by the biomedicine disciplines, but is rarely articulated by sociologists and historians. In the meantime, the viewpoint, which sees university education as a public good and appraises its contributions to society in a broader sense, is cited reliably among disciplines, although it seldom functions as a primary frame. Academic disciplines play the most influential role on the trends of narratives within universities, followed by the orientations of each department or university.

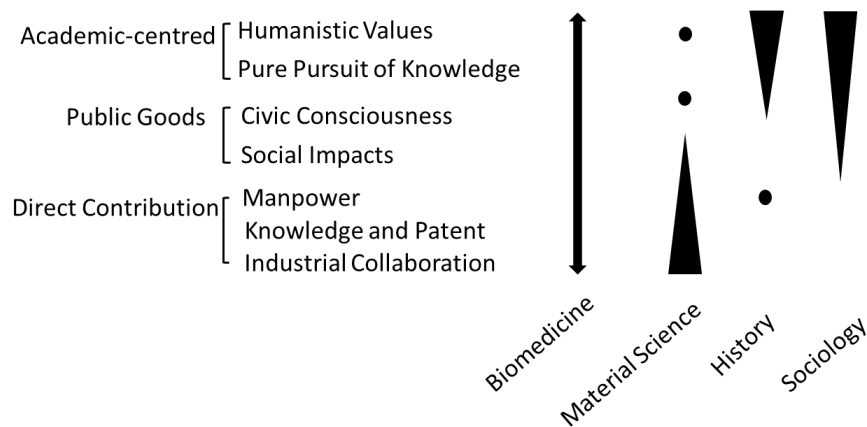


Figure 6. Image: Distribution of narratives regarding university

Comparing this with the textual analysis conducted in Chapter 4, narratives shown in interviews are more diverse. From the end of the 1990s, the narrative of national progress has become the only dominant framework in official releases and academic publications. Even in the period of Education Reform, it was not easy to discuss higher education beyond the frame of national progress. However, there are arguments which directly challenge the rationale for national progress in interviews. This disagreement with the hegemonic discourse with alternative frames to interpret higher education imply possible resistance within the academy. One of the features in interviews is the academic-centred account, which had hardly been represented in academic presses, nor official publications, since the 1970s. However, this is still the main frame for describing higher education within the disciplines of history, sociology, and occasionally in the area of biomedicine. This comparison shows how a narrative has been deprived of legitimacy through its exclusion as a valid frame for describing higher education. By contrast, the existence of the human-centred account

in the academy implies possible resistance against the dominant discourse.

Distribution of the academic-centred statements is worth further discussion. As mentioned before, the academic-centred statement was represented mostly by scholars in the disciplines of humanities or social sciences, inferring a disadvantage for scholars within these fields in Taiwan. Some interviewees (H3, H6 and H9, from three national universities) complained that university management and academic values, such as standards for promotion or internal evaluations, were dominated by NSE culture. Even if it seems that academic environments are dominated by NSE culture, my analysis indicates that the academic environment is dominated by the narrative of national progress, rather than NSE culture. I suggest relations among NSE culture, academy and the state should be understood in this way: because the properties of NSE fit the needs of national progress, it appears that the academy is dominated by NSE culture. For example, when the state plans to enhance communities or rural development, narratives of university social responsibility and social impacts become more influential than before. In sum, both the existence and absence of the human-centred account reflect tension among various academic disciplines. For instance, engineering disciplines are different actors to social sciences and humanities.

Distribution of various narratives about the role of universities is also influenced by interviewees' affiliations, even within the same academic discipline. Universities in Taiwan can be classified into four functions: research-type universities; regional and teaching-type universities; normal universities and technology universities. Different types of universities focus on various aspects, such as research, community development, liberal arts, vocational training or industrial collaboration. The pattern in the fields of biomedicine is the most diverse, where the characteristics of individual institutes might play a significant role. The first interesting comparative group is B3, B7, B10 and B11. B3, B7 and B11 were associate professors in three private universities: T. University, C. University and G. University; and B10 was a professor in private M. College. M. College and T. University are Christian organisations, while C. University and G. University are managed by two enterprises, which also operate biomedicine and health related industries. The stance of B3 and B10 (one male and one female) was close to the second type which emphasises social impacts in the long

run. Conversely, although B7 and B11 (one male and one female) also attempted to remain a balance between the basic research and application studies, they were inclined towards industrial progress. In addition, their narratives might be affected by institutional frames, either consciously or unconsciously. For instance,

“Now people emphasise university-industry collaboration. Does your university also promote it? (interviewer)”

“I reckon we do encourage this...From the angle of the school, they would like to encourage application research, because their final goal is collaboration with industry. (interviewee B7)”

“...Do you think the university should encourage staff to carry university-industry collaboration? (interviewer)”

“They promote university-industry collaboration by policy. However, the university-industry collaboration is based on basic research. Without solid basic research, the university-industry collaboration is a castle in the air...I consider both important. (interviewee B7)”

This example shows how B7 negotiated with institutional policy. The enterprise that owned the C. University was eager to develop related businesses by connecting its industries with the C. University. As a staff member it is difficult to keep distance from institute policy. Hence, for the collaboration, sometimes it was ‘they promote’; sometimes it was ‘we do’. As a compromise, both were considered important.

Another comparison to show the influence of institutions is B4 and B5. Both interviewees were junior male researchers in the same public university, the same position (assistant professor) and of similar ages but in different institutes (Institute of Molecular Medicine and Institute of Biomedical Engineering). B4’s narrative alternated among the first type and second type. B4 even called the policy of encouraging industry-university cooperation ‘derangement’. However, the stance of B5 was of the third type. In B5’s words,

“Because we are in the college of engineering, applications do matter. For application, the final goal is commercialisation. In the case of biology,

application means clinical practice.”

This example shows how institutional character, influenced by culture, historical backgrounds, tradition and orientations, influence individual interpretations about academic practices, resulting in diverse narratives. Because an institute may own its interests, and therefore can be differentiated from the government and individual scholars, the institute should itself be deemed an entity for analysis.

However, interviewees (B2, professor and, B1, post-doctor) in the same institute may present different narratives. For instance, both argued that an Impact Factor should not be the only criterion to judge academic efforts, but for different reasons. For B2 (professor), some real values of higher education can not be quantified, values such as cultivation or personality. For B1 (post-doctor), an Impact Factor can not include industrial values of applications. In this case, a difference in age may account for a difference in opinion.

Even within the dominant discourse, it is not entirely universal. For instance, in the case of material science, there is an interesting comparison between M8, M9 and M10 (male researchers in their forties) in terms of their attitudes toward relations between the university and industry. M8 worked at the National X University of Applied Sciences, which was transformed from a vocational college in 2000, while M9 and M10 worked at a prestigious research-type university, the National T. University. Like other interviewees of the same group, M8, M9 and M10 all agreed with the narrative of national progress (“The purpose (of higher education) is for national progress”, M9). However, there were some nuances in their attitudes towards industry. For M9, most industrial collaborative projects were superficial; hence, he doubted if this work actually leads to ‘industrial progress’. In M9’s words,

“In a relation of cooperation what they want us to do is something simple, certain and visible. That is all right. We can offer this service, for sure. However, a service is just a service. Nothing more. In my opinion, it is less ideal for what we should do in academy...I hope there will be more cooperation projects of innovation.”

For M10, because the whole environment made students very career-driven, students might lose their passion for exploring knowledge or themselves. In M10's words,

“TSMC (Taiwan Semiconductor Manufacturing Company) has attracted too many excellent young Taiwanese. This is a bother. Yes, TSMC is a very nice company. A lot of students chose to study material science because they just want to work for TSMC. They already know their goal, so their views become very narrow. However, we always expect students to explore their own interests, and all possibilities.

Compared to M9 and M10, M8 offered yet another viewpoint. For universities of technology, the seemingly trivial projects which the research-type university is reluctant to carry out are their niches. In addition, this kind of university-industry collaborative projects can ensure students' employability. In M8's words,

“In south Taiwan if you have an industrial issue, you may go to NCKU or NSYSU for a hand...Usually an analysis costs a thousand dollars (NTD). Of course, they are not willing to take it. When they can get one or two million dollars from research projects from MOST, why do they need to take the project of thousand dollars...In fact, numerous teachers in our university carry out projects of industry-university collaboration. Not only do we have plenty of chances but also we are glad to do it.

“I graduated from the first rank of universities in Taiwan. When I began to work here, I was shocked by the environment. You can not expect students to do research, which is done by me, usually. Otherwise, they are happy to get involved in fundamental projects with the company, because this stuff is tangible. In addition, because they already know the drill, when the company releases positions, my students are more likely to get the job.”

This comparison indicates that variety in affiliations leads to difference in statements about the proper position of universities. Furthermore, this suggests that even within

the dominant discourse, there is a room for ‘flexibility in interpretation’. In this case, for each university, as an entity and actor, interpreting their roles in industrial developments, more or less, reflects on their own interests and conditions. There is another example in the field of material science which proves that the dominant discourse is not universal. M1, M2, M3 and M4 belonged to the same university, the National H. University, which is a prestigious research-type university, like the National T. University. However, the National H. University is located by a science and technology park, which is a copy of California's Silicon Valley in Taiwan. Hence, the National H. University has tight connections with adjacent high-tech enterprises. The dual characteristics of the National H. University lead to different priorities among academic affairs or industrial needs, even if they all agreed with the mission of national progress. For knowledge production, M1 and M4 were inclined to basic research, while M2 and M3 were inclined to application studies. For a student’s core abilities, M1 and M4 (male researchers) were inclined to train academic experts, while M2 and M3 (one male and one female) emphasised employability though collaboration with industry. This comparison suggests that the variety in narratives may reflect diverse aspects of the same university. The comparison also confirms that the dominant discourse is not universal even in the same university, inferring the existence of personal choices and interests.

In summary, the characters of academic institutions play a significant role in narrative diversity, especially when considering the fact that connections between state administration and individual scholars are mediated by the academic institution. This empirical study identifies the existence of the agency of academic institutions; they should therefore be deemed actors. However, an institutions’ role is influential, but not inevitably influential. Under institutional policies or influences, individual interests and choices still exist in many cases. Hence, even at the same institution, narratives could be diverse. As a result of individual and institutional agency, several narratives continue to proliferate. Even contents of the hegemonic narrative might be heterogeneous. Both diversity in narratives and within the same narrative suggest that individuals are not entirely subject to the hegemonic discourse of state progress. The flexibility in interpretation infers possible resistance

3.3. Power, resistance and institutional practices: multiple universities

What is power? Giddens made a brief definition, “power is not inherently oppressive...[p]ower is the capacity to achieve outcomes” (p.257, 1984). In the chapter on methodology I reviewed how Foucault and ANT scholars identify the essence of power. In short, Latour disagrees with an approach which treats power as a real thing that can be possessed and circulated; nor does he agree that power can provide an explanation for people’s actions (Latour, 1984, Latour, 2005). The existence of power rests on how a leader convinces, enrolls and mobilises others. For Foucault (1980), power is “actions on others’ actions” (p. 245). To learn the essence of power is to learn a set of operations which shapes how individuals interpret themselves and their relations to others (Rose and Miller, 1992).

According to Foucault (2000), even if domination exists, the existence of power relations presupposes that there are free subjects with a certain degree of freedom, even the freedom, for instance, to open a window. “This means that in power relations there is necessarily the possibility of resistance because if there were no possibility of resistance (of violent resistance, flight, deception, strategies capable of reversing the situation), there would be no power relations at all” (p. 292). Although Foucault focused on the mechanism of power relations, he did not deny that individuals possess agency and possibilities for resistance. According to Apple (1995), even if educational institutions are state apparatuses, its composition of staff and students, as reflexive and free individuals, may not be entirely subject to political power. Previous analysis in this chapter identified alternative narratives parallel to the dominant one. In addition, the appearance of alternative narratives is relevant to characters of disciplines and institutions. Hence, when discussing possibilities of resistance against domination, the role of institutions should be considered as an agentic entity.

In terms of ANT, institutions could be regarded as an actor (Callon, 1980, Callon, 1999, Latour, 2005). It is perhaps not ANT’s main focus to explore how an institution formalises its interests or ‘personality’. Giddens’s work offers insights into understanding institutions. For Giddens, what he calls structure or structural properties is an enduring feature of social life, and institutions are one of the most enduring of social life (Giddens, 1984). The structural property is a system linking the

past and present, and time and space. For Giddens, social structures are essentially reproduced social practices, not an external force which acts on individuals. Hence, structural properties are more like habits and routines instead of natural principles; this influence is not compulsory nor determinant for individuals, but functions as a condition. These reproduced routines or trajectories consist of institutions' characters and interests. Besides the aspect of rules, another aspect of institutions is resources, by which the institution enables people to make a thing happen (Giddens, 1984). In this case, because each academic institution has its own historical tradition and routine, scholars are empowered to retain alternative accounts parallel to the dominant narrative, such as humanities or social science disciplines, and T. University with its traditional emphasis on liberal arts education. In addition, because an institution might have diverse traditions, the internal diversity within an institution might lead to various interpretations of academic practices, such as in the case of M1, M2, M3 and M4 in the National H. University. Taken together, because the purposes of universities undergo a procedure of translation in each academic institution between the institution and staff, it makes the hegemonic narrative less universal and makes resistance possible.

Finally, these heterogeneous imaginaries of higher education practices, by which academic institutes perform, imply the multiplicity of universities. According to Mol, plural and multiple mean different statuses (Mol, 1999, Mol, 2002). Both conceptions express an idea that various realities are produced when people apply different frames, models and tools to interpret the same thing. However, plural worlds mean that these realities are parallel to each other without interferences; here discrete entities simply co-exist. On the other hand, multiple worlds mean that these coexisting realities interact with each other, either clashing or being reliant on each other. My analysis suggests that the heterogeneous university should be considered as a multiple world with connections and interferences. These clash with each other while competing for funds, spaces and reputation. Meanwhile, coexisting academic entities also cooperate with each other in various ways. First, a university consists of different colleges. Second, each discipline is built on its own paradigm: a model of puzzle-solution. When a confronting question does not fit the paradigm they follow, researchers may seek interdisciplinary collaboration. Third, as Bourdieu (2013) elaborates, university

education is an important way for students to acquire so-called habitus or cultural capital, where the humanities disciplines play a role of assimilation rather than NSE fields. Hence, the university should be seen as a composition of multiple universities. In sum, this chapter explores these academic institutes as different entities, which retain their academic identities and strive for autonomy. The autonomy is not enacted by one single university, but by multiple academics.

4. The third lens: university social responsibility

As discussed in the literature review chapter, the role of universities varies in different ages, reflecting variety in relations between the university and other social sectors (Mirowski, 2011). Nowadays, several new norms for academic practices in the university have been formalised, such as Impact in the UK and Responsible Research and Innovation (RRI) in the EU. In the context of Taiwan, an emerging norm is called University Social Responsibility (USR). Norms are constructed within social contexts and embedded in relative discourse; the norm is the embodiment of the narrative. While the topic of university social responsibility (USR) is an ongoing issue, definitions of university social responsibility, social impacts and community are very controversial and prompt intensive debates. Hence, USR offers a significant opportunity to illuminate relevant narratives. This section focuses on the topic of USR and relevant discussions in terms of three subtopics: ideas, definitions and rationales; schemes, policies and practices; and validity and outputs. Like industry-university cooperation, which engendered plenty of relevant discussions among the material scientists, the USR scheme engendered much relevant discussion among sociologists. Before I analyse the interview data, I will explore the development of USR by textual analysis.

4.1. The idea, definition and rationale of university social responsibility-1

What does the phrase ‘university social responsibility’ refer to? In this section of textual analysis I explore the content of university social responsibility. The first quotation is from an academic book, ‘*Education Reform Series 7: University Autonomy and Responsibility*’, published by the National Taiwan Normal University in 1997.

“University social responsibility includes at least five aspects. The first is to discover truth and to invent progress and evolution. The second is to train intellectuals and moral citizens by holistic education. This is for social mobility, equality and progress. The third is to deliver cultural norms for stabilising society. In the meantime, it encourages intellectuals to criticise the system constructively. The fourth is to popularise knowledge for the masses for fitting social needs and enhancing quality of life. The fifth is to promote civilisation by achieving all the above aspects. (Freedom, Autonomy and Responsibility, *University Autonomy and Responsibility*, p. 5)”

This statement about university social responsibility could be categorised into two narratives. One was the narrative of state progress, including fitting social needs and normalising individuals to keep society stable. Another was the narrative of social justice and equity. Even if the phrase ‘holistic education’ was mentioned, the goal of holistic education aimed at social mobility and progress. The feature of compromise between several narratives was a character of the Education Reform in Taiwan, as shown in previous analysis.

The second example is a talk from the Minister of Education in the National Conference of University and College Presidents, published in *Higher Education Newsletter* in 2006.

“I hope that the university could certainly take social responsibility and academic responsibility. Besides cultivating elite human resources for national economic growth, all universities should realise the fact that most funds are citizens’ taxes. As a result, the public care about universities’ accountability. This is a worldwide phenomenon. Hence, the university has to enhance the quality of education, show the public its performance and be examined by the public. This is also university social responsibility. (The university has to take social and academic responsibility, *Higher Education Newsletter*, vol 180. p. 2.)”

In this speech the main narrative incorporated the frame of national progress and

neoliberal notion: accountability. The Higher Education Evaluation and Accreditation Council of Taiwan was founded in 2005 and the first round of systematic university assessment was conducted in 2006. In this context, accountability was also university social responsibility, along with the mission of providing quality human resources.

The last example is an appendix of application forms for USR projects in 2017. The appendix clarified the USR project's ambition for applicants.

“This USR aims to fulfil the target of enhancing ‘local connections and developments’, which is an important aspect of ‘Higher Education Sprout Project’. The university should link local industries, research institutes and regional government tightly to promote industrial innovation and globalisation. In addition, the university should take the responsibility of connecting communities. That is, USR, including developing either urban or rural areas, reviving culture, renewing communities and creating local values. Hence, in order to improve collaboration among universities, colleges and communities and to train quality human resources for regional development, USR takes centre stage. This project makes the university contribute to the community more than before and facilitates local development and employment.

Higher education policy will focus on USR. There are two strategies: links with the local, and university-industry collaboration; and cultivating an elite for national progress...The proposal might reflect on features of each university to fit policy and social needs, such as local issues, linkage with industries, sustainable environment, food-safety, long-term care and other social practices...”

This quotation indicates that the purpose of USR in Taiwan is for local development in terms of economic profits. Those practical items, like sustainable environment, food safety and long-term care, are current national policies. The humanistic viewpoint and social equity are almost excluded from these values. As a policy, what USR seeks is instant effects rather than profound impacts. As discussed in the literature review chapter, one of the properties of a neoliberalising state is that some

governmental responsibilities are relocated to communities and individuals by marketising the affairs of government, in areas such as education, public health, transport or prison policy (Apple, 2013, Miller and Rose, 2008). The formation of USR in Taiwan shows how the government transfers its responsibilities for community renewal and tackling urban-rural economic disparity to academic communities by competition-based funds.

4.2. The idea, definition and rationale of university social responsibility-2

As a general concept, what do the phrases ‘social impacts’ and ‘university social responsibility’ mean for individual scholars? The answer depends on how one interprets university education. Interviewees who followed the human-centred narrative about higher education held negative opinions towards the idea of ‘university social responsibility’. First, human-centred values are less likely to be quantified and measured (H1 and S5). In H1’s words,

“Humanities have another function: through reflection on our experiences to ponder on the meaning of our lives...However, this isn’t defined as social responsibility, is it?”

Second, for scholars (B10 and S3) who argued that education was the primary concern of the university, “the real USR is to round out education inside the campus (S3)”. Several interviewees (B10, H2, B8 and S2) treated university social responsibility as ‘external’ burdens rather than academic affairs. Several interviewees (B10, H2, S1, S2 and S4) strongly disagreed with the idea of ‘community service’ as a form of USR, expressing their views in ironic and emotional language.

Along with the second type narrative of higher education as a public good, social impacts or university social responsibility mean positive influences on the whole of society or humankind in the long run. These responsible practices and long term impacts include popularising knowledge (B10, H9, M5 and M8), providing insightful thoughts (H6), recognising and resolving social problems (B2 and S7), student performance, (M1 and H2), taking part in social activities and local communities (H3, S5, S6 and S9) and linking the university and society (S9 and S10). B10 also used the

case of how medical research improved public health in Taiwan to elucidate his definition of long-term social impacts.

In the light of the third type narrative, economic growth is regarded as university social responsibility; hence, university-industry collaboration is the proper way to exercise university social responsibility (M2, M4 and M8, all male researchers). This is especially true, even when university social responsibility – defined as public participation or community service – has been promoted by the government. M1 and M7 admitted they were unfamiliar with this concept. According to M4, various disciplines had various ways to participate in society. In M4's words.

“In the system of normal schools, it is demanded that they practice this kind of affairs (public participation). In the college of natural sciences, like math, chemistry and physics, it comes as the affair of science popularisation. In the college of engineering, our primary way of participation in society is industry-university collaboration. There are some incentives for us to do that, because the industry provides grants in return.”

In sum, concepts of university social responsibility are very diverse; some of them are even incompatible. The ways in which people interpret university social responsibility reflect the ways that people understand the purpose of the university. Hence, the distribution of statements about university social responsibility among different disciplines is roughly consistent with the three patterns discussed in the previous section.

Among these heterogeneous statements, perhaps the only consensus among interviewees is that practices of university social responsibility should, by all means, not be compulsory for individual researchers. S10, a senior scholar, argued that because each university had its own property and focus, it was not proper to force each university to conduct USR. For S4, USR projects offered a chance for scholars to keep in touch with society, by which the scholar was able to discover something insightful about social change or challenges. However, this does not mean community or local development should become universities' responsibility. Finally, S1 and S6

(junior researchers) noted the issue of legitimacy. S1 worried that the USR scheme might function as certification. That means that only practices approved by the USR scheme are valuable among all kinds of relevant practices, such as public engagement, community development or social activities. S6 pointed out that USR might become a mechanism for the university to obtain legitimacy. In S6's words,

“Because we must seem very much responsible for society, we have to do this and so on. It becomes a mechanism of legitimacy in the sense of the sociology of organisation. That means you need to carry on USR to justify yourself as a qualified university.”

Nevertheless, when the general note of university social responsibility becomes the scheme of USR as policy, it becomes something compulsory.

4.3. The University Social Responsibility scheme in practice

What is the context in which USR emerged as a government scheme? There are two attitudes to describe it. One viewpoint is positive (S5, S9 and S10), which treats USR as a compensation for skewed emphasis on research in the past. In S5's narrative,

“This resulted from former policies...It made people focus on publications and get disconnected from the outside. In addition, these papers are out of touch with society.”

Another is negative (S2 and S4), a view which treats USR as a concession to political pressure. With USR, the government has a powerful excuse to transfer its responsibility to universities. In S2's viewpoint (a senior male professor),

“Why do we have these budgets (for USR)? This is funny. They also play the game with MPs. Why should I assign budgets to higher education? Do social sciences generate any benefits to society? They need to deal with these attacks. Hence, we set up several administrative offices to carry out responsibility for society and politics.”

Besides the introduction of USR, several interviewees shared their opinions towards impacts of conducting USR projects. For S5 and S7, who have administrative experience of academic management, the existence of USR schemes promoted the importance of Sociology departments in universities. Because USR projects play an increasing role in the application for university-based project funds, the university has to cooperate with the department of sociology which has more expertise in civic engagement, social practices and community development than other disciplines. S7' experience is an example to show how the university uses USR as a strategy for promoting itself.

“When I was the director of department, our application for a project of USR was approved. This was partially because we had done service for community's seniors for a while before we applied for USR project. The principal had assigned funds to us for it. In fact, the office of research and development noted that the calculation of university ranking included community service...For the sake of my own interest, I have run the project for a while. I kept in touch with communities and did interviews. This data is very important for the school. If you plan to apply for USR, you need to show that you had been engaged in communities. Hence, we organised an event and invites the academic association, students, retired staff and community. This was reported by journalists on media. This is meaningful for the university...Exposure on media is counted for university ranks...In fact, my real aim is to make students realise potential needs of society by inviting students to take part in communities. However, err...we still need to display it in this way.”

As shown in the previous section, long-term care is an important focus in the USR scheme, which is very likely to be a research topic of sociology or social work. As a result, relevant departments are likely to gain more attention and academic resources.

4.4. The validity of USR

Can USR projects fulfil their goals? Interviewees' tones were pessimistic about effectiveness of USR projects for two reasons. The first factor is relations between universities and local societies. In general, the university is supposed to play a leading

role in the USR project to ‘help’ communities. However, several scholars (H5, S3 and S9) doubted this top-down mode and pointed out that ‘laymen’ may have more expertise in local businesses than academics, either staff or students. In addition, uneven relations might take place but in a reverse direction. For instance, H7’s university is located within a prime district. Hence, in community service practices H7 (a middle-aged female researcher) only saw ‘intergenerational injustice’.

Another reason is an issue of evaluation. For S3 and S8, because these USR projects were short-term competition-based grants, it would lead to the same disadvantage as all competition-based grants without any substantial impacts in the long run. S4 was a junior researcher hired by a USR project and had related experiences. S4 indicated that substantial efforts, such as building relations with communities, were difficult to translate into papers or written data. In other words, data that were capable of being reviewed were usually superficial. Other interviewees also doubted the certification of USR projects because the quality of certification was either casual (S2) or shallow (S8). This represents a typical dilemma in audit practices: what can be counted might not count, whereas what counts may not be counted (Muller, 2018).

In summary, the formalisation of USR in Taiwan follows a similar arc as the foundation of university evaluations. In the beginning, the dominant narrative of university social responsibility was utilised to neutralise the narrative of national progress and an over emphasis on short-term practical values. Nevertheless, after a series of negotiations and compromises, when the concept of university social responsibility turned into the policy of USR, its contents were substantially replaced by the dominant narrative. Through textual analysis in this section, I show the government’s intention to mobilise academic capacity in regional developments. The establishment of university evaluations with a focus on publications and bibliometrics strengthens the leadership of NSE disciplines in the academy. Similarly, the establishment of USR enhances the position of social sciences in the academy. Hence, some actors are keen to get enrolled in this network. This represents tensions among disciplines. On the other hand, by the procedures of competition-based funds, the state gains more capacity to mobilise academic resources for either economic growth or regional development.

However, USR is not yet a coherent discourse for several reasons. First, unlike academic evaluations, the practice of USR lacks a consensus: most actors did not agree with this idea. In addition, the practice of USR has not yet become an institutional routine; it seems more like a temporary policy. Third, the exercise of USR lacks a valid indicator or instrument to measure and quantify outputs; bibliometrics do not suit here. As a result, the USR scheme becomes something controversial rather than something to be taken for granted; a world where USR is fully enacted has not been introduced yet. Hence, I argue that the USR scheme will encounter resistance and difficulty, which means that the USR scheme might not be able to mobilise targeted actors effectively, either academics or communities.

5. The final lens: academic autonomy and state power

5.1. Contemporary situations of academic autonomy in Taiwan

The final theme is academic autonomy. According to interviewees' experience, academic practices have been influenced by state organisations, showing a tension between state power and academic autonomy. Because of common worries about one hegemonic standard for higher education and a decrease in university diversity, this section begins by examining the role of the university in society, and moves to a consideration of the government's role in regulating higher education.

There are several types of universities in Taiwan: the research-type university, the regional university, the teaching-type university, the normal university (whose main function was teacher-training), and the technology university, which was developed from the vocational college. However, under the hegemonic narrative of national competitiveness and economic growth, all types of universities are expected to take part in R&D in a more direct way. This tendency and policy towards practical and short-term values provoked many discussions. For example, The National X Normal University (anonymous), where H7 works, used to focus on training teachers for primary and secondary schools. Today this university has undergone a transformation to a multi-functional university. H7 witnessed the disappearance of the university's former characteristic through her personal experience. In her words,

“The X Normal University is in the process of transformation into a research-type university...If you look at official announcements of X Normal University, they tell you that we are a multi-functional university. They never claim we are going to give up the previous function of cultivating teachers. They never say it, but I can tell you. According to requirements for hiring, you can see obviously that what they want is not who has experience of teaching but researching.”

Some interviewees (B4, H4, H10, M2, M5 and S1, all working at national universities) emphasised a difference in function between the general/research-type university, regional/teaching-type university and former polytechnics, such as the university of technology. Because one size did not fit all, there should be different practices in different types of universities (H6, M4, M5, S1 and S10). Some interviewees (M2, M4, M5 and H6) mentioned that the decline in the system of polytechnics led to two negative results. One negative result was a lack of available technicians. Another was the confusing role of the general/research-type university, which unavoidably incorporated the partial functions of polytechnics. Some interviewees (B10, H10 and S5, senior professors) took a more radical position: industry cooperation was the business of industrial universities and vocational colleges, not the university.

These discussions were pivoted on one issue: how universities' roles are assigned. This implies that academic practices in the university are substantially influenced by the state. When the theme of university autonomy continues to be represented, the object of concern changes. As shown in the previous chapter, in the past the main issues were Ministry of Education-led promotion evaluations, curriculum and financial supervision. After the Education Reform, the essential power of promotion evaluations shifted from the Ministry of Education to university committees, and the system of university funds was introduced to fulfil financial autonomy. Today, scholars continue to worry about academic autonomy. Along with the Ministry of Education, the Ministry of Science and Technology (MOST) has been considered a source of interference. The primary format of interference is competition-based funds. Other interferences include tuition fees and processes of recruitment. This means there is a lasting tension between state power and university autonomy but this tension is expressed in a different way.

Several interviewees expressed an awareness of a threat to academic autonomy from state power. Most discussion was related to ways of distributing research funds, implying that the threat to academic autonomy is a result of financial dependence upon the state. The major research fund in Taiwan is the MOST Research Project Grant, which either individual scholars or groups are eligible to apply for. The MOST Research Project Grant is open to all research topics and operated annually. Besides the MOST Research Project, MOST might operate National Sci-Tech Programs on an irregular basis, which focuses on particular aims, such as energy or AI. Along with MOST, the Ministry of Education exercises ‘The Aim For The Top University Project’ to fund a few universities. The financial amount and the time period of each ‘The Aim For The Top University Project’ varies. For example, the first round lasted from 2006 to 2007 and funded 17 universities. The second round lasted from 2008 to 2010 and funded 15 universities. The latest round started in 2018 and funds 24 universities and was renamed the ‘Higher Education Sprout Project’. The USR is part of the latest round. All these research funds are competition-based.

As all these research funds are characterised by competition, S7 and S8 utilised the context of New Managerialism to interpret the current system of evaluations and accountability. Some scholars (H5, S3, S7 and S8) took a radical stance and argued that the practices of New Managerialism in the university produced negative impacts on scholar’s spirits. In S3’s words,

“The money or projects are like a ringing bell, ‘Come here! Come here!’...Why doesn’t any real scholar who can think in liberal and critical ways exist in our country? This is because most of our scholars are keen to be an element or extension of the state. Intellectuals must keep wary of the state.”

For MOST National Sci-Tech Programs, some scholars (B2, H3 and H6) argued that the government had to take the responsibility to indicate a correct direction for national development. Thus, the state-led National Sci-Tech Programs was a rational policy. Some (M10 and S10) admitted the value of National Sci-Tech Programs but worried about reduction in individual freedom. This dilemma could be shown in

M10's words,

“Now the research of AI gets very popular, so people just rush to submit proposals about AI. I think there are some things we should insist on... I can understand its rationale. Taiwan is a small country...If you develop every topic, all topics can only be assigned a little funding. That would be another problem...If the Minister of Science and Technology takes AI as a potential way in future, they have the power to push it...We hope that our leader will lead us to a new way, right? However, will this policy satisfy everyone? Very difficult. Some people may disagree with it. I don't know if it is good or bad.”

Several interviewees disagreed with the exercise of National Sci-Tech Programs for three reasons. First, the National Sci-Tech Programs with specific aims might interrupt long-term research and personal freedom (M6, B8 and B10). When the National Sci-Tech Program was subject to temporary national policy, it seemed less professional (M8, B4 and B11). The second reason was ineffectiveness of the National Sci-Tech Program. Several interviewees (B8, B9, B11 and M9) considered the effort of previous National Sci-Tech Programs mediocre. In their opinion, this ineffectiveness was due to a fact that quite a few sub-projects were not very relevant to the major aim (M9 and B9). Third, those indicators, such as publications and patents, could not be translated into something more substantial (B9).

Some scholars (S5, B5 and B10) disagreed with the Ministry of Education's grant projects. While S5 emphasised academic freedom, B5 and B10 thought that USR programmes may distract research-type universities from academic affairs.

Besides the competition-based research funds, several scholars criticised the Ministry of Education in terms of bureaucracy. Some interviewees (M1 and B10, senior male professor with administrative experience) argued that the Ministry of Education lacked officers with experience of working in academia. Hence, the Ministry of Education might conduct policies without consensus with academics, leading to controversies. Some interviewees (B11 and S7) attributed homogenisation of universities in Taiwan to the bureaucratic administration conducted by the Ministry of

Education. Some interviewees (B11 and H10) argued that the Ministry of Education should stop regulating university policies on recruitment and tuition fees. S2 considered state influences on academia unavoidable when the university depends on state budgets. B10 also argued that private universities' flexibility and independence would be an advantage, compared to public universities. However, B10's affiliation was a medical college. In general, in Taiwan medical colleges or universities composed of a medical college, either public or private, have more resources. Private universities without a medical college would be more vulnerable to state policy than others (M5, S6, S7, S8 and S10). M5, a senior male professor, had worked in public universities for a while and used to be a dean of a private technological university. In M5's experience,

“In terms of staff, they are amenable to administrative orders, because this is a private university. In national universities, staff always express their opinions loudly...When an officer of the Ministry of Education visits the campus, private university staff always treat them as a VIP. In the case of national universities, of course they also host the officer, but their attitudes are quite casual.”

The above discussion identifies scholars' concerns about contemporary conditions of academic autonomy in Taiwan and how university management is affected by the government. It might be true that current academic practices in Taiwan are influenced by either New Public Management, such as performance-based funding distribution, or traditional bureaucratic administration, such as regulation of recruitment or tuition fees. However, does this mean that scholars enjoyed more academic freedom in the past? In addition, what does the term 'academic autonomy' mean? I will explore the states of Taiwan academic autonomy in terms of financial dependence and human capital theory in the following section.

5.2. Academic autonomous and financial dependence on the state

“Academic development should not be directly influenced by politics. At the same time, social shaping and influences, such as career choices or distribution

of funding, are unavoidable. (H3, a male scholar in his fifties)”

Why is the university so vulnerable to the state? As Archer (1984) identifies, a key reason is financial dependence. In *Social origins of educational systems*, Archer attempted to elaborate relations between financial dependence and educational autonomy. In general, because educational institutes can not generate enough profit to maintain themselves, operation substantially relies on external resources. In this way, the educational system is unavoidably subject to the interests of sponsors, especially in terms of personnel or curriculum. From the Middle Ages, the education system the West had been monopolised by churches. Under these circumstances, the education system, including universities, had autonomy against state influence, but were dominated by the religious sector. For example, only Anglicans were allowed to attend the University of Oxford until 1866. During the 19th century, an emerging industrial middle class in England attempted to challenge the church-monopolised education system by establishing its own, parallel system, with the foundation of University College London, for instance, as a counterpoint to Oxbridge, and then the foundation of King’s College as a counterpart to UCL. In order to alleviate conflicts among these parallel education systems, a national education system was established to merge them. By accepting public funds, private education systems gradually ceded autonomy and ownership to the state. Archer’s study suggests that when talking about autonomy, we should think about autonomy from whom, and from whose funds.

Overall, in Europe historical universities were established or supported by guilds, regional societies, churches or notable families. In this context, autonomy from the state was developed, as a result of maintaining a delicate balance among those actors. Because of a historically aristocratic tradition in ancient universities of feudal origin, there had been a tension between career-oriented training and humanist/liberal arts education (Ashby, 1965, Halsey, 1965a). However, in Taiwan, as well as other developing or emerging countries, the foundation of universities was led by the state rather than as a spontaneous procedure. There are fewer actors who are capable of negotiating with the government in this field. This fact might explain why the university in Taiwan is vulnerable to state influence in the age of neoliberalism or globalisation. As shown in previous sections, all of the Ministry of Education’s USR

scheme, the Ministry of Science and Technology's regular project grants or in particular the National Sci-Tech Programs, generate impacts on academic activities, from individual research to management of departments and universities. Private universities with resources might have more autonomy from the government, but may also reflect the interests of their sponsors.

As I argued before, neoliberalism is not an external determinant; it is performed by individuals and emerges as a form of truth. This chapter illustrates conditions for the performativity of neoliberalism in Taiwan. First, like most countries, the distribution of higher education represents social stratifications. Second, higher education in Taiwan has been subject to state influence, due to financial dependence on public funds. During the democracy movement in the late 1980s, these situations were problematised and challenged. In the meantime, there was a rise of neoliberal thought around the world. As a contingent result, the relation between the government and university shifted from direct top-down regulation to indirect supervision, via the foundation of academic assessments and performance-based fund distribution.

In addition, the case study of the education system in Taiwan provides an opportunity to further clarify the role of financial dependence. It is true that financial dependence is a crucial factor in power relations between the state and universities. However, is financial dependence a sufficient or necessary condition for national domination over higher education? First, even if higher education in Taiwan has persistently relied on national resources from the authoritarian period to democratic period, the government always needs a rationale for regulating universities, such as national progress or international competitiveness. Second, due to challenges launched by the transition to democracy, power relations between the government and universities had to transform from a mode of sovereign power to one of governmentality. Financial dependence alone is not sufficient for domination over university education. For instance, some scholars point out that the government in the UK had played the role of generous sponsor in higher education without strict supervision while the university worked like a public-funded corporation until the first round of RSE in 1986 (Harrison, 1994, Morley, 1997). Sponsorship in educational sectors are very likely to cause domination, but do not equal domination. The deployment of discourse is the sufficient condition.

5.3. Human capital theory and universities' destiny

Does the academic version of 'the good old days' exist in Taiwan? At least before the last wave of democracy movements in the late 1980s, the answer is no. Before Martial Law and Temporary Provisions against the Communist Rebellion were abolished in 1987 and 1991, civic rights had been limited, including freedom of speech and thought in the university. For example, a liberalist scholar, Yin Hai-Guang, who published several articles against KMT, finally lost his position in the National Taiwan University (吳乃德, 2013). Students who read 'sensitive' books were arrested within the campus (吳乃德, 2013, 胡慧玲, 2013). Along with political and social conditions, by analysing documents in Chapter 4, I suggested that the role of universities in Taiwan is consistently embedded in a great scheme of national progress, which works like an apparatus, "an element or extension of the state (S3)". From the angle of human resources and career training, I continue to elaborate relations between the state and higher education.

It is said that education systems in the West played a positive role in facilitating the rise of industrialisation during the 19th century. This is a fundamental assumption of the linear model of national development and industrial progress. However, this assumption has been challenged by numerous scholars (Halsey et al., 1965, Collins, 1977, Meyer et al., 1992). According to Green (2013), there is a disjuncture between the education system, including universities, and industrial procedures or economic growth, either in England or on the European continent. During this period, traditional craft skills still took centre stage in factories and economic outputs, rather than those skills provided by schools. In Germany and France, the procedure of industrialisation was launched by the railway boom rather than the massification of education. In England, the development of industrialisation occurred before the rise of systematic schooling, nor did the education system substantially match the need for technical skills. For the importance of the university in industrialisation, some scholars may even argue "in the rise of British industry, universities played no part whatever, and the Scottish universities only a very small part; indeed formal education of any sort was a negligible factor in its success" (p. 466, Ashby, 1965). In short, relations between the emergence of an education system, including higher education, and

industrial development in the West are not as direct as the human capital theory claims.

The occurrence and massification of education interacted with development of industrialisation and capitalism, but in subtle ways. According to Archer (1984), the emergence of a contemporary model of education system in the 19th century was the result of a series of conflicts and compromises among various social groups, including churches (either Anglican and Nonconformist in England, or Catholic in France), political elites, the working class, entrepreneurs and the bourgeoisie. In order to balance the conflicting interests of different groups, fragmented education systems had been gradually incorporated into one national education system, and ownership of instruction shifted from private sectors (mainly the church) to the state (Archer, 1984). The need for industrial skills was one reason (for instance vocational schools were founded by entrepreneurs), but the primary issue was competition between the state and the church, and between the traditional elite and an emerging middle class due to industrialisation. As a consequence, the design of contemporary education systems in the West was not mainly intended to promote industrial development. According to Green (2013), the rise of education systems played a crucial role in nation state formation in the West, via implanting ideologies of national identity, patriotism, discipline, meritocracy and mercantilism, some of which provided conditions for the development of capitalism in the long run. However, industrial development and economic growth were by-products of the practices of national education systems. Considering the disjuncture between the education system and industrial development, Green (2013) sees the narrative of a strong correlation between education and industrial revolution as a myth. In Green's eyes, arguments that education plays an important role in modern industrial economies, such as those of human capital theory, are insufficient explanations.

As human capital theory, which takes consequences as purposes, does not match the trajectory of education and industrial economies in the West, it might be utilised as a framework for policy makers in late developing countries, leading to the 'performativity' of human capital theory. According to Green (2013), in those late developmental countries, like Japan, Singapore, South Korea and Taiwan, processes

of industrialisation were led by the state rather than individual entrepreneurs. To catch up quickly with predecessors, followers adopted the human capital theory as a protocol to foster national development. In the process, education systems have played a crucial role in implanting patriotism and nationhood, like those achieved by predecessors; meanwhile, a unified education system has also helped exercise state plans for manpower, substantially contributing rapid economic growth in these countries (Green, 2013). In Chapter 4, I suggested that higher education in Taiwan has been subject to the state's manpower policy from the initial stage in the name of national glory and its variant: national competitiveness. By practising human capital theory, an insufficient functionalist explanation for developments in the West, became a kind of truth in east Asia. In the sense of ANT, this is the 'performativity' of human capital theory (Latour, 2005, Callon and Muniesa, 2005).

Taken together, from the angle of human resources, universities in Taiwan have been profoundly influenced by the state's manpower policy. In this way, it is less convincing to say there was ever a utopian past in academia when Taiwanese scholars enjoyed more academic autonomy and were more independent from state interference. According to Mirowski (2011), the imaginary of the good old days in academia is usually located in a particular period due to the Cold War. Considering domestic contexts, the imaginary of the good old days is even a myth in Taiwan.

6. A plea for a new imaginary: what is the university for

Today, the advent of university massification is usually stated in negative language, either on paper or in dialogue. Did this policy actually fail? There is a more important question: fail in terms of what? Behind all relevant discussions, the inevitable core issue is what is the university for.

If we apply human capital theory, the answer would be yes. The policy of university massification failed. When the number of degree holders increases year by year, it leads to a new issue: underemployment (Green and Henseke, 2016). Mass higher education does not contribute to economic growth as significantly as the state development model promises. By contrast, mass higher education is more likely to be a temporary solution for unemployed youth. Several studies suggest links between

mass education and industrial progress is weaker than stated, the same is true for mass higher education.

In terms of humanistic values, more educational chances leave less disadvantage. Nevertheless, the primary issue is to clarify the contents of a liberal arts education. What does the term liberal arts mean in the 21st century? As the previous analysis shows, contemporary liberal arts narratives are deeply influenced by Newman, reflecting a religious viewpoint from the 19th century. According to Newman, the purpose of knowing all branches of knowledge is to recognise and then appraise the omniscience of God (Newman, 1947). Perhaps, it is not a coincidence that the T university, which is also a Christian university, retains its tradition of liberal arts education. However, this plea might prove less convincing in the 21st century, furthermore Taiwan is not even a Christian country. In practice, no curricula can include all branches of knowledge; some knowledge is more equal than others. Newman's holistic education is composed of the trivium, mathematics, and physical sciences. Ideas of civilisation, the disciplining of minds, civic participation, could be valuable, but their contents must be refined in order to match Taiwanese contexts rather than attempt direct transplantation. Without a crystal-clear definition of holistic education, it is impossible to judge the effects of mass higher education.

For academic autonomy, the policy of university massification theoretically should not engender negative impacts on university management. However, because mass higher education comes with academic evaluations, it has generated profound influences on academic practices. In the light of financial dependence on the state and competition-based funds, only few private universities could keep relatively independent from state interference. Meanwhile, the Ministry of Education still has the right to determine the amount of tuition fees and levels of recruitment. The next chapter will elaborate on how the circulation of neoliberal discourse affects academic behaviours in everyday life.

In terms of equity, effects of mass university education are limited. Even though mass universities have been established, these new universities fail to recruit enough resources and gain reputation. The phenomenon of underemployment implies that

mass higher education may fail to promote social mobility. Several researchers suggest that academic achievements correlate strongly with family backgrounds in primary and secondary education (Reardon, 2011, Morgan and Jung, 2016). Given this, students from marginal backgrounds are more likely to attend less prestigious universities and to hold a less valuable degree (張宜君 and 林宗弘, 2015). The case of Education Reform in Taiwan indicates that university massification is not an effective way to alleviate social stratification. However, Taiwanese experience suggests that an alternative route for marginal students to elite universities could be an option. After a decade of implementing the ‘Star Plan’, research indicates that there is no significant gap in academic achievements between students from normal recruitment and the alternative route (李維倫 et al., 2018). At this point, the Star Plan exercise has invoked urban elites. This tension shows that the university is not just an embodiment of knowledge but also a battlefield of socioeconomic reproduction.

As Apple (2015) argues, a critical analysis should also point out an alternative conceptual framework which enables agentic possibilities and counter-hegemonic actions. For instance, Guinier (2015) proposes a model of democratic merit, that attempts to negotiate an agreement on long-term benefits, equity and citizenship, in order to replace the model of meritocracy. By comparing contemporary accounts and past narratives, this chapter rediscovers alternative frameworks for seeing higher education that are rarely represented in formal publications. From this, I identify the multiplicity of universities, which are enacted by their own networks. This chapter enumerates a range of lenses through which to think about higher education, as well as their current disadvantages, which may help researchers to figure out a new imaginary of universities matching Taiwanese contexts to replace the neoliberalising one and to redefine interests: what is the university for. In addition, this new narrative of higher education needs a device to become tangible, thinkable and manageable, by which more actors will be gathered to connect and extend those existing alternative universities.

7. Conclusion

Overall, in this chapter, by analysing four issues: globalisation of higher education, university-industry collaboration, University Society Responsibility and academic

autonomy, I identify three narratives of higher education in Taiwan. According to these three narratives, the rationale of universities rests on its own right, long-term social impacts and short-term contributions, respectively. Through interviews, I aspire to present the kind of personal experiential accounts that rarely appear in formal textual documents. Comparing these with the historical accounts represented in Chapter 4, I show how a notion of social justice is replaced by a notion of national competitiveness. By analysing distribution of the various narratives across four academic disciplines and more than 10 universities, I argue that, as an actor, academic institutions may play an important part in retaining academic autonomy. For the main research question of this thesis, this chapter suggests that the problematisation of universities in Taiwan is still ongoing and encounters resistance. As subjects of the problematisation procedure, even though some scholars took the dominant narrative for granted, some scholars were aware of the deployment of discourse around them.

The transformation into democracy in Taiwan provides a case to respond with a crucial sociological discussion: what the essence of power is. In the authoritarian period, exercise of power was so visible that the existence of apparatuses was prominent, taking the form of central government, the army, the police and the judicial system. Thus, in the sphere of educational affairs, the main issues about academic autonomy were personnel matters, curriculum design and financial supervision, which manifested in the character of administrative governance in a directive approach. However, has the university in Taiwan become independent from state influences in the democratic age? The answer is a partial yes. At the least, all forms of censorship on publication, speech and thought have been abolished, either on or off the campus. However, according to my study, there is still room for more academic autonomy. Both the cases of globalisation in higher education and USSR indicate that the university in Taiwan is substantially influenced by the state, even if an unchallengeable external authority does not exist anymore. This shows that domination is behind those visible national apparatuses, which enable the exercise of power.

If the essence of power is behind the visible apparatus, what is the mechanism of power? This empirical study supports a Foucauldian understanding about power:

power rests upon the conceptions of individuals and relies on discursive practices: the mechanism of producing narratives and knowledge, by which individuals' conception is formalised. In the case of higher education in Taiwan, although the authoritarian government has gone, the narrative of state progress, national glory, global competitiveness and accountability has become taken for granted, akin to a truth. Hence, the rationale for governing the academy lasts, and it is difficult for academics to refuse the call for national glory. During the process, material practices play an indispensable function; these material practices include requiring institutes to produce and reproduce relevant statements, and following measurement protocols, with tools such as bibliometrics. This procedure was elucidated in Chapter 4. As a result, the concern about university autonomy shifts from personnel matters, curriculum design and financial supervision to competition-based funds. This change manifests the character of governmentality: individuals continue to be mobilised, not by direct top-down governing but through self-discipline.

As Foucault emphasises, discourse is not only about the spread and production of narratives, but includes institutional practices where social relations are reproduced. In the next chapter I will explore how the university is neoliberalised through institutional practices with bibliometrics and its impact on individual academic activities.

Figure 7. Table: Overview of interviewees-1

| | Sociology | History | Material Science | Biomedicine |
|------------------------|-----------|---------|------------------|-------------|
| Position | | | | |
| Professor | 3 | 2 | 4 | 3 |
| Associate Professor | 4 | 5 | 2 | 4 |
| Assistant Professor | 3 | 3 | 4 | 3 |
| Post-Doc | | | | 1 |
| Gender | | | | |
| Male | 7 | 7 | 9 | 9 |
| Female | 3 | 3 | 1 | 2 |
| University Type | | | | |
| Public | 6 | 10 | 10 | 7 |
| Private | 4* | | | 4** |
| Sum | 10 | 10 | 10 | 11 |

*: 2 Christian and 1 Buddhist universities

** : 2 Christian institutes

Figure 8. Table: Overview of interviewees-2

| Administrative Experience | Sociology | History | Material Science | Biomedicine |
|----------------------------|-----------|---------|------------------|-------------|
| Department Director | 4 | 2 | 1 | 1 |
| College Head | | | | 1 |
| University/College Dean | | | 1 | 1 |
| Members of Editorial Board | 1 | 2 | 2 | 2 |
| Core Members of HE Union | 2 | | | |
| Vice Minister | | | | 1 |

Figure 9. Table: Overview of interviewees-3

| Code | Affiliation | Position |
|------------------|---|------------------------------|
| Sociology | | |
| S1 | National D. University | Assistant Professor |
| S2 | National D. University | Professor |
| S3 | S. University (Private) | Associate Professor |
| S4 | National S. University | Contract Assistant Professor |
| S5 | National S. University | Professor |
| S6 | T. University (Private) | Associate Professor |
| S7 | T. University (Private) | Associate Professor |
| S8 | N. University (Private) | Associate Professor |
| S9 | National H. University | Assistant Professor |
| S10 | National H. University | Professor |
| History | | |
| H1 | National H. University | Associate Professor |
| H2 | National H. University | Associate Professor |
| H3 | National H. University | Associate Professor |
| H4 | National K. University | Professor |
| H5 | National K. University | Associate Professor |
| H6 | National K. University | Associate Professor |
| H7 | National X. Normal University | Assistant Professor |
| H8 | National CH. University | Assistant Professor |
| H9 | National CH. University | Assistant Professor |
| H10 | National C. University | Professor |
| Material Science | | |
| M1 | National H. University | Professor |
| M2 | National H. University | Professor |
| M3 | National H. University | Assistant Professor |
| M4 | National H. University | Professor |
| M5 | National K. University | Professor |
| M6 | National O. University | Assistant Professor |
| M7 | National CH. University | Assistant Professor |
| M8 | National X University of Applied Sciences | Assistant Professor |
| M9 | National T. University | Associate Professor |
| M10 | National T. University | Associate Professor |
| Biomedicine | | |
| B1 | National T. University | Post-Doc |
| B2 | National T. University | Professor |
| B3 | T. University (Private) | Associate Professor |

| | | |
|-----|---|---------------------|
| B4 | National H. University | Assistant Professor |
| B5 | National H. University | Assistant Professor |
| B6 | National Defense Medical Center | Assistant Professor |
| B7 | C. University (Private) | Associate Professor |
| B8 | National S. University | Associate Professor |
| B9 | National Y. University/ Academica Sinica | Professor |
| B10 | M. College (Private) | Professor |
| B11 | G. University (Private) | Associate Professor |

Figure 10. Table: Thematization of interviewees' mindsets

Theme 1: The function and responsibility of the university

1.1. For the sake of the university itself and practises in universities

Production of knowledge (B7, B10 and B11; H6, H9 and H10; M1, M4 and M5; S2, S3, S4, S7, S8 and S9)

Basic research (B3, B4 and B8; H10; M10)

Applied science (B5 and B7; M1, M3, M4, M5 and M8)

Deliver knowledge (S2)

Liberal Art (S7 and S10)

Research vs teaching (B7, B9 and B11; H1, H2, H4 and H6; M3, M4, M6 and M7; S1, S3 and S10)

Knowledge inheritance (B2 and B8)

1.2. The relation between industry and the university

Industry-University Collaboration (B1-B4, B6-B10; H1, H5-8; M2, M3, M5-10; S1, S3 and S6)

Certification of Industry-University Collaboration (M2 and M7)

Role of the university: knowledge economy (B6, B8 and B11: M9)

Gap between theory and application (B6)

Career training (B3; H5 and H7; M1, M3, M8 and M10; S1, S6 and S10)

The gap between industry and the university (S3 and S4)

University division (B4 and B10; H2, H3, H6, H7 and H10; M2, M4, M5 and M8; S1, S5 and S10)

Labour exploitation (S3)

Universities as an R&D sector (H6, S10)

Academic investment (B6, B7, B9 and B11)

Quality manpower (M1, M4, M5 and M6; B1, B2, B4 and B10; H8, H9 and H10)

An engine for local development (H6 and H10)

Patent vs Technology transfer and Licensing Fee (M1 and M8)

Patent (B1 and B11)

1.3. The relation between society and the university

The linkage between the university and society (H3 and H9; S10)
National progress/ competitiveness (M9; S7 and S10)
University Social Responsibility: ideas, definitions and legitimacy (B2, B8 and B10;
H1 and H6; S1, S2, S3, S4, S5, S6, S9 and S10)
University Social Responsibility: schemes and policies (S3, S4, S5, S6, S8 and S10)
University Social Responsibility: validity and outputs (H5; S2, S3, S4 and S9)
Social Impacts (B10; M1 and M2; S5, S7 and S10)
Taxpayer (B1 and B3; H3; M8)
Autonomy (M6 and M10; B11; H3 and H4; S3, S6, S7 and S8)
University subjectivity (H1 and H4)
Mobility (B2)
Multi-culture (H3)
Democracy (H10)
Public participation/community service (B8 and B10; H2 and H7; M1, M3, M5, M7
and M8; S1, S2, S3 and S5)

1.4. Purposes of the university for students

Expertise (B4, B6 and B11; H10; M6; S1 and S10)
Logic (B3, B5 and B11)
English (B5)
Ability of self-learning (B3 and B11; M1 and M3)
Independent and critical thinking (B1 and B3; H1; M1 and M3; S1 and S10)
Ability to resolve a problem (B5 and B6)
Purpose and potential of life (B4; M10; S3)
Virtue and personality (B4; M2 and M6; S7)
Ability to produce knowledge (H1)

Theme 2: Academic Management

2.1. Believe in number and decoupling

Paperwork/ admin burden (B8; H2 and H4; S4 and S6; M2 and M8)
Objectivity (B3, B5, B6, B7 and B11; M1, M2 and M6)
Transparency (H1)
Accountability/ value for money (B2, B6, B9 and B10; H1, H3 and H4; S2 and S10;

M2)

Game (B4; H2 and H5)

Formalism/ decoupling between formats and contents/ formality/ alienation (B2 and B9; H4 and H6; S3, S6, S7 and S8; M2, M4 and M9)

Positive functions of evaluations (B4, B8 and B10; H1, H5 and H6; S6, S7 and S10;)

Marketisation of higher education/ entrepreneurship (S3 and S8)

Bibliometric index as a standard (H9; S10)

Pedagogy and Educational Statistics (S6)

2.2. Normalisation of the university and scholars: institutional practices

Meritocracy/ key performance indicators (KPI) (B6, B7 and B11, H2, H4-8 and H10; S2, S3, S7 and S8; M1, M3, M5-8)

Criteria for promotion: KPI, projects and bibliometric index (H2, H5-8; S1, S3-5 and S10; M1, M3, M6, M8 and M10)

Single criteria/ flexible criteria (B3, B4, B5, B7 and B10; H1-3, H6 and H9; S1, S6 and S7; M1, M2, M4-7)

Competition for funds (H2-H5; S1 and S5; M6)

Duplication of criteria (B7, B9-11; H4 and H5; S3 and S8; M5)

Punishment and reward (B4, B7 and B9; H1, H3 and H5; S2, S3, S5, S7 and S8; M1, M4, M5 and M7)

Peer pressure (B10; H2, H5 and H8; S5, S9 and S10; M5, M6 and M10)

Unwritten rules (B4 and B7; H1 and H5; M6)

New public management (S2, S6-8)

2.3. Practices in committee panels

Anonymity and interpersonal networks (B4, B5, B7-11; H3, H4, H7 and H9; S2, S5, S9 and S10; M6)

Role of Impact Factor in panel review (B9, H4 and H8)

Role of panel chairmen (B9 and B10; S7)

Ethics of reviewers (1)

Innovation (1)

A case of rejection (S6)

2.4. Others

Fix-term contract (S4 and M3)

Promotion as voluntariness, time framework, right to work and tenure track (H5, H7 and H10; S1, S3, S6, S8-10; M1, M3, M6 and M8)

Vulnerable private universities (S6-8 and S10; M5)

Withdrawal mechanism (H1, H5-7 and H10; S5 and S9)

The power and responsibility of departmental head (H4 and H6; S2, S5, S7 and S8)

Union (S3 and S5)

Alternative accountability (S8)

Theme 3: Impacts on researcher's behaviours

Emotions: Oppression/ pressure for family life (H4, H5 and H10; S4 and S6)

Worries about funds (B3 and B5; H1, H3 and H5; M3 and M8)

Worries about promotion (B6 and B7; H1, H3, H8 and H9; M3, M7, M8 and M10)

Worries about bibliometric indicators (B1 and B3; S2;)

Worries about projects (H1 and H10; S1 and S10; M8)

Timeframe (B3 and B7; H2, H4 and H7; M7)

Centralisation of resources and generational conflicts (B5 and B9; S1, S4 and S8; M9)

Concerns of publication for Impact Factor or other bibliometric indexes (B1, B2, B4-8 and B11; H3, H5 and H8; S1, S6, S8-10; M2, M3, M5, M9 and M10)

Concerns of publication for promotion (H1, H5 and H9; S1-3;)

Concerns of publication for audiences and language (6)

Concerns of publication for networks (H2; S3 and S4)

Concerns of publication for publication fee (M6)

Books (B1, B3, B5-8; H3, H7, H9 and H10; S3, S5 and S9; M3-6, M9)

Factors in topic choice: student interests (S8)

Factors in topic choice: personal interests (B4 and B6; H3, H4 and H9;)

Factors in topic choice: extension, feasibility and low risk (B3, B4, B5 and B8; H2, H3 and H8; S1 and S3; M3, M5, M7, M9 and M10)

Factors in topic choice: frontier and innovation (B2 and B5, H1 and H8; S6; M2)

Factors in topic choice: popular issues (B3, B6 and B7; H5 and H8; M1 and M6)

Factors in topic choice: dialogue (H3 and H5)

Strategy: cooperation (B2-4, B7, B8 and B11; S1, S2, S5 and S7; M4, M6, M8 and

M10)

Non-cooperation movement (S3 and S8)

Theme 4: Impacts on editorial boards

The impact of TSSCI (H1, H4 and H6; S2 and S5)

The Homogenisation of journals (H1 and H6)

Concerns for journal ranking (B10; H1 and H4; S2; M4 and M5)

Impacts on submission (H1, H4, H5 and H6; S2 and S5; M4)

Theme 5: National policies and current challenges

University explosion (B3 and B10; H4, H8 and H10; S8 and S10; M1, M2 and M6)

Decline in the birth rate (B10; H3, H7 and H9; S1, S9 and S10; M2 and M10)

Decline in PhD students (M7 and M9)

The ratio of staff to students (B4, S1, S4-6 and S8)

Salary and global pay (S2 and S6)

The guide of the state vs deregulation (B2 B8 B10 and B11)

The aim for the top university project (B5, B8, B10 and B11)

National Sci-Tech programs vs general grant programs (B4, B8-11; H3 and H6; S3, S5 and S10; M9 and M10)

Theme 6: The globalisation of the university

Factors in topic choice: local issues and global issues (B1, B2, B6 and B11; M4)

International competition (B9 and B11, H1 and H10; S10; M1 and m10)

Foreign audiences (B4-6)

Concerns of publication for audiences and languages (B1-3, B5, B7 and B8; H1, H3, H5 and H10; S1, S3, S6-10; M2, M4-9)

Right of discourse (B9 and B11; M2 and M4)

Hegemony of English (H5 and H9)

Chapter 6: Governing through metrics: neoliberalism in academic everyday life

1. Introduction

This chapter explores the various ways through which discourse is diffused through management into the Academy and then enacted in everyday life. In Chapter 5, through analysing issues around the globalisation of higher education, university-industry collaboration, and the University Social Responsibility scheme, I characterised how scholars themselves frame the purposes of higher education. From this, I elucidated relations among narratives of university education, different types of universities and academic disciplines. By focusing on the topics of university autonomy and the influence of state bureaucratic organisations, including the Ministry of Education, and the Ministry of Science and Technology (MOST), I tried to grasp the power relations between the state and universities in terms of financial dependence. This investigation maps out the conditions of emergence of neoliberal higher education. Nevertheless, what Foucault calls discourse is not only the formation of statements; it also includes spaces for intervention and ways of diffusing discourse through organisations into action (Foucault, 1991b). In other words, the omnipresence of power relations rests on the deployment of governmental apparatus (Foucault, 1991a, Foucault, 1978). Numerous studies have illustrated the development of neoliberalism, its introduction into educational sectors and its consequences (Mirowski, 2011, Evans, 2004, Elzinga, 2012, Apple, 2013); however, what has been overlooked is how the neoliberal discourse on universities has gained authority. I argue that this authority is achieved by the distribution of bibliometrics, as a form of knowledge for evaluating knowledge production. Thus, along with the conditions through which discourse is diffused into the Academy, this chapter aims to analyse the procedures through which discourses circulate within academic organisations; that is, “the practices within institutions for dealing with the subjects” (p. 73, Hall, 2001) .

To begin, I must delineate definitions of following terms consistently used in this chapter. As discussed in Chapter 3, concerning methodology, in conformity with Foucauldian theory, the term ‘discourse’ means a set of rules to produce authoritative

statements regarding a given subject (Foucault, 2002a, Foucault, 1981). Meanwhile, rules for establishing knowledge regarding the subject, consisting of measure, inquiry and examination, are also a means of exercising power (Foucault, 2000). Therefore, power and knowledge are to be understood as two sides of the same coin. Along with this notion, ‘truth’ is not to be understood as a statement which is universal, untouched by and independent from subjective interpretations. Rather, truth is produced through an accepted discourse in a given society, functioning as a mechanism which gives people the framework to discriminate correct statements from false statements (Foucault, 1980). The object of the power-knowledge complex is the social body, constructed by the procedure of subjectification (Foucault, 2008, Foucault, 1978, Foucault, 1979). In the case of the neoliberal university, I name this social body as the Academy.

The meaning of ‘institutions’, to a certain extent, could be ambiguous. According to Foucault, the concept of institutions means a space or system for observation, record, communication, pedagogy, registration and accumulation during discursive practices (Foucault, 1978, Foucault, 2000, Foucault, 1981). In accord with the power-knowledge complex, the institution also plays dual roles in discursive formation: first, to produce knowledge; and second, to produce and maintain power relations. For example, in the case of the deployment of discourse on sexuality, clinics and hospitals play a dual role. These are where medical data were engendered and accumulated, and where a new model of doctor-patient relations was embodied. In other words, all possible meanings of the institutions play a crucial role in diffusing discourse into everyday life, leading to an omnipresence of power relations, which one cannot escape from. Chapter 4's analysis of Taiwanese historical documents dating from the 1960s suggests how relevant institutions became involved in producing discourse on the Academy. Hence, this chapter is focused on the aspect of dispersing discourse on the Academy within academic organisations. When I use the word ‘institution’ in this chapter, I refer in particular to academic organisations, such as universities, colleges, departments or panels. By the phrase ‘institutional practices’, I mean managerial strategies utilised in academic organisations. There are four major research questions in Chapter 6: How has neoliberal discourse on the Academy been enacted by institutional practices? How have bibliometrics been involved in institutional

practices? How have institutional practices shaped scholars' ways of interpreting themselves? How have institutional practices changed ways of producing knowledge?

This chapter is divided into two themes: first, the chapter investigates modes of academic management and secondly, it explores influences on academics. The first theme aims to demonstrate how the neoliberal discourse has been enacted and has eventually encompassed Taiwan higher education in terms of academic management and institutional practices. It begins by considering the issue of promotion evaluations, which are the most important concern for most interviewees, to delineate the principle of accountability and Key Performance Indicators (KPI), followed by other internal evaluations and honouring systems. Both accountability and performance measurements represent the key elements of neoliberal discourse. After this, this first section explores how a set of performance criteria, designed by the government, has been transmitted to universities through university evaluations. By elucidating the distribution of neoliberal discourse regarding higher education within all these processes, the first theme will outline power relations among the state, academic organisations and researchers. Additionally, by deliberating on the broad usage of KPI and bibliometric devices, the first part will illustrate the trust in numbers and the rhetoric of objectivity behind the exercise of assessments.

The second theme represents influences of the neoliberal university on individual scholars. As the aim of this thesis is to produce knowledge, there are two challenges when conducting this research: to distinguish changes in knowledge production; and then to couple the changes with policy environments (Gläser et al., 2002, Laudel and Gläser, 2014). Hence, two lenses are utilised to recognise the influences of the neoliberal university on academics. The first lens is that of direct subjective experiences and emotions regarding precarious academic careers, in the light of an intense emphasis on meritocracy. This is presented in the first motif. The second method is to generate specific accounts for each turn in research topics or publishing patterns, instead of a general narrative. In order to encourage interviewees to make specific explanations for each significant event, previous publications of interviewees were analysed and visualised in picture-form in advance of interviews, and shared

with interviewees so that they could articulate their detailed processes of publication (illustrated in Chapter 3).

Taking both motifs together, Chapter 6 articulates not only how the discourse on academic excellence influences what we will see via changes in knowledge production. It also attempts to highlight whether the incorporation of bibliometric measures and the enterprising universities can be understood as a system of governmentality.

2. Impacts of institutional practices on academics' perceptions of self

The first motif is academic management and institutional practices. Are institutional practices able to modify individuals' frames of self-appraisal? Do individuals adopt external criteria of the institutional practice, such as performance assessments, to evaluate themselves? An interviewee's narrative provides a meaningful example. S6 was a sociology researcher. In general, S6, a middle-aged male associate professor at a private university, disagreed with the over-emphasis on quantitative measures and state intention to normalise higher education. In his words,

“I argue the development of higher education should not and must not be conducted in the light of business management...When pedagogy becomes statistic-based pedagogy, it is not pedagogy at all...In other words, the problem in higher education is that we don't understand the spirit of higher education.”

“To be honest, our department still has some agency. At least we don't use SSCI or SCI for evaluations...This is an unwritten rule or consensus. The requirement (for promotion) is four papers, no matter if it is a SSCI paper or not.”

The above statements delineate S6's stance, which is different from the dominant narrative regarding university education: a disagreement with the quantitative

approaches to educational policy. In discussing university's relations with other social sectors in Chapter 5, S6 held unfavourable opinions of state bureaucracy interference, doubting the validity of the linear innovation model between the industry and university. He admired his department for its sense of agency, where non-indexed journal articles were counted as valid outputs, unlike most academic institutions. However, before our interview, S6's proposal for MOST research grants had been refused. S6 was going to write an appeal to justify his performance. The following quotations illustrate how S6 defended himself.

“The proposal evaluation consists of two parts. One is previous publications; another half is contents of research proposals. My performance of publications is very outstanding...

I checked all approval proposals of hundred cases in this field and sorted out similar research topics. There are 50 scholars in my field who got their projects approved. Then, I checked their recent publications and calculated their points... Among these 50 scholars, I am ranked in the middle. In addition, I just published a paper in a high-ranked SSCI journal. In the field of X, this journal is on the first tier, ranked as the top three. Plus this paper, I should be a top scholar.

When I review the proposals of others, I read them carefully. I also publish papers regularly as I am expected to do...I have certain numbers of publications. I can calculate it in terms of numbers of articles, authorships, impact factors, SSCI and ranking... one by one, I can demonstrate it.”

Comparing both statements, although S6 disliked procedures of performative metricisation in academia, in defence of his ability and contribution, he had to draw on the languages of bibliometrics, such as publications, authorship, impact factors and ranking. This case highlights what Foucault names regime of truth: “the type of discourse which it accepts and make function as truth” (p. 131, Foucault, 1980).

Therefore, even though S6 argued that the university should be verified by diverse criteria, he could only use one set of criteria to tell his truth about his academic value. There could be several ways to describe valuable academic performances. However, in the present climate only a description constructed by bibliometrics is considered true. This case shows the power of distribution of neoliberal discourse within academic organisations, which encompasses individuals, making alternatives less possible.

In sum, this opening example recognises how the deployment of discourse on the Academy through academic organisations modifies scholars' perceptions of self to a degree. Even someone critical of the system has to use its language occasionally. The following sections will provide an explicit analysis of its composition.

3. Practices of accountability by academics: Key Performance Indicators systems

This section begins by overviewing means of academic assessment in Taiwan. From this, I will elaborate on a coherent feature of accountability beyond these practices. In general, there are four types of academic assessments: internal evaluations, promotion evaluations, grant applications and university evaluations. Among these, for individual scholars, the thing of matter is promotion evaluations and grant applications, followed by internal evaluations and university evaluations. In terms of evaluation standards, because procedures of grant applications and university evaluations are operated by external organisations, for instance, MOST, the Ministry of Education and Institute of Engineering Education Taiwan, their criteria are not determined by universities themselves. In cases of internal evaluations and promotion evaluations, it is the affair of each university and department. Even though the criteria for promotion evaluations and internal evaluations vary in different departments, there is a consistent characteristic among all academic institutes: a usage of Key Performance Indicators (KPI).

In discussion about academic management, most interviewees focused on aspects of

promotion evaluations, manifesting its prominent position for individuals. Hence, I took it as an example to analyse the principle of accountability. For the procedure of promotion evaluations, 18 interviewees mentioned the usage of KPI systems (S1, S3, S5, S6, S10, B7, B8, B10, H5, H6, H10, M1, M3, M6, M7, M8, M9 and M10). Usually, the promotion evaluation is composed of three parts: teaching, service and research. There is near-consensus among interviewees that the part of teaching and service is unlikely to fail. Thus, in practice, the crucial part is research performance. Detailed requirements vary, but the principle of KPI is universal. There are charts, tables or formulas to list all valid academic outputs and quantify scholars' performances in every department, reifying the spirit of meritocracy.

In disciplines of social sciences and humanities (SSH), criteria are more flexible than those in natural sciences and engineering (NSE); this category defining valid outputs may include books, chapters, conference papers, workshop papers, journal articles which are either registered in SSCI and TSSCI, or non-indexed journals. In some departments, conference papers and workshop papers are excluded from qualified publications. Each item represents a score, and the sum will determine if applicants reach the criteria for promotion. Several SSH interviewees (S3, S5, S6, S9, H1 and H5) pointed out that indexed journal articles were not necessary; theoretically, monographs were qualified for promotion. S5 and S6 argued that panel's peer review regarded research quality over quantity. S5, a professor who used to be a department director, also emphasised that one of his colleagues was recently promoted by a monograph, as an example. In some cases, publishing at least one monograph was an essential condition (H10). However, two junior assistant professors (H7 and H9) did not reckon publishing books a practical strategy for promotion. Even in cases where indexed journal papers were not necessary in terms of official requirements, two associate professors (H1 and H5) were reminded of the importance of indexed journal papers in person. S3, a middle-aged associate professor working at a private university, admitted that SSCI or TSSCI-indexed journal papers were less risky. In S3's words,

“The requirement of our department for promotion is about three papers, but not

limited to indexed journals...If external reviewers recognise its value, it works. However, in practice, indexes matter, because your college and university may not be very familiar with your fields. If all of your publications are out of the index, you trouble yourself. In the end, the index becomes a standard.”

In NSE fields, the criteria for promotion is relatively monotonous, and this is where bibliometric indexes take centre stage. There is no such thing as a set of key performance indicators, but only the usage of SCI. In some institutes, numbers of patents or industrial collaboration projects were adapted in promotion evaluations (B3, M3 and M8). In some cases, there was no minimum requirement for publications (B4), nor a formula (B5), but SCI-indexed journal articles were always essential. Usually, there was a clear requirement for publication numbers, such as two papers (M10), five papers (B8, M7 and M8), 6 papers (M1), 7 papers (M6) or 15 papers (B7, working at a private university). In particular, there are several traces of the Research Performance Indicator (RPI) formula. Some interviewees (M1, M6, B6, B7 and B10) across private and public universities mentioned that they might calculate a score according to impact factors and authorships, inferring the usage of RPI formula or its variant; some (B7 and B10, working at private universities) mentioned that they applied RPI formula in their institutes. Chapter 4 shows that RPI formula represented a prominent type of quantitative governance and accountability.

Besides research, KPI systems are also used to assess service. The element of service covers recruitment affairs, tutorials, interviewing students, curriculum design, public speech, adult education, on-line courses, being directors of programmes, taking part in university evaluations, holding a conference, taking part in academic associations, taking part in committees and being journal editors or reviewers. These items suggest the service is characterised as administrative business. Like research outputs, there are charts or tables to list all acceptable services with corresponding grades (B7, H7, H10, S1, M1, M6 and M8). Applicants have to collect enough points to achieve the requirement. In this way, all scholars share administrative works in order to promote their academic career. Some interviewees considered it a positive strategy to involve all staff in academic communities (H2, M3 and M8), whilst some regarded it as a

negative method to exploit academic labour (S8, M6 and H10). For example, H10, a senior professor, used the word ‘suffering’ to describe the affairs of service. Whether seen as positive or negative, the application of KPI systems in the service section represents the spirit of accountability and meritocracy in university management, diffusing within academic institutions.

There are several discussions and much research about teaching assessments, including its origin, design and consequence, either in UK, Taiwan or other countries (Skelton, 2005, Morley, 2003). In parallel with the emergence of research evaluations, a model of neoliberal universities also aims to render teaching quality transparent, calculative and comparable by quantitative surveys, in order to achieve accountability and eventually competition (Strathern, 2000). This topic of teaching assessments is worth more study. Nevertheless, because the teaching assessment is not the key factor *de facto* in the promotion evaluation or other evaluations, I will not focus on the role of teaching assessments itself in this thesis, as discussed in the introduction chapter.

The last feature of promotion evaluations in Taiwan is a time framework to achieve required KPI. In general, researchers have to submit their promotion proposal by a given deadline, or their department will not renew their contracts. The time framework varies from 6 years to 8 years, depending on institutes; female researchers might get a two-year extension in the case of a pregnancy. The time framework seems to resemble the USA mode of tenure track, but it is applied to both promotions to Associate Professor and to Professor. The appearance of a time framework represents the principle of accountability: one must justify contributions within a certain period, entailing visible outcomes in a short time. This time frame makes researchers nervous and stressful. Emotional reactions caused by institutional practices will be explored in following sections.

According to 戴伯芬, a revision of the University Act in 2005 empowered universities to establish internal faculty evaluation systems, including promotion evaluations; since then, the promotion timeline was invented by university

bureaucracies (戴伯芬 et al., 2015). According to interviewees' interpretations (H4 and H5, who actually worked at one of those top universities), the idea of the promotion time framework was designed by a few so-called top universities in response to The Aim For The Top University Project in 2006, and then spread. In other words, the occurrence of the timeline is a spontaneous bottom-up process, instead of government policy. This example accounts for the character of power relations, where the existence of a significant central government is not necessary in a Foucauldian sense. The essence of power rests on how individuals recognise their moral obligations, by which the individuals work; that is to say, ethics. In the case of timelines, the moral obligation is efficiency, one of the 3Es. Thus, the existence of power, as relations rather than things, is not located in the government, but dispersed among social bodies (Foucault, 1978, Foucault, 1980). This phenomenon also echoes with a character of community self-discipline in terms of governmentality, whilst standards of desirable behaviours have been internalised by communities from a governmental influence (Apple, 2013, Miller and Rose, 2008). That is, since state bureaucracy has been devoted to delivering imaginaries of desirable behaviours to communities and operating performance assurance, communities internalise these external expectations, resulting in self-discipline. In the example of time frameworks, the academic community invented the system spontaneously for developing/increasing efficiency.

4. Duplication of external performance criteria in internal managerial strategies

4.1. The social life of RPI formula

As the previous section focused on the feature of accountability in institutional practices of academics, this section elaborates on the circulation of metric discourse in academic life. My interview data indicate that the RPI formula and its variants are still used to quantify scholars' productivity in several universities. The existence of the RPI formula is an example to show how a standard of measurement has been duplicated from the government to universities, and then generates influence on individual scholars. Chapter 4 shows that RPI was invented and utilised by the National Science Council in the 1990s, when the role of bibliometrics had been

extended from helping librarians purchase valuable academic journals to governing academic communities. B9 (a senior male professor) was a Vice Minister of Science and Technology after 2000. When B9 was in this position, he abandoned the usage of RPI formula inside MOST. In this interview, he reviewed the history of the RPI formula:

“I think it was created to answer the needs of the times. In the past, some of our papers were not good enough nor international. The purpose of RPI was to enhance quality by encouraging people to publish in international journals. It attempted to transform academic judgement into objective and quantitative standards rather than the tastes of a few schools. When the whole level of academic communities had risen, we thought we didn't need such rigid criteria anymore and stopped using it.”

This statement identifies a pursuit of international visibility and trust in an ‘objective’ number. Both notions are enabled to become thinkable and manageable by introducing bibliometric devices, whose entangled procedures are elaborated in Chapter 4. In response to intense criticism against over-emphasis on quantitative values, B9 stopped the usage of the RPI formula in MOST. Nevertheless, B9 admitted that “numerous universities still keep using it” and he did not have the right to interfere in each university’s policy on internal affairs. B11 (a male associate professor in his forties) also noted and criticised the profound impacts of the RPI formula on academics. In B11’s words, “once the RPI was founded, it spread to the whole country and is still working in universities today.” The lasting practice of the RPI formula shows that the imaginary of academic performances has been redefined and transformed by the bibliometric indicator. Beginning with RPI, bibliometric-authorized values have eventually encompassed everyday life of academics. Once the RPI formula became an element of 'common sense', simply removing it from an official organisation (in this case MOST) does not challenge the whole discourse of bibliometrics. In sum, the appearance of the RPI formula manifests two features: faith in numbers; and circulation of calculative devices.

4.2. Everyday academic life encompassed by metrics

Along with promotion evaluations, another format of assessments conducted within universities is that of internal evaluation. There are two types of internal evaluation: at levels of individual scholars; or by departments. I begin by considering individual evaluations. The internal evaluation is a regular assessment, which takes place annually (H2, S4 as fixed-term, S8 and S9), biennially (B11), once per three years (H7, H8, B3 and S2), once per four years (S7) or once per five years (H4, H10, B8, S3, S5 and M9). It is almost a consensus among all interviewees that the internal evaluation is just a regular routine that does not generate considerable effects overall. Because the internal evaluation is considered relatively unimportant, quite a few interviewees were not very sure about its frequency.

In terms of evaluation standards, the internal evaluation is more or less a copy of promotion evaluations and universities evaluations, including the KPI measures. “Essentially, this (internal evaluation) is meant to make staff prepare data for the next evaluation (S6)”. This statement contains meaningful implications. Although usually regular evaluation does not produce serious effects, neither punishment nor rewards, its exercise still renders academic staff aware of the set of correct academic behaviours, functioning like a gentle but consistent reminder. Moreover, the internal assessment plays a role in measuring, ranking and accumulating documents on scholars, by which the Academy is formalised and becomes visible (Foucault, 1978, Foucault, 1979). Third, through applying similar criteria in managerial practices, such as KPI or bibliometric indicators, these evaluations accumulate comparable and transferable data. As Latour (1999) argues, comparability is a crucial feature of circulating measurements, by which separate things are categorised as one entity. The feature of comparability forms a basis for competitive markets; competition entails not only visible but also comparable data (Beer, 2016). Hence, the duplication of calculative devices within institutions represents the actualisation of universities as enterprising bodies.

In some cases, scholars who continue to obtain research projects granted by MOST can be free from internal evaluation (H10 and M6). This marks the fact that an approved research project is considered as valuable as a verified performance indicator. There are several implications behind this. First, while research grants turn into a performance indicator, there is an alienation of relations between research projects and research activities. Ideally, the research grant is a means to support research practices. However, as an indicator, the role of the research grant shifts from a method to a purpose, which the researcher is subject to. Second, this case shows how an indicator is formalised. Several scholars indicate that, although a pursuit of objectivity in quantitative senses is assumed to exclude subjective judgement and personal biases, subjective intentions are intrinsic to designs of parameters (Power, 1997, Porter, 1996, Beer, 2016). MOST research projects, as an indicator, represent a desirable outcome and expectation. The transformation of MOST projects into a parameter of internal evaluations implies circulation of discourse from state bureaucracy to university bureaucracy.

Along with the promotion check and internal evaluation, several interviewees across private and state universities (M1, M7, H2, S2, S7 and S8) mentioned that there were honour systems based on publications in their universities. Detailed standards differ among institutes, but the spirit of bibliometric-based meritocracy is coherent. After publishing journal articles, scholars may gain grants as rewards from the university or college. The amount of grants, as the level of honours, rely on bibliometric values. SCI, SSCI and A&HCI journals were rated as more valuable than non-indexed journals, whereas high impact factor journals were more prestigious than low impact factor journals. In M7's case, an increase in citation numbers could also translate into rewards. In S8's case, books and chapters were excluded from the standards of reward. Publishing a bibliometric-authorized journal article is regarded as a thing of matter for academics. There is a vivid example which represents how universities' administrators were concerned about bibliometrics:

“Last year I published a paper in an A&HCI-indexed journal...Anyway, one month later, an administrative staff called me. 'Professor, did you publish an

A&HCI paper?' He even couldn't remember the name of the journal but just knew this it was A&HCI-indexed. (Interviewee H9, a junior assistant professor)"

Similar methods might be utilised to encourage university-industry collaboration as well, whilst the university-industry collaboration is another desirable effort. For instance,

"They set a grant to encourage us. If I make a deal with a company, they will grant this cooperation project...They cannot control our behaviours. They just control money. In this way if you plan to apply the grant, you must do what they want you to do. (Interviewee B4, a junior assistant professor)"

Besides these operations, there is a variant named 'a system of internal resource distribution', which manifests in embroiled relations between visibility and competitiveness in the neoliberal discourse. Through this example, I will analyse linkages between managerial practices and narratives of international prestige.

4.3. Proliferation of visibility and competitiveness

M1 was a director of the department of Material Science and Engineering in the National H. University. In interview, M1 gave a detailed description of the establishment of a system of internal resource distribution. The following are his statements on rationale and the background to the internal resource distribution system:

"He (the former head) attempted to estimate the position of our department in the world. He listed all the prestigious departments of material science around the world and compared us with them...Five years later, when I was the head, we mentioned the issue again. We wondered if there was any progress during these five years, but the result was still the same. Because the environment did not change at all, we got the same outcome...In these circumstances, we wanted

to kindle a faculty passion for research...Certainly, our department is less excellent than MIT or Stanford.”

These statements provide an account for the founding of a system of internal resource allocation. It identifies a passion for visible international and academic recognition. This is a consistent theme across the decades, whenever people think of and talk about higher education in Taiwan, as outlined in Chapter 4 – and in the preceding discussion of RPI. Furthermore, it also shows an intrinsic linkage between visibility and competitiveness. As Foucault (2008) points out, competition is a central component of neoliberal governmentality. Along with this outcome, it was essential to investigate the department’s ranking in global academic communities and compete/compare with other prestigious foreign universities, such as “MIT or Stanford”. Nevertheless, it is difficult to make a convincing comparison without a common benchmark.

The following is his statement on methods for ranking their department within academic communities:

“We made a list of prestigious departments and compared them with their publications, such as journals where they published. Then we noted that the number of our publications was close to others, but the number of good papers was less than others...Hence, we did a self-examination and drew the conclusion that we should pursue high impact journals...High impact journals means that those articles topics are more significant in a scientific sense, generally. It evoked many opposing voices. Some people argued we should have freedom of research and publishing without any interference. Nevertheless, we still wondered about our academic position. When you had no alternative approach to evaluate academic performances, the easiest way was the established approach of SCI. Is this the right way? No one can tell.”

The availability of a bibliometric indicator, like SCI, can prove to be a tangible

quantitative device in this kind of situation. In this way, bibliometrics play the role of self-actualisation or self-fulfilment. “Measures define what is true and then are used to verify that truth” (p.28, Beer, 2016). The combination of bibliometric measures and the pursuit of international prestige formalised a set of desirable academic performances, and rendered a lack of publications problematic. This narrative offers an empirical case to show the procedure of problematisation of academic behaviour and the entanglements between solutions and problems, and echoes with the material presented in Chapter 4. As a result, the circulation of metric discourse makes alternatives less conceivable.

With the rationale of progress, a mechanism of internal evaluations was established. The following is M1’s statements on how they chose parameters for internal estimation:

“There used to be no evaluation mechanism...A professor could enjoy supreme freedom. Even if you have nothing to do with research, no one can interfere with you.”

“The system counts all ways of activities, like your publications, the amount of your project funding and other distinct performances.”

“In order to assign the resources, we checked your publications in the past three years. We used to call it three-year merit. Now it extends to five years.”

“In general, when you get higher Impact Factors, you also get more influence as people consider it important. Hence, both Impact Factor and number are counted as the credit of publications.”

Because the bibliometric is available, departmental reputations and individual efforts

have become more commensurable. Therefore, the use of bibliometrics was duplicated from appraising departments to examining individual researchers. In Espeland and Lom's words, "commensuration...unifies disparate objects or events by imposing a shared metric on them" (2015, p. 34) . After the same standard was also adapted to rank international excellence for internal measurements, 'the whole' becomes the 'sum of its parts'. Meanwhile, other desirable outcomes, such as external funds, were categorised as parameters. This process shows how subjective interests are hidden by the selection of quantitative indicators.

An evaluation without corresponding actions is less likely to be a thing of matter. Hence, the distribution of resources, such as spaces and students, was incorporated within the bibliometric-based evaluation. With the machinery of punishment and reward, a mechanism of internal competition was launched. Taken together, this empirical case shows how the spirit of accountability is enacted and diffused in everyday life by institutional practices. The term used to state the problem is applied to define the solution. Desirable outcomes are categorised as measurement indicators, while subjective motivations are hidden by numbers. Via circulation of measurements, the Academy is formalised. Resource allocation functions as a machinery of punishment and reward, by which the Academy is disciplined and governed by neo-liberal discourse, becoming a norm.

According to M1's narrative, the settlement of internal evaluations was a spontaneous bottom-up procedure. It was launched by internal motivations and self-awareness instead of external policy. The spontaneous feature echoes with the emergence of promotion timelines. Both empirical cases suggest that power is exercised through individual judgement based on ethics rather than obeying sovereign power. In this context, ethics are a combination of national glory and neoliberal virtues, such as competitiveness, accountability and the 3Es. While academics think of themselves in neoliberal frames, the academic gradually becomes 'governmentalised' in Foucault's sense.

When the university is a main field of academic life, university bureaucracy essentially consists of this academic milieu, mediating between scholars and the government. In M1's example, the department head played an active role in the emergence of the internal evaluation. I will further explore the role of departmental leaders and how they interact with university bureaucracy in the following section.

4.4. Transmitting pressure on performances from university centres to colleges and departments

Besides individual internal evaluations, there are either informal comparison or formal internal evaluations for departments or colleges, operated by university bureaucracy. This kind of internal evaluation involves transmitting pressures on productivity as well as circulation of neoliberal discourse from university centres to colleges and departments. Several interviewees (M5, H4, S5, S7 and S8) referred to their experience of being directors or deans, which involves power relations and interactions between university bureaucracy and colleges.

The first example indicates how an academic leader played an active role in enhancing academic competitiveness through an institution's management. M5 used to be a dean of a national university and a dean of a private technology university. In this position M5 made a list of performance indicators to measure departments within the same college. The result was shown to all department directors. The most productive department was rewarded, while less productive ones were embarrassed by gaining nothing. In this way, faculty and departments were encouraged to promote their own performance. The criteria used in these internal evaluations (even if slightly modified to reflect a department's orientations) were a copy of the university evaluation, conducted by the Ministry of Education, such as "average publications, industrial research projects, grants and everything" (M5). According to M5, alternative standards are very limited, "because this is a top-down policy" (M5). This case identifies the duplication of criteria from national schemes to academic routines.

From the other side, H4, S5, S7 and S8 had been department directors. They

mentioned how in committees with high-ranking officials and bureaucrats, they faced stress from ‘high bureaucracy’ to enhance their overall academic performance. Nevertheless, these four interviewees chose a passive attitude for dealing with these demands. H4 disagreed with the model of competition-based research grants. H4 said that in such committees, topics about indicators, globalisation or industrial collaboration continued to be highlighted, whilst each department’s performance was ranked. Nevertheless, he never kept this in his own mind. The following quotation is H4’s insight (a senior professor):

“The Ministry of Education now and then has provided plenty of project grants to spur universities for competing with each other, like a golden apple of discord. Then, the Ministry of Education may define several indicators of performance. If the university plans to compete for these resources, they must follow the rules. Hence, the university would expect colleges and department to strive for the grant together by fitting the indicator...One size doesn't fit all, especially for humanities.”

Similarly, three other former directors (S5, S7 and S8) did not think that they had the right to transfer this pressure to faculty. Therefore they chose not to show enthusiasm for the number of publications, projects or grants achieved by faculty. As in the case of internal evaluations for individuals, the mechanism of punishment and reward makes internal evaluations for departments a thing of matter. In S5’s experience, because the university bureaucracy had the right to assign vacancies, a decrease in faculty positions was a possible means of punishment for those departments that could not reach given requirements. Other interviewees also noticed that the results of internal department evaluations might influence ways of allocating space (H3) or numbers of faculty (H1 and H3).

In sum, the experience of internal department evaluations points to several features. First, it represents the duplication and spread of criteria from government organisations to academic departments via university bureaucracy. Like internal

individual evaluations and promotion assessments, the exercise of internal department evaluations is another procedure for enacting the dominant narrative of academic excellence into everyday life. Second, it contains the mechanism of punishment and reward to normalise academic institutions (Foucault, 1979). Third, it manifests the properties of New Public Management by launching a mechanism of competition to mimic the market (Foucault, 2008, Kettl, 2005, Strathern, 2000, Power, 1997, Beer, 2016). Measurements produce comparable data, rendering academic institutions visible and transparent. With metric assessments, performance-based allocation of resources among departments is enacted, implementing the principle of accountability inside universities. In this way, desirable performances are not achieved by direct commands one by one, but through disciplinary power. Finally, the growth of administrative affairs within universities may empower the executive layers but it may also awaken collegiality. As Marginson and Considine (2000) note, when promoting university ranking through performance evaluation turns into a common object for all faculty, university managers gain more legitimacy for their central policy-making. However, as discussed in Chapter 5, academic institutions might own their interests and missions, which were formalised by their history and tradition. Hence, department heads may attempt to resist the stress from the university upper bureaucracy by choosing a passive attitude.

5. The influence of state policy on academic organisations via university evaluations

This section moves forward to policy environments. Compared to the above evaluation systems, university evaluations seem less influential for interviewees. As shown in Chapter 4, the exercise of university evaluations is a consequence of the Education Reform of the 1990s. The Ministry of Education's resources would be allocated to universities based on university evaluation, which would in turn consider student numbers an important factor. However, university evaluation has never played this given role. Since 'The Aim For The Top University Project' was launched in 2006, most of the Ministry of Education's higher education resources have been distributed among a few traditional elite universities through competition-based funds. In other words, by the process of competition, the concentration of higher education resources has been justified. This procedure, where the narrative of social justice is

replaced by national competitiveness and state progress, has been elucidated in Chapter 4 and Chapter 5. Because of it, what university evaluation could affect was each university's capacity to recruit students.

The Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT) was founded in 2005 to implement a formal university evaluation. The first-round of university evaluation was launched in 2006, and the second round in 2012. University evaluation was conducted within the unit of academic departments. Due to intense criticism against university evaluation from academics, in February 2017 the Minister of Education announced there would be no more compulsory university evaluation conducted by HEEACT (2017). When my interviews were conducted from September to November 2017, this policy-reversal on university evaluations may influence how interviewees reviewed their relevant experience. Along with the HEEACT, there are other non-government accreditation organisations, such as the Institute of Engineering Education Taiwan (IEET), which are recognised by the Ministry of Education. Departments that take IEET evaluations could be free from HEEACT evaluations. The IEET evaluation is popular in the disciplines of engineering. For instance, five out of ten interviewees (M1, M3, M5, M6 and M7) mentioned that their departments had taken the IEET certification instead of the HEEACT university evaluation.

In general, most interviewees (M2, M6, M9, B2, B9, S3, H1, H4 and H6) considered the university evaluation a routine of paperwork and doubted if it could engender any substantially constructive changes. Some interviewees (S6 and H1) mentioned that university evaluation left them with endless forms to fill in, and at times they had no idea where these forms originated. Paperwork and formality are the main themes which emerge in university evaluation. Two senior scholars S8 and H4 provided their experience to show how meaningless the university evaluation was.

“When I was the director, I happened to meet the first round of evaluation run by HEEACT... We had to do a lot of activity and record everything as proof. If there was no record, we had to fabricate one. In order to fit those indicators of

department evaluations, we suffered significant pressure. (Interviewee S8)”

“When I was the head, I happened to miss the evaluation...I am very sorry for the head and assistants who met the evaluation. They worked hard to prepare lots of paper documents...Every department has their own development goals or teaching targets, which are expressed in a few words or sentences. Some departments would print out these slogans, send them to students or stick them on the wall in posters...it’s ridiculous. (Interviewee H4)”

Some interviewees (S7 and H6) thought university evaluation was a good reason to keep in touch with alumni, but was not worth what the cost. S7's criticism was that university evaluation made universities more homogeneous than before by implementation of a single set of criteria. M2 and B10 felt that practices of university evaluation had been allowed to flourish as a kind of commercial entity. Few interviewees thought university evaluation would benefit academics. S6 and H5 mentioned that university evaluation was an opportunity for departments to review and revise their curricula. B8 considered some of the advice from the university evaluation positive, but they did not have resources to make improvements in response to the advice.

Overall, HEEACT university evaluation still played a role in circulating neo-liberal discourse in Taiwan, contributing to governmentality within academia. Even if it may not offer considerable reward or punishment, by the rationale of transparency, higher education sectors had to take part in the assessment, which consisted of seemingly endless paperwork. This procedure assimilated universities into what Foucault calls the ‘administrative state’. Gradually, standards used in state university evaluation infiltrate into internal valuations, from university central bureaucracy to college offices, from colleges to departments, and eventually to individual researchers, functioning as a circulation of measures. Similar to the development of the RPI formula, due to intense criticism, HEEACT evaluation was no longer compulsory. Since 2017, the HEEACT only assesses universities who apply for the process

voluntarily. However, this does not mean that the standards embedded in academic routines are erased. As universities' internal evaluations become regular practice in the name of competitiveness, the spirit of competitiveness has turned into an ethic. This corresponds with Foucault's insight into power; the essence of power is beyond state apparatuses, which are a medium of discourse circulation. Rather than singular apparatuses, neoliberal power rests on how extensively neoliberal discourse is deployed.

6. The omnipresence of performance metricisation

The previous discussion follows a bottom-up route from pertinent individual experiences: such as promotion and grant applications, to distant experiences, such as university valuations. This section will summarise the deployment of neoliberal discourse within academic organisations.

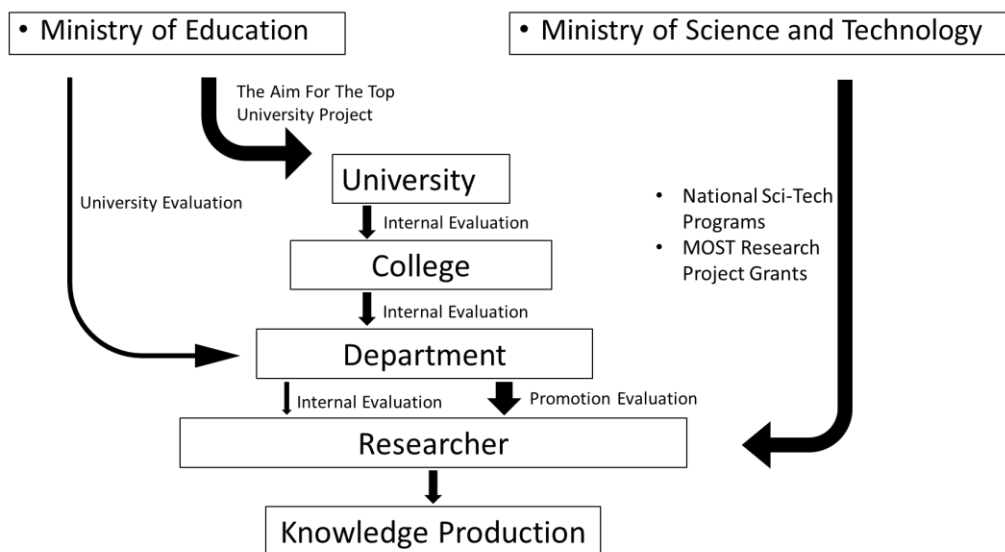


Figure 11. Image: Circulation of neoliberal discourse within academia

Scholars have attempted to illustrate interactions among research organisations, researchers, knowledge production and policy environments (Gläser et al., 2002, Gläser et al., 2010). Gläser et al. (2002) categorise two kinds of evaluation-based funds: organisation funds and project funds. The former resembles quality-related

research (QR) funding in the UK, which is tied to REF, and the latter resembles ESRC funding. While dealing with the issue of financial dependence and academic autonomy in Chapter 5, I explained how state funding works in Taiwan. The Ministry of Education provides university-based blocks of money, such as The Aim for Top University Project. The Ministry of Science and Technology offers project funds, such as MOST Research Project Grants, which are open to all topics, and the National Sci-Tech Project, which assigns a given topic. All these fund schemes are competition-based, enacting the principle of accountability. By following a set of established indicators, the influence of subjective factors and personal preferences are supposed to be minimised while conducting evaluations. However, as shown in Chapter 5, ways to certify the impacts of university-industry cooperation and university society responsibility projects are still varied, which indicates that the meaning of indicators is not self-evident.

In terms of discourse circulation, competitive block grants engender a range of influences on research organisations' perceptions and managerial practices. These managerial practices consist of several aspects but follow one principle: applying external performance standards internally. First, universities might establish a similar performance-based system of distributing resources from central funds to departments, as per a case study of universities in Australia (Marginson and Considine, 2000). The incidence of performance-based internal resource distribution could be found in my cases also. Second, academic organisations might adopt performance criteria into hiring practices. There are several studies showing impacts of RAE on hiring practices in the UK (McNay, 1997, Harley and Lowe, 1998, Henkel, 2000). The adoption of performance criteria in hiring practices also takes place in Taiwan. For example,

“According to requirements for hiring, you can see obviously that what they want is not someone with experience of teaching but research...If one has projects, that's wonderful. (Interviewee H7)”

“While I just got a job...a senior professor told me that:...we hired you due to your outstanding record of MOST projects. (Interviewee H5)”

In terms of personnel practices, my Taiwan case studies identify that the adoption of KPI, RPI and bibliometrics in promotion evaluations plays another significant role in transmitting pressure and performance criteria from organisations to individuals. It seems to individual scholars that promotion evaluation is the influential factor in shaping their actions.

Competitive project grants affect researchers’ perceptions of self and activities in a direct way, such as the opening example in this chapter. Meanwhile, the project grant plays a subtle role in circulating discourse on the Academy; for instance, the emergence and diffusion of RPI formula from MOST to academic institutes. In addition, when the grant project itself is taken as an indicator, it represents another, subtler, approach to the circulation of metrics. As Latour (1999) argues, behind one measurement device there is a set of indicators. While the research grant is translated as an indicator, a set of diverse standards utilised to estimate research proposals is simplified into one standard for other evaluations; that is, “the circulation of reference”.

In sum, all these approaches of managerial practices consist of the deployment of discourse, resulting in an omnipresent existence of performative metricisation, by which a narrative of national progress, global reputation and international competitiveness has been enacted into everyday routines, which individuals find extremely difficult to avoid.

7. Subjective experience of the neoliberal university

The second motif is subjective experience of the neoliberal university. To what extent can neoliberal higher education be understood as an example of neoliberal governmentality? The first theme has elaborated on how neoliberalism has been

adopted and dispersed into managerial practices within academic organisations. The second theme now continues to explore linkages between neoliberal academic management and its impacts on individuals.

In the literature review chapter, I enumerated several neoliberal principles in practice, consisting of accountability, competitive markets, productivity, transparency and the 3Es (effectiveness, efficiency and economy) (Harvey, 2005, Power, 1997, Kettl, 2005, Drechsler, 2005). Under neoliberalism, universities have been transformed into what Gill terms ‘the neoliberal university’ as a sort of ‘cultural and creative industries’ (Gill, 2010, Gill, 2014). Gane (2012) argues, “neoliberalism is not simply about deregulation, privatisation or governing through freedom, but also about intervention and regulation with the aim of injecting market principles of competition into all forms of social and cultural life” (p. 629-630). The introduction of entrepreneurial culture into education sectors makes academics individualised through emphasis on personal merit, effort and responsibility (Apple, 2001, Loveday, 2018a). By portraying the academic landscape in Taiwan, the first part depicts how these neoliberal principles and the entrepreneurial culture are embodied in managerial strategies, dispersing within academic organisations. The opening example in the second section also presents how the entrepreneurial culture guides scholars to interpret themselves. From this, the following sections move on to influences on individuals in terms of subjective experiences and behaviours.

For the aspect of subjective experiences, this section intends to highlight the existence of neoliberalism on individuals by focusing on emotional responses. The neoliberal university has generated an emotional response from researchers: anxiety. As Loveday (2018b) suggests, anxiety is not only a symptom caused by competitive atmosphere and casualised employment, it also plays an active role in neoliberal governance. In this sense anxiety does not mean something having gone wrong (which could be fixed), but represents people’s experience of structural insecurity in the neoliberal academia (Loveday, 2018b, Smail, 2015). Furthermore, according to Hall and Bowles (2016), anxiety “is not an intended consequence or malfunction, but is inherent in the design of a system driven by improving productivity and the

potential for the accumulation of capital” (p. 33). Even if this interpretation of anxiety seems more or less functionalist, (an interpretation with which I may not entirely agree), it nevertheless stresses that anxiety is not just a response but also a motive. Within the frame of understanding anxiety, I begin by exploring interviewees’ emotional responses as an experience of precarious academics, followed by an analysis of how emotions of anxiety, fear and worry play an active role in facilitating academic competition.

During interviews, although I mainly focused on interviewees’ opinions on university education and evaluations rather than their feelings, several interviewees spontaneously revealed a personal emotional response to unstable academic milieu. I categorise these emotional responses into two types. The first is caused by precarious career conditions; the second is triggered by precarious research environments. As the first motif shows, it seems that the primary concern to most researchers is promotion evaluations. Hence, worries about promotion is a common phenomenon among associate professors and assistant professors, especially in the disciplines of history (H1, H3, H8, H9, M7 and B6). For instance, when B6, a female scholar in her forties, reviewed her career development, she thought that she was forced to rush into promotion; as a result, B6 regretted that her publications and research topics were not sufficiently coherent. Environments of hyperactive competition, such as intensive timeframes for promotion caused unreasonable pressure on wellbeing and negative impacts on family life (H4, H5, H10, S4 and S6). For example, “the educational environment has distorted family life, but it seems like all faculty just bear it quietly” (interviewee S4, a junior researcher). H10, a professor at a prestigious department, used the word 'painful' to describe her initial career and admitted that she eventually got divorced after promotion. H4 and H5 also complained about a severe imbalance between career and family life, including an issue of separation due to their academic careers. The experience of unstable personal life implies the reality of neoliberal precarity for academics.

Another emotional expression which emerged is a complaint about intergenerational unfairness. In S1’s statement (a junior male researcher),

“Why do people with passion get exploited? Why does our system take passionate people as disposable? [...]We can witness intergenerational injustice in higher education.”

B5 also complained that performance-based project evaluations were favourable for scholars who had already accumulated considerable merit, and who were usually senior. S4 worked as an associate professor with a fixed-term contract, conducting a University Social Responsibility project. S4 questioned who among faculty is equipped to do community work. In S4’s opinion, because senior scholars have more empirical experience and less pressure regarding evaluations, they are more suitable for university-community cooperation than their junior colleagues. However, “You can see that it is new scholars who are nearly forced to enter the community” (interviewee S4). As a fixed-term contracted associate professor, S4 was worried that putting effort into a university-community cooperative project would be unfavourable to promotion and career development. M3 worked as a fixed-term assistant professor. She also expressed serious anxiety about whether she could succeed in becoming a formal member of staff; M3 mentioned that she sometimes called her partner in the night to cry over the stress. The prevailing experience of anxiety among people working on fixed-term contracts corresponds with previous studies (Loveday, 2018a, Loveday, 2018b).

However, M3 was not very worried about the promotion time framework once she received the position of formal assistant professor. Similarly, two junior scholars (B5 and S9) mentioned that the promotion time framework was not their main concern. In general, expressions of anxiety occurred more often in the areas of sociology and history than in biomedicine and material science. This phenomenon implies that SSH scholars may not match a current paradigm of academic excellence as precisely as NSE. As I elaborated in Chapters 4 and 5, the tension between SSH and NSE does not only represent diverse discipline cultures within academia but reflects a controversial aspect of the current paradigm of academic excellence, which is constructed on the

basis of industrial progress and economic values. As a result, the academic paradigm favouring NSE renders SSH scholars more anxious.

The second type of anxiety reflects neoliberal precarity in research conditions, especially for NSE disciplines. Because resource distribution is based on so-called market principles of performance evaluations and competition, scholars have to take responsibility for collecting research grants. In Taiwan, the major source for an individual researcher is MOST-granted research projects. Under these circumstances, scholars commonly worried about either research funds (M3, M8, B3, B5 and B8), or research projects (M8, B3, H10, S1 and S10). Because the costs of maintaining a laboratory are considerable, worries about research funds and projects were prevalent more in NSE areas than SSH fields. For example, M8 mentioned that he used to rely on medicine to control high blood pressure during his first couple of years as an assistant professor, with the stress of recruiting sufficient research funds. Nevertheless, after M8 had built connections with industry and acquired essential resources from university-industrial cooperation, applications for MOST projects was not his primary stress anymore. On the other hand, the issue of research grants was not a main concern for historians (H1, H3 and H5). For instance, H5 had a bachelor's degree in chemistry. "The reason why I switched to history is simple; I want to do research which doesn't overly rely on resources" (Interviewee H5). This difference in attitudes toward grants represents a difference in financial dependence across various disciplines.

The concern for research projects was expressed in more subtle ways than for grants. For NSE researchers, because the research project was the format for obtaining research funds, concerns about the research project and about grants were effectively the same thing. However, SSH scholars were worried about research projects because an approval for a MOST research project was itself an indicator of valuable academic practice. For instance, H10 (a professor) applied for MOST grant projects because of the pressure transmitted from the university. For the junior assistant professor S1, a record of approval for MOST research projects was essential for employment. For S10 (a senior professor), an absence of MOST research projects would be an issue in

promotion evaluations. H7 offered a story relating to the stress for securing MOST research projects: some scholars may submit an application for MOST research projects, but claimed no funds. In other words, what they needed was nominal approval for a project rather than substantial financial support. This phenomenon indicates the alienating nature of research projects, mirroring previous discussion, where projects are seen as indicators; scholars may pursue a research project not for research needs but for external values. This also suggests that relations among researchers, research topics and research projects has been transformed; a novel type of relations between scholars and research projects has been formalised by institutional practice, as a means to verify scholarly values, rather than as a means to realise ideas.

In conclusion, this section has aimed to elucidate managerial practices in terms of governmentality. Rather than deregulation, numerous scholars suggest that neoliberalism and New Public Management should be understood as neoliberal governmentality: an art of governing (Mirowski, 2013, Miller and Rose, 2008, Gane, 2012). In order to identify the main features of governmentality, this section has highlighted an intense awareness of those neoliberal norms by analysing interviewees' emotional response: ongoing anxiety. These empirical data indicate that the incorporation of performance evaluations into organisations' managerial practices has made academic careers precarious, and triggers anxiety amongst scholars, including worries about employment, promotion and resources. These kinds of anxiety might incentivize scholars to get more engaged in the academic game of competition for research funds, for example. Previous studies have presented increasing anxiety about precarious and competitive atmosphere in neoliberal academia (Hall and Bowles, 2016, Loveday, 2018b, Gill, 2014, Gill, 2010, Berg et al., 2016). What has been overlooked until now is a linkage between emotional responses and behaviour patterns. The following section will explore if the anxiety leads to corresponding behaviours.

8. Changes in epistemic properties of research content

The previous section suggests that broad exercises of assessment in academic

organisations, incorporated with bibliometric measures, account for scholars' awareness of those external standards and anxiety in terms of subjective experience. This section continues to explore whether the introduction of the market principle and entrepreneurial culture into academia succeeds in transforming individuals' frames of action. To investigate whether the bibliometric-based model of academic excellence has been represented in individuals' activities is also to illustrate whether the bibliometric-based academic paradigm is characterised by governmentality, which is the major research question of this thesis. Because knowledge takes centre stage in the intellectual world, this analysis focused on knowledge production, followed by channels of communicating knowledge.

Interviewees in my research provide numerous factors involved in knowledge production. I categorise these factors into three sorts: research topic selections; collaborative strategies; and research timelines.

8.1. Factors influencing research topic selections

The theme of research topic selections includes a variety of responses from interviewees grouped into the following: *departmental policy; innovation; personal interests; society's needs and policy needs; the mainstream; feasibility and extensibility.*

Departmental policy on promotion plays a direct role in topic selection. By the diachronic analysis of interviewees' knowledge production, significant turns in research topics could be identified. Two historians (H1 and H8) explained that they switched to different research themes for the requirements of promotion. In the name of innovation, only publications whose topics were entirely different to previous stages (PhD studies) qualified for promotion evaluations. Similarly, in M6's department, *innovation* (which meant publications differing from PhD research) was an 'unwritten' criterion for promotion. This case shows the influence of academic organisations on individuals' intellectual activities. Even if there was no such formal requirement, several interviewees (S6, M2, M3, M6, B2, B5 and B6) still reflected on

innovation during the research design process. In particular, M3 was worried whether MOST panel reviewers would question her innovativeness, because her research proposal was built on her PhD study. This case indicates that pursuit of innovation is not only a self-challenge but also about meeting the expectations of others.

Numerous researchers (H3, H4, M6, B4 and B7) mentioned that they followed their *personal interests* to conduct research, while some (H5, H9, B1, B6 and B11) emphasised *society's needs* or *policy needs*, such as researching diseases that only occur in Taiwan. H9 and B6 mentioned that they would highlight the aspect of society's needs or policy needs especially when composing a research proposal for grants. In another instance, interviewee M6, a junior researcher, emphasised the dignity of personal interests. However, he developed a novel research topic because he had been advised by his department to compete for a project with a given topic, and he succeeded in getting the grant. This infers that state policy has infiltrated into individual researcher's agendas through the mechanism of research funding allocation.

Like the concern about society's needs or policy needs, a concern about *the mainstream* shows an intention by individuals to coordinate with collectives. Numerous interviewees (H3, H5, H8, M1 and B7) mentioned that they would consider current trends among fellow academics. For example, M1 published few papers on nanotechnology but this topic only lasted a couple of years. M1 explained that there had been a fashion for nanotechnology; hence, he had attempted to research this topic for a while but later returned to his main field. Some researchers (H3, H5 and H8) may consider fashionable topics seriously particularly while designing a grant application. On the other hand, interviewee B6 argued that she would prefer to avoid the hottest topic but attempted to find alternatives to discover a research niche.

The most common factors when designing research agenda is *feasibility* (H2, H3, S1, M5, M9, M10, B5, B6 and B8). The idea of feasibility includes available grants; numbers of postgraduate students and research assistants; pilot tests; equipment requirements and access to fields and archives. As with previous elements, concern

with feasibility was also meant to convince panel reviewers of applicants' capacity (H3, M5, M9 and B5). As interviewee M5 argued, if one switches to an entirely different research topic, one's research proposal is less likely to be approved due to its 'innovation'. In other words, innovation is placed in opposition to feasibility. A similar concern is *extensibility*. As numerous interviewees (H8, M5 and M7) argued, it was rational for researchers to continue developing previous studies. Meanwhile, for grant application, extensibility was also taken as a strategy to prove the feasibility of projects (B3 and B6).

Taken together, I highlight several factors involved in procedures of selecting research topics. They are *departmental policy; innovation; personal interests; society's needs and policy needs; the mainstream; feasibility* and *extensibility*, which each play a part in shaping the epistemic properties of research content. This implies that motivations behind knowledge production are complicated in an era of neoliberalism. Admittedly, not all the factors are directly related to neoliberal universities or entrepreneurial culture, for instance *personal interests*. *Departmental policy* on *innovation* may show the influence of university bureaucracy on individuals, but does not necessarily link to neoliberal policy. The issues of *feasibility* and *extensibility* could be regarded as a practical strategy for conducting research. Meanwhile, interviewees also infer an awareness of being measured. Due to precarity in research funds, anxious researchers might choose a less risky approach to knowledge production.

The issues of *society's needs and policy needs* manifests in the mechanism of governmentality in academia. By designing a set of goals and rules for competition-based grants, the state is able to govern knowledge production at a distance; that is, the technique of governance. For scholars, along with anxiety regarding research resources, their primary concern is to stand out in evaluations rather than questioning the rationales of policy needs and society's needs. The factor of *the mainstream* invokes a similar notion. How is a fashionable topic formalised? Does a mainstream research topic represent the intrinsic traditions in academia or state intentions/aspirations? Some research programmes are assigned a given topic, such as

the National Sci-Tech Programs, which clearly represent contemporary science state policy. Some research programmes are open to all topics, for example MOST Research Project Grants. Nevertheless, even without policy restrictions on research themes, the formation of the mainstream research topic is not just caused by intrinsic academic traditions but consists of the procedure of problematisation and subjectification in a Foucauldian sense (Foucault, 1980, Foucault, 1978). In Foucault's words, "the exercise of power itself creates and causes to emerge new objects of knowledge and accumulates new bodies of information" (1980, p. 52). The formation of research objects, when known as discursive practices, is an essential part of power exercise, embedded in a social nexus. In other words, the mainstream research topic itself means exercise of power. Taking nanotechnology research as one example, nanotechnology used to be a focus of state-led industrial schemes. It is therefore unconvincing to claim that this mainstream research topic merely reflects academic interests. While this thesis aims at examining neoliberal universities in a broad sense, this analysis could not focus on the emergence of mainstream research topics one by one.

In addition, domestic government is not the only actor involved in developing a research topic. For example, B11 criticised the idea that numerous Taiwanese scholars were devoting themselves to areas of Western importance, for instance, studying diseases that are not prevalent in Taiwan but rather in the West, such as skin cancer. Similarly, a difference between the focus of the domestic academic community and the interests of the international academic community has been reported by previous studies (Gläser, 2004, Piñeiro and Hicks, 2014). The phenomenon in which Taiwanese scholars select diseases mainly occurring in the West as research topics implies a power relation between academic communities: a Western hegemony in Taiwanese academia. Issue of readership will be further explored later. In sum, both domestic policy and international contexts influence what we are going to know.

Taken together, by analysing the mechanisms behind the concern for research on *mainstream, society's needs and policy needs*, this section highlights how the neoliberal university is characteristic of governmentality. This mechanism also entails

anxiety regarding unstable research resources.

8.2. Collaborative strategies

Collaboration accounts for several appearances of new research themes. The following factors stimulated scholars to cooperate with others: *mentorship*; *personal networks and interests*; *science policy* and *technology support*.

Mentorship is a reason for developing a novel research topic. Two interviewees (S8 and M1) had published a couple of journal articles whose themes are different to their main focus. These separate works were inspired by supervising students with various interests. Interviewee M4 also launched a new topic due to a supervisee's interest, which eventually turned to one of his main research interests (unlike in the case of S8 and M1). As previous studies indicate, cooperation with students could be a practical strategy to multiply one's publications (Gläser et al., 2010). Interviewee S1 stated a similar phenomenon. He listed a few prestigious scholars who had published several journal articles in diverse subdisciplines but had never released a monograph, because they only followed students' research projects instead of conducting/conceiving a coherent research project for themselves. Besides mentorships, *networks with peers* and *curiousness* accounted for several collaborative projects for broadening academic horizons (S2, M10, B2, B3 and B4). However, in my study, there is insufficient data to be able to assert linkages between these two considerations and enterprising universities.

Several collaborative projects were intentionally prompted by competitive research schemes, either granted by MOST or by the Ministry of Education. For example, one state university (where interviewees S5 and B8 worked) used to be funded by The Aim For The Top University Project, granted by the Ministry of Education. Under the scheme S5 (a senior professor) conducted interdisciplinary research with scholars whose expertise was in marine science, while B8 (a junior associate professor) took part in a collaborative project with peers from another medical university. MOST's research schemes also played a similar role in encouraging academic collaboration.

For instance, interviewee S2, a senior researcher, conducted a collaborative project on infrastructure with foreign scholars, and the project was funded by MOST to enhance international cooperation. Under MOST grant schemes, interviewees S7 working at a private university and M10 working at a public university were involved in collaborative research projects. Several studies suggest that academic performance assessments may make interdisciplinarity difficult (Schäfer, 2016, Wilsdon et al., 2015c, McNay, 1997, Talib, 2001, Henkel, 2000, Rafols et al., 2012). As a qualitative study, this thesis does not aim to show, overall, if performance assessment produces positive or negative impacts on interdisciplinary studies. For instance, in B8's case, the collaborative project diminished gradually after the grant scheme had terminated. Conversely, my analysis examines how science policy on interdisciplinary communication influences researchers' motivations for academic cooperation.

In NSE disciplines, technology support is a common reason for co-authorships (M3, M6, M8, M10, B2, B3, B4, B8 and B11). The term 'technology support' means that scholars might partially contribute to research projects through providing instruments, materials or research methods to achieve substantial data, rather than taking part in the project as a primary investigator. In fact, most interviewees would like to name this kind of collaboration as technology support rather than as a form of substantial collaboration. Several studies reported difference in authorship culture among various disciplines (Liu, 2003, Piro et al., 2013, Nederhof, 2006). I argue that the co-authorship pattern might be seen as a way to acknowledge participants' contribution instead of a practical strategy in response to the enterprising university. Most interviewees would not list those nominal publications in a section outlining their core effort towards promotion evaluations nor for obtaining research grant applications; they might just list the nominal papers in appendixes.

In sum, this section identifies four factors relating to collaborative strategies: *mentorship*; *networks*; *science policy*; and *technology support*. These do not necessarily link to the circulation of neoliberal discourse. The role of *science policy* is a prominent example to show the government's capacity to mobilise academics by competitive grant schemes. The format of competition justifies rationales of state

science policy, which in this case are aimed at interdisciplinary communication. Meanwhile, the exercise of competitive grants amplifies precarity in academic resources and its correspondent anxiety, making scholars less likely to question its rationales.

8.3. Research timelines

The final aspect relating to knowledge production is a timeline. The timeline comprises when a researcher composes a research agenda, how long the researcher takes to complete a project, and when the researcher summarises findings for publication. As discussed in the first part, an occurrence of timelines in Taiwan represents the neoliberal principles of accountability and efficiency. Preceding data also indicate that the existence of timelines might result in an emotional response of worry and anxiety.

There are two sorts of time frameworks playing a part in research agendas. The first timeline reflects on MOST research project grants. As MOST research project grants are allocated annually, applications for MOST research projects has become a part of academic routine. The period of the MOST research project varies from one to three years. When an approved project ends, managers must write a report. If an approved project is two or three years long, project managers have to write an interim report annually. Scholars who could not manage these administrative tasks may refuse to apply for a MOST project (like interviewees H2 and H4). As discussed previously, since the cost of research is less in history than for other disciplines, historians are less vulnerable to needing the MOST research scheme. On the other hand, scholars who rely on MOST financial support have to adjust timelines to MOST agendas. For example, B3 stated that she had to submit an article to an academic journal during the summer terms; in this way, she could conclude a project with a paper and submit it for the next application by December. In another instance, a junior researcher M7 complained that he had no choice but to rush into publishing in low ranked journals in order to fit the MOST timeline. If he had had more time, he would round out his research.

Another significant factor is the time framework for promotion, while promotion is one of the most prominent concerns among scholars. Therefore, this anxiety might cause researchers to adjust their research agenda to the promotion timeline. For example, B7 published six papers two years before the promotion deadline; interviewees S2 and H7 followed a similar pattern. In line with the case of MOST research fund schemes, B8 complained that he did not have enough time to elaborate his research due to the promotion timeline. On the other hand, after promotion, interviewee M8 began to slow down his rate of publishing.

As Latour (1987) points out, techniques of knowing a given subject play dual roles in collecting information, as well as in establishing new dimensions of time and space, within which centres of calculation enable domination and mobilise the targeted domain at a distance. These empirical data suggest that grant schemes and performance evaluations have built a time dimension which scholars are obliged to inhabit. In this way, academic life is divided into small segments with assigned tasks for each timeline.

Taken together, this section elucidates how a milieu of neoliberal universities with anxiety and central managerial practices reshapes faculty's behaviours. In selection of research topics and collaborative strategies, external factors, such as science policy and social needs, partially affect individuals' decisions about research contents. In respect of timelines, external timetables play a significant role in modifying scholars' research agendas, working against long-term studies. The external timeline also engenders profound impacts on publishing behaviours, which will be analysed in the following section.

9. Changes in publishing patterns

The previous section investigates how the neoliberal university has reshaped academic practice in terms of producing knowledge. This section continues to apprehend the impacts of the neoliberal university on ways of communicating

knowledge: in the form of publication patterns. A focus on publishing patterns is important for two reasons. First, communicating knowledge is an indispensable component of intellectual life. Second, as promotion and grant applications are the main source of scholars' anxiety, publications are one of the major indicators used in processes of evaluation. Discussion of this is organised into two aspects: researcher's perspectives; and editor's viewpoints.

9.1. Publishing strategies

Interviewees' considerations involved in publishing strategies include *publishing formats*, *bibliometric indexes*, *selection of languages* and *readerships*. Selection of publishing formats reflect influences of academic institutes' preferences. There are several media to present research discoveries: journal articles, workshop papers, conference papers, book chapters and monographs. While development of bibliometrics, to a certain extent, is on the basis of journal articles, several studies suggest that scholars are encouraged to publish in academic journals rather than other forms in the light of performance evaluations and demands for accountability (Hammarfelt and de Rijcke, 2014, Rijcke et al., 2016). Some studies also identify a difference in publication customs between NSE and SSH (Piro et al., 2013, Glänzel and Schoepflin, 1999). In my interviews, NSE researchers also displayed a preference for serials over books. For these researchers, the genre of books is a means to summarise well-known knowledge rather than a platform to share a novel discovery. Hence, several scholars (M6, M9, B1 and B8) mentioned they might write a book in future to conclude their academic career. Several NSE scholars (B3, B5, B6, M3, M4 and M5) mentioned that they had or would write a book chapter for the sake of invitation and favours, but did not take it as a major achievement. For instance, M3, a junior scholar, had published a book chapter due to invitation, but M3 doubted if members of the hiring panel treated it as valuable, while the genre of books and chapters was placed in an appendix.

On the other hand, there is a tension in the selection of publishing forms in disciplines of SSH, where writing books is considered a benchmark. In spite of this tradition, numerous SSH scholars (S3, S9, H3, H7 and H9) did not give priority to monographs,

because book-type publications did not actually count in promotion evaluations. It is said that the value of monographs was too ambiguous and ‘subjective’ to be marked. Hence, under the rhetoric of objectivity, book-type publications were excluded from assessments. Even if the value of books was recognised, two associate professors (H2 and S3) would prefer to publish journal articles instead of books, because it took less time to finish a journal paper than a monograph, considering the promotion timeline. In this context, interviewee H7 (a junior scholar) felt frustrated, because she could not fulfil her desire to publish a monograph, as a traditional scholar would. Nevertheless, in the cases of S5 and H10, the traditional emphasis on the monograph had been systematically preserved. In H10’s department, publishing a monograph was an essential condition for promotion.

The above data identify impacts on the conception of publications in SSH domains, caused by bibliometric measures, while some SSH institutes retained agency, insisting on their academic customs. In Chapter 4 I suggested that the notion of bibliometrics in Taiwan arose from the fields biomedicine and then diffused into other natural science and engineering disciplines, eventually influencing SSH areas. Hence, SSH scholars experienced tension when selecting publishing formats. Preference for journal articles matches the NSE paradigm, but this demand is an external expectation for SSH areas. In response to the external expectation and resource allocation, SSH scholars had to adjust their ways of communicating knowledge. As SSH research is less dependent upon project grants, pressure to publish rapidly account for SSH scholars’ anxiety, which mainly focuses on promotion.

There is near-consensus across all disciplines that bibliometric indexes are the most important standard when selecting a journal to submit to: an indexed journal is better than a non-indexed one, whereas a high ranked journal is even better than a low ranked one (B1, B2, B4, B5, B6, B7, B8, B11, M2, M3, M5, M9, S1, S6, S9, S10, H3, H5, H8 and H9). The bibliometric index was described as a guarantee of ‘credit’ (S10) or ‘authority’(B11). For NSE areas, SCI is the main bibliometric database. For SSH domains, recognised bibliometric indexes are SSCI, A&HCI, THCI (Taiwan Humanities Citation Index) and TSSCI (Taiwan Social Sciences Citation Index). H3

attributed this trend to favouring indexes to unavoidable external expectations. S6, an associate professor at a private university, stated this as a strategy to survive in academia. The junior researcher S1 shared a personal experience; after he had published a paper in a non-indexed journal, he gained no praise but advice that he should choose an indexed one wisely for the next paper. The case of S8 (a senior scholar) is a counterexample; interviewee S8 avoided publishing in indexed journals consciously as a non-cooperation movement against the neoliberal university. As a result, he would remain in the position of associate professor. These cases indicate that, with the implementation of punishment and reward through the practice of grant allocation, performance evaluations, hiring policy and honouring systems, bibliometric values have turned to a norm in academy to classify desirable intellectual labour, as well as guide individuals to productivity (Foucault, 1979). This echoes with Foucault's argument: disciplinary power is not necessarily oppressive but has to be productive to enact effect.

Along with selections of publishing genres and journals, choice of language is another crucial topic. There are numerous studies focusing on the representation of languages in bibliometric databases, as well as impacts of performance evaluations on changes in language usage in academy (Engels et al., 2012, Hammarfelt and de Rijcke, 2014, Archambault and Larivière, 2009, Nederhof, 2006, Archambault et al., 2006). A prevailing usage of English in academy has been noted even in Western but non-English speaking countries. My empirical data also show a similar preference for publishing in English, but the degree varies across different disciplines. On the basis of semi-structured interviews, this research aims to go beyond the phenomenon and investigate its mechanism. I identify two determinants accounting for the choice between English and Mandarin: bibliometric authority and readerships.

The emphasis on bibliometric indexes, especially for SCI, still plays a crucial role in language usage. In NSE domains, most of SCI-indexed journals are English. Even though there are a few Mandarin-language journals enrolled in SCI, their Journal Impact Factors are relatively low. This fact provides Taiwanese NSE researchers an incentive to only publish in English (B3, B7 and M8), unless they are invited to

publish in Mandarin-language journals (M2). Some interviewees (B2 and M6) expressed an honest opinion: they were doubtful of not only Mandarin-language journals but the whole national culture. The absence of Mandarin-language journals is a self-fulfilling process. Interviewee M2, a senior male professor, used to be a chief editor of a domestic Mandarin-language journal. According to M2, when the focus on SCI arose in the 1990s, fewer researchers were willing to submit their findings to the Mandarin-language journal, which led to a decline in journal quality. The decrease in the quality of the Mandarin-language journal made it more difficult to be included in SCI. This self-fulfilling impact is profound. In another example, M4, a senior male professor, used to publish in Mandarin-language journals occasionally. However, when he developed a novel research theme, there was no available Mandarin-language journal for the topic. The decline in domestic Mandarin-language journals was not caused by state acts or censorship; rather it represents an effect of disciplinary power in academia. Several interviewees (B4 and M9) explained that high Impact Factor journals meant international visibility and a wider audience. This perspective corresponds with the narrative of international recognition, elaborated in Chapter 4, and links to an imaginary of readerships.

In SSH disciplines, the selection of language manifests a boundary of readerships. In the previous case of choosing specific diseases as research targets, I showed a tension between a national-oriented focus and ‘worldwide’ topics. As previous studies point out, the national or regional orientation of SSH literatures is more significant, leading to a lower coverage of international bibliometric databases (Hicks, 1999, Archambault et al., 2006, Nederhof, 2006). The national or regional orientation of SSH research underlines the preference for languages used, as well as the boundary of readerships. For example, S3 and S7 (two associate professors at private universities) favoured Mandarin-language journals because of their prominent regional orientation. Even if H10 (a professor) focused on European history, because she aimed for dialogue with domestic readers, she mainly published in Mandarin. By contrast, because S10, a senior professor, was interested in American studies, most of her publications were written in English. Several scholars (H1, H5, S6 and S8) mentioned they would switch between English and Mandarin, depending on the properties of their research topics and their assumed audiences. Meanwhile, along the topic-led readerships,

international visibility (which means foreign readers), is an imperative for academics, despite the regional orientation of SSH literatures. For instance, S1 would like to publish in English in order to be visible to international academic communities. H3, a male associate professor at a prestigious public university, gave a contradictory narrative:

“My research topic is Chinese History. I must dialogue with readers and scholars who are either from China or Mandarin speakers...But I'm used to writing in English. That doesn't mean my English is very good. This is the result of my training, whose thinking model is difficult to switch. I hope I can write in English as much as possible, instead of Chinese.”

There is an implication behind this statement: academic training means communication with international academics, which has priority over research orientation. As “the purpose of these indexes aims to globalise these (SSH) disciplines (interviewee B9)”, I argue that the imaginary of global readerships is based on the international bibliometric index. In other words, the conception of audience and peers is redefined by bibliometrics. In contrast to a traditional audience sharing similar interests, a new type of relation among international academics is produced via bibliometrics; that is, the construction of ‘imagined academic communities’. However, because those international bibliometrics are in favour of English-language journals, in order to be a member of the imagined global academic communities, scholars in Taiwan, to a certain degree, are tending to get more involved in research topics of Western importance than before.

9.2. Editor's practices

Some interviewees had experience on editorial boards. The concern about bibliometric performances was stated by several editors (S2, M4, M5 and B10). In practice, a citation analysis was utilised to compare with other journals' performances in internal discussion. For editors of SSH journals, another primary concern was to register their journals in bibliometric databases, such as TSSCI or THCI (H1 and H4).

In order to be recognised by the bibliometric index, the criteria of bibliometric databases have been adopted by editors. Several strategies were used to round out Impact Factors or citations. First, because review papers in general could gain more citations, editors may actively invite scholars to write a review article or even write one themselves (M4 and B10). Second, editors might actively cooperate with academic conferences for organising a special issue, which could draw more attention to their journals (M4 and B10). Otherwise, editors may prefer short articles and diversify a volume to attract more audiences (S2). These show that the bibliometric index has turned into an authoritative mechanism to justify the value of academic journals. In another instance, H5 was in charge of a non-indexed journal. He felt sorry when he attempted to invite researchers to submit articles, because he thought this article would not help their career.

The rising role of bibliometric indexes engenders impacts on journals. Numerous SSH editors (H1, H4, H5, H6, S2 and S5) observed that quite a few journals which were excluded from TSSCI or THCI eventually disappeared, while indexed journals gained more submissions, resulting in decreasing diversity in academia. This situation happened to NSE journals as well, as in the previous case of a domestic Mandarin-language engineering journal (M2). The non-indexed journal lost readership gradually and faded out from academia, mirroring what I term ‘bibliometric-based academic communities’.

In sum, the second motif depicts an explicit landscape of the neoliberal university by inquiring into subjective experience and building a link between policy environments and individual activities. Through tracing the deployment of governing techniques, which in this case is bibliometric meritocracy, this empirical research presents how neoliberal principles of competitive markets, the 3Es and accountability has been duplicated from official organisations to academic communities, and eventually internalised into individuals’ conceptions, identifying the governmentality of the neoliberal university.

10. Conclusion

This chapter aimed to investigate neoliberal governmentality by analysing academic management in Taiwan. Previous studies of neoliberalism argue that the core of neoliberalist thought rests on a competitive mechanism, by which a true value is verified (Foucault, 2008, Gane, 2012). In this context, ways of interpreting markets shift from a space where exchange takes place to that of competition. Because the market is considered a ‘transcendental superior information processor’, it is considered that the state could be better supervised by the market, or even be marketized (Mirowski, 2013). This is the presupposition standing for New Public Management. Other neoliberal principles of accountability, audits, transparency, visibility and enterprise, pivot on fostering a competitive atmosphere (Gane, 2012). Because the competitive mechanism entails calculative and comparable data, measurements play an indispensable role in procedures of marketisation (Beer, 2016).

The role of measures is more prominent in a case of marketizing educational sectors. Because academy is unlike the architecture of prisons, there is no real-world panopticon from which to monitor all cells consistently. Hence, establishment of visibility in academy rests on circulation of metrics. In the deployment of neoliberal discourse on the Academy, bibliometric indicators function as a major instrument of knowing as well as governing. Therefore, to investigate neoliberal governmentality in academia is to explore the circulation of bibliometrics within academic organisations. In this chapter, the first theme identifies how bibliometric devices are circulated via all ways of evaluations, such as promotion assessments, grant applications, internal valuations and honouring systems. Those standards used for evaluations are transmitted from university bureaucracy to departmental offices, layer by layer, showing a process of internalising external criteria designed by the government into academic organisations and, eventually, individuals.

The audit society is characterised by distrust in professional judgements and personal experiences (Muller, 2018, Mintzberg, 1996). The first part also grapples with a faith in objectivity during an exercise of evaluation. Because disciplinary power is authorised by truth produced within discourse, “quantification is a way of making

decisions without seeming to decide” (Porter, 1996, p. 8) . Hence, pedagogy is replaced by statistics, whilst academic management is subject to KPI, a concept borrowed from business management. Conversely, by tracing the process of designing indicators used in resource allocation, such as cases of RPI and internal estimations, this section illustrates how subjective judgement is hidden in numbers.

As Hacking argues, “bureaucracy of statistics imposes not just by creating administrative ruling but by determining classification within which people must think of themselves and of actions that are open to them” (1991, p. 194). The same could be said for bibliometric measures. While there is a range of studies – as well as Chapter 4 of this study – exploring the procedure of subjectification under neoliberalism, “less has been said about the ways in which neoliberalism is lived out on a subjective level” (Scharff, 2016, p. 107). Hence, the second motif focuses on how neoliberalism affects individuals’ ways of thinking and acting. In Chapter 5, I suggested there are still alternative frames used by academics to describe an ideal university in parallel with the dominant neoliberal narrative, inferring the possibility of resistance and multiple academic realities in Mol’s sense (Mol, 1999, Mol, 2002). The second part turns to the aspect of emotional responses, for exploring linkages between subjective experience and behaviours. Overall, this empirical study on a subjective level shows that the omnipresence of neoliberal discourse renders scholars in Taiwan aware of those external criteria, based on which their research agenda is modified. Bibliometrics help to capture as well as to set standards for reality (Beer, 2016).

In this chapter I have emphasised social relations which are engendered or modified by managerial strategies within the neoliberal university. Or in ANT terms, how are actors’ positions translated by a foundation of networks? The first example of changing relations is that between knowledge and knowledge producers: scholars. In general, when talking about objects of exploitation, relevant discussions are likely to exclude intellectual labours. This is because scholarly production, like cultural and creative work, is considered as a way of expressing self rather than alienated labour (Gill, 2014). However, under neoliberalism, academic labour has been transformed

into alienated labour, as meanings of scholarly production are replaced by a perception of academic capital, incurring a notion of exploitation within the academy (Hall and Bowles, 2016, Gill, 2014, Berg et al., 2016). In other words, knowledge producers are not the owners of the means of producing knowledge. Meanwhile, the values of academics are determined by knowledge they have produced in terms of its potential for GDP enhancement or economic growth. The notion of academic exploitation is worthy of further attention. In addition, the implications of academic alienated labour for epistemic properties of research content would be worth more research. By providing an explicit analysis of the changing relations between knowledge and researchers via all means of performance assessments and bibliometric measures, this chapter contributes to an understanding of alienated labour within neoliberal universities.

A second example of changing relations is that between the state and academia shifting from that of sponsors to supervisors. As Archer (1984) points out, the relations between the state and educational sectors vary in different periods and countries, reflecting temporary social contexts, especially in terms of class conflict. During the period from the post-war to the neoliberal era, the role of states in the West is described as one of a generous sponsor which left universities highly autonomous, while education was one of the focuses of the welfare state (Anderson, 1995, Evans, 2004). However, contexts in Taiwan are different to the West. Chapter 4 deliberated on explicit contexts in which neoliberal universities emerged in Taiwan. Before the late 1980s, the role of the state in higher education was close to being a direct governor through the exercise of censorship. Since the democratisation movement in the early 1990s, direct exercise of sovereign power has not been tolerated. Under this situation, New Public Management was introduced to higher education in Taiwan, making state interference justified and concealed by competitive markets. Chapter 4 indicates how this historical event is likely to be overlooked by contemporary discussions in Taiwan. In sum, this thesis shows how the route towards neoliberal universities in Taiwan had a different starting point but has nevertheless arrived at a similar destination: neoliberal governmentality.

The third changing relation is readerships. In the past, readers or peers were people who shared similar interests in research themes or methods. In the age of globalisation, readers or peers are people who use the same international bibliometric index, which the imagined academic community is built on.

The final changing relation is among scholars themselves, which could be polyvalent. It is said that the introduction of self-enterprise culture and individualistic practices into universities would break down academic communities as an entity (Miller and Rose, 2008, Gill, 2010). It is partially true that individualising practices, such as promotion assessments and personal project application, have taken centre stage in academic life. Individualistic accounts of career development could be identified quite often either in my interviews or in my document analysis. By contrast, team projects or interdisciplinary cooperation might be encouraged by grant schemes. In another example, higher education unions in Taiwan proliferated after the 2010s, against a backdrop of increasing pressure of evaluations. According to one of my interviewees (a core member of Taiwan Higher Education Union), “we launched the union because we were fed up with those endless evaluations”. Taiwan Higher Education Union was founded in 2012, with branches established in numerous universities. The appearance of unions manifests a faith in academic communities. My empirical data suggests that both heterogeneity and agency of academics should not be underestimated nor simplified under neoliberalism.

Chapter 7: Conclusion

1. Introduction

Through this thesis, I have examined how universities have become an object of governance in Taiwan and how the university has been neoliberalised or marketised, incorporating a wide usage of bibliometrics. Initially, neoliberalism, as a set of conceptions, is taken to describe and analyse what has taken place in Taiwan. Each empirical chapter contributes knowledge to studies of power relations between the academy and other social sectors, including state bureaucracy, industries and communities. This case study recognised several features of power/knowledge complex to help us understand the increasing role of neoliberal governmentality. By contrast, this study also explored to what extent the idea of neoliberalism provides a means to adequately account for the direction of higher education policies in Taiwan.

Why am I curious about the adoption of neoliberalised procedures in Taiwan's higher education? And how can this study contribute to sociological studies of knowledge production, science policy and education? This research topic was inspired by my experience, outlined in the introduction chapter. When I studied and worked in biomedicine disciplines, I observed massive pressure on scholars to publish as soon as possible. What researchers conceived as possible research topics was substantially pivoted on the possibility of being published as SCI journal articles. The academic culture of 'publish or perish' inspired me to investigate its impacts on epistemic features of academic research. It raised a further question about how this competitive atmosphere and enterprise culture had been formalised among academics. Hence, I turned to the Foucauldian concept of discourse analysis for grappling with the contextualised situation in which the neoliberalised university emerged. In addition, from my experience, when people talked about narratives of state competitiveness or knowledge-based economy, the narrative was taken as an inescapable tendency or even destiny, which stimulated me to develop this topic in terms of truth/power. Governmentality is one of key words to use in understanding how people can be disciplined by a set of neoliberal norms. In a Foucauldian sense, governmentality is a particular form of power relations in administrative state, in contrast to traditional

sovereign power (Miller and Rose, 2008, Foucault, 1991a). The implementation of governmentality, as an art of governing at a distance, rests on a set of norms, ethics or common sense, which are authorised by truth and correspondent knowledge regarding the truth. Thus, this study included a focus on the conditions of truth: how statements about the ideal academic practices had been produced and come to be viewed as valid. In other words, to illuminate the process of how valid statements about the ideal academic practices had been generated is to elaborate the mechanism of how the university had become an object of a neoliberal agenda.

Hence, an advanced question emerged: by which genres of literatures and knowledge is the exercise of governing academic practices enabled. As previously mentioned, these narratives include state development, global competitiveness and economic priority. Another essential genre of knowledge is bibliometrics, which is utilised to quantify the values of knowledge. In the case of governing the social body in the academy, bibliometrics is the correspondent knowledge taking part in subjectification procedures. Hence, in this thesis I also paid attention to discursive practices of bibliometrics, consisting of its formation, introduction and circulation. Foucauldian discourse analysis here aimed to identify the conditions where these two true statements had emerged.

From my experience and preliminary observation, I noted that people were inclined to attribute the neoliberalised procedure of Taiwan higher education – as well as relevant reforms or policy – to an external force like a tidal wave. The worldwide trend in higher education was stated as an objective macrostructural force, whose effect was unavoidable and whose existence transcended individuals. It seems to me that these viewpoints are not very ‘accountable’. First, most participants involved in educational reforms are still alive or play an active role in their fields; meanwhile most relevant documents are still available. To some degree, neoliberalism is adopted as a rhetorical strategy to sidestep individuals’ accountability. Hence, it is unnecessary to summarise the neoliberalisation of universities as simply an abstract concept or distant phenomenon. Second, taking the neoliberal agenda as an inevitable destiny would undervalue both the agency of individuals and the possibility for change. For these

two reasons I also chose an actor-focused approach to analyse the configuration where relevant actors encountered the same problematisation event and then were actively enrolled in networks, by which the process of neoliberalising higher education was enacted. This approach is Actor Network Theory.

With above interpretations, I deliberated on theoretical frameworks and designed pertinent research methods to conduct empirical research. This conclusion chapter is structured in the following way. It starts by reviewing the main research questions and then exploring how empirical findings respond to the questions. Subsequently, this chapter concludes that this study contributes to relative research fields with four main implications. These implications are: performativity of neoliberalism; singular aspects of a Taiwanese study; linking the STS approach (constructivism) and Foucauldian approach (constructionism) and applying into critical studies on university management; and linking sociology of education to STS research.

2. The composition and practice of neoliberalism in Taiwan's higher education sector

This section returns to the main research questions of this thesis. I will briefly review to what degree the research questions have been addressed by my empirical findings, and presented through preceding chapters. Implications behind the empirical findings will be further articulated in the next section, where I will analyse how my thesis, based on constructionist approaches, has contributed to both the study of neoliberalism and the sociology of education.

A) How have academic practices become an object of knowledge and power?

In Chapter 5 I compared various conditions where modern education systems emerged, including higher education. In the West, education sectors were initially founded and maintained by religious bodies, industrial entrepreneurs and the bourgeoisie, representing social conflicts between traditional elites and the emerging middle class in the 19th century. During processes of negotiations, ownership of the education system gradually shifted to the state, along with increasing financial

dependence on the government (Archer, 1984). Hence, whilst studying neoliberalising universities in the West, one of the core issues is how academic autonomy versus state interference is replaced by neoliberal governmentality. However, contexts in Taiwan, regarding the emergence of higher education are different. As a developing country which intentionally followed the trajectories of developed countries, higher education in Taiwan was established and controlled by the government from the beginning. This historical background was delineated in Chapter 1. In Chapter 4 I highlighted that university management, in terms of finance, curriculum and personnel, had been dominated by the authoritarian government in Taiwan until the democracy movement in the late 1980s. By analysing historical documents, Chapter 4 indicated that university education in Taiwan had been subject to industrial development and human resources, functioning like a state apparatus. In other words, academic practices had always been an object of power in Taiwan. What had changed were ways of governing. Subsequently, Chapter 4 elaborated on contexts of the Education Reform Movement, as a part of democracy movements during the 1990s in Taiwan, when exercises of sovereign power over universities was challenged. In parallel to demands for university autonomy, there was a demand for more available university places, in the name of educational equity and social justice. As a result, the university in Taiwan gained more autonomy *de jure*, and more universities were founded. The massification of university hence catalysed an imperative to establish a transparent and objective model of allocating educational resources, which empowered state bureaucracy to operate performance evaluation-based funds: a novel model of regulating higher education. In conclusion, Chapter 4 suggested that the exercise of New Public Management in Taiwan's higher education was a contingent result of the above contexts rather than something determined by (purely) neoliberal agendas. The academy has continually been an object of power, but neoliberalism helped governance models switch from sovereign power to neoliberal disciplinary power.

B) How have bibliometric measures become a resolution for assessing academic excellence?

As Chapter 4 presented, an efficient way to mobilise academic resources had been of interest to the state. In addition, there had been a persistent impetus in Taiwan to achieve international visibility. The introduction of bibliometric measures enabled the

government to estimate domestic academic capacity and then compare this with other countries. Meanwhile, due to the democracy movement from the late 1980s, there was a demand for an objective mechanism of educational resource distribution, as a replacement for the previous bureaucracy. Under these circumstances, the bibliometric measure had become an objective resolution to assess academic performance. The existence of faith in objectivity could be illustrated in the past (Chapter 4) as well as through contemporary accounts (Chapter 6). Whilst the bibliometric measure had become a benchmark to frame what an ideal academy should look like, it also defined a new problem: a lack of bibliometric indexed publications, suggesting the entanglement between solutions and problems. This procedure of problematisation was deliberated in Chapter 4. In sum, this thesis recognised how bibliometric measures had become a resolution by examining relevant institutions taking part in formalising discourse on academic excellence.

C) Can the neoliberalised university best be understood through notions of governmentality?

Does the neoliberalised university represent neoliberal governmentality in a Foucauldian sense? By analysing cases of higher education globalisation, university-industry collaboration and university social responsibility, Chapter 5 characterised how the government intervened in university management via the competitive allocation of resources instead of direct domination. Those goals of state development included international prestige, industrial progress and community promotion, which were substantially transmitted to universities. Although there were opposing voices and resistance from academics, overall the government succeeded in governing universities at a distance. The capacity of neoliberal discourse to act on academics rests on how it circulates within academic organisations. Chapter 6 recognised how all means of performance evaluations amplified the role of executive layers within academic organisations. Growing administrative layers and paperwork routines have built more compatibility with state bureaucracy, assimilating academics within national apparatuses. Thus, the administrative routine consisted of academic everyday life, affecting individual researchers. While individuals were encompassed by the neoliberal discourse, Chapter 6 delineated that those external criteria used in evaluations were internalised into individuals' self-values as well as behaviours.

Taken together, my empirical study suggested that the neoliberalised university was characterised by governmentality, in line with Miller and Rose's arguments (Miller and Rose, 2008, Rose and Miller, 1992).

D) Are bibliometric measures an aspect of governmentality?

According to Foucault, implementation of governmentality over a given subject, as a type of power relations, entails correspondent knowledge regarding the social body (Foucault, 1978, Foucault, 1980, Foucault, 1979). As Chapter 4 illustrated, the bibliometric device played an indispensable role in the subjectification of academic practices by rendering them thinkable, visible, tangible, comparable and eventually manageable. Relevant institutions, which had been involved in the discursive formation regarding an imaginary of academic practises, were outlined in Chapter 4. Along with the formation of knowledge regarding knowledge production, bibliometrics also play an essential role in circulating neoliberal discourse into universities, functioning like a technique of governance. In Chapter 6 I highlighted how bibliometrics had been adopted in all forms of performance assessments within academic organisations, such as promotion evaluations, internal evaluations and university ranking, by which academic activities became visible and accountable. In sum, the bibliometrics, to some degree, functioned like a panopticon in academia, contributing to knowledge regarding knowledge production, which the neoliberal governmentality rested on. The bibliometrics manifested the dual roles of knowledge/power complex in a Foucauldian sense.

3. Neoliberalism as Performativity

For Foucault, "power is what needs to be explained, rather than being something that offers an explanation" (2002, p. 284); the same could be said for neoliberalism. Taking tendencies of higher education in Taiwan as an example, this thesis provides a ground to evaluate 'the explanatory status of neoliberalism' (Peck, 2013).

In Chapter 4 I delineated the historical social configuration through which universities in Taiwan began to undergo a process of so-called neoliberalisation. Chapter 4

recognised that demands for educational equity and university democracy accounted for Education Reform in the 1990s. Although contemporary accounts in Taiwan interpret policy on higher education since the 1990s as neoliberalisation, at that moment, the label of neoliberalism had seldom been applied by those activists and participants. There was no financial crisis nor shock therapy taking place in Taiwan; neoliberal thought was not a main cause for the launch of Education Reform in Taiwan during the 1990s. However, as Chapter 4 indicated, the narrative of neoliberalism arose in Taiwan since 2000 and had become a major frame through which to re-interpret and re-define Education Reform. As a result, even critical studies of higher education also focus on neoliberalism but overlook the historical appeals for social justice and educational equity (反思會議工作小組, 2005, 戴伯芬 et al., 2015). My empirical study suggests that the over-emphasis on neoliberalism as an ‘all-determining mega-cause’ might invoke an issue of misrepresentation (Peck, 2013).

In Peck’s words, “The establishment of straight-line connections to a singular global Neoliberalism represent more than analytical shortcuts, in this context; they also misrepresent the constructed and contradictory nature of neoliberalisation as a transformative process” (2013, p. 140-141). To consider neoliberalism as a macrostructural force may lead to a functionalist misrepresentation, which takes effects as causes. As Cahill points out, “neoliberal doctrine is best understood as an ideology...which provides only a partial representation of the world and whose misrepresentations mask material processes which benefit dominant class interest” p. 45). In the case of marketising Taiwanese higher education, people with an over-reliance upon the analytical frame of neoliberalism might disproportionately attribute undesirable consequences to the mechanism of the competitive market but pay less attention to the controversy of class reproduction and conflict. As illustrated in Chapter 4, the controversy of class interest was the essence of the Education Reform movement in the early 1990s, rather than a perceived lack of free educational markets. This would be an issue of misrepresentation, a position which takes neoliberalism as an explanation rather than one that seeks to explain it.

Treating neoliberalism as a global monolithic agenda might result in numerous

unaccountable exceptions, which could not match the paradigm of neoliberalism. The discrepancy between neoliberal theories and practices, or the uneven geographical development of neoliberalism have been highlighted in previous critical studies of neoliberalism (Mirowski, 2013, Harvey, 2005). However, what these critical studies did is merely describe the gap rather than analysing how it is given effect. Critical studies about neoliberalism might attempt to summarise a homogeneous abstract model to account for one singular global neoliberal phenomenon. In this way, neoliberalism is likely to be reduced into a macrostructural force above actors. Within the simplified imagination of a supreme influence, contingent and unstable characters of neoliberalisation, as a continuous transformation, become unaccountable exceptions. On the other hand, an actor/action-centred approach could provide a pertinent research method to grapple with the contextualised situation by which neoliberalism is diversely enacted. In Latour's sense, it is actors and actions that transform a neoliberal claim into a matter of fact (Latour, 1987). Hence, there is no universal neoliberalism. Since so-called neoliberalism is performed by various actors in different co-ordinations, it is composed of heterogeneous practices of neoliberalisation. Chapter 4 identified how various actors were engaged in 'neoliberalising' higher education in Taiwan via a contextualised interoperation of the historical configuration. For another instance, with a focus on local formations, Chapter 6 investigated how neoliberal discourse constructed a reality through academics by circulating various metrics among academic organisations. This is the mechanism of neoliberalism, which comprehensively accounts for heterogeneous neoliberal practices.

More singular facets shown in the case study of Taiwan will be summarised in the next section. Nevertheless, changes in Taiwan's higher education policies also share a similar pattern with other countries whose higher education sectors have been described as neoliberal. First, before the reform of marketisation, higher education in Taiwan had undergone a period of massification (Chapter 4). This pattern is akin to what took place in the UK, Australia and other Western countries (Marginson and Considine, 2000, Evans, 2004, Anderson, 1995). The phase of university massification reflects a call for social justice and educational equity, implying the existence of class conflict or race conflict behind university entry in Taiwan as well as

in other countries. In a similar vein, after the expansion of higher education, university accreditation and academic excellence benchmarks have been used to re-concentrate resources on elite universities, when the narrative of social justice had gradually been overridden by the narrative of the 3Es. The above phenomenon is identified in Taiwan (Chapter 4) as well as in the UK (Henkel, 1999, Sayer, 2014). The tendency shared by Taiwan and other cases does not imply the all-determining mega-cause of neoliberalism, but infers that elite actors across various nations might take similar strategies to tackle the issue of class conflict at different moments. In other words, interest conflict among actors might be a persistent theme across various societies and periods; but neoliberalism, perhaps not.

In sum, the above discussion does not mean that we have to abandon the frame of neoliberalism but reminds us that “classifications are not determined by how the world is but are convenient ways in which to represent it” (p. 33, Hacking, 1999) . According to Collier, neoliberalism as an analytical tool, articulates “meaningful connections among a range of historical experiences and contemporary problems” (2011, p. 247). The concept of neoliberalism provides a preliminary lens through which to interpret and summarise contemporary issues. There is no point in claiming that the phenomenon of neoliberalism does not exist, but it is not necessary to essentialise neoliberalism. The ontological existence of neoliberalism rests on actions, rather than a determining force over actors. We have to be aware of its limitations; whilst exploring a singular case, we should draw on particular geo-historical configurations rather than a general explanation or abstract concept.

4. Singular aspects of a Taiwanese study

Even if Harvey (2005) is inclined to interpret the neoliberal movement as a worldwide political tendency in a monolithic way, he also pays attention to an uneven geographical development of neoliberalism and categorises it into several main types, such as established democracy states (the USA and the UK), authoritarian states (China and Chile), former Soviet states, and states encountering debt crisis (Mexico, Argentina and the Philippines). The case of neoliberal processes in Taiwan represents a model where a state undergoes a transition from an authoritarian regime to a

democratic political system. In an ideal neoliberalised state, the business climate is created and operated by a technocratic government. According to Harvey (2005), the anti-democratic aspects of neoliberalism implies a compatibility with authoritarian states, such as neoliberalised practices in China and Chile. However, this empirical study of Taiwan suggests that the implications of power relations between neoliberalism and the state could be more subtle.

First, the occurrence of neoliberalised processes in higher education was meant to neutralise direct exercises of sovereign power and to replace the authoritarian regime in Taiwan. As shown in Chapter 4, the authoritarian government's interference in university management was considered an imperative issue in the early 1990s, while the demand for university democracy and academic autonomy was underscored in the White Lily student movement and the Education Reform movement. In this situation, the introduction of market mechanisms into higher education represented a distrust of the government rather than a clear embrace of entrepreneurial culture. Hence, the case of the transformation of higher education transforms shows that there is very rarely compatibility between authoritarianism and neoliberalism in Taiwan, as a democratising country. Nevertheless, this is not to say that the government is no longer able to exercise power. In contrast, this transformative process into democracy manifests a character of transition from government to governance. While the Taiwan authoritarian regime ended in the early 1990s, the exercise of power still had to be authorised by truth and knowledge (Foucault, 1980). In this case, truth and knowledge included a national development model, human resources theory, knowledge economy, globalisation and bibliometrics, by which the government restored its legitimacy. Power relations between the state and citizens still exist, but in a format of governmentality; neoliberal practices function as a path to governmentality. However, neoliberalism is not the only approach to governmentality. Meanwhile, there is no such thing as a completely neoliberalised state, but rather there are hybrids of neoliberalising and welfare state. Taking Taiwan as an example, higher education is characterised by neoliberalism, but the public health system is characterised by the welfare state, especially in the case of Taiwan National Health Insurance, which was also established in the 1990s. Relevant studies about the public health system and debates on privacy policy might draw on the notion of governmentality or biopolitics,

but are less related to neoliberalism (陳宗文, 2013, 吳嘉苓, 2000, 曾凡慈, 2008). In sum, this presents the multiplicity of neoliberalism.

Beside neoliberalism, this study of Taiwan's higher education system offers a preliminary lens through which to understand tendencies in education policy or science policy among East and South-East Asian countries. As Green (2013) suggests, there is a paradigm of state development in East Asia, which was established by Japan in the 19th century (the Meiji Restoration), followed by other Asian states in the 20th century, such as Taiwan, South Korea and Singapore. This model is characterised by state interventionism, where education systems are led by the government, subject to policy needs, consisting of promoting national identities and languages; training skills for economic growth; providing disciplined manpower for industry and bureaucracy. As I elaborated in Chapters 4 and 5, because education systems were founded and funded by the state, university autonomy in Taiwan had been more vulnerable to state policy than universities in the West. With similar centralised educational systems, even if geographical and historical contexts vary, a study of Taiwan higher education could be a more pertinent lens through which to interpret the tendencies in academic management and science governance characteristic of East and South-East Asian states than a perspective from Western historical academic traditions.

When there is a worldwide tendency to marketise, globalise and neoliberalise universities, academic careers in East and South-East Asian states also become precarious. An increasing ratio of fixed-term contract academic staff and atypical employment has deteriorated young scholars' labour conditions (戴伯芬 et al., 2015, 翁裕峰, 2012). For example, an award-winning Japanese humanities scholar took her own life in 2016 due to a chronically unstable academic career (Komiya and Kabata, 2019). An intensely competitive atmosphere in academia might lead to an increase in systemic academic misconduct. For example, there was a scandal in Taiwan where 60 articles attributed to a researcher were retracted due to a fraudulent peer-review ring (2014a). A Minister of Education resigned during this scandal, as a co-author of the withdrawn papers. There was another significant scandal in Taiwan

in 2016, involving a research team from National Taiwan University. The research team, consisting of several award winners, a university dean and a college dean, was accused of producing fraudulent data (2016b). In Japan there was a retraction of a stem cell study from *Nature*, because of data manipulation (2014b). In South Korea, an esteemed professor of biotechnology was charged with data fabrication, ethical violations and embezzlement, and his breakthrough papers in *Science* were eventually retracted. Before that, this scholar was regarded as the 'Pride of Korea' for his pioneering research in stem cells (Wade and Sang-Hun, 2006). In 2012, the issue of a fraudulent peer-review ring led to a retraction of 28 biomedicine papers conducted by a Korean researcher (Ferguson et al., 2014). Recently, close to 200 Korean professors at 110 universities were accused of plagiarism since the 1980s (Matthews, 2015). The above cases represent just some notable incidents of misconduct, it is not a complete list. Because of similar development patterns, this study on Taiwan might contribute a preliminary frame for understanding academic milieus which facilitate misconduct in East, South-East Asian or other late-industrialised states.

5. Bringing constructivism and constructionism into studies on university management

In the previous section and the Literature Review chapter, I argued that there is a tendency in some sociological studies, human geography studies or policy studies to essentialise the transformative processes of neoliberalised universities. That is, to assume an external force of neoliberalism, whose agency works over individuals. The issue of higher education marketisation has also been a concern to studies of pedagogy. In a similar vein, neoliberalism, as a continuous and contradictory process, is likely to be characterised as a monolithic entity (Herbst, 2007, Ball, 2003, Morley, 1997, Morley, 2003). As I elaborated in the preceding discussion, because these studies rarely go beyond overly broad descriptions, the formation of neoliberalism tends to be taken for granted, implying a lack of actors. In this way, it is quite difficult to explain how relevant participants were mobilised for marketising higher education. Why did they not resist? Why did the resistance not generate impact? Alternatively, this empirical study suggests that a constructivism/constructionism approach could be a pertinent theoretical frame to conduct relevant research, going beyond such general summaries.

In general, Foucauldian approaches are deemed to be constructionism, whose analytical aim is to explore historically or geographically contextualised situations where what is said and ways of saying have been formalised (Burr, 2015). The Foucauldian approach might be criticised for underestimating the agency of individuals; that is, ‘the death of subject’, which means people act merely as bearers of social structures (Burr, 2015). However, Foucault does not deny the existence of personal autonomy. Foucault (2000) argues, once one still has the ability to open a window or to commit suicide, there is a room for agency; because individuals are not yet entirely controlled, there is a room for the exercise of power. In other words, conditions of power relations presuppose the agency of individuals. An extreme case in which one loses all agency would be violence. Foucault would not apply the model of power relations to pure violence. It is nevertheless true that Foucault might pay less attention to individuals’ agency and resistance, but this is because Foucault (and Foucauldian) scholars mainly focus on procedures of subjectification.

On the other side, ANT approaches might be named as constructivism by sociological scholars (Abbott, 2010). Like Foucauldian approaches, the procedure of problematisation is focused on by ANT scholars. But scholars who apply the ANT frame are also interested in the procedure of engagement whereby various actors play active roles in network formation. This is not to say that actors’ interpretations of problems and interests are absolutely independent from discourse. ANT scholars are aware that some actors might play a more influential role in underlining a particular interpretation of problems as well as acting in its interests (Callon, 1980). Nevertheless, what ANT research focuses on are procedures of mobilising actors, sociomaterial assemblage, formation of consensus and controversies.

This thesis suggests that constructivism and constructionism could be compatible, and thus provide an analytic framework to go beyond a mere description of phenomena. By adopting Foucauldian discourse analysis, Chapter 4 articulated contingent conditions of neoliberalised universities in Taiwan and then illuminated the

deployment of neoliberal discourse into higher education. Meanwhile, along with ANT approaches, Chapter 4 also recognised how different actors played an active role in reaching a consensus during the Education Reform Movement of the 1990s. This accounted for the formation and mechanism of neoliberalised higher education in Taiwan. Chapter 5 further investigated differences in the interpretation of university education and academic excellence across four varied academic disciplines, in the form of actors. This delineated controversial events in academia but also manifested agency in academic organisations and individual researchers, as entities, which enabled possible resistance. Chapter 6 characterised the omnipresence of neoliberal discourse by enumerating the circulation of measurement devices among academic organisations to explain why successful resistance or alternatives are less likely to occur. The importance of the circulation of calculative instruments is emphasised by both Foucauldian and ANT approaches. In sum, this thesis contributes a study drawing on constructivism/constructionism to critical studies on university management and higher education.

6. Linking the sociology of education to STS research on knowledge: from hierarchical knowledge production to hierarchical education

Knowledge production has been focused on several sociological subdisciplines, such as the study of science and technology (STS), the sociology of knowledge and the study of science policy, which examine epistemic properties among a range of processes for the production of knowledge. Needless to say, knowledge formation is the very core of Foucauldian research, which emphasises connections between knowledge formation and the exercise of power. However, the objects of research focusing on knowledge production are less likely to cover facets of class conflict, socioeconomic division and reproduction, which are core elements for the sociology of education. This thesis provides a link between sociological studies of knowledge and the sociology of education.

Sociological studies of knowledge focus on how a range of interactions influence epistemic properties of research content. These interactions consist of several aspects. A classic STS approach emphasises how a set of calculative instruments or

laboratories modify researchers' ways of producing knowledge (Latour, 1999, Latour, 1983, Pickering, 2010). Some explore how rules or norms within academic disciplines had been formed, in accordance with which scholars conduct research activities (Abbott, 2010, Merton, 1973, Foucault, 1981). For studies of science policy and governance, some highlight the interaction between academics and policy environments, such as funding bodies (Laudel, 2006), performance evaluation-based resource allocation (Münch and Schäfer, 2014, Hammarfelt and de Rijcke, 2014, Hicks, 2012, Piñeiro and Hicks, 2014, Wilsdon et al., 2015c) and university rankings (Sauder and Espeland, 2009). With the same notion, some draw on roles of academic organisations in mediating the impacts of policy environments on academics, such as policy on personnel (Gläser et al., 2002, Laudel and Gläser, 2014). All these studies contribute to investigating a multiplicity of material conditions which are involved in knowledge formation. Nevertheless, while discussing those material configurations where knowledge is produced, an aspect of social strata is less likely to be considered as one of the main factors.

On the other hand, the issue of social reproduction has been the core of the sociology of education or the critical study of education. Scholars of these disciplines explore the issue via various approaches. For instance, by analysing the historical conditions of state education systems, Archer (1984) characterises relations between monopoly on instructive sectors and dominant groups. Some scholars reflect on Marxist perceptions of ideology and capitalism, which focus on how capitalist ideology transfers to people via hierarchised school education (Apple, 1995, Apple, 2004). Besides economic structure, an emphasis on symbolic power is widely utilised to diagnose processes of inter-generational class reproduction through education (Bourdieu, 1986, Bourdieu and Passeron, 1977, Bourdieu, 2013, Bernstein, 2003). This critical research on education, focusing on class stratification, might consider higher education as a part of the social reproduction machinery in terms of 'knowledge reproduction', fitting the needs of an unequal society, but pay less attention to 'knowledge production', which is an essential characteristic of academia.

It does not seem like these two spheres are relevant to each other, but there are some

connections between class stratification and knowledge production. In *Leviathan and the air-pump: Hobbes, Boyle, and the experimental life*, Shapin and Schaffer (2011) indicate that the composition of the Royal Society and intellectual practices virtually came to represent the aristocracy in the 17th century, whose culture of nobility deeply influenced the formation of scientific methods, such as an incorporation of scientific experimentation, practices of witnessing and endorsement. Since the 19th century, universities have become the main field where knowledge production is conducted. Meanwhile, the tension between elite universities and mass universities, and its implication for social strata, have been noted (Evans, 2004, Sayer, 2014, Anderson, 1995, Marginson, 2017). Several scholars argue that a growing emphasis on the mission of research should be considered a strategy that elite universities take to protect their reputation from the massification of higher education (Fuller, 2009). The correlation between class stratification and epistemic properties of research content has to be further elucidated, considering that the university plays a dual role in class reproduction and knowledge production. My thesis identified that performance-based resource distribution in Taiwan was taken as a strategy to justify the re-concentration of educational resources in the elite university (Chapter 4). In return, the increasing pressure on knowledge production and academic assessments engendered profound impacts on the epistemic properties of research (Chapter 6). Thereby, this empirical study contributes a connection between the concern for class production and the focus on knowledge production: a link between hierarchical journal rankings (bibliometrics) to hierarchical education.

7. Implications of this study

There are ethical implications that emerge as a result of carrying out this research project. In Chapter 1 (introduction) I described tensions between research subjects and myself, as well as the relationships between myself and the research topic. In relation to the sensitivity of the research topic, in Chapter 3 (methodology) I stated how I ensured that no participants were harmed as a result of my fieldwork. In this section I will elaborate on the implications of this project.

In Understanding and interrupting hegemonic projects in education: Learning from

Stuart Hall, Apple attempts to characterise how critical research should look (2015). These tasks include providing an alternative model, challenging taken-for-granted relations of unequal power and speaking for those who do not now have a voice. In accordance with the criterion to benefit members of society, this research project attempts to raise public awareness of the purpose and nature of university education beyond the language of accountability, economy, state development and entrepreneurship. This project engaged critically with a focus on discursive practices by which models of academic excellence have been formalised. In this way, this research challenges the existing model of university management and explores engagements with non-human actors: in this case, bibliometrics. This study might provide a valuable reference for policy makers who are involved in these activities.

In terms of suggesting alternative ways to think about the purpose and nature of academic practices, this thesis emphasises the role of bibliometric indicators. It is true that a conception of academic excellence is constructed and then performed by human beings. However, to say that academic excellence is performed does not mean that academic excellence can be anything at all. In *Bodies that matter*, Butler (2011) argues

“...performativity cannot be understood outside of a process of iterability, a regularised and constrained repetition of norms. And this repetition is not performed by a subject; this repetition is what enables a subject and constitutes the temporal condition for the subject. This iterability implies that performativity is not a singular act or event, but a ritualised production...(p. 60)”

In the case of higher education, bibliometrics play an essential role in formalising the materiality of academic excellence, as a site where academics display their identities. My empirical chapters show that bibliometrics can be understood as both a constraint and a component of this ritualised production, as well as being a reiteration process in academia. As I elaborated in the literature review chapter, this aspect of materiality in

academia might be underplayed in some critical studies of university management in the neoliberal era. In addition, this project also demonstrates that the authority and meaning of bibliometrics is not determined by the attributions of bibliometrics itself. Instead, it relies on how people take up and relate to these measures through reviewing the process by which bibliometrics have been introduced into foreign libraries and are then carried across into domestic policies. With these two understandings of bibliometrics, this research reminds readers that the bibliometric indicator as a stubborn benchmark is not eternal but changeable.

8. Summary and future research

Based on my empirical data, this thesis analysed power relations between the state and academic sectors; relations between knowledge and power; the role of quantitative measures; and governmentality in the neoliberal era. By analysing the historical configurations at the point when so-called neoliberal policy was formalised, I suggest that the concept of neoliberalism could be a convenient frame to understand and compare political developments since the 1970s around the world; however, as an analytical tool, neoliberalism itself could not be the ultimate cause accounting for the political development. This thesis also suggests a linkage between STS research and the sociology of education: from hierarchised knowledge production to social stratification. By my research, I show the possibility of applying Foucauldian and STS research methods to critical studies on educational practices. Finally, the case study of Taiwan provides a model to interpret education policy in South East Asian countries whose historical contexts are different to those in the West.

Drawing on the above implications, I propose several potential directions for future research. The first potential topic is the impacts of ongoing policy on the social impacts of the university. Living in the age of Responsible Research and Innovation (RRI), University Social Responsibility (USR), and Social Impacts, there is an increasing expectation that the university contributes more immediate efforts to the community, society and industry. I look forward to articulating how the notion of short-term impacts redefines knowledge production and then influences the epistemic character of research content, and how this policy modifies funding bodies' ways of

granting research projects. In practice, this new project might choose marginal academic disciplines to conduct ethnographic observation for understanding the following strategies: how researchers from a marginal academic discipline present their studies; if the researchers ever attempt to match benchmarks for utilitarian academic excellence; how the researchers gain attention from the funding body; and how the marginal discipline maintains its position within academia. By investigating the 'bad science' of the utilitarian period, this project aims to explore the regime of knowledge in an STS sense.

The second potential topic is to examine difference in epistemic characters of knowledge production between elite universities and mass universities. This topic reflects on both concerns in the sociology of education towards class reproduction and the focus of STS on knowledge production. Within narratives of higher education, there is a subtle but continuous theme of antagonism: liberal arts education versus vocational/professional education, symbolic values versus utilitarian values, social stability versus mobility, and elite versus mass. When the higher education sector has undergone a process of expansion, what constitutes the cultural capital of degrees? This thesis as well as other studies, such as Fuller (2009), suggest that traditional elite universities may restore their reputation and resources by highlighting research capacity. However, as Chapter 6 shows, even within the elite university, the growing reliance on professional values may contradict traditional faith in liberal arts education, cultivation and discipline of minds, which – ironically - constitute cultural capital and habitus, in Pierre Bourdieu's sense. Hence, I would like to explore the difference in knowledge production between different types of universities, and its impacts on student career development. This project would therefore attempt to further delineate linkages between hierarchised knowledge production and hierarchised education.

Finally, I would like to investigate the roles of international organisations in governing educational affairs. By analysing historical documents, I noted that international organisations, such as the OECD, had played an influential role in the metricisation of Taiwan's higher education. Although this thesis mainly focuses on

power relations between state bureaucracy and university, moving forward I would like to further explore the role of international organisations, as well as interactions between international organisations and the state. This new project would aim to explore the procedures by which the machinery of transnational metric power is established. In the light of Foucauldian insights into power/knowledge/truth complex, the new project would focus on examining the procedure of how academic practices have been identified as an object of transnational governance.

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Appendix

Appendix 1.

1973. The scientific development and policy in our country. *National Science Council Monthly*, Volume 1.1, 5-10.

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| 1. | The Scientific Development and Policy in Our Country |
| 2. | 1. A brief review of scientific development in our country |
| 3. | While discussing our current condition of science, we should begin by decades ago. In the late period of Qing Dynasty, we started to encounter the west and had been beaten for several times. |
| 4. | Even though we witnessed the strength of their force, what we realised was just the skin of western science. We used to think that their strength was only based on modern weapons. |
| 5. | Hence, we purchased their fleets and factories. We did not see the role of science, which is the basis of western material civilisation. We were not willing to learn science. |
| 6. | At that time, the principle was Chinese episteme as the spirit, Western episteme as practical uses. In the meantime, what was imported to China were mere applications, not science itself. |
| 7. | After the Republic of China was established, scientific disciplines began to emerge gradually in universities. In the meantime, our citizens also started to study abroad for science. These scholars are (a list of names and their expertise, including anthropology, linguist, psychology and archaeology) ... |
| 15. | Unfortunately, while this scientific ‘research’ was just beginning, the second world war was launched. At this moment, |
| 16. | our scientific research in geology and archaeology was internationally prestigious. |
| 17. | During the war, all universities and institutes moved to south west China, but most libraries and instruments were lost in the enemy-held territory. All conditions of scientific research were insufficient. |

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| 18. | When the war kept going, life of researchers and teachers got worst. However, under the circumstance, a few scholars still worked hardly and incubated more new scholars. |
| 19. | Nevertheless, in the scale of whole state, the development of science was destroyed in the initial stage. |
| 20. | After the second world war, we attempted to re-establish these universities and institutes. However, soon the civil war was launched and the Communist Party took over China mainland. There were only few scholars who were lucky enough to escape to Taiwan. |
| 21. | It was too hurrying to transfer those research instruments to Taiwan. For library resources, only Institute of History and Philosophy, Institute of Mathematics, Academia Sinica and the central library were able transfer partial collections to Taiwan. |
| 22. | There was almost no library resource and research instrument in Taiwan. The Japanese colonial period left us nothing. Compared to the period of second world war, |
| 23. | it is worse. |
| 24. | The initial situations in Taiwan, briefly, were (1) lacks in educational funds and instruments, (2) lacks in university faculty |
| 25. | (3) unreasonable salaries for faculty and administrative officers. In order to survive, a lot of professors did part time jobs. There was no condition of scientific 'research'. |
| 26. | Teachers and student were keen to study abroad, but few of them came back, leading to an issue of brain drain. In order to deal with it, in 1958 |
| 27. | The dean of Academia Sinica, Dr. Hu, suggested the government to set a scheme for national development of science: the National Council on Science Development. |
| 28. | The suggestion was approved. This is the revival of science in our country. |
| 29. | The Constitution of the National Council on Science Development has been established for 13 years. In this period, national economics grew very fast. The government has more funds to support science. |
| 30. | Following is a brief review of science development in our country. |
| 31. | With support of our government and the U.S., the budget of the first year |

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| | was... |
| 34. | The main missions of the National Council on Science Development are (1) to grant well-established institutes, like Taiwan University or Academia Sinica for new building or devices of research and teaching, |
| 35. | (2) to grant research. Researchers could submit a research proposal, which is evaluated by the National Council on Science Development via a process of peer review. |
| 36. | This grant is almost equal to the salary of applicants. It is meant to let researchers focus on research and teaching, instead of part-time jobs. |
| 37. | (3) to set a fellowship of National Chair Professor and Visiting Chair Professor. It is meant to hire prestigious or foreign scholars with slightly higher salary than general professors. |
| 38. | (4) to fund 20 researchers for studying abroad every year, with a condition of domestic service. |
| 39. | All of these policies engender great positive impacts on some faculty's life and emotion. Some departments or colleges |
| 40. | are able to purchase research device gradually. By hiring Visiting Chair Professor, the quality of faculty increases. However, due to limited resources, |
| 41. | what we should do is much more than what we have done. |
| 42. | In this period, the university still lacks outstanding faculty. There are just few efforts into research. If we expect the state to be academic dependent and to accumulate sufficient human capital, |
| 43. | we are very far to this aim. |
| 44. | 2. The policy of our state on science development |
| 45. | The human capital in our country is insufficient, in terms of following two aspects: (1) International academic standards, and |
| 46. | (2) national development (education, economics and national defense). I do not intend to elaborate on these two points here. |
| 47. | There are several reasons accounting for the lack in scientific talents. (1) We do not have proper devices and faculty to train advanced scientific talents. |
| 48. | (2) Our salary lets faculty attempt to go abroad and makes people who stay abroad reluctant to come back. (3) Our administrative systems (like promotion) |
| 49. | do not make sense often. This is one reason for the brain drain. (4) For many |

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| | years in the past, our government and society |
| 50. | could not realise nor support science development. People who study abroad can not see any domestic policy |
| 51. | which makes them optimistic about academic career if they come back. In the past of 20 years, though there is no substantial number, |
| 52. | we lost around 20 thousand scholars and students. |
| 53. | President Chiang Kai-shek, among those leaders in our offices, is the only one who realises the meaning and importance of (broadly) science to modern countries, especially to ours. |
| 54. | In 1967, he settled The Scientific Advisory Committee |
| 55. | to elaborate the whole national scheme and policy of scientific development. |
| 56. | The Scientific Advisory Committee argued we have to design a comprehensive scheme for a long run. Economic power is the basis of society and national defence. |
| 57. | Economic power is based on science and technology. Taken together, the aims of our scientific development are gradually to make our academia independent and to provide |
| 58. | sufficient talents for national progress. |
| 59. | In 1968 and 1969, the Scientific Advisory Committee invited relevant official departments and academic institutes to make a 12-year project for scientific development. |
| 60. | As the guide for scientific development in our country, the project includes three main points: |
| 61. | (1) to improve scientific education and recruit talents in all ways of disciplines. This is not only for national progress but also for |
| 62. | the enhancement of faculty in all levels of education. |
| 63. | (2) to promote scientific (or academic, broadly) research. This is not only for advanced scientific human capital but also for independence of national science. |
| 64. | (3) to support studies of application science relative to national economy. Details are shown in the following section. |
| 65. | 3. The policy and fund distribution of the National Science Council |
| 66. | The first policy of The Scientific Advisory Committee is to enlarge and |

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| | reorganise National Council on Science Development into the National Science Council. |
| 67 | The National Science Council is under the Executive Yuan. Its mission is to operate policies of national scientific development... |

Appendix 2.

1983. An investigation of higher educational evaluation in Republic of China. *Bulletin of Educational Research*, Vol.25, 227-239.

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| 1. | An Investigation of Higher Educational Evaluation in Republic of China Author: Mei-Yuan Lu |
| 2. | 1. Research backgrounds, purposes, scope and methods |
| 3. | (1) Backgrounds and purposes |
| 4. | In the end of the 60s and the beginning of the 70's was an important period for higher education development in numerous countries. There were two apparent trends in this stage: |
| 5. | an increase in numbers of universities and students and a change in higher education curricula. Higher education's curricula had to be reformed in response to changing social needs and economic structure |
| 6. | instead of adhering to academic tradition. |
| 7. | Taken our country as an example, it has been 30 years since the government withdrew to Taiwan. During this period, there is a forty-nine-fold increase in higher education's student numbers. There are several substantial reforms of educational purposes and curricula. |
| 8. | The rapid expansion of higher education has contributed to the development of economy, society and culture, the cultivation of experts, and the youth's education. |
| 9. | However, there are also some problems. |
| 10. | 1. An issue of imbalance between demand and supply of manpower. There are two sorts of imbalance: undersupply and oversupply. The case of oversupply on manpower market leads to a problem of unemployment or underemployment. |
| 11. | This is a waste of educational investment. This problem in areas of humanities and law studies is the most severe. Another situation is undersupply. According to the prediction of Council for Economic Planning and Development, the situation of undersupply might |
| 12. | happen to some engineering departments in the coming future. This situation |

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| | will impede the national development. |
| 13. | 2. The issue of faculty's quality. Teachers are the soul of pedagogy. The quality of teachers decides directly the result of education. Although there is no concrete evaluation of the overall quality of university faculty, |
| 14. | some studies show that (1) curricula might not fit real needs but adapt to faculty's expertise due to the inflexibility of manpower establishment. |
| 15. | (2) The ratio of adjunct teachers is too high in private universities. (3) The teaching hour per teacher is too much. (4) Faculty's passion for research is not enough. |
| 16. | (5) The criteria for hiring and evaluating academic staff are too loose. These phenomena affect teaching and point out that the current quality of staff should be improved. |
| 17. | 3. The issue of student's quality: (omitted) |
| 19. | 4. The issue of lacking books, instruments and budget: (omitted) |
| 24. | All above problems, in a sentence, is the issue of education's quality. It is very important to guarantee that the quality of higher education gets better in the light of higher education explosion. |
| 25. | Since 1975 the Ministry of Education began to run university evaluation for deeply classifying the quality of every department in an objective way, as a basis to improve the quality of higher education. Whilst the evaluation was once launched, |
| 26. | all sectors had great hopes on it. In general, it is said that evaluations of university have following meanings: (1) to promote not only the quantity also the quality of higher education; (2) to offer students an indicator for selecting programs, beside university's prestige, |
| 27. | and (3) to nudge departments and university to learn and emulate from each other. Since the evaluation procedures is in an initial step, there is no precedent to follow. In addition, opinion |
| 28. | from society and educational circles are quite diverse. These make the evaluation working unsuccessfully. In addition, some people criticise that |
| 29. | the university evaluation is nothing more than a work of formalities. Taken together, it is significant to review the university evaluation systemically in order to match with real |

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| 30. | conditions of our education and to establish meanable methods for evaluations. |
| 31. | Based on the series of problems, I am going to research the university evaluation in our country. This research aims to: |
| 32. | (1) review theories of educational evaluations and establish a valid frame |
| 33. | (2) understand the development of evaluations in the U.S. as a reference |
| 34. | (3) script the exercise of university evaluations in our country and discuss problems in practices |
| 35. | (4) draw a conclusion and practical advice as a reference to improve the evaluation of university education |

Appendix 3.

1986. A research on objects of technological development policy. *National Science Council Monthly*, Vol 14, 261-267.

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| 1. | A Research on Objects of Technological Development Policy |
| 2. | Cheng-Chan Tseng, Jing-Sin Cheng |
| 3. | Institute of Management Sciences, National Chiao Tung University |
| 4. | Abstract |
| 5. | At first, this article aims to discuss the conception of policy and object. Then, based on benefits of technological development, this article turns to discussions about types of objects of |
| 6. | technological development and then offers an ought-to-be frame of technological development policy. Finally, this article compares differences in de facto systems of technological development's policy and objects |
| 7. | between different countries. |
| 8. | 1. Introduction |
| 9. | Since Schumpeter used economics to analyse |
| 10. | technological innovation in 1934, technological innovation has been regarded as a main |
| 11. | factor for national economic growth and enterprise's productivity. |
| 12. | This is the main source to create benefits. There are two sources of |
| 13. | Technological progression. One is a spontaneous progression, resulted from experts' |
| 14. | spontaneous studies from each other. Another is a |
| 15. | long-term development led systematically by the national policy. |
| 16. | With theories of technological policy, Brooks Harvey points out that |
| 17. | due to intensive international economic competition and arm race, |
| 18. | an increase in amount of research institutes and researchers, and more appeals to the state, |
| 19. | gradually the technological development would follow national plans. |
| 20. | Johnston and Gummett argue that when international enterprises |

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| 21. | keep growing and new risky technology spring up, |
| 22. | the government gains rationales to guide the technological development. |
| 23. | Hence, the policy of the technological development has become |
| 24. | a crucial issue for the governments around the world. |
| 25. | The technological development affects not only on technology itself but also |
| 26. | induces the development of society, economy and politics. |
| 27. | In other words, its influence covers the whole development of |
| 28. | society, technology, economy |
| 29. | and politics (STEP.) |
| 30. | Because the technological development could follow various trend in different |
| 31. | cases, it might result in different impacts on STEP. |
| 32. | Hence, based on differences in conditions, resources and national missions, |
| 33. | each country has their policy and focus. Such as UK and the US (omitted) |
| 37. | Because different countries have various goals of technological policy, |
| 38. | their strategies are quite different. Hence, before the strategy is chosen, we |
| 39. | must set objects of policy carefully. In this way, we can choose the accurate strategy |
| 40. | To avoid a waste of resources. |

Appendix 4.

1993. The Minister pointed out that in terms of personnel matters, academy, finance and curricula the university will become autonomous. *Higher Education Newsletter*, No. 27, 1.

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| 1. | The Minister pointed out that in terms of personnel matters, academy, finance and curricula |
| 2. | The university will become autonomous |
| 3. | Mr Guo, the Minister of Education, gave a speech last month |
| 4. | in the national conference of higher education |
| 5. | to review the growth in higher education in the past and discuss a |
| 6. | new trend for the future. |
| 7. | The Minister pointed out that ‘university autonomy’ is an inevitable |
| 8. | trend, but we must have a prudent attitude toward the trend |
| 9. | and evaluate the price carefully. |
| 10. | The Minister of Education will empower university gradually and drop |
| 11. | unnecessary regulations to make the university autonomous |
| 12. | in terms of personnel matters, academy, finance and curricula. |
| 13. | Following is the digest of Minister’s speech: |
| 14. | In the past of 30 or 40 years, there are three rough stages in the development of |
| 15. | higher education. The period from 1950 to 1970 is a stage of |
| 16. | rapid growth. The number of technical colleges increased |
| 17. | from 33 to 70. The number of universities increased from 4 |
| 18. | to 21. From 1971 the Minister of Education took a |
| 19. | conservative attitude t. This is the second phrase. |
| 20. | From 1971 to 1985 the number of universities |
| 21. | increased from 22 to 28. The number of technical colleges |
| 22. | increased from 70 to 77. There were few increases in higher education. |
| 23. | However, the ratio of growth speeds up again sine the past of 6 years. |
| 24. | From 1986 to 1991 there are |

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| 25 | 11 new technical colleges and 9 new universities...(omitted) |
| 36. | Does this rapid growth fit needs for |
| 37. | social development? It is worthy of more discussions. |
| | (omitted) |
| 52. | Our country also meets a deflation in higher educational budgets. |
| 53. | We must have some strategies. The primary point |
| 54. | is the administration. Public universities must |
| 55 | spend money smartly and promote the efficiency of administration. |
| 56. | Second, the Minister of Education will not support universities in the principle |
| 57. | of equality. Those who are potential or are prestigious in academy |
| 58. | will gain more support to become an international |
| 59. | outstanding university. For those teaching-oriented or |
| 60. | service-oriented universities, we will |
| 61. | offer alternative aid. In this way, |
| 62 | we expect all universities to find their own characters. |
| | (omitted) |
| 71. | ‘University autonomy’ is an inevitable trend. However, we |
| 72. | must take a serious attitude toward the issue of democratisation and |
| 73. | pay attention to the prize. There are |
| 74. | 3 aspects of university autonomy. The first is autonomy for personnel matters, |
| 75. | such as the election for deans. (details) |
| 78. | In the process of democratisation in the campus, we hope to establish |
| 79. | a new system, but what the Minister of Education expect is |
| 80. | a stable university. |
| 81. | The second aspect is academic freedom. Of course, the academic freedom |
| 82. | should be guaranteed, but only within the campus and limited in |
| 83. | academic research and lecture. |
| 84. | Beside academic freedom, the last one is autonomy for finance. |
| 85. | The distribution of budgets will not be operated only by the Minister of Education. |

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| 86 | We look for an objective and experienced actor to |
| 87. | assign budgets according to various indicators. |
| 88. | In addition, there should be autonomy for curricula. Among all |
| 89. | kinds of university autonomy, autonomy for curricula is the most difficult task, |
| 90. | because a reform of curricula is very likely to derive a lot of complicated issues or |
| 91. | unnecessary doubts about politicization. Nevertheless, autonomy for curricula |
| 92. | is an inevitable trend. We must make it carefully. |

Appendix 5.

1978. The contemporary destiny of universities in our state. *Bulletin of Educational Research*, Vol 20, 37-55.

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| Page | |
| 1 | |
| 1. | The Contemporary Destiny of Universities in Our State |
| 2. | 1. Our university in the ancient age |
| 3. | Education is our country has rested on humanism from the beginning...(omitted) |
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| Page | |
| 4 | |
| 5. | 3. The mission of the university |
| 6. | (1) Research |
| 7. | As mentioning before, research is one of the main university's mission. I believe there is no exception in any state. The research here does not mean |
| 8. | visible institutes or organisations. It means that both professors and students in any university should do research ordinarily. However, in order to amply the effort of research, |
| 9. | most of states have established postgraduate school as a specific place for research in addition to undergraduate. This seems like the tree main missions of the university are reduced into one, like our system. |
| 10. | In some countries the research institute is independent to universities as another system, like Germany. Along with the university, there |
| 11. | are also some institutes in our country which are external to the university, such as Academia Sinica and the Institute of International Studies. |
| 12. | The U.S. also adopts the model |
| 13. | First, should the settlement of institutes locate in the university or outside of the universities as an independent unit? |
| 14. | There are various opinions. (omitted) |

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| Page 5 | |
| 11. | (2) Professional education |
| 12. | The second mission of the university is professional education. This genre of education makes people acquire a part of knowledge from academy but is not meant to contribute cultural production. |
| 13. | It just focuses on those knowledge and skills fitting vocational needs. Eduard Spranger argued that in Germany people has never adopted this narrow view based on needs, benefits and applications. |
| 14. | Alternatively, they keep the free spirit as much as possible. This spirit once had been adopted in the U.S. and China |
| 15. | in the past. |
| 16. | Nowadays, different cultures keep differentiating and characters of each vocation get more specific. This trend speeds up so that all departments in the university face this situation. |
| 17. | In the centennial memorial to American University of Beirut, an American scholar, N. M. Pussey, gave a talk: tomorrow's liberal education in the university. In the beginning, he said, |
| 18. | "Liberal education is a very debatable issue in academy. |
| 19. | Some scorn it, when some believe in it. However, even people who advocate of liberal education might have a feeling of nostalgia that the golden age of liberal education never comes back..." |
| 20. | He then argued that in the beginning the university education was equal to liberal education. During that age, cultural people, especially in literature, gained a high status. |
| 21. | This reflects the view of humanist education. In the beginning of 19 th century, new scientific knowledge invaded the gate of universities. After that, the trend of specification is unavoidable. |
| 22. | In Europe, like Germany, to reserve university's tradition, people were reluctant to settle new disciplines of application studies. Hence, out of the university system, new higher institutes were established for industrial or anticultural studies. |

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| 23. | In fact, there were parallel colleges or universities for application studies. (omitted) |
| Page 6 | |
| 23. | Young students look for an advantageous status for life of themselves and family. Hence, we can not expect them to have a long term ideal. |
| 24. | Nowadays, there are more realistic pressures, which suppress the conditions of spontaneous research. |
| 25. | This trend makes the youth get lost. When the free world's culture and society become realistic, materialistic, pragmatic, banal and vulgar, |
| Page 7 | |
| 1. | the youth are less likely to develop their personality in a humanist environment. This issue is related to the fortune of the free world. Can we watch with folded arms? |
| 2. | (3) Humanism education |
| 3. | Even two of three main university's missions have not been achieved entirely, they have been done partially. However, for the last mission of humanist education or liberal education |
| 4. | what we have not done is much more than what we have not done. This is the main focus of the education reformation in Germany after the second world war. I have mentioned this issue before. |
| 5. | This is something about our fortune. It is worthy of more deep discussion. |
| 6. | Either in the past or nowadays, in the West or the Oriental, all people agree that the central mission of university education is humanity. |
| 7. | In ' <i>The Idea of University</i> ' Newman argued that the purpose of university is to cultivate members who make society sublimate... |

Appendix 6.

1958. The research purpose of this institute. *Bulletin of Educational Research*, Vol 1, 1-2.

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| 1. | The research purpose of this institute |
| 2. | The term of ‘university’, in the western history of pedagogy, means ‘a group of scholars’ or ‘a group of academics’. In the end of European middle age, |
| 3. | the ‘university’ and general school education were not from the same root. During that period, the school was supported by churches, courts or guilds. |
| 4. | Although the school had various sponsors, but the mission of all schools was to educate teenagers and children. |
| 5. | Universities were groups which were composed of scholars from various regions in spontaneous ways. Their main mission was ‘academic research’, not ‘educating young people’. |
| 6. | Based on this tradition, until 19 th century the university in Europe kept autonomous |
| 7. | and independent from school systems. In the German case of university developments, both Heidelberg University, the oldest one in Germany |
| 8. | , and Halle University, which underwent a reformation, are institutes for academic research. In the beginning of 19 th century, |
| 9. | when the Berlin University was founded, besides academic research, educating young people and cultivating teachers have been included in missions of the university. |
| 10. | This is a significant change in the essence of European universities. However, this change just burdened the university with more responsibilities. |
| 11. | It never gives up the original mission of the university: academic research. Our new educational system has been established for mere 60 years. |
| 12. | Although we take the university as higher education, which is a part of the formal education system, the University Act, which was released in 1948, still located ‘academic research’ |
| 13. | in front of ‘cultivating professional talents’. Both were listed as the purpose of the university. On this basis of the tradition and reality, |

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| 14. | the essence of the university always rests in academic research. Even if the university has been given the meaning of ‘education’ in this century, the value of ‘research’ |
| 15. | is still more than ‘education’. |
| 16. | Taiwan Normal University is a university. With ‘normal’ in front of the university, the mission of this university is limited to pedagogy. |
| 17. | Hence, the normal university is not a general university anymore. According to rules of Taiwan Normal University, the purpose of a normal university |
| 18. | is quite different to the University Act. The first mission of the normal university is to ‘cultivate qualified teachers’, |
| 19. | followed by ‘academic research’. Hence, the essence of the normal universe reflects on training teachers rather than academic research. |
| 20. | Academic research is for the sake of academic research. Academic research is its own purpose. For sure, results of academic research sometimes may benefit people, but |
| 21. | pragmatic values do not matter during the process of pure academic research. The improvement in technology derives from academic research, |
| 22. | but we can not say academic research is equal to the improvement in technology. The purpose of the normal university is to cultivate qualified teachers, so the essence of the normal university |
| 23. | Had been limited to practical areas from the very beginning. This is ‘reality’, not ‘criticism’. The main purpose of the normal university |
| 24. | is to cultivate qualified teachers. Due to developments of modern culture and technology, the educational requirement for human being to live increases. |
| 25. | Hence, the cultivation of qualified teachers can not be just limited to usage of pedagogic techniques. Studies of pedagogic theories |
| 26. | become an important condition of training qualified teachers. In the past pedagogic studies had focused on pedagogic skills. |
| 27. | It turns to theoretical studies within a century. It is located in the school of philosophy in some countries. |
| 28. | Some countries established a department of educational research. No matter how diverse it is, the university, which used to be in charge of academic research, starts to |

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| 29. | carry on pedagogic research. This is an undeniable fact. Hence, if we expect the normal university arrive in the level of universities, we should account for the work of pedagogic research. |
| 30. | (omitted) |

Appendix 7.

1987. A study of teacher promotion system of university and college. *Bulletin of Educational Research*, Vol. 29, 191-202.

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| 1. | A study of teacher promotion system of university and college Author: Su-Yun Huang |
| 2. | Chapter 1: Introduction |
| 3. | Section 1: Research purpose |
| 4. | In 1927, the Council of Educational Administration, which is a unit of the central China government, released the University Faculty Ordinance. According the University Faculty Ordinance, the Academic Council took over the affair of certifying faculty. (detailed processes) |
| 11. | The above is a review of the development of faculty certification system in the university and college. Only during the period from 1949 to 1953 the evaluation had been run by each university or the Regional Academic Council, Taiwan Province. |
| 12. | Besides that period, the affair of faculty evaluations has been always exercised by the Ministry of Education. This policy, that the highest organ of state education administration operates the faculty promotion's evaluation for all universities and colleges, aims to |
| 13. | unify and improve the quality of teachers in every university and college in an objective and fair approach. Nowadays, the system of promotion evaluations in the university and college is managed very well, |
| 14. | with a few problems: |
| 15. | (1) The issue of institutions: according to the second act of the University Faculty Evaluation Ordinance, faculty of the university and college are qualified by the Ministry of Education. |
| 16. | According to the Ordinance of the Academic Council, the Ministry of Education, signed and released by the president in 1955, one of the major missions of the Academic Council is to design detailed procedures for qualifying faculty of the university and college. |
| 17. | Until today, the Ministry of Education still argues that the affair of faculty |

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| | evaluations should continue to be conducted by the Ministry of Education to avoid incoherent criteria among various universities. Opponents argue promotion evaluations of university faculty are managed by each university in the rest of the world. |
| 18. | This procedure is exclusively operated by the Ministry of Education only in Taiwan. This is not necessary. In addition, the Ministry of Education is only able to evaluate performances of publications but exclude efforts of teaching and service from the criteria. |
| 19. | Moreover, if one is qualified by university councils but gets unqualified by the Ministry of Education, it seems like the government is meant to ignore the function of each university councils. Based on these reasons, |
| 20. | the opponent argues that the promotion affair should be operated by each university exclusively. Shall the faculty promotion evaluation be exercised by the Ministry of Education as the past, or by each university and college? This is a meaningful research topic. |
| 21. | (2) The issue of faculty class. There are four faculty's classes in the university and college: assistant, lecture, associate professor and professor. (omitted) |
| 25. | (3) The issue of seniority and experience: (omitted) |
| 27. | (4) The issue of publications and time frames: the faculty promotion evaluation ran by the Ministry of Education requires one publication within three years. However, |
| 28. | one publication can not account for whole research performances. This can not tell the real academic ability of a staff. Hence, some people suggest we should evaluate all publications |
| 29. | within a given period. |
| 30. | The issue of evaluation's scope: the faculty promotion evaluation ran by the Ministry of Education has only included efforts of publications. However, responsibilities of faculty |
| 31. | are very diverse. Hence, some argue that the evaluation should cover aspects of teaching, research and service. |
| 32. | Beside these issues, there are several relevant issues. For instance, who should in charge of marking the effort of teaching, research and service? Should we set a quota of promotion? |

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| 33. | Should publications for promotion be shown to the public? If one fails, should the one be informed of reasons? All these issues are worthy of further discussions. |
| 34. | (omitted) |

Appendix 8.

1978. The relationships between major family differential factor and the opportunity of university attendance. *Bulletin of Educational Research*, Vol 20, 589-602

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| 1. | The relationships between major family differential factor and the opportunity of university attendance |
| 2. | An abstract of a master thesis by Ming-Hue Chang |
| 3. | 1. Questions |
| 4. | Functions of education vary in response to changes in social environment. In traditional society, degree of education is symbolic of meaning and values. Educational achievement |
| 5. | usually is symbolic of social statuses for specific classes. This is because in the traditional society personal social status is usually the main factor that determines the degree of education. |
| 6. | Hence, higher degree of school education is an exclusive access to the minority. |
| 7. | From this century, due to the trend of democracy thoughts, the ideal of equity of educational opportunity rises gradually. As the result, equity of education opportunity has been seen as |
| 8. | a kind of human right rather than a luxury for the higher class. In the book, <i>Crisis in the Classroom</i> , Silberman argues that |
| 9. | “there is the most significant educational reform in the U.S. from 50’s to 60’s, which attempted to |
| 10. | traditional education. This movement had led to numerous changes...The modern school is in a particular social culture and has to |
| 11. | undergo a transformation in functions and structure. The equity of educational opportunity will become the most popular theme”. On the other hand, due to the change in university education, |
| 12. | in developed countries the higher education is open to the mass. Higher education is not just a symbolic condition of social status but an approach for individuals |
| 13. | to develop their intellectual abilities and to contribute to the country. |

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| 14. | Because higher education is open to the mass, this leads to an expansion in higher education. In addition, because university education established novel social functions, the mass demand |
| 15. | more opportunities for higher education, resulting in an increase in numbers of higher education students. |
| 16. | According a statistic data of OECED, the number of higher education students |
| 17. | increases in 24 countries, including Austria... |
| | (detailed description) |
| 25. | The Commission on Human Resources and Advanced Education released a report |
| 26. | in 1968 and indicated that even though family background is not the only one criterion for admission to universities, |
| 27. | 91% of high school graduates from the top 20% socioeconomic family could go to the university |
| 28. | while only 69% of high school graduates from the lowest 20% socioeconomic family could do. |
| 29. | In addition, the Commission published another report indicating that gender and family socioeconomic statue play a crucial role in the chance of admission to the university. |
| 30. | In the meantime, the family socioeconomic statue also generates impacts on student's achievement in the university. More than half students from the higher class whose abilities are mediocre |
| 31. | could go to the university due to the family backgrounds. Only 15% students with the same ability |
| 32. | but from the lower class could go to the university. |
| 33. | Taken together, the factor of family backgrounds affects the admission to universities. However, the family backgrounds include various factors. In the past, |
| 34. | relevant studies focus on relations between the family background and student's achievement. There are only few studies focusing on relations between the family background and the admission to the university. |
| 35. | UK is characterised as strict hierarchy. After the 50's some scholars payed attention to this field. For example, by analysing university student's family |

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| | backgrounds |
| 36. | from 1937 to 1946, J Floud found that only 1.7% students from labour classes could go to the university. K.R. Kelsall |
| 37. | showed that only around 28 to 30% freshmen were from the labour class in 1955. |
| 38. | In the Cambridge University the number was 9% while the ratio in the Oxford University was 13%. In Leeds University and others the number was above 30%. |
| 39. | Since 60's scholars from other countries started to research the role of family differential factors in the field of education study and especially sociology of education. |
| 40. | They explored the effect of family differential factors on the admission to the university and attempted to reduce this negative effect. Nevertheless, |
| 41. | relevant studies are still very rare. There is also a variety in viewpoints and focuses. Most studies focus on relations among parent's education degree, parent's occupation |
| 42. | and children's admission to the university. Recently, the scope extended to family size, family income and family cultural level. |
| 43. | There is a variety in ways of interpreting and explaining. Some analyse those factors separately while others try to integrate these factors and emphasise |
| 44. | relations among these factors. However, there is no research discussing domestic cases. |
| 45. | There are two kinds of factors affecting the admission to the university: intellectual factors and non-intellectual factors, like personality and social factors. The formation |
| 46. | of personality is a part of socialisation, so the social factor is the most important one of all non-intellectual factors. Family is the most important basic unit where socialisation takes place, |
| 47. | so family factors are the most one of social factors. However, relations among these factor are interwoven so that it is |
| 48. | hard to distinguish the most dominant one. |
| 49. | There are several approaches to study factors involved in the admission to the university. This study is based on sociologic approach. This focuses on how |

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| | the family factors |
| 50. | influence the admission and suggest how we can achieve the equity of higher education opportunity in our country. |

Appendix 9.

1992. A rational re-arrangement of educational resources. *Higher Education Newsletter*. Vol. 10.

| | |
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| 1. | A series report on university education and human resource planning: No.2 |
| 2. | A rational re-arrangement of educational resources |
| 3. | There is an obvious difference in the structure of students and resources between public and private universities |
| 4. | Nowadays there is a gap in educational resources between public and private universities. In general, the scale of the private university is much larger then |
| 5. | much larger than the public university, but their educational resources are much less. Nowadays, 64 % of whole students in universities |
| 6. | are from the private university (not including normal training colleges |
| 7. | and technical colleges). |
| 8. | Here is brief analysis of distribution of educational resources between the public and private university: |
| 9. | In terms of educational grants (excluding lands and building), averagely each student of public university is assigned |
| 10. | 230 thousand NTD, whist each student of private universities is assigned 80 thousand NTD. |
| 11. | In terms of student's composition., undergraduate students account for 68 % of the sum of students |
| 12. | in the private university, while the ratio in the public university is 32%. The ratio of postgraduate students, |
| 13. | in the public university is more than 70 %, |
| 14. | but in a minority in the private university. This shows the difference in student's composition |
| 15. | between the public and private university: |
| 16. | In terms of school's scale, the average student's number per public university is 6200, but |
| 17. | public universities in the north Taiwan have less students. The average |

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| | student's number per private university |
| 18. | is 11000, but private universities in the north Taiwan have more students (the average number of students per private university in the north Taiwan |
| 19. | is 13217). |
| 20. | In terms of lands,...(detailed description) |
| 23. | ...It is obvious that the private university suffers a very narrow campus and a lack of |
| 24. | educational resources, especially for those in the north Taiwan. |
| 25. | A direction to re-arrangement of educational resources |
| 26. | If we are going to modify the distribution of educational resources, we have better follow these directions: |
| 27. | (1) Modification of educational resources in the private university: 1. to make tuitions flexible gradually |
| 28. | in response to rational educational investment and cost. 2. To increase the amount of grants |
| 29. | for the private university, especially through project-based funds. 3. To raise |
| 30. | more external funds and to enlarge financial resources |
| 31. | (2) Conditional limitations on the expansion in the private university. However, under some situation |
| 32. | the expansion in postgraduate students could be supported. In addition, |
| 33. | we are going to discuss a new tuition system for postgraduate students. |
| 34. | (3) The public university should modify the arrangement of budgets and faculty. In this way, the public university might have more incentive to |
| 35. | expand. |

Appendix 10

1995. Deregulation of Education: Ideal, Principle and Affair. *Educational Reform Newsletter*. Vol 4, 9-10.

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| 1. | Deregulation of Education: Ideal, Principle and Affair |
| 2. | By the panel of educational ideals and objectives/An introduction for the fifth meeting of the Education Reform Commission |
| 3. | 1. The ideal of deregulation |
| 4. | This term of deregulation is translated from English. |
| 5. | Usually the term is translated as ‘discharge of regulation’ or taken as |
| 6. | another way to express ‘liberalisation’. The term, ‘deregulation’, |
| 7. | is borrowed from economics, actually. It means that prices of goods should be |
| 8. | determined by free markets and law of demand and supply, and government’s |
| 9. | unnecessary interferences should be avoided. Among those aims that could |
| 10. | be achieved by the method of deregulation, there are two notable points: |
| 11. | (1) to create a condition of fair competition and (2) to promote right of |
| 12. | participants. |
| 13. | If free competition is applied to ‘educational markets’, it will |
| 14. | knock out unqualified educational products. However, if underprivileged |
| 15. | students take |
| 16. | damage, it is unbearable for social justice. Human being is |
| 17. | not a product at all. There is no compensation for a waste of |
| 18. | life due to unqualified education. Therefore, when taking about deregulation, |
| 19. | we should not |
| 20. | entirely adopt the economic model. When there are more choices in a market, |
| 21. | an actor can decide not to select a particular choice. |
| 22. | However, in the initial stage of national education, there should be some |
| 23. | common elements for all students. Hence, |
| 24. | the right of selection for this aspect should be limited to some degree. |
| 25. | The deregulation of education should not aim at the maximum |
| 26. | of liberalisation. |

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| 25. | When education becomes a public affair, it is unavoidable to govern it |
| 26. | to some degree. The rationale of regulating education is |
| 27. | a guarantee of qualified education. However, when time changes |
| 28. | and current trends are toward democratisation and diversity, side effects of |
| 29. | intensive regulation get apparent. Especially, it is imperative to |
| 30. | remove those codes of education designed for non-educational purposes, |
| 31. | such as implanting a preference for a specific political party, economic-central |
| 32. | educational policy, all kinds of cultural chauvinism, and |
| 33. | military training. |
| 34. | The deregulation of education does not aim at complete laissez-faire. |
| 35. | Hence, it is still necessary to govern education in a proper way. However, |
| 36. | all practices of ruling need a rationale. Our Constitution |
| 37. | lacks clear definitions of the code of educational exercises. |
| 38. | Therefore, citizens appeal to establish |
| 39. | ‘Educational Fundamental Act’. |
| | (omitted) |
| 45. | 2. Principles of deregulation |
| 46. | Efforts of deregulation have to cover all aspects. Hence, it |
| 47. | requires well-design policies to make the procedure of deregulation |
| 48. | systematic. Here we list three common |
| 49. | principles: |
| 50. | 1. When the policy of deregulation is ongoing, the spirit of self-discipline and responsibility should be emphasised. |
| 51. | Detailed affairs of deregulation have to adapt |
| 52. | to contexts and conditions. |
| 53. | 2. Distribution of educational resources is still irrational. Therefore, |
| 54. | the procedure of deregulation must avoid damaging |
| 55. | equity of educational opportunity. |
| 56. | 3. Student’s right to education and subjectivity should be guaranteed. |
| 57. | The values and dignity of human must be assured. Only in this way the process |
| 58. | of education is complete. |
| 59. | 3. Affairs of deregulation. |

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| 60. | Detailed affairs of deregulation need to be confirmed |
| 61. | in each panel. This section only offers an outline |
| 62 | as references. |
| 63. | 1. Deregulation of educational resources |
| | (omitted) |
| 75. | (4) Operation of funds: Limits on ways of managing funds might obstruct |
| 76. | school's developments, but equipment costs in public university sometimes |
| 77. | seem like a waste of money. Hence, whether it is a public or private school, |
| 78. | in order to enhance the efficiency of financial management, the key point is |
| 79. | a structure to assign educational resources. |
| 80. | 2. Deregulation of educational structures |
| | (omitted) |
| 86. | (6) Arrangement of departments and programmes: The Ministry of Education |
| 87. | governs establishments of departments and amounts of students. Their considerations |
| 88. | over centre on trends in job markets. Boundaries between higher education and labour markets |
| 89. | need more analysis and understanding. |

Appendix 11

1993. A research on causality among equity of educational opportunity, educational development and needs for university education. *Journal of Education & Psychology*. Vol 16, 223-254

| | |
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| 1. | A research on causality among equity of educational opportunity, educational development and needs for university education |
| 2. | Bi-Feng Chang and Ming-Ning Yu |
| 3. | (Bi-Feng Chang is a secondary school's teacher) |
| 4. | (Ming-Ning Yu is a principal of an experimental primary school and an associate professor of the department of education, National Chengchi University) |
| 5. | Abstract |
| | (omitted) |
| 13. | 1. Introduction |
| 14. | In the last century because the idea of civil right arose and education expanded, policy makers act |
| 15. | on the premise of equity of educational opportunity. The equity of educational opportunity |
| 16. | does not mean that all citizens can have the same degree of education. It means that in the light of equity, |
| 17. | all citizens can accept education that match their abilities (Gai, 1985a). Because human beings have |
| 18. | different talent, the fairness of educational opportunity rests in equity |
| 19. | in order to let individual talent development to the maximum. |
| 20. | The ideal of the equity of educational opportunity is written on the Constitution. In the past of 40 years in Taiwan, |
| 21. | because careers get differentiated, degrees of education become a criterion used in selecting people for jobs. |
| 22. | Changes in the job market and career structure show an example of social mobility (Yang, 1988). Education |

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| 23. | is a desirable value, which is guaranteed by the equity of educational opportunity as justice. |
| 24. | The equity of educational opportunity is a core value of educational reforms in every country, such as |
| 25. | the establishment of compulsory education...(omitted) massification of higher education...(omitted) |
| 27. | The ideal of the equity of educational opportunity is derived from democracy and civil right. Several researches show that the equity of educational opportunity is a right direction |
| 28. | to social justice and economic equality (Guo et al, 1991). |
| 29. | Implementations of education accomplish the goal of even distribution of wealth and power. |
| 30. | The equity of educational opportunity accomplishes the goal of social mobility (Ma, 1991). |
| 31. | In this book, 'Education, Manpower and Economic Growth: Strategies of Human Resource Development', Harbison and Myers (1964) argued that |
| 32. | education plays a crucial role in development for either developed countries or developing countries. Our country is a developing country, which |
| 33. | needs efforts of research for technological development. These efforts rested on development of higher education. Once our country become a developed country, |
| 34. | more research and innovation will be necessary for exploring global markets. Hence, all of these are on the basis of |
| 35. | well-developed higher education (Ma, 1991). |
| 36. | According to Ma (1991), the distribution of educational resources gets more unequal in higher levels of education. In the level of higher education, |
| 37. | the uneven distribution of resources between public universities (including colleges) and private universities |
| 38. | is more than unbearable for society. The fairness of the distribution of education resources determines righteousness of educational policy. |
| 39. | Hence, this study aims to analyse exercises of the equity of educational opportunity in university education, and to explore if the distribution of resources for students |

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| 40 | between the public university and private university is fair or not. This is one of research motives. |
| 41. | ...(omitted) |

Appendix 12

1994. A speech for the first meeting of the Education Reform Commission.
Educational Reform Newsletter. Vol 1, 2.

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| 1. | A speech for the first meeting of the Education Reform Commission |
| 2. | By Lien Chan, Prime Minister |
| 3. | To the Minister of Education, Mr Guo and all commissioners: |
| 4. | The Education Reform Commission, a subordinate organization of Executive Yuan |
| 5. | takes place the first meeting today. At first, I have to thank Dr Lee, the dean of Academia Sinica |
| 6. | for being a convenor of the council, and all commissioners for |
| 7. | taking part in this task. |
| 8. | Education is a root of national establishment. Developments of politics, economy, |
| 9. | society and culture are tightly linked to education. In the past of two or three decades, |
| 10. | scientific and technologic developments, economic growth and |
| 11. | political progression are outcomes of massification and promotion of |
| 12. | education. However, education has to reform endlessly |
| 13. | in order to fit national development, social changes and world trend. |
| 14. | The achievement of educational development that we had done |
| 15. | is great. However, when objective environments change rapidly, |
| 16. | There are several current issues that we have to deal with. For example, how can |
| 17. | we reduce a gap in education between urban areas and countryside? How can higher education |
| 18. | incorporate academy with socioeconomic development's needs? How can educational resources be assigned in a more rational way? How can we promote |
| 19. | functions of vocational education? |

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| | (omitted) |
| 22. | These are all issues that we need to work on. |
| 23. | President Lee said, ‘after a reform of the Constitution, a reform of education |
| 24. | is the most imperative work’. Nowadays, countries around the world |
| 25. | are pursuing ‘excellence’, ‘efficiency’ and ‘equality’. |
| 26. | Our citizens appeal for the educational reform zealously. Hence, our educational policy will |
| 27. | focus on the foundation of flexible school systems, cultivation of global citizens, |
| 28. | applications, new academic environments, |
| 29. | and liberal education. There are four main goals: |
| 30. | ‘diversity’, ‘excellence’, ‘foresight’ and ‘elaboration’. |
| 31. | These four principles would lead the state’s |
| 32. | development. |
| 33. | The Ministry of Education took place the 7 th national forum for education in this June |
| 34. | and invited elites of the circle of education and representative of other sectors who are concerned for educational reforms. |
| 35. | Participants had discussion about eight issues, including ‘distribution of educational resources’ |
| 36. | and ‘reforms of curricula’, and then drew a conclusion. |
| 37. | However, this is a significant matter of national policy on education. More discussions are |
| 38. | necessary. Therefore, the Executive Yuan organised the Education Reform Commission |
| 39. | to elaborate on these affairs. We also expect the Education Reform Commission to |
| 40. | figure out detailed policies and make a report every six month. (omitted) |

Appendix 13

1995. University diversity: reorganization of meritorious junior colleges into technical colleges. *Educational Reform Newsletter*, No. 7, 13-15.

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|-----|---|
| 1. | University Diversity: Reorganization of Meritorious Junior Colleges into Technical Colleges |
| 2. | Huang Tseng-Tai, a member of the Education Reform Commission |
| 3. | The idea of reorganization of meritorious junior colleges into technical colleges is quite |
| 4. | simple. We just need to extend length of the course by two more years. However, |
| 5. | this policy has to consider several aspects. This is also a beginning |
| 6. | of the whole educational reform. |
| 7. | Distortion of vocational education |
| 8. | In terms of student's characters and social needs, vocational education matters. |
| 9. | Nowadays, Chances of admission to higher education for students of vocational education are limited. |
| 10. | Under the social pressure of a university diploma, a lot of junior college students and vocational high school students |
| 11. | can not focus on learning in their last academic year. |
| 12. | Instead, they go to tutorial schools and apply for any university randomly. |
| 13. | They might enter even an irrelevant programme just for a university diploma. |
| 14. | This phenomenon causes a severe distortion of vocational education. |
| | (omitted) |
| 21. | Because our society over emphasises the diploma, acquirement of a diploma becomes |
| 22. | the only approach for students to promote their socioeconomic status. |
| 23. | Only in this way, parents would reckon that their |
| 24. | children are excellent. |
| 25. | It is said that only those disqualified and inferior |
| 26. | go to the system of vocational education, because they are not able to get a |

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| | degree. Nevertheless, |
| 27. | what do the words, disqualified and useless, mean? |
| 28. | We are used to this arguments that those who are bad at studying should |
| 29. | go to work. This idea is wrong. |
| 30. | Studying via reading books is mere one of abilities. |
| 31. | Another ability is to practice. This is not an easy task. |
| 32. | Quite a few students have talent for practice. We should not call it inferior. |
| 33. | We shall say there are various kinds of abilities. |
| 34. | All above problems are entangled together. |
| 35. | The knot rests in the over emphasis on the university diploma. If we plan to make it right, |
| 36. | a moral appeal is not enough. The government must |
| 37. | do something substantial. |
| 38. | University diversity |
| 39. | The proposal of the reorganization of meritorious junior colleges into technical colleges is a |
| 40. | important strategy to establish the dignity of vocational education. However, |
| 41. | an increase in opportunities to colleges is not the only |
| 42. | purpose. |
| 43. | After reviewing the whole higher education, we drew a conclusion |
| 44. | that this project can push the university to diversity, |
| 45. | manage the whole educational resources efficiently, |
| 46. | and assign vocational education social status that they deserve. |
| 47. | The proposal is...(omitted) |
| 53. | This proposal only requires a limited investment in educational resources |
| 54. | and a minor amendment to relevant acts. |
| 55. | In addition, the establishment of junior college divisions under technical Colleges and technical universities |
| 56. | maintains the tradition of emphasis on pragmatic values. |
| 57. | When higher education is dominated by ‘academic’ universities, this proposal |
| 58. | can lead practicality-oriented universities to proper development. |
| 59. | What is practicality? |

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| 60. | Practicality, in short, means purposes of teaching |
| 61. | centre on students' needs for career and collaboration |
| 62. | between schools and companies. Academic universities, |
| 63. | or named as general universities do not pay attention to |
| 64. | these two aspects. |
| 65. | When people mention universities, they think of academic research in academic universities. |
| 66. | In fact, the university should not be limited to one function. Given a |
| 67. | healthy situation, universities would evolve into practical university (as well as departments) |
| 68. | and academic universities (as well as departments). At the meantime, |
| 69. | the number of practical universities would be more than academic universities, |
| 70. | because most people would like to get a job |
| 71. | in job markets. |
| 72. | The 'technical college' is exactly a 'university'! We should never reckon that |
| 73. | people who go to vocational education is impotent. |
| 74. | No, they are not. They just have different interests, by which abilities can not be distinguished nor ranked. |
| 75. | They just dislike burying themselves in books and laboratory |
| 76. | for pure academic research... |

Appendix 14

1994. An Empirical View on Performance Indicators on Higher Education of Taiwan.

Journal of Education & Psychology. Vol 17, 61-98

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| P.61 | |
| 1. | An Empirical View on Performance Indicators on Higher Education of Taiwan |
| 2. | Bao-Jinn Wang |
| 3. | Associate Professor, National Chiayi University Teachers College |
| 4. | Abstract |
| | (Omitted) |
| P.62 | |
| 1. | 1. Research purposes |
| 2. | 'Being an excellent (comprehensive) university' has become a slogan when a new university is established or a new dean assumes office. |
| 3. | However, there are more needs than resources. In terms of resources, |
| 4. | when all universities are desperate to become an excellent university, each university has to justify why it deserves a particular resource instead of other universities. |
| 5. | In the past, sectors of higher education had been public utilities. |
| 6. | When demand for admission to university is more than supply along with joint college entrance examinations, it was less likely to encounter a shortage of recruitment. |
| 7. | However, because the government keeps increasing opportunities of university education and plans to reform university admission channels, |
| 8. | a model of higher education in Taiwan will shift from seller's market to buyer's market. |
| 9. | Hence, each university will need to show its performance and to justify its expenditures |
| 10. | to attract students. In fact, several new universities, like National Chung Cheng University and Yuan Ze Engineering College, |

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| 11. | and private universities, such as Feng Chia University, attempt to recruit excellent |
| 12. | students by advertises. This is a proper example. Thus, there should be an objective standard |
| 13. | to account for performances. By all means of education, it is necessary to establish |
| 14. | a set of performance indicators for evaluations. |
| 15. | Organization for Economic Co-operation and Development (OECD) |
| 16. | founded the Centre for Educational Research and Innovation in 1968. |
| 17. | This Centre aims to promote research on education, |
| 18. | to support pioneering educational reforms and experiences, and to foster collaborations with member countries on educational research |
| 19. | (OECD, 1992a). Based on these three targets, in 1969 the Centre build |
| 20. | The Programme on Institutional Management in Higher Education (IMHE). |
| 21. | By research, training and information exchange, this programme aims to enhance member country's higher education management |
| 22. | and make it professional. This programme also aims to spread this practical management methods |
| 23. | beyond member countries. |
| 24. | With OECD's promotion, several member countries, higher education relevant |
| 25. | organisations (such UK's University Grants Committee) and universities |
| 26. | have payed attention to this topic. Thus, most of member countries launched research projects toward higher education performance indicators. |
| 27. | Nowadays these developed countries have done considerable research on higher education performance indicators. Some already established comprehensive |
| 28. | indicator systems, such as the US, UK, Dutch, Finland and Australia. Due to political and cultural conditions, |
| 29. | some established basic models of performance indicators with controversies, like Germany and France. Overall, |
| 30. | establishment of objective performance indicators, as a reference for higher education administrations and policy makers |

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| 31. | to estimate university's accountability, effectiveness and efficiency, |
| P.63 | |
| 1. | has become a crucial issue for each government and university (Sizer, 1990). |
| 2. | Affairs of higher education evaluations in Taiwan began from 1975. Because Dr. Wu, the dean of Academia Sinica, proposed, |
| 3. | the Ministry of Education took the affair of higher education evaluations to investigate |
| 4. | conditions of university education. This evaluation was also assumed to offer reference resources for grants. |
| 5. | Aspects of the evaluation included faculty, curriculum, library collections, instruments and educational outputs. |
| 6. | Even if this evaluation was based on a good intention, evaluation procedures usually followed the model of presentations, paper evaluations, |
| 7. | visits and symposiums. Due to limited time and manpower, results of evaluations were not released to the public. |
| 8. | There was no specific institution to exercise the evaluations and to trace following improvements. As the results, |
| 9. | the evaluation was only a formality. |
| 10. | It is said that university evaluations enable the Ministry of Education to know the performance of university in an objective way |
| 11. | and enable each department to review quality of faculty, curricula and instruments in a comprehensive sense (Lu, 1982), but it also engenders |
| 12. | backfires. Chen (1992) indicates that unclear evaluation standards lead to |
| 13. | unconvincing results. Ma (1990) indicates that less objective evaluation tools are |
| 14. | a waste of resources and demoralise higher education. Hence, Ma argues that evaluations should be measurable, observable and accountable. |
| 15. | It is an important task to establish this kind of evaluation indicators. |
| 16. | The establishment of performance indicators is not only relative to university evaluations. Besides university evaluations, the |
| 17. | Ministry of Education launched the Medium-range University Development Plan to enable each university to develop its own characteristics and to distribute |

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| 18. | educational resources in a rational way...(details omitted) |
| 22. | When implementing this plan, for the sake of fair evaluations, the Ministry of Education set five main |
| 23. | objective indicators (the Ministry of Education, 1992b). These are faculty productivity indicators, student resource indicators, faculty resource indicators, |
| 24. | Investment-in-student indicators and expenditure indicators. However, these criteria |
| 25. | incurred criticisms, especially from those historical and prestigious universities. |
| 26. | They criticise that the criterion selected by the Ministry of Education only favours new established universities and colleges. It is necessary to learn effects of |
| 27. | indicators on performance assessments, strategy making and university evaluation. |
| 28. | In summary, this study aims at an empirical view on performance indicators on higher education of Taiwan |
| 29. | to learn practical effects of performance indicators. With empirical analysis, this study |
| 30. | provides suggestion about establishment of performance indicators on higher education and university administrative management. |

Appendix 15

1995. Tuition and distribution of higher educational resources. *Educational Reform Newsletter*, No. 13, 2-7.

| | |
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| P.2 | |
| 1. | Tuition and Distribution of Higher Educational Resources |
| 2. | Authors: (omitted) |
| 3. | Section 1. Introduction |
| 4. | Higher education is costly and relies on sufficient |
| 5. | financial support. In the past, due to a deficiency of economic condition, |
| 6. | higher education had been available only for few elites. |
| 7. | In the last few years, because economy has grown fast, more people are able |
| 8. | and willing to take higher education. Thus, higher education has flourished. |
| 9. | The expansion of higher education makes the distribution of |
| 10. | educational resources becomes one of important problems of educational policy. |
| 11. | There are various opinions on whether higher educational resources are enough |
| 12. | and whether current methods of assigning resources are rational. |
| 13. | It is worthy of further discussions about a more ideal model of resource distribution. |
| | (omitted) |
| P.4 | |
| 5. | Section 4. Problem Analysis |
| 6. | 1. Positions and characters of the university |
| 7. | Reviewing the domestic development of higher education, in the initial period, it had |
| 8. | it been deemed as elite education, a mechanism of selecting talents, |
| 9. | an educational investment and equilibrium of labour market. |
| 10. | Based on this position, the function of higher education was nearer to public |
| 11. | goods than individual interests. Therefore, the state had to take major |

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| 12. | responsibility for providing educational resources. When social contexts change, |
| 13. | the function of higher education includes not only economic effects but also |
| 14. | non-economic educational purposes. Thus, in order to satisfy |
| 15. | people's will and needs for higher education, there is an inevitable trend |
| 16. | toward the expansion of the market of higher education. The domestic |
| 17. | expansion of higher education reflects the trend. Hence, when the government |
| 18. | distributes educational resources, it has to consider factors of fairness and |
| 19. | priority. |
| | (omitted) |
| 68. | 4. Distribution of higher educational resources |
| P.5 | |
| 35. | (3) Effectiveness of management of higher educational resources |
| 36. | Although public university's grant is more than private universities, |
| 37. | the effectiveness of money usages in the public university is obviously less than the private. |
| 38. | The main reason is that the public university is supervised by government budget inspection system. |
| 39. | The usage of budgets is less flexible. The school is not assigned |
| 40. | power and responsibility for financial management. This phenomenon |
| 41. | has been well known and criticised. Given that the expansion of educational resources is limited, |
| 42. | we must find a method to promote the effectiveness of resource usage, or |
| 43. | development of the public university would be a serious potential problem. |
| 44. | A fundamental solution is to adjust financial management systems of |
| 45. | the public university. |
| 46. | Section 5. Practical strategies |
| 47. | Based on above analysis, practical strategies for 'tuition and distribution of |
| 48. | higher educational resources' are listed by categories of |
| 49. | short-term and long-term |
| 50. | 1. To enhance the market mechanism in higher education |
| 51. | Short-term: |

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| 52. | (1) Stop settling new public universities and colleges and limit the expansion |
| 53. | of established public schools. This avoids interfacing development of private |
| 54. | schools and market mechanism and reduces government's financial burden. |
| 55. | (2) Encourage establishment of private schools and reduce limits on |
| 56. | founding a private university. This improves the market mechanism in the |
| | sector of private schools and |
| 57. | offer students more choices of careers. This policy can exert proper pressure |
| 58. | on current schools and then promotes quality of education. |
| | (omitted) |
| 70. | 2. To enlarge private investment in higher education |
| 71. | Short-term: |
| 72. | (1) Modify the budget system of public universities and colleges. This means a |
| 73. | foundation of 'school development fund' in each university to get independent |
| | from the national treasury administration. |
| 74. | In this way, the financial relation between the government and public |
| | universities switches from 'full paid' |
| 75. | to 'partial support'. Principles and scopes of government's financial support |
| 76. | for the public universities need to be clarified. Each school development fund |
| | is free |
| 77. | to manage funds from incomes. The government will only pay basic |
| 78. | operating expenses and provide project-based funds. Beside these, the school |
| 79. | has to raise funds for partial costs. |
| | (omitted) |
| P.6 | |
| 7. | (3) Push university to focus on fund raising and industrial collaboration. This |
| | aims |
| 8. | to attract social resources for higher education. |
| | (omitted) |
| 15. | 3. To modify distribution of higher education resources |
| 16. | Short-term: |
| 17. | (1) To coordinate with changes in university budget systems, financial support |
| 18. | for each university is one the basis of university types, positions, scopes, |

| | |
|-----|--|
| 19. | amounts of students and characters. The government will only offer funds |
| 20. | for basic operating expenses. For university development, each school needs |
| 21. | to recruit funds by itself. Based on |
| 22. | policy's needs and conditions of each school, the government would offer project-based grants |
| 23. | and evaluate each applicant by each university's situations in order to |
| 24. | lead the public university to diverse development and to make resources usage |
| 25. | effective. |
| 26. | (2) To empower the public university to manage funds with |
| 27. | sufficient flexibility. This promotes effectiveness of |
| 28. | resources usage. |
| 29. | Long-term: |
| 30. | (1) To establish 'the University Grants Committee' and consider its |
| 31. | composition carefully. The University Grants Committee will be in charge of |
| 32. | distributing government's grants to the university and evaluating the effectiveness of |
| 33. | grant usage. To match the foundation of 'the University Grants Committee', |
| 34. | the structure of the Ministry of Education should be modified. Relations between the Ministry |
| 35. | and the Committee should be elucidated. |
| 36. | (2) To license new private universities without strict evaluations. |
| 37. | The government offers research grants to the private university through |
| 38. | project-based grants for higher education policy's needs. The number of students that a private university |
| 39. | is allowed to recruit is determined by resources and previous performances. Within the allowed quota, |
| 40. | general grants are assigned to the private university according to student numbers. |

Appendix 16

1982. A Discussion on Domestic Biological Journals. *National Science Council Monthly*, Vol 11, 1002-1009.

| | |
|-----|---|
| 1. | Special Issue |
| 2. | A Discussion on Domestic Biological Journals |
| 3. | Shian-Hua Lin |
| 4. | The Department of Life Sciences, National Science Council National Science Council |
| 5. | 1. Introduction |
| 6. | In the first (1978) and second (1982) National Science and Technology Conference, |
| 7. | participants mentioned the issue of promoting the quality of domestic academic journals and |
| 8. | expected the National Science Council to operate |
| 9. | an international recognised journal. This shows how researches care the domestic |
| 10. | academic journals. However, after several years, each journal still |
| 11. | acts in its own way without significant progress. There is no shortcut |
| 12. | to enhance the quality of the journal. Some essential requirements have to be satisfied. |
| 13. | For example, the primary requirement is a qualified research result and academic writing |
| 14. | skills. In addition, the selection of papers and editing depend on |
| 15. | a solid editorial board. Even the work of typesetting and printing |
| 16. | needs cooperation. Hence, academic publication business needs |
| 17. | both editors for professional works and experts for |
| 18. | practical affairs. |
| 19. | Because the scope of scientific research is so broad and personal ability is limited, this |
| 20. | article only focuses on journals of biology, medicine and agriculture. These |

| | |
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| | three disciplines |
| 21. | belong to natural sciences. Thus, excluding some agricultural studies |
| 22. | are regional focuses, basic studies in the area of biology and medicine |
| 23. | should be universal. Valuable results should be shared with all |
| 24. | human beings. The spread of the research result should not |
| 25. | be limited by types of journals. Therefore, it is our common goal |
| 26. | to deliver our research results to other experts in the |
| 27. | world. |
| 28. | With kind support from the National Science Council, the quality of domestic |
| 29. | research in the field of biology, medicine and agriculture increases as well as numbers |
| 30. | of researchers. Theoretically, there should be an outstanding journal. |
| 31. | In fact, there are a lot of journals in biology, medicine and agriculture |
| 32. | , but each works in its own way and varies in quality. In the beginning, this article reviews |
| 33. | current conditions of the journal of biology, medicine and agriculture as a reference |
| 34. | for improvement in future. |
| 35. | 2. Current Condition |
| 36. | I did a survey in this march... |
| | (detailed method) |
| 41. | As shown in the table 1, there are three kinds of domestic academic journals: |
| 42. | academic associate's publications, institute's academic press and foundation's |
| 43. | publications. There is a variety in editing processes among these three types. |
| | (detailed description) |
| 60. | For volumes, more than half of domestic academic journals are released semi-annually or |
| 61. | quarterly. Because choices of journals are too many, numbers of summations for each are merely |
| 62. | enough for quarterly and semi-annual magazines. However, to squeeze into |

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| | the world mainstream, |
| 63. | the gap between two volumes should not be too long, or it might not attract other's attention. |
| 64. | Of course, a monthly is the best format. In terms of domestic biologic journals... |
| | (detailed description) |
| 70. | For the issue of rejection rates, several journals just call for paper before releasing. |
| 71 | The number of submissions is not enough, so the case of rejection is quite rare. |
| 72. | In addition, a lot of journals are annual journals. Then, |
| 73. | there is no point to compare its rate of rejection. It is meaningful to compare the rejection |
| 74. | rate among monthly, quarterly and semi-annual journals. |
| 75. | Detailed data are shown in table 1. For amounts of circulation, it depends on |
| 76. | numbers of members in the case of associate's journals. For example, |
| | (detailed description) |
| 82. | The sum of academic journals is so considerable that no institute |
| 83 | can afford to collect all important journals in the world. |
| 84. | Hence, there are several abstracts of journals, such as Chemical |
| 85. | Abstracts, Biology Abstracts, Zoological |
| 86. | Record, Index Medicus... |
| | (detailed list) |
| 89. | Besides, in the U.S. Institute |
| 90. | for Scientific Information (ISI) publishes Science |
| 91. | Citation Index and Current Contents, which are good |
| 92. | evaluations of academic serials. Because these abstracts follow |
| 93 | an appropriate standard to select journals, a position in these indexes |
| 94. | turned to a thing of matter in academy. I have payed attention to if domestic journals |
| 95. | are listed in foreign indexes. In 1982, four domestic journals were included in Index |

| | |
|-----|---|
| 96. | Medicus. They are (detailed list). |
| 99. | In addition, nine journals were listed in ISI (shown in Table 3). |

Appendix 17

1983. A Discussion about Application of Science Citation Index. *National Science Council Monthly*, Vol 11, 70-71.

| | |
|-----|---|
| 1. | A Discussion about Application of Bibliometric Indexes |
| 2. | Shian-Hua Lin, Ching-Tsu Peng |
| 3. | Confucius said: "exemplary gentlemen are not competitive, except where they have to be in the archery ceremony." This is gentleman's manner of competing. |
| 4. | The sum of population increases significantly, as well as the sum of peers. |
| 5. | Hence, when competition between peers gets intensive, what is the standard to distinguish? |
| 6. | In the case of academy, results of academic research usually are published in the format of |
| 7. | paper in order to exchange knowledge. Nowadays the number of academic papers is |
| 8. | countless. How can we judge the value of each paper? |
| 9. | Since the 20 th century, every country has kept an eye on the development |
| 10. | of science and technology, making academy flourished. Along with this growth, |
| 11. | the number of academic papers increases incredibly. |
| 12. | The increase in academic journals is a pattern of flourished academy, but it also |
| 13. | bothers researchers. In a formal academic research, the first step |
| 14. | is literature review to catch up other's experience and |
| 15. | to avoid unnecessary errors. If the number of journals is too many, |
| 16. | it takes more expenditure of money on purchasing and time on reviewing. |
| 17. | For saving time and money, American chemist |
| 18. | Eugene Garfield published <i>Current contents</i> |
| 19. | and <i>Science Citation Index</i> . |
| 20. | These not only save researcher's time and money |
| 21. | on literatures but also make Eugene Garfield become a big name |
| 22. | in the field of information study. |
| 23. | <i>Science Citation Index</i> is based on citations... |

| | |
|-----|---|
| | (detailed description) |
| 32. | Therefore, by the aid of <i>Science Citation Index</i> we can not only know |
| 33. | the level of a journal but also realise current landscape in academy, importance of each topic |
| 34. | and research trends in future. In addition, we can use it to |
| 35. | judge if a paper is a very important discover or innovation. Hence, |
| 36. | authors with more citation numbers engender more impacts on the development of |
| 37. | science. However, several factors are involved in citations. For example, |
| 38. | self-citations or citations by author's students may result in |
| 39. | a deviation. When we use the index, we have to consider this |
| 40. | issue. |
| 41. | Since the National Council on Science Development was established in 1959, |
| 42. | the government has played an active role in cultivating scientific research. In 1967 |
| 43. | the National Council on Science Development was transformed into National Science Council, which is in charge of... |
| | (detailed description) |
| 47. | In the past of 20 year, there is a progress in scientific study, such as... |
| | (detailed description) |
| 53. | Is our research recognised by international academic communities? To understand our |
| 54. | position in international academy, we utilised the <i>Science Citation Index</i> database |
| 55. | which was purchased by the National Science Council to investigate |
| 56. | citation numbers of professors and associate professors who belong to fields of biology, |
| 57. | medicine and agriculture and work in colleges, universities and institutes |
| 58. | from 1976 to 1911. |
| 59. | We focused on the first authorship. |
| 60. | Among 655 researchers we investigated, 258 scholars have papers |
| 61. | that are cited by other researchers. We can say 39.3% researcher's |

| | |
|-----|---|
| 62. | 39.3% researcher's effort are recognised by foreign scholars. |
| 63. | Among these scholars whose papers are cited by foreigners, 73.2% of them are |
| 64. | 40 to 59-year-old. In the area of medicine, the majority is |
| 65. | 50 to 59-year-old. In biology and agriculture, the majority is 40 to 49-year-old. |
| 66. | This shows an aging of active researchers in basic medicine study. |
| 67. | We should enhance basic medicine research and encourage young graduates |
| 68. | to take part in it. |
| 69. | In addition, according to this analysis, all top ten scholars in terms of citations |
| 70 | got project funds from National Science Council. Their disciplines are... |
| | (detailed description) |
| 73. | This shows that project-based funds supported by National Science Council |
| 74. | contribute to the promotion of domestic scientific research. |
| 75. | If we analyse citation numbers in terms of affiliations, |
| 76. | The top institute is... (detailed description) |
| 78. | If we analyse citation numbers in terms of journal's locations, |
| 79. | most of these important papers are published on foreign famous serials. |
| | (detailed description) |
| 84. | <i>Science Citation Index</i> is a reliable tool. |
| 85. | The Ministry of Education had devoted effort to evaluating |
| 86. | universities and departments. Along with on-site inspections, if they refer to |
| 87. | this objective indicator, they can get a more correct conclusion, by which |
| 88. | they can grasp changes and trends in academy as references for scientific policy makers. |
| 89. | In addition, research fund bodies can realise applicant's performance in an |
| 90. | objective and accurate way by reviewing applicant's publications in the past of five |
| 91. | or ten years with the <i>Science Citation Index</i> database. They can refer to this data |
| 92. | when they distribute funds to projects. |
| 93. | Science and Technology Information Centre of National Science Council can |
| 94. | apply the <i>Science Citation Index</i> database to publications of domestic researchers |
| 95. | for a long-term analysis, by which we can understand changes in academy. |

| | |
|-----|--|
| | Policy |
| 96. | makers can refer to it as well. |
| 97. | In sum, all researchers should use this index to review themselves and to check |
| 98. | if someone cites your work and how many times your work is cited. |
| 99. | This is a useful reference to know your past performance and then to guide your next plan. |

Appendix 18

1988. A Discussion about Domestic Scientific Development Indicators in terms of Science Citation Index. *National Science Council Monthly*, Vol. 14, 558-568.

| | |
|-----------|---|
| p. 558 | |
| 1. | A Discussion about Domestic Scientific Development Indicators in terms of Science Citation Index |
| 2. | Shian-Hua Lin |
| 3. | Department of Biology, National Science Council |
| 4. | 1. Introduction |
| 5. | Because the number of journals increases day by day, it becomes less convenient for |
| 6. | scholars to research literatures. For this reason, an American chemist, E. Garfield |
| 7. | invited experts and scholars to select famous international academic |
| 8. | journals and monographs and then published it as <i>Science Citation Index</i> |
| 9. | (SCI). |
| | (detailed description about SCI) |
| 23. | Because there is a specific academic committee in charge of |
| 24. | selecting journals, in general those chosen journal are qualified. |
| 25. | When SCI has been released regularly for several years, it is |
| 26. | recognised by academy to some degree. Every year the number of data counted in SCI |
| 27. | is around 0.5 million. These plentiful data include information of articles, |
| 28. | authors and citations. Hence, this set of information is |
| 29. | quite useful not only for academy but also for |
| 30. | administrators of science affairs around the world |
| 31. | as statistic data. In fact, science policy makers in several countries |
| 32. | are using this database to understand their positions in academy |
| 33. | and to make science policy. |

| | |
|-----------|--|
| 34. | 2. Analysis on Current Conditions |
| 35. | In global academic community, the method in the past of measuring national investment |
| 36. | in scientific development and following results was to count and compare numbers of active |
| 37. | researchers and amounts of funds in various countries. This comparison |
| 38. | allows us to understand some superficial issues in the international academic community. |
| 39. | However, scientific development can not be fulfilled just by financial investment. |
| 40. | This evaluation would be more reliable if the number of publications, citations, |
| 41. | and patents is included. In addition, |
| 42. | the time gap between academic research and industrial applications gets shorter gradually. |
| 43. | Hence, it is more imperative for each country to realise |
| 44. | its ability of scientific research. Therefore, one of generally acknowledged ways |
| 45. | to rank each country's capacity of science and technology in the international academy |
| 46. | is to balance quantitative indicators: numbers of publications; and |
| 47. | qualitative data: numbers of being cited per publication. |
| p. 567 | |
| 17. | 3. Discussion |
| 18. | Since the 60s because technological civilisation and economy |
| 19. | have grown stably around the world, the number of researchers has increased |
| 20. | as well as the number of academic journals. While SCI only selects |
| 21. | qualified journals, it is not easy for new journals to be listed. |
| 22. | In terms of the sum of journals listed in SCI, |
| 23. | the number grows every year. For instance... |
| | (detailed description) |
| 27. | However, the SCI database can not afford |

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| 28. | unlimited expansion. They have to take an unavoidable |
| 29. | strategy to drop off some inactive journals. |
| 30. | This strategy affects three domestic journals that used to be listed in |
| 31. | SCI (Botanical Bulletin of Academia Sinica, |
| 32. | Bulletin of the Institute of Zoology, Academia Sinica and Journal of the Chinese |
| 33. | Chemical Society). One was already removed from the list in 1986. |
| 34. | People said our situation might get worse in 1987 |
| 35. | (personal communication) |
| 36. | In recent years, with government's generous support there is an |
| 37. | increase in numbers of researchers, funds and instruments. As the result, |
| 38. | the quality of our research also increases. However, most of outstanding |
| 39. | outcomes |
| 39. | are published on international prestigious journals. Hence, domestic journals |
| 40. | lack excellent papers and deteriorate. If all these three |
| 41. | SCI-indexed journals are disqualified, we will |
| 42. | lose one hundred authors who own SCI-indexed papers. This will generate |
| 43. | significant |
| 43. | impacts on our rank in international academic community. |
| 44. | SCI based analysis only shows a temporary |
| 45. | situation in the academy. In the long run, |
| 46. | if a research paper can become a part of textbooks, |
| 47. | it will engender more impacts, such as the work of Dr... |
| | (detailed description) |
| 51. | Only if there are more this kind of |
| 52. | outputs, we can say science roots in our country. |
| 53. | We should elaborate a plan of increases in the number of publications |
| 54. | and citations but also encourage research with long-term |
| 55. | impacts. |
| 56. | In summary, along with economic growth, we are |
| 57. | one of influential countries. The whole country has devoted numerous |
| 58. | resources and manpower to research. In return, we gain some good fruits. |

| | |
|-----|---|
| 59. | However, there might be a lack in aids. For example, some researchers might not |
| 60. | be able to write in proper English and submit to foreign journals. |
| | (detailed description) |
| 63. | If we can work a bit on analysing data, editing papers and English |
| 64. | proofreading, it will promote our level of |
| 65. | research. |

Appendix 19

1995. The Importance of Indicators of Science and Technology and The Improvement of National Science and Technology Survey. *National Science Council Monthly*, Vol 23, 118-131.

| | |
|-----|---|
| 1. | The Importance of Indicators of Science and Technology and The Improvement of National Science and Technology Survey |
| 2. | Tzau-Ming Wu |
| 3. | Directorate General of Budget, Accounting and Statistics, Executive Yuan |
| 4. | 1. Introduction |
| 5. | It is said that research and development in science and technology is one of |
| 6. | major factors to measure national economic growth and social progress. |
| 7. | Especially in industrialised and developed countries, the research and development |
| 8. | in science and technology is deemed a representative indicator of national competitiveness |
| 9. | as well as a key factor that determines if a developing country can promote to a developed country. |
| 10. | According to a survey of 15 developing countries, conducted by International |
| 11. | Institute for Management Development (IMD) |
| 12. | in terms of economic compositeness, |
| 13. | our country is ranked second in the capacity of science and technology |
| 14. | and fifth in comprehensive competitiveness. This shows how important the |
| 15. | strength of science and technology to the national economic development. |
| 16. | Our country has transformed from labour intensive industry to technology intensive industry. |
| 17. | The development of comprehensive industry is moving to a new era. |
| 18. | For either the state or enterprises, the research work gets more important, and |
| 19. | indicators of science and technology have been established and applied widely. |
| 20. | Numerous countries have devoted to |
| 21. | investigation on the activity in science and technology for realising a whole |

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|-----|--|
| | scene |
| 22. | of investment in development and research, research activities in each field and |
| 23. | the research effects. This is a major reference for science and technology policy. |
| 24. | Nowadays, regular investigations on the activity in science and technology |
| 25. | are the National Science and Technology Survey, conducted by the National Science Council, |
| 26. | and the Industrial Production Statistic, conducted by the Ministry of Economic Affairs. |
| 27. | These two investigations are relatively comprehensive. Other surveys are relatively |
| 28. | incomplete and scatter in several units. |
| 29. | This article will list three cases of applying the indicator of science and technology |
| 30. | to show its importance... |
| | |
| 44. | 2. The Importance of the indicator of science and technology |
| 45. | Innovation in technique is often derived from innovation in science. |
| 46. | Novel products and operating programmes are resulted from these |
| 47. | complicated interactions. The process of interaction rests on research activities. |
| 48. | This process involves knowledge of science and technology but also |
| 49. | requires a sufficient grasp on social and economic needs. |
| 50. | The process of research activities is classified into three phases: |
| 51. | upstream, midstream and downstream. Upstream research activities |
| 52. | focus on new science and technology knowledge rather than |
| 53. | economic profits. However, while the upstream section is linked to the midstream and downstream section, |
| 54. | it engenders broad impacts. Hence, the character of upstream section seems like |
| 55. | public goods. Innovation in the downstream section is likely to produce economic profits, |
| 56. | so this part of innovation works is conducted by private firms. In general, |
| 57. | the upstream research and innovation are operated by academic institutes, when |
| 58. | research and innovation conducted in the private firm focus on the downstream, |

| | |
|-----|--|
| 59. | such as product development, process innovation, production design |
| 60. | and commercialisation. In order to monitor effectively each phase of |
| 61. | development and innovation, the design for the indicator of science and technology |
| 62. | has to correspond with properties of various research activities. For example, |
| 63. | numbers of publications are a proper indicator for the upstream type. Numbers of patents |
| 64. | matches the character of the midstream research and development. Added values of |
| 65. | products fit the downstream type. In addition, there is a chronic indicator |
| 66. | to count efforts of a project in different phases of research and innovation... |

Appendix 20

1991. The Incorporation of Domestic Academy Journals of Earth Science. *National Science Council Monthly*, Vol 21, 357-359.

| | |
|-----|---|
| 1. | The Incorporation of Domestic Academy Journals of Earth Science |
| 2. | Wen-Yen Chang, Ching-Zhong Yang and Pei-Fang Chen |
| 3. | Department of Natural Sciences, National Science Council |
| 4. | 1. Introduction |
| 5. | In a competitive society, it is a thing of matter for researchers |
| 6. | to publish meaningful and valuable research results |
| 7. | quickly. Academic journals allow research |
| 8. | to spread to researchers around the world and then make |
| 9. | researchers in the same field to communicate. |
| 10. | With it followers can refer to previous studies |
| 11. | and continue further work. The journal is a kind of literatures |
| 12. | along with the emergence of modern science. In general, |
| 13. | each journal has a stable title, format and volume. |
| 14. | It should be released at least once per year. |
| 15. | There should be more than two articles written by different authors. |
| 16. | The journal has a sequence of volumes. |
| 17. | The first academic journal was created in 1665 |
| 18. | named as <i>Le Journal des Scavans</i> . Nowadays, the format of journals |
| 19. | is still the best tool for researchers to |
| 20. | perform research outcomes. |
| 21. | It is one of the most universal references. |
| 22. | It is also the major tool for academic communication and research |
| 23. | record. Hence, to own a prestigious |
| 24. | academic journal is what domestic scholar expect |
| 25. | and the common goal to achieve. |
| 26. | How can people judge a journal? Beside |
| 27. | the quality of articles on the journal, another |

| | |
|-----|---|
| 28. | criterion is the frequency of being cited. |
| 29. | In the U.S. the Institute for Scientific Information |
| 30. | publish SCI by... |
| | (detailed description) |
| 34. | A journal must fit three conditions to be included in SCI. These three conditions are |
| | (detailed description) |
| 40. | A country manifests its academic capacity |
| 41. | in prestigious academic journals. Therefore, promoting the level of domestic academic |
| 42. | journals is always an aim of the National Science Council. |
| 43. | For the sake of enhancing international communication and promoting the level |
| 44. | of domestic academic journals, the National Science Council releases |
| 45. | 'the Guideline for the Award of Domestic Academic Journals' to encourage |
| 46. | organisations who operate the academic journal. |
| 47. | Earth science covers broad topics, including geology |
| 48. | geophysics, geochemistry, oceanography |
| 49. | and atmospheric science. Except some basic theories, most of studies are quite regional |
| 50. | Therefore, it is said that in the case of regional studies |
| 51. | foreign journals might favour studies focusing on where journal organisers are |
| 52. | rather than studies from other regions, |
| 53. | using a lack of specific experts and editors as an excuse |
| 54. | or something like that. |
| 55. | Though there are quite a few domestic journals of earth science, only |
| 56. | few of them are quarterly publications. In the sake of |
| 57. | creating a better environment to publish and to share research result, |
| 58. | scholars in the area of earth science proposed to |
| 59. | incorporate all journals of earth science. |
| 60. | If there is an excellent academic journal, it can directly |
| 61. | promote the quality of domestic research. The excellent journal can also |
| 62. | promote our position in the international community of earth science, if it |

| | |
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| 63. | is recognised by the international community... |
|-----|---|

Appendix 21

1994. The Foundation of the Journal of Biomedical Science. *National Science Council Monthly*, Vol 22, 321-333.

| | |
|-----|--|
| 1. | The Foundation of the Journal of Biomedical Science |
| 2. | Ming-Kuan Li and Tsu-Ling Yang |
| 3. | Department of Science Education, National Science Council |
| 4. | 1. Introduction |
| 5. | There are many domestic academic journals but only few of them |
| 6. | are included in foreign well-known institutes of information. |
| 7. | According to Science and Technology Information Centre, National Science Council, |
| 8. | among 110 academic journals of science or technology, |
| 9. | only four journals are listed in the international famous index, |
| 10. | <i>Science Citation Index</i> (SCI)while |
| 11. | three of 110 journals are listed in |
| 12. | <i>Engineering Index</i> (EI). |
| 13. | 51 journals are listed in each discipline's database, but |
| 14. | only 18 journals are included in famous databases, |
| 15. | such as SCISEARCH, MEDLINE (Index Medicus), |
| 16. | COMPENDEX (Engineering Index) and INSPEC. |
| 17. | The ratio of being registered in the well-known index is less than one-sixth. |
| 18. | However, our domestic scholars have published more than 3500 |
| 19. | papers on SCI-indexed journals every year since 1991. |
| 20. | The number of publications on EI-indexed journals |
| 21. | has been around 1500 every year since 1991. |
| 22. | Apparently, there is a gap between domestic indexed journals and the papers. |
| 23. | Though there are several reasons, the main cause is a lack |
| 24. | of channels of international marketing for the domestic journal. As the result, it is hard |
| 25. | for the domestic journal to gain international visibility. In the meantime, it is |

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|-----|--|
| | easier for |
| 26. | domestic scholars to gain international recognition by punishing on |
| 27. | foreign well-known journals. Taken together, |
| 28. | it leads to a shortage of submitting for the domestic journals. Without sufficient |
| 29. | papers, it is hard to draw international attention. This influences our position in the |
| 30. | international academy deeply. |
| 31. | Considering this issue, National Science Council launched a project in 1992. |
| 32. | By cooperating with international famous publishing houses, |
| 33. | we expect to employ their experience and expertise in marketing |
| 34. | to promote the level and international visibility of our academic journals |
| 35. | and to break through the current difficulty which our academic journals |
| 36. | are struggling with. Because there are numerous researchers |
| 37. | as well as research fruits in the area of biomedicine, we decided to |
| 38. | <i>found Journal of Biomedical Science</i> |
| 39. | (JBS) as an experiment. |
| 40. | The journal is published in English to spread in international academic |
| 41. | communities and, hopefully, to be registered in international indexed. The purpose |
| 42. | of the journal is to (1) become an international academic monthly, (2) to reach at |
| 43. | at least a meddle tier is SCI ranking, (3) to improve our research quality |
| 44. | and position in international academy and (4) to help junior domestic scholar to publish |
| 45. | their studies. |

Appendix 22

1999. A Reform in the Guideline for the Type-1 Award of Research in the Department of Biology, National Science Council, and the Following Result of Evaluations. *National Science Council Monthly*, Vol 27, 1143-1152.

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| 1. | A Reform in the Guideline for the Type-1 Award of Research in the Department of Biology, National Science Council, and the Following Result of Evaluations |
| 2. | Feng-Yu Wang and Pei-Wen Cheng |
| 3. | Department of Biology, National Science Council |
| 4. | 1. Introduction |
| 5. | There used to be the same ratio of approval to |
| 6. | application for research award among all subdisciplines in the department |
| 7. | of biology, the National Science Council until 1997. |
| 8. | This even-handed principle might ensure balance among all subdisciplines |
| 9. | but also ignore the difference in research outcomes among various |
| 10. | subdisciplines. This ignorance of the variety in substantial contributions generates |
| 11. | a counter mechanism of selection by competition. This has been criticised |
| 12. | by researcher as ‘pseudo fairness’. In addition, ‘territorial principle’ used to be utilised in |
| 13. | evaluation procedures. That is, the classification of subdisciplines |
| 14. | was entirely determined by applicant’s department. |
| 15. | Because the previous method of classification did not consider applicant’s |
| 16. | expertise, interest and intention, some |
| 17. | applicants with specific research topics could not be evaluated |
| 18. | by an appropriate panel. According a survey conducted |
| 19. | by the National Science Council in 1988, |
| 20. | among 2859 applicants, 72 applicants would like to |
| 21. | switch within three major departments (biology, medicine and |
| 22. | agriculture) on the basis of their expertise |

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| 23. | and personal wills. |
| 24. | 275 of 2859 applicants would |
| 25 | like to switch among subdiscipline panels under a |
| 26. | major department. |
| 27. | Hence, from 1998 there is a reform in the guideline |
| 28. | for the award of research in the department of biology, |
| 29. | National Science Council. The committee approved |
| 30. | three new policies. (1) The choice of |
| 31. | panels is determined by applicant's expertise and will. |
| 32. | (2) The permission ratio of award in each subdiscipline is |
| 33. | determined by each subdiscipline's performance. |
| 34. | (3) According to Dr. Chang's advice, |
| 35. | the formula of Research Performance Indicator (RPI) is going to be utilised |
| 36. | to calculate performances of individuals and subdisciplines. |
| 37. | In 1998, the evaluation procedures of the type-1 research award consists of |
| 38. | documentary preliminary review, documentary secondary review and |
| 39. | committee review. In the first step of documentary preliminary review, two |
| 40. | examiners graded the application in terms of a representative work (50%) |
| 41. | and research outcomes in the past of five years |
| 42. | (50%). The result of |
| 43. | documentary preliminary review was delivered to the evaluation committee |
| 44. | for documentary secondary review and committee review. |
| 45. | During the committee all reviewers had a discussion on each application |
| 46. | one by one, checked application forms and feedbacks from documentary review, |
| 47. | and marked it. |
| 48. | The part of research outcomes in the past of five years |
| 49. | has a great influence in the evaluation, which is marked by |
| 50. | examiners. Hence, in order to assess application in |
| 51. | a fair and prudent way and to reduce the effect |
| 52. | of variety in reviewer's subjective standards, |
| 53. | in 1998 all applicants are advised to |

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| 54. | add supplementary information as objective data for reviewers. |
| 55. | The table 1 of supplementary information aims to |
| 56. | evaluate the quantity of applicant's research outputs while |
| 57. | the table 2 of supplementary information aims to evaluate the quality of applicant's |
| 58. | research outputs by several representative publications whose number is based on |
| 59. | length of career. All the supplementary information is linked to |
| 60. | the database of <i>Science Citation Index (SCI)</i> . |
| 61. | According to the type of publications, authorships, |
| 62. | and journal ranking, every paper is translated into a score. |
| 63. | By the process of calculation, the Research Performance Indicator is applied to all applicants and subdisciplines. |

Appendix 23

2000. An Analysis of National Competitive Strength of Science and Technology in the Age of Knowledge Economy. *National Science Council Monthly*, Vol 28, 780-788.

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| P. 780 | |
| 1. | An Analysis of National Competitive Strength of Science and Technology in the Age of Knowledge Economy |
| 2. | Ching-Tian Chiou/ Science and Technology Information Centre, National Science Council, Executive Yuan |
| 3. | 1. Introduction |
| 4. | When the age of knowledge economy comes, countries of the world |
| 5. | pay more attention to the capacity of innovation in science and technology. Especially in |
| 6. | well developed countries, such as the U.S. and Japan, or emerging |
| 7. | industrial countries, like Taiwan and Korea, this emphasis |
| 8. | gets more apparent. When environments of the global market change quickly, |
| 9. | changes in the capacity of science and technology influence national competitiveness deeply. Hence, |
| 10. | designs of science and technology policies, distribution of funds and human resources, |
| 11. | research directions and priorities are embedded in the whole national scheme and |
| 12. | play a crucial role in promoting the national competitive strength. |
| 13. | This paper uses the <i>Main Science and Technology</i> |
| 14. | <i>Indicators</i> (MSTI), conducted by the Organisation for Economic |
| 15. | Cooperation and Development (OECD), |
| 16. | <i>Science Citation Index</i> (SCI) and |
| 17. | <i>Engineering Index</i> (EI) to |
| 18. | analyse our current competitiveness and compare to other main countries. |
| 19. | We draw a conclusion in the last section as a reference |

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| 20. | for the government to make science and technology policy. |
| 21. | 2. The Current Competitive Strength of Our Country |
| 22. | There are several indicators developed by various institutions for measuring national |
| 23. | competitiveness (table 1). Most of them are based on one indicator and then |
| 24. | transformed into a comprehensive indicator mere by simple average formulas |
| 25. | or subjective weigh calculation. Thus, they lack theoretical support and validity. |
| 26. | In addition, the content of ‘innovation in science and technology’ is quite complex. |
| 27. | It is difficult to quantify knowledge-based activities. For instance, |
| 28. | It is hard to trance and to assess scientific knowledge, as difficult as to calculate electronic commerce. |
| 29. | Thus, there is no universal standard of national science and technology capacity |
| 30. | in the world. |
| 31. | This article selected several science and technology indicators operated by plausible |
| 32. | institution to measure current competitiveness of our country and to compare with |
| 33. | other main countries |
| 34. | 2.1. The science and technology indicator of OECD |
| 35. | In the age of knowledge economy and global competition, |
| 36. | a meaningful science and technology indicator should be capable of international comparison. Nowadays, |
| 37. | the science and technology indicator of OECD is relatively reliable. |
| 38. | Because the trend of science and technology development turns to |
| 39. | emphasis on relations between on economic growth and employment, globalisation of R&D, and |
| 40. | ICT, OECD countries has increased investment in education, R&D and |
| 41. | innovation. Under this circumstance, the old |
| 42. | science and technology indicator can not reflect the trend comprehensively. |

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| 43. | Hence, OECD has worked on studies of the science and technology indicator since 1995 |
| 44. | to develop a new indicator for evaluating the performance of innovation and the |
| 45. | productivity of knowledge economy... |
| P. 783 | |
| 13. | 2.2. Science Citation Index |
| 14. | SCI that is published by an American company ISI is widely utilised |
| 15. | as a standard to measure both the quantity and quality of scientific papers. |
| 16. | From 1963 SCI began to register |
| 17. | international quality journals and to analyse those papers on the indexed journals. |
| 18. | With the long-period analysis a database has been established. |
| 19. | This offers a reliable quantitative data to evaluate scientific papers. |
| 20. | In the beginning, the purpose of SCI is to study trends in science development. |
| 21. | Nowadays, SCI has already become the major reference to assess the quality of scientific papers. |
| 22. | This article analyses the science research outputs in terms of scientific publications |
| 23. | through using the data released by ISI in 1999. |
| 24. | This analysis focuses on the number of scientific articles as quantity and the frequency of being cited |
| 25. | as quality, both of which is compared with other countries... |
| P.785 | |
| 2. | 2.3. Engineering Index |
| 3. | By using SCI database to evaluate the quantity and quality of |
| 4. | scientific publications, the capacity of basic science research in various countries |
| 5. | is shown. Comparing with SCI, the database of |
| 6. | <i>Engineering Index</i> (EI) is capable of |

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| 7. | measuring a country's research ability in engineering fields... |
| P.786 | |
| 16. | 2.4. The science and technology indicator of International Institute for Management Development |
| 17. | The World Competitiveness Yearbook published by IMD |
| 18. | covers 47 industrialised countries and emerging countries or economies |
| 19. | with eight main sets of indicators. |
| 20. | The aspect of science and technology consists of five categories and 26 |
| 21. | detailed indicators. The of five categories include investment in R&D, |
| 22. | R&D manpower, technology governance, science development environments, and patterns... |

Appendix 24

2001. A preface to the White Paper on University Educational Policy. *Educational Reform Newsletter*, No. 126, 1.

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| 1. | A Preface to the White Paper on University Educational Policy |
| 2. | Chih-lang Tzeng, the Minister of Education |
| 3. | It has been a half century since the government moved to Taiwan. During this period, there are several substantial changes in society and economy. Because society gets open, |
| 4. | economy grows and information accumulates quickly, development of university education expands rapidly. The number of universities and colleges in Taiwan increases |
| 5. | from 4 to 143, and the number of students increases from 5 thousand to 640 thousand. |
| 6. | The development of higher education is a mirror of socioeconomic development. |
| 7. | The 21th century is a period when knowledge economy takes a central stage. The university has become an arena for innovation and manpower around the world. |
| 8. | Competitiveness of universities is a crucial indicator of national competitiveness. The trend in university education is gradually from elite education |
| 9. | toward massive education, from economy-orientation toward education characteristic, from career training toward consumer demand, |
| 10. | from government's direct supervision toward autonomy, from a monotonous standard toward diversity, |
| 11. | and from school learning toward lifelong Learning. Even though reforms in university education have |
| 12. | satisfied parts of social needs, in the circumstance of facing novel challenges and changes, |
| 13. | we need to have a new thought and a new model of governance for building new cultural values and new university culture. In this way, we can maximise |

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| | the function |
| 14. | and social value of the university. |
| 15. | Now is the critical moment when the university encounters an impact of global competition. In response to new century's demand, the |
| 16. | Ministry of Education drew prospect of domestic university education as a guide to make educational policy, to manage universities and |
| 17. | to pursue a goal of excellent university education. In the meantime, the White Paper on University Educational Policy |
| 18. | offer the masses a chance to realise current policy of university education. We started to work on the white paper from August 1999. |
| 19. | We have to thank all scholars and experts who are concerned about higher education and contributed to the White Paper. |
| 20. | We also have to thank all colleagues of the Ministry of Education who collected data and organised a series of panel discussion. |
| 21. | With these efforts, finally the White Paper is finished. |
| 22. | The White Paper analyses current situations of university educational development in terms of an imbalance between quality and quantity of university education, |
| 23. | irrational distribution of resources, university management, lacks of internationalisation, interaction between the university and society, and the foundation of evaluation mechanisms. |
| 24. | Along with these notions, the White Paper provides short-term and medium-term suggestion about positions of the university, recruitment and distribution of resources, |
| 25. | standardisation of university management, cultivation of manpower, promotion of global competitiveness, opportunism for adults to take higher education, |
| 26. | and the goal of the excellent university. |
| 27. | The release of the White Paper is a new start for university educational policy. It also represents national expectation for knowledge economy. |
| 28. | It will lead the university to promote innovation and global competitiveness and to keep pace with other international top universities. However, |
| 29. | implementation of policy requires not only detailed plans and effective practices, but also university's participation and effort. |

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| 30. | The release of the White Paper is not an end but a start. When both domestic and global conditions change rapidly, |
| 31. | we have to check our scheme whenever necessary and then modify it in order to make our university catch up with social changes and |
| 32. | break through its own limitations. |
| 33. | Many thanks for all scholars, experts and participants. |
| 34. | Although we had done our best to compose the White Paper, there may be some deficiencies. We would appreciate it if anyone is willing to correct our neglect. |