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Enhancing the Performance of Chinese High Education Institutions through Collaborative Governance: A Dynamic Performance Management Approach

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Abstract

With the development of the knowledge economy, knowledge generation and application has been a powerful engine for economic development and global competition. Higher Education Institutions (HEIs) are under great pressure to improve their performance in teaching, research and the third mission, to respond to the changing social needs actively. This doctoral thesis is aimed at proposing a framework to enhance the performance of Chinese HEIs through collaborative governance using a dynamic performance management approach. Based on a literature review of performance management in Chinese HEIs, a conceptual framework is proposed to enhance the performance of teaching, research and the third mission in Chinese HEIs by 1) identifying the end results of the collaborative governance; 2) finding respective performance drivers for achieving end results and 3) building-up, preserving, and deploying a proper endowment of strategic resources. Especially, the performance drivers can be gauged to examine the performance of collaborative governance.

A comparative case study of a consulting project and a joint lab was conducted to demonstrate the power of the conceptual framework to foster collaborative governance between HEIs and external organizations to enhance HEIs' performance, specifically in the Chinese context. Firstly, it provides a framework to map and model the structure and process of collaborative governance. This framework allows us to make explicit expected end results, performance drivers and related strategic resources. Secondly, by the means of the causal loop diagrams depicting the underlying processes and mechanisms of the conceptual framework, this can engage HEIs and external organizations in a learning process to foster understanding, consensus and commitments. Finally, the conceptual framework can facilitate the implementation or improvement of collaborative governance practices by cascading overall organizational goals among different actors and analyzing alternative policies with the "learning device".

The case study shows that collaborative governance can enhance Chinese HEIs' performance by (1) providing additional resources to support the research activities, such as funding, field research opportunities, data and application scenarios; (2) improving the efficiency of service delivery and relevance of research with field knowledge and external stakeholders' active participation; (3) contributing to the improvement of teaching through new

cases, new knowledge and learning-by-doing opportunities in projects. Furthermore, the active interaction with external stakeholders builds mutual understanding, trust, shared norms and good relationships, which in turn create critical strategic resources to enhance future collaborations.

This thesis is a trial to enhance Chinese HEIs' performance through collaborative governance. Future research can also introduce the objective view and the subjective view of dynamic performance management to further examine the processes and activities, and the responsibility of different decision-makers in the collaborating process. Besides, the development of simulation models can help strengthening the substantive validity of the conceptual framework and the case studies. Finally, it would be worthy to investigate the impact of the proposed framework in non-Chinese HEIs.

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Chapter 1 Research Design

1.1 Background

In the era of the knowledge economy, knowledge generation has replaced ownership of capital assets and labor productivity as the source of growth and prosperity. As a center of great minds, the importance of Higher Education Institutions (HEIs) has been recognized in all countries (Salmi, 2009; Gu, Li and Wang, 2018). On one hand, HEI helps to train qualified talents for industries, either traditional labor-intensive industries, or advanced high-tech industries (Xia, 2017). On the other hand, HEI is the central hub of knowledge and innovation, providing new patents, start-ups, products and services for society (Zumeta, 2011).

However, it is observed that the linear model either expressed in terms of ‘‘market pull’’ or ‘‘technology push’’ was insufficient to induce transfer of knowledge and technology (Etzkowitz and Zhou, 2017). Instead, the Triple Helix is proposed to tighten the connection and interaction between HEIs and external organizations, to realize an innovative environment which is consisting of university spin-off firms, multilateral initiatives for knowledge-based economic development, and strategic alliances among firms of different sizes, and with different levels of technology, laboratories and research groups. Beyond the traditional knowledge transfer model, HEIs can also serve as change agents for promoting collective agency and affecting systemic social change (Petersen and Kruss, 2021).

Under such a paradigm, HEIs need to take a more active role and embed themselves in the industry and society. Collaborative governance (O’Flynn and Wanna, 2008; Zhang et al. 2020) can be a promising scheme to enhance the performance of HEIs. Firstly, to function in the Triple Helix, HEIs need to collaborate with broad stakeholders, by which a deep understanding of social needs and high legitimacy can be achieved. Secondly, collaborative governance helps to pool strategic resources and to build close ties to facilitate the generation and delivery process of qualified graduated students, relevant research and competitive services. Finally, collaborative governance can provide feedback from the external organizations, which enables HEIs to learn and adapt to the ongoing change and deep uncertainty.

With the open and reform of the economy, China makes a big effort to improve its higher

education to meet the needs of social and economic development. The massive expansion was carried out since 1998, which enable China to be the largest high education system (Wan, 2006; Gu, Li and Wang, 2018), with a total enrollment of regular undergraduate students of 10.02 million and a gross enrollment rate of 51.6% in 2019 (Ministry of Education, 2020). Besides, a series of elite initiatives (e.g., project "211", project "985" and "double first-class") were implemented to build world-class universities in China (Li, 2012; Gu, Li and Wang, 2020). However, many problems are challenging the improvement of Chinese HEIs' performance. For example, the quality of higher education is a big concern, and the culture that demands quick results hampers innovative and long-term research (Slami, 2009).

This study proposes to adopt a collaborative governance approach to enhance the performance of Chinese HEIs in the knowledge economy era. Although such an approach between HEIs and external organizations has shown valuable and remarkable results (Horstmanshof and Moore, 2016), it appears complex and rarely applied in practice (Hunter, 2008). As the implementation of collaborative governance is a complex and dynamic process with high cost, risks and uncertainty (Bianchi, 2020), to pursue such a goal, a Dynamic Performance Management (DPM) perspective has been adopted (Bianchi, 2016).

1.2 Research methodology

After a review of the literature on performance management systems and Chinese HEIs, the research questions are formulated to address the gaps in the literature. Next, a conceptual framework is developed based on a Dynamic Performance Management approach to foster collaborative governance in higher education institutions. Finally, two case studies are conducted to empirically examine the impact of collaborative governance on Chinese HEIs' performance.

1.2.1 Case study approach

A case study is a research method involving an up-close, in-depth, and detailed examination of a particular case. Generally, a case can be nearly any unit of analysis, including individuals, organizations, events, or actions. There are three situations where a case study is better than the other research methods (Yin, 2009). First, the research problem is about how and

why, which calls for in-depth investigation rather than broad surveys. Second, the researcher can't place control over the object, which exceeds the limit of the experimental study. Third, the research phenomenon is happening currently, so historical study is not proper for it. In this thesis, a comparative study of two cases will be applied to investigate the collaborative governance between HEIs and external organizations. After analyzing a single case, a comparative study will be conducted. Such a process is particularly useful to help us understanding the commonalities and differences between the two cases and learn possible generalizations of the results.

1.2.1.1 Data gathered and key-actor interviews

The interview is a qualitative research method, which is conducted in the form of a conversation to elicit information based on the answers to questions (Savin-Baden and Major, 2013). In the interview, a researcher poses questions to the interviewee, and the interviewee response in an alternating series of questions and answers. It is different from focus groups in which a researcher questions a group of people and observes the following conversation between them or surveys that are often anonymous and offer limited predetermined answer choices for the questions. Based on the content of the questions, an interview can be structured, semi-structured, or unstructured. In a structured interview, the questions and process are planned, while in an unstructured interview, the setting of questions is more flexible. Compared to surveys, the interview is more interactive and personal, which helps to get more information from the interviewees. In this thesis, a semi-structured interview is used to investigate the process and dynamics of collaborative governance in HEIs.

1.2.1.2 Coding

In the social sciences, coding is an analytical process in which data, in either quantitative form (such as survey results) or qualitative form (such as interview transcripts), is categorized to facilitate analysis. In this thesis, a three-step coding scheme is applied, i.e., open codes, axial codes, and selective codes (Corbin and Strauss, 2008; Zhang, Yan and Qi, 2020). First, a few concepts were derived from the data based on open codes, i.e., it was extracted in "a grounded way". Next, based on the emerging themes and related knowledge from literature review, the

study classified the extracted concepts into different thematic categories according to axial codes. In the last step, the link between the themes is added to synthesize the case and the relationships between different concepts.

1.2.2 Dynamic Performance Management

Dynamic Performance Management is an approach that enables organization decision-makers to frame the causal mechanisms affecting organizational performance over time (Bianchi, 2016). This framework is developed based on two converging methods of inquiry: Performance Management and System Dynamics (SD) modeling. On one hand, it speaks in the language of performance management, emphasizing maintaining consistency and balance between internal, external and time perspectives to achieve sustainable growth. Especially, this approach distinguishes between end-results, performance drivers and strategic resources. On the other hand, it leverages the strengths of SD to make explicit underlying mechanisms driving system behavior (i.e., organizational performance) by the means of causal relations and stock and flows. The strengths of System Dynamics include thinking dynamically, thinking in stocks and flows, thinking in feedback loops, and thinking endogenously (Richardson and Andersen, 2010; Zhang, Yan and Qi, 2020). Thinking endogenously refers to the effort to see the cause of the system as being internal forces rather than outside intervention, to extend the boundary of thinking and connect the cause and effect in a consistent map. Besides, System Dynamics not only does build models based on numerical data but also emphasizes the importance of mental models, which entails the underlying assumptions and mental models that guide the managers' decision-making process.

1.3 Thesis structure

To investigate how to foster collaborative governance in Chinese HEIs to enhance their performance, this thesis has been arranged as follows.

Chapter 1 depicts the research design. It first introduces the background of HEI transformation and the HEIs' challenges to improve performance. Next, the research process and applied methodology are presented.

Chapter 2 (Literature review) elicits the contribution of the literature review. The extant

literature on performance management, collaborative governance and Chinese HEIs are reviewed and summarized. Next, two research questions are proposed to close the gaps in the literature.

Chapter 3 proposes a conceptual framework based on the dynamic performance management approach to foster collaborative governance in Chinese HEIs, thereby improving HEI performance. Through the instrumental view of DPM, the theoretical framework examines the implementation of collaborative governance in teaching, research and the third mission. In each of the three dimensions, the relationships between strategic resources, performance drivers and end-results are identified. Finally, an integrative framework is drawn to synthesize how collaborative governance can enhance Chinese HEIs' performance.

Chapter 4 presents two cases of collaborative governance in a Chinese HEI. The first case is about a consulting project, while the second case investigates a joint lab. For each case, the two research questions are discussed, and common findings and differences between the two cases are discussed.

Chapter 5 summarizes the findings in the thesis and discusses the contributions of this research to knowledge and practice. In conclusion, limitations of the study and opportunities for future research are presented.

Chapter 2 Performance management in Chinese HEIs and future challenges： a literature review

2.1 Introduction

With the increasing pervasiveness of the knowledge economy, the importance of higher education has been recognized in all countries (Ma, 2009; Salmi, 2009; Zumeta, 2011; Gu, Li and Wang, 2018). Education, or more specifically, higher education, is the pathway to the empowerment of people and the key strategy to the development of nations. Knowledge generation has replaced ownership of capital assets and labor productivity as the source of growth and prosperity (Altbach, 2011).

In the race of knowledge economy, every country has launched initiatives to develop its higher education system, which can be evidenced by the popularity of national education development plans and university rankings, such as the THES ranking and SJTU ranking (Buckner, 2020). For example, a recent national elite initiative titled “double first-class” was implemented in China to build world-class universities. This initiative, on one hand, contributed to diversifying HEIs’ goals and orientations to gain competitive advantages, on the other hand, reinforced universities’ dependence on the government (Zhao and You, 2019). Although the trustworthiness of these rankings is debatable (Soh, 2017), to a considerable extent, these rankings have been used as golden standards in the job market to judge the quality of universities and their graduates. Besides, inside the higher education system, the performance in the rankings is a part of the development goal and sometimes it is used for funding allocation (Zhao and You, 2019).

To accelerate the development of the higher education system, the key 21st-century realities for tertiary education worldwide must be acknowledged and addressed, including the massification of enrollment, the role of the private sector and the privatization of public higher education, the ongoing debate concerning public versus private good in higher education, the

rise of Asian countries as academic centers, and, the global economic crisis and its effect on higher education (Altbach, 2011; Zhao and You, 2019).

As an emerging power and the largest developing country, China has launched three major initiatives to develop world-class universities, i.e. “211”, “985” and “double first-class”, all of which aim to improve universities’ national and international competitiveness and to narrow the gap in academic achievement, research performance, and scientific innovation with leading research universities in the developed countries (Zhang, Patton and Kenney, 2013; Zhao and You, 2019; Zong and Zhang, 2019). These initiatives have a big impact on the development of Chinese HEIs. The Chinese HEIs' institutional framework will be discussed later in section 2.3.1.

However, a few challenges become prominent in the development of the Chinese higher education system, which are deeply rooted in the cultural and national context. As it is summarized by Salmi (2009),

“*First is the concern that Chinese universities have expanded too quickly at the expense of maintaining quality. Second, the academic culture that demands quick results hampers innovative and long-term research efforts. Finally, China’s vision of world-class universities focuses almost exclusively on factors such as increased publications in international journals, up-to-date laboratories, more buildings, star professors, and additional funding (Mohrman 2003). Yet the vision is largely imitative, rather than creative.*”

The current performance management system of Chinese HEIs focuses on measurable performance indicators of inner efficiencies, such as publications, buildings, programs, laboratories and funding, without considering the active participation of external stakeholders and the quality of the evaluated performance indicators, which hinders the improvement of HEIs’ performance. Besides, although it has turned from the Soviet model to the Western model, the Chinese higher education system is still highly centralized and pragmatic (Gu, Li and Wang, 2018), which requires higher education institutions to adapt to organizational and cultural contexts (Duan, 2003; Ma, 2009).

After this short introduction about Chinese HEIs, the next section starts by reviewing performance management in higher education, which is a central theme of the thesis. Traditional

performance management emphasizes the formal system and silo accountability, which was undermined by behavior distortion and lack of coordination among different silos. Therefore, the recent development of collaborative governance is introduced to overcome the bias of traditional performance management systems.

Next, the literature on performance management in Chinese HEIs is summarized. First, both the institutional framework and performance management system in the Chinese HEIs are introduced. Especially, the recent reform and development of Chinese higher education are discussed, which entails massive expansion, the building of world-class universities and governance reform. This part summarizes the main limits of the Chinese HEIs' performance management system.

Finally, this chapter highlights gaps in the literature and proposes research questions to fill the gaps in the literature.

2.2 Performance Management in higher education

This section begins with the introduction of performance management and then examines its application in the public sector, especially in higher education. Based on the literature review, the main limits of the performance management system are summarized, the recent development of collaborative governance and its application in HEIs to overcome such limits are introduced.

2.2.1 Performance Management

Performance management is the process of improving the effectiveness and efficiency of organizations' activities and outputs to accomplish organizational goals, which is critical for the success of organizations (Platts and Sobotka, 2010; Poister, Pasha and Edwards, 2013; Tseng and Levy, 2019; Brown et al. 2019). It can be used in different kinds of organizations and in multiple levels, which entail organizational, departmental, group, or individual performance (Harris, Brewster and Sparrow, 2003).

A broad definition of Performance Management (PM) provided by Aguinis (2013) refers to "identifying, measuring, and developing the performance of individuals and teams and aligning performance with the strategic goals of the organization". The focus of PM is to

support goal attainment, and many scholars pioneered to introduce the use of multiple methods and techniques to fulfill this purpose, including the balanced scorecard (Kaplan and Norton, 1992; Kaplan, 2009), the performance pyramid (Lynch and Cross, 1991), and the performance prism (Neely, Adams and Crowe, 2001; Najmi, Etebari and Emami, 2012).

Despite its importance and potential benefits for organizational success, a recent review (Brown et al. 2019) of the PM literature over more than 11 years, uncovering 230 articles from 41 different journals, concluded that the PM literature explores primarily the process-driven aspect of PM, namely performance appraisal (PA), as opposed to investigating PM in a truly holistic way (Lee, 2019). PA was also referred to as performance evaluation or performance review, which is a systematic and periodic process that assesses an employee's job performance and productivity concerning certain pre-established criteria and organizational objectives (DeNisi and Pritchard, 2006; Abu-Doleh and Weir, 2007). Traditionally, PA was conducted annually or biannually, which is criticized to be too slow to provide useful feedback for performance improvement. Nowadays, PAs are conducted in organizations with shorter cycles (for instance, every six months or every quarter), and some have been conducted weekly or bi-weekly (Cederblom, 1982). Besides, in terms of methods to collect PA data, both objective data and subjective judgments are used. Objective data includes sales, revenues, electronic records and time, while subjective judgments can be obtained through the managers' rating of employees' performance.

There are different components of performance management systems, which entail inputs, outputs and outcomes (De Lancer, 2006). Inputs are the required resources to produce organizational output. While outputs are the final product or services, outcomes are long-term consequences of outputs, which are difficult to quantify because of their broadness and complexity (Bianchi, 2016; Rua, 2019). Besides, there are diverse ways to measure performance (Ridgway, 1956): single criteria, multiple criteria, and composite criteria. Multiple criteria are used when organizational performance goes beyond the achievement of a single output, while composite criteria are used to calculate a weighted sum of different performance indicators.

The information generated by performance management system (PMS) can be integrated into a larger system to support organizations in a few aspects (Pulakos, 2009; Rabovsky, 2014;

Kairuz et al., 2016; Rua, 2019):

1) performance evaluations: information from the PMS can help to understand the accomplishment of organizational goals and individual performance;

2) reward for good performance: based on the evaluated performance, employees can be rewarded accordingly;

3) performance improvement: the performance evaluation also provides valuable feedback to improve the performance;

4) goal setting and planning, PMS helps to find problems and opportunities, which can guide the future planning process. For example, if actual performance is far below expectation, changes should be made in the goal setting and planning process. The other expected benefits also include facilitation of communication between managers and subordinates, sharpening of organizational focus, and determination of training needs.

Although PM can be applied to both private and public organizations, PMS in the public sector face extra challenges, which are related to the specific complexity of this environment (Bianchi, 2016; Van Helden and Reichard, 2016). More specifically, the design and implementation of PMS in the public sector is aimed at fostering change, accountability, legitimacy, and the improvement of service to both users and the wider community, which involve multiple stakeholders and deep uncertainty. In the following section, the prevailing performance management literature in the public sector will be reviewed.

2.2.2 Performance Management in the public sector

Different from the private sector, public organizations deliver services to a wider community at the cost of the public budget from the state or local government. This creates a specific complexity for performance management in the public sector. The Multi-dimensionality of the PMS is core in both public and private sector organizations. However, multiple studies in the private sector point to a financial focus at the top of the PMS, while public sector organizations show a broad variety of performance indicators, including those relevant to society (Gerrish, E, 2016; Van Helden and Reichard, 2016), such as safety, happiness, and quality of life. Besides, performance information in public sector organizations is primarily used for external accountability reasons, while internal managerial control is often the main

purpose only in private firms (Van Helden and Reichard, 2016; Mizrahi and Minchuk, 2019).

During the 1970s, as a response to the crisis of lack of efficiency and accountability in the government, the UK government brought in legislation and introduced concepts such as "value for money" and "performance management", which marked the beginning of "new public management (NPM)" (Fryer, Antony and Ogden, 2009). Aiming to adopt management techniques and practices from the private sector, the premises of NPM were (Hood, 1991): 1) employment of professional managers; 2) explicit standards and measures of performance; 3) greater emphasis on consistency of services; 4) decentralization; 5) increased competition between organizations and sub-units; 6) emphasis on private-sector management styles; and 7) increased accountability and parsimony in resource use. The NPM was first introduced in the US and UK， then spread to New Zealand and Australia, latterly to most OECD countries and other nations (Dunsire, 1995; Gruening, 2001; Lægreid, 2017).

Although NPM contributes to the improvement of efficiency and accountability in the public sector, it also brings a few side effects (Osborne, 2006; Bryson, Crosby and Bloomberg, 2014). Firstly, the emphasis on silo accountability in NPM causes fragmentation in public policy design and implementation, which has been considered a major cause of inconsistency to improve community outcomes and public value. Secondly, as NPM focus on measurable indicators, it tends to sacrifice long-term outcomes for outputs in the short run. Finally, lack of interaction and coordination with the other stakeholders, NPM is not able to fix "wicked" issues, which involve dynamic complexity and multiple stakeholders. These side effects call for new theories and practices, which emphasize the importance of collaboration and stakeholders' involvement for better governance (Osborne, 2006; O'Flynn and Wanna, 2008; Bianchi, Luna-Reyes and Rich, 2020).

As this thesis focuses on the performance of higher education institutions (HEIs), which is a specific kind of public organization, the next part will narrow down the focus to the literature on performance management in HEIs.

2.2.3 Performance Management in HEIs

In the last decades, worldwide governments introduced new university reforms to respond

more effectively to the changes of the economic, social and political systems (Lindstrom, 1994; Tierney and William, G, 1999; Butera, 2000; Gu, Li and Wang, 2018; Ortagus et. al., 2020). Traditionally, universities are expected to create new knowledge and share it, to educate and to train people for the manufacturing and service sectors and the society at large. Besides the traditional twin missions of teaching and research, more recently, universities also promoted and monitored results achieved in the so-called third mission. This additional activity involves transferring and commercializing generated knowledge by interacting with key actors of the socio-economic system and contributing to regional and national economic development (Etzkowitz, 2004; Etzkowitz and Zhou, 2017).

It is difficult to precisely define the universities' role in modern society. Since it is founded in the middle century, the university is the center of great minds, which creates and diffuses knowledge, delivers both knowledge and skilled students to society. With the booming knowledge economy and increasing global competition, universities need to reposition themselves and restructure to respond more effectively to the changing social, economic, and political forces (Butera, 2000; Altbach, 2011; Etzkowitz and Zhou, 2017).

As suggested by Lindstrom (1994), this is a time of transition for everyone involved in the production of public service, internal effectiveness and external influence have been the identical standard for all organizations. The author argued that quality is the strategic factor for competition and cooperation in the university world and we need to go back to the fundamental questions, i.e., "What is meant by quality? For whom is quality intended? Who is responsible for quality? Within which areas will quality be followed up? How are quality levels followed up?" Finally, Lindstrom concluded that the university should engage staff in quality evaluation and improving all areas of operations continuously.

In the book titled "The Responsive University: Restructuring for High Performance", Tierney and William (1998) advocate reorienting basic working structures and designing more creative organizations and they argue that it is critical to find alternative ways to measure productivity and reconfigure promotion and tenure, along with academic freedom, faculty roles and rewards. Butera (2000) argues that it is the true challenge facing the universities to contribute substantially to the development of a knowledge economy and the training of knowledge workers. Universities own desirable assets to be successful but also suffer severe

constraints because of legacy systems rooted in the organization, personnel rules, and outdated organizational culture.

Defining the performance of universities is the prerequisite to achieve university missions. Sarpong et al (2017) identified three domains of practices (i.e., advanced research capabilities and external partnerships, the quantification of scientific knowledge and outputs, and collective entrepreneurship) that constitutively facilitate partnership and in turn the successful transition to a hybrid triple helix model (Etzkowitz and Zhou, 2017). They also suggested integrating flexible routines and procedures into organizational processes and collaboration architectures, to engage productive innovation partnerships. Based on the model of collective intelligence (Boder, 2006), Secundo *et al*. (2016) proposed a three-dimension framework, i.e., entrepreneurial competence development, technology transfer and innovation, social engagement and regional development, for universities to enhance their intangible resources and endorse the capacity of their "crowd", on which a profitable interaction with the external environment is based.

Besides the reposition of missions and activities, findings indicate that public universities often use performance data to help managing three tasks (Rabovsky, 2014): 1) strategic planning, 2) evaluating employees, and 3) interacting with external stakeholders. A prominent feature of performance management reform in higher education is the implementation of the Performance Funding System (PFS, sometimes also used interchangeably with performance-based funding PBF) (Dougherty, Jones and Pheatt, 2016; Ortagus et. al., 2020). PFS is the respective part of NPM in higher education, which sought to hold publicly funded HEIs accountable for their performance and be responsive to the change of social needs.

Performance funding is a specific method to manage performance by tying public funding to performance rather than to inputs identified by the organization (Mizrahi, 2020). Since the 1980s, many countries have adopted variated versions of performance funding in the higher education sector as part of marketization processes and in response to increased competition, making it a major issue in higher education policy. Mizrahi (2020) argues that performance funding creates an "autonomy paradox" that ultimately explains the failures in accountability related to performance funding, which calls for a reexamination of this approach. Finally, the author recommends expanding the collection of performance information to include inputs and

capabilities and creating various mechanisms that connect customized solutions to specific problems.

Similarly, Kairuz et al. (2016) warn the detrimental effect of Key Performance Indicators (KPIs) and performance management in the higher education sector, as their use causes undue stress which impacts negatively on the essential criterion of academia, i.e., cognitive thinking. In their views, the core business of universities is learning, and cognitive thinking is critical for both learning and the development of new knowledge in higher education. Therefore, top managers in HEIs, such as presidents and deans, should be mindful of the ever-growing emphasis on quantitative measures and bureaucratic demands in higher education.

Finally, the intensified global education competition and massive expansion also encourage the implementation of Total Quality Management (TQM) to ensure the quality in universities and other HEIs (Ali and Shastri, 2010; Asif et al., 2013). With a scoping literature review, Nasim, Sikander and Tian (2020) find that extant research focuses on:

1) teaching and learning, but neglects research and industry engagement;

2) an isolated factor (e.g., teacher), but neglects other factors (e.g., facilities);

3) the HEIs in advanced countries, but neglects the HEIs in developing countries, and

4) TQM as a phenomenon, but neglects theory development and integration.

The above discussions show that there are tensions, bias and side-effects in implementing PMS in organizations, which undermine the potential of a successful PMS. Next, the main limits of PMS will be examined.

2.2.4 Main limits of the performance management system

Although extensive research and practice have focused on understanding and improving performance management systems in organizations, the formula for effective performance management remains elusive (Fryer, Antony and Ogden, 2009; Pulakos and O'Leary, 2011). Reviews of the PMS practices find only a small average effect of performance management on organizational performance or mixed results (Gerrish, 2016), with both costs and gains and with daunting challenges, such as gaming and remaining (Gao, 2015). Fryer, Antony and Ogden (2009) identify five key features of a successful performance management system:

- Alignment of the performance management system and the existing systems and

strategies of the organizations;

- Leadership commitment;
- A culture in which it is seen as a way of improving and identifying good performance and not a burden that is used to chastise poor performers;
- Stakeholder involvement; and
- Continuous monitoring, feedback, dissemination and learning from results.

However, there are a few factors that often hinder the achievement of a successful PMS, which will be examined as follows: limits of performance indicators and measurements, lack of stakeholders' involvement and recognition, behavioral distortion and gaming, and emphasis on silo accountability.

2.2.4.1 Limits of performance indicators and measurements

The design of performance indicators is important for information collection and usage. The early indicators were primarily financial, but gradually many other measures such as reputation and customer satisfaction have been introduced (Kaplan and Norton, 1992). The increase in the number of indicators doesn't always improve the quality of the indicators for a few reasons:

- Overloaded by performance indicators. Organizations tend to have a large number of indicators. On one hand, some of the indicators are obsolete or irrelevant (Kennerley and Neely, 2002), and on the other hand, too many targets make employees difficult to focus their activities and energy (Moxham and Boaden, 2008).
- A short-term and narrow perspective. Firstly, driven by performance indicators, individuals may achieve short-term results at the cost of long-term benefits (Youngblood, 2003), which hampers the sustainability of organizations; Secondly, performance indicators tend to ignore the effect of trade-offs in the system (Bianchi, 2016), making the performance indicators inconsistent with organizational performance. Finally, because of the difficulties to quantify, intangible targets (e.g. reputation), which are increasingly important for the success of organizations, are rarely included in the performance indicators (Zigan, Macfarlane and Desombre, 2008).

- Static and disconnected. Popular frameworks such as the Balanced Scorecard are adopted without careful examination and customization (Schalm, 2008), which ignore the dynamic industrial and organizational contexts (Rua, 2019). These static indicators don't reflect the needs of the organization and the changes in the environment, which make performance measurements disconnected from performance improvement.

Furthermore, extra difficulties lie in the process of performance measurements. Firstly, it is difficult to select and agree on the most appropriate measures to be implemented in each organizational unit, as conflicting goals among agencies represent the norm rather than the exception (Lindblom, 1959; Rua, 2019). Secondly, the process of performance measurement involves personal judgments (e.g. rating by managers), which are subject to prejudice and bias. For example, managers may rate the subordinates' performance according to serving time and personal relationships rather than actual performance (Franco-Santos and Otley, 2018).

2.2.4.2 Lack of stakeholders' involvement and recognition

Despite the potential benefits that PMS can provide to organizations, the implementation process is not straightforward. Lee (2019) applied Farndale et al. (2011) description of the intended, actual and perceived PMS practices:

> "*The intended PM system refers to the PM system designed and developed at the top through policies and practices that are implemented across the organization. However, line managers can deviate from the intended system during the implementation process. The implementation process of the intended PM system then leads to the actual PM system, which can be in line with or deviate from the intended PM. The actual PM system that is implemented by line managers leads to the perceived PM system, which refers to the perceptions that individuals on the receiving end of the actual PM system have regarding PM.*"

Similarly, Pulakos and O'Leary (2011) argued that a significant part of the problem in PMS has been reduced to prescribed, often discrete steps within formal administrative systems, while the behaviors of the day-to-day activities of communicating ongoing expectations, setting short-term objectives, and giving continual guidance, are largely disconnected from the formal systems. Lee, Townsend and Wilkinson (2018) also emphasize the effect of formality and

informality on the implementation of PMS. Formal processes are structured procedures that are developed explicitly for employees to perform for the achievement of organizational goals and are usually recorded in writing, such as documents and emails; while informal processes are implicit, tending to develop and emerge automatically over time (Nadler and Tushman, 1980; Schleicher et al., 2018). It is observed that traditional research ignores the effect of the informal system, which becomes increasingly important for the success of PMS (Schleicher et al., 2018; Lee, 2019).

The PMS usually begins with senior management and cascades through the organization in a top-down manner (Weiss and Hartle, 1997; Lee, 2019). However, because of lack of involvement in the designing and implementing process, external stakeholders and employees (especially line managers) don't recognize the usefulness and credibility of PMS (Moynihan and Lavertu, 2012). The resulted mistrust and resistance to using the PMS leads to failure. As a result, new performance management practices are enthusiastically and readily adopted, without sufficient consideration of what is required to implement them effectively or how they will fit within an organization's culture and routine (Pulakos, 2009). Consequently, this may lead to repenting vicious cycles, implying organizations reinventing their performance management systems every few years only to overcome implementation failures (Pulakos and O'Leary, 2011).

2.2.4.3 Behavioral distortion and gaming

The premise behind the PMS is that holding individuals and organizations accountable leads to improvement in the quality of products and services (Rua, 2019). However, devising good indicators of quality is hard (Zineldin, 2006), which frequently causes side-effects in organizations (Smith, 1993), which entail myopia, ossification, tunnel vision, sub-optimization, measure fixation and misrepresentation.

These side-effects in the actual PMS and perceived PMS further lead to behavioral distortions: illegal acts and falsification, biasing and focusing, smoothing, and filtering (Ronen and Sadan, 1981; Bimber, Turopolec and Young, 1983; Simon and Eitzen, 1986; Rua, 2019). These behavioral distortions are unintended responses to the accountability system to get favorable results at the cost of organizational goals. For example, employees may manipulate

the reported indicators without altering the actual performance, or even cut promising investments to get significant profits in the short term.

Gaming is a specific kind of behavioral distortion, which takes advantage of the system of rules because of the lack of quality in the performance indicators and measuring process (Smith, 1995; Mizrahi, 2017; Franco-Santos and Otley, 2018). For example, as the crime-control system focuses on reported solved crimes rather than the safety of the community, police officers may focus on "easy-to-solve" crime suppression efforts on one hand, and ignore the prevention of new crimes, on the other hand, to game the PMS for strategic advantages (Bianchi and Williams, 2015). Similarly, teachers may focus their efforts to increase the number of high-performance students rather than teaching improvement as PMS only considers the final absolute performance without considering the quality of entrants (Rubin and Zanutto, 2004).

To prevent and counteract the behavioral distortions, performance indicators should include both long-term and short-term goals on one hand, and both tangible and intangible resources on the other hand (Zigan, Macfarlane and Desombre, 2008). Moreover, stakeholders' involvement and interests should be taken into account to improve their recognition and trust in implemented PMS. In addition, the view of organization performance should shift from a static to a dynamic picture of organizational processes and results (Bianchi and Williams, 2015), embedding PMS into day-to-day activities (Pulakos and O'Leary, 2011).

2.2.4.4 Emphasis on silo accountability

PMS is a mechanism of accountability and can be used as enhancements to managerial control for aligning individual behaviors with organizational goals. Although the performance can be measured in the unit of individuals, programs, agencies, or larger systems, in practice, the performance of individual programs and agencies is the most common focus of PMS (Denhardt and Aristigueta, 2008).

The emphasis on silo accountability on one hand has the benefit of establishing clear lines of accountability, on the other hand, this kind of PMS would be inclined to prevent partnerships and other forms of collaboration across different silos, which have been increasingly emphasized in management theory and practice (Osborne, 2006; O'Flynn and Wanna, 2008). Complex social problems are beyond the reach of any single organization acting alone, which

are typically addressed by multiple organizations inside and outside government, so (at a minimum) coordination among programs is necessary to avoid duplication or gaps, as well as to achieve better outcomes (Denhardt and Aristigueta, 2008; Bianchi and Williams, 2015).

Silo accountability is especially prominent in the reform towards NPM, in which standalone silos are evaluated independently without considering the efficient achievement of public value (Osborne, 2006; Bryson, Crosby and Bloomberg, 2014). For instance, a billing product in a water public utility needs the coordination among customer billing office, public relations office, legal office and connections office, and technical service (Bianchi, 2010). Therefore, to achieve public outcomes, it is not enough to emphasize only a combination of different silos, but also a coherent strategy considering both 'external' and 'internal' perspective (Bianchi, 2010), or even an outside-in stakeholder collaboration perspective (Bianchi and Vignieri, 2020).

In this section, the main limits of the performance management system are summarized. To achieve the expected results of PMS, quality of performance indicators, stakeholders' involvement and recognition, possible behavioral distortions and the side-effect of silo accountability must be taken into account and examined carefully. To address those issues, a few theories and practices are emerging, which entail primarily collaborative governance (Ansell and Gash, 2018), network governance (Berthod et al., 2017), participative governance (Fischer, 2012), new public governance (Osborne, 2006; Howlett, Kekez and Poocharoen, 2017) and whole-of-government (Christensen and Lægreid, 2007). These similar concepts of performance governance are related to five strands (Bianchi, 2020): (1) organizational relationships within and beyond the public sector; (2) participation and citizen engagement in performance feedback; (3) focus on outcomes, public value, trust in government, and social capital, (4) information sharing, and (5) joint responsibility/accountability. Among them, collaborative governance is a promising way to deal with "wicked issues" characterized by intrinsic dynamic complexity (Bianchi, 2020; Zhang *et al.*, 2020). Such an approach will be introduced in the following section.

2.2.5 Collaborative governance

The potential benefit of applying collaborative governance to enhance performance is the

focus of this thesis. Thus, this section examines the research on collaborative governance. As this thesis focuses on performance management in HEIs, the application of collaborative governance in higher education is also introduced.

2.2.5.1 Collaborative governance

The development of collaborative governance originates from the decline of the New Public Management (NPM) and the rising of the New Public Governance (NPG). While NPM emphasizes the accountability of different silos, NPG promotes achieving public value collectively (Hood, 1991; Osborne and Gaebler, 1992; Bryson, Crosby and Bloomberg, 2014).

Gray and Wood (1991) define collaboration as "a process through which organizations who can see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their limited vision of what is possible." Among the most important features of the collaboration is the dynamism of the process, the organizations involved, the duration of the cooperation and the shared responsibility. Typical outcomes of collaborative approaches include solved problems, achieved shared norms, and the ultimate survival of the partnership itself. Gray and Wood (1991) conclude that because of the broad nature of collaborative governance, no one single perspective, either preconditions, the process or outcomes, can fully conceptualize it precisely.

Amsler (2016) argues that collaboration is a value itself, and a legal framework must be considered to govern public managers' actions. Law provides a set of decision rules, while management and politics shape decision-making arrangements.

Thomson and Perry (2006) remark on the interactive process of collaboration. They highlight the continuous partners' interaction and attitude to work together towards participative decision-making. While reciprocity and trust are necessary for collective actions, various self-interests must also be aggregated into mutual understanding for common choices and decisions. Therefore, the outcome of the collaboration may not necessarily represent the best possible solution. Instead, it may consist of the achievement of a shared vision among all involved actors.

Hardy, Lawrence and Grant (2005) investigate the causal relationship between the dialogue among collaborative participants and the success of these partnerships. The authors emphasize the role of tension among actors in strengthening partnerships because this allows

for a balanced relationship between cooperative and assertive conversations among members. Finding an accepted construction is also crucial, where participants come to a general agreement by discussing the causes, solutions, and goals relating to the issues the collaboration is attempting to address. As participants both begin and continue to interact, this creates a collective identity, legitimizing the partnership.

Similarly, Flynn and Wanna (2008) and Thomson et al. (2007) summarize four distinctive characteristics of collaboration:

- multiple purposes. It can be seen as a means of pooling existing resources or leveraging new ones, a strategy to reduce risk or to enter new markets, an attempt to reduce transaction costs, a reaction to complexity or turbulent environments, and, finally, as a way for (re)integration in a fragmented domain (Lowndes and Skelcher, 1998; Lawrence 1999; Bryson, Crosby and Stone, 2006);

- multiple dimensions of success. It can be referred to as the achievement of outcomes, getting processes to work, reaching milestones, gaining external recognition and also a personal pride that develops from successfully championing a project;

- trade-offs between efforts (e.g., resources and time) and rewards, which may undermine cooperation. Recognizing the specific capabilities and strategic assets owned by the different organizations is particularly important in setting effective collaborative operations;

- dynamic process. It implies that organizations' incentives for working together needed to be carefully thought out, particularly when the players' power relations change over time.

Through the analysis of a relevant sample of collaborative governance applications in various sectors, Ansell and Gash (2008) outline organizational features leading to productive collaborations. Notably, they remark that time, trust, and actors' interdependence play a crucial role in a successful partnership, as well as in resource governance.

Bryson, Crosby and Stone (2006) investigate the conditions and necessities for collaboration by examining the difficulties and challenges associated with the processes and outcomes of cross-sector collaboration. Through a review of the literature, the authors find that cross-sectoral collaboration takes shape when single ventures in addressing a problem fail. Therefore, both self-interest and interdependences lead to cooperation between multiple stakeholders. The design of a cross-sectoral partnership must include accountability, leadership,

trust, and mutual gain. The literature review provides propositions that would help stakeholders to understand the plan, composition, and implementation of successful cross-sectoral collaborations.

Emerson, Nabatchi and Balogh (2012) synthesized and extended a suite of conceptual frameworks, research findings, and practice-based knowledge into an integrative framework for collaborative governance, which specifies a set of nested dimensions that encompass a more extensive system context, a collaborative governance regime, and its internal cooperative dynamism. As Figure 2.1 shows, Emerson et al. (2012) remark the role played by actors' engagement, the capacity to joint action, and shared motivation as those internal collaboration engines, which lead to actions that can generate impacts and adaptations across the system.

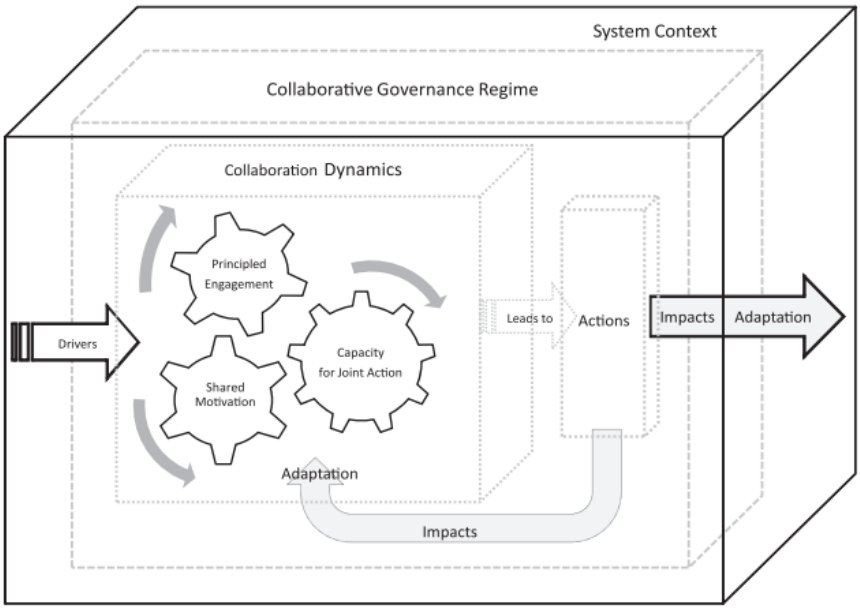


Figure 2.1 An integrative framework for collaborative governance (Emerson et al. 2012, p. 6)

Kania and Kramer (2011) concluded five kinds of collaborations:

1. Funder collaboratives are groups of funders interested in supporting the same issue who pool their resources.
2. Public-Private Partnerships are partnerships formed between government and private sector organizations to deliver specific services or benefits.
3. Multi-Stakeholder Initiatives are voluntary activities by stakeholders from

different sectors around a common theme.

4. Social Sector Networks are groups of individuals or organizations fluidly connected through purposeful relationships, whether formal or informal.
5. Collective Impact Initiatives are long-term commitments by a group of important actors from different sectors to a common agenda for solving a specific social problem.

Their research shows that successful collective impact initiatives typically have five conditions that work coherently to achieve expected results: a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication, and backbone support organizations (Kania and Kramer, 2011). Besides, they also identified three strategies to deal with dynamic social issues: collective vigilance, collective learning, and collective action (Kania and Kramer, 2013). Similarly, Weaver (2014) emphasized the three pre-conditions for Collective Impact, which entail influential leaders, a sense of urgency for the issue, and adequate resources.

Based on the above literature review on collaborative governance, it is possible to outline three main dimensions: *motivations, organizational features, and expected results*. Motivations are the prerequisites for collaboration, and organizational features are the critical success factors, while expected results are the goals and byproducts for collaborative governance. As summarized in Table 2.1, collaborative governance emerges in a complex system context in which a single organization cannot solve the problem alone. It begins with the identification of resource interdependence and different interests of broad stakeholders. Then, trust and a sense of collective identity are built to promote shared understandings and collaboration among partners. Successful collaborative governance contributes to solving the wicked problems on the one hand and builds shared norms, visions, and partnerships for future collaborations on the other hand. Although the long-term value of collaborative governance is recognized among partners, it is a complex and dynamic process with a high cost, a lot of risks and uncertainty, which needs careful examination. Implementation is frequently a serious challenge with a high risk of failure even for those collaborative programs designed by committed visionary leaders (Bianchi, 2020). Thus, a "collaborative platform" is suggested to provide structured frameworks for facilitating the creation, adaption, and success of collaborative governance projects (Ansell

and Gash, 2018), by the means of "decision rules" and "learning vehicles" to foster learning, communication, and collaboration among different stakeholders in the policy design and implementation process of collaborative governance (Ansell and Gash, 2018; Bianchi, 2020).

Table 2.1 Summary of Collaborative Governance Dimensions

Motivations	Resource interdependencies, pooling existing resources, leveraging new resources, complexity, turbulent environments, crisis
Organizational features	Reciprocity and trust, balancing different interests, mutual understanding, dialogue, a joint construction, collective identity, time, leadership, mutual gain, accountability, initial success
Expected results	Solved problems, shared norms, partnership, shared vision

2.2.5.2 Collaborative governance in higher education

Economic growth and global competitiveness are increasingly driven by knowledge and universities play a crucial role in that context (Salmi, 2009). Due to the importance of HEIs in our society, several scholars investigated the governance of HEIs. Amaral and Magalhaes (2002) and Kennedy (2003) emphasize the critical role external stakeholders may play in university governance. They argue that external stakeholders are assuming a growing prominence relative to internal stakeholders in the rhetoric of change, and their presence is designed to make HEIs more responsive to environmental needs and changes.

Paradeise et al. (2009) observe that changes in higher education follow the same trends recorded in other public sectors such as health, social care, security, and justice, in which formalized tools are developed, such as plans, budgeting, and reporting, to improve performance. They also remark that the current situation displays, with a different degree (depending upon the country and the sector), all three possible types of regulation: by substantive rules, by markets or quasi-markets as described by in the NPM narrative, and by the institutionalization of collective action, as in the NPG model.

The collaboration between higher education and external organizations is valuable (Smith et al., 2006; Horstmanshof and Moore, 2016). For example, successful collaborative governance can build a more purposeful work-based learning program that can better enable student capability and increase their employability (Henderson and Trede, 2017). However, there are only a few collaborative governance practices in the higher education area reported (Hunter, 2008). Some examples are an aerospace project in Australia, involving industry stakeholders to train students for the aviation industry and the joined collaboration at Queensland health to provide emotional, therapeutic, and educational support to meet the complex needs of the child.

The above researches focus on university governance from the perspective of the government or outside stakeholders. They highlight the managed relation between government and HEIs, shifting the focus from internal to external. However, few have paid attention to the collaborative governance in HEIs, and the role played by external stakeholders. The reason can rely on the recognition that the implementation of collaborative governance is a complex and dynamic process with high cost, risks and uncertainty (Bianchi, 2020), which needs a careful examination of organizational context and contingency. As this thesis focuses on performance management in Chinese HEIs, the next section will offer a review of the literature on such a topic.

2.3 Performance Management system in Chinese Higher Education Institutions

In this section, the literature on Chinese HEIs PMS is reviewed. Firstly, the institutional framework is presented. Next, the PMS in Chinese HEIs is analyzed and the main limits are summarized.

2.3.1 Chinese HEIs' institutional framework

2.3.1.1 A brief history of Chinese HEIs' development

Modern universities have unique European origins and characteristics (Rüegg, 1992). The first degree-granting university, the University of Bologna, was established in 1088 in Italy (UNIPA was founded in 1806). Modern universities were seen as a place where research can develop independently from any other power, with academic freedom as the take-for-granted

notion.

However, the Western concept of the university does not have many linkages to the Chinese indigenous intellectual traditions (Yang, 2013). Rather than understanding oneself outside of the world, the Chinese view themselves as part of the world and view the world as continual and in-process (Henkel, 2006). Contrary to the notion of academic freedom and autonomy in the West, there is a strong tradition of the alliance between high education and politics in Chinese history. In the 2000 years of imperial history before the 18th century, an imperial examination system was built to select talents and higher education was a part of the bureaucratic system aiming at preparing would-be officials for the state (Zhang, 2009), such as Piyong in Zhou Dynasty (1046-249 BC), and Taixue in Han Dynasty (202-220 AD) (Hayhoe, 1996). Since China's first imperial university, the Taixue, was established in 124 BC, this tradition of integrating ethics-centered knowing into social practice, or the unity of knowledge and action, has been incorporated into the secular aims of China's HEIs (Li, 2012). It is remarkable to see how such a tradition shapes the development of higher education in China.

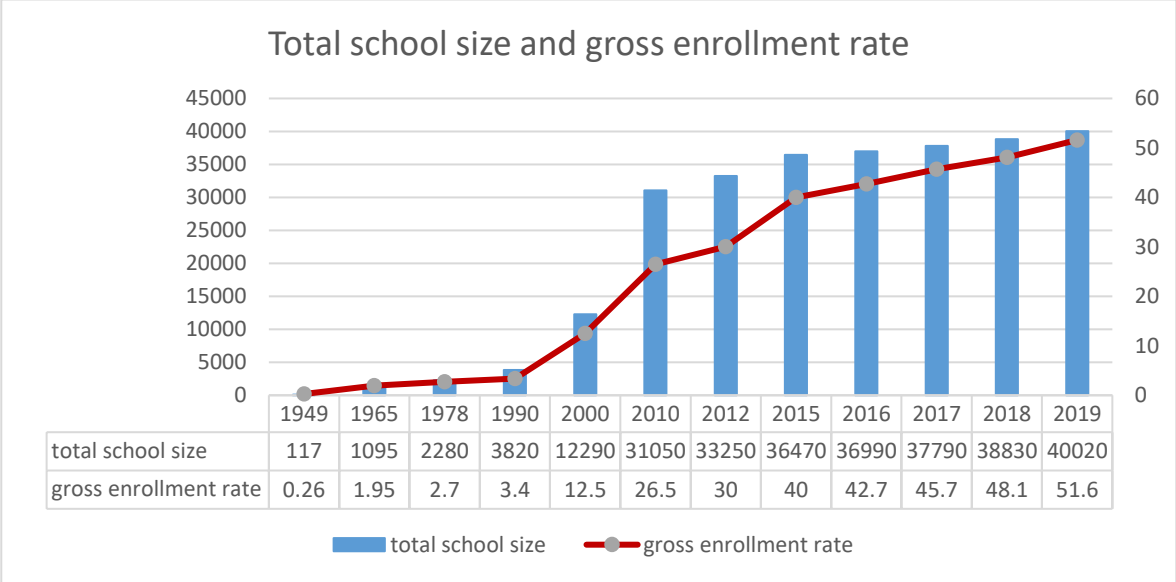
The efforts to indigenize the Western concept of the university in China started in the 19th century. Matteo Ricci's arrival into China was a prologue, which was followed by missionaries, including Ernst Faber, Timothy Richard, William Alexander Parsons Martin, and Young John Allen (Yang, 2013). After the Opium Wars, pioneer Chinese officials started to see more fundamental roles of education. Successful efforts were brought by overseas returnees. Cai Yuanpei, who graduated from Leipzig University in Germany, made a courageous experiment when he was appointed Minister of Education by the government in 1911 and president of Peking University in 1917, which transformed the university from an official institution into a modern institution. Similar efforts were also made at Tsinghua University by Mei Yiqi and at Zhejiang University by Zu Kezheng.

During the Second Sino-Japanese War, the National Southwestern Associated University built in Kunming was seen to uphold a model of higher education in which modern universities, based on the American model in large part, sought to preserve liberal education, academic freedom and political autonomy. As pointed out by Hayhoe (1996), the lack of central government provided Chinese higher education with the possibility of vigorous experimentation departing from the tradition.

After the founding of the People's Republic of China, Chinese higher education cut off links to the Western world and turned, towards the Soviet Union's model for universities (Duan, 2003). The Chinese HEIs were reformed into single disciplinary universities, such as universities of engineering, agriculture, steel, petroleum, geology, etc. These specialized universities were affiliated with ministries and tightly controlled to coordinate with national development plans. The major mechanisms included: governments allocating higher education resources, appointing university leaders, assigning graduates jobs and deciding enrollment numbers for individual institutions (Cai, 2004).

Following the open-door policy in the 1980s, Chinese higher education once again draws closer to the developed Western world to improve efficiency and effectiveness (Duan, 2003). A few trends can be observed in the recent reform of Chinese higher education, which entails expansion, the building of world-class universities and governance reform. These reforms are called for by the demand for economic development on one hand and assisted by the international organizations on the other hand, such as the World Bank and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) (Cai, 2010).

Nowadays, China is considered the largest higher education system in the world (Gu, Li and Wang, 2018). As Figure 2.2 shows, according to the 2019 National Education Development Statistical Bulletin, there are 2688 HEIs in mainland, China, with a total school size of 40,002,000 people and a gross enrollment rate of 51.6%. In 2019, 9,149,000 new regular undergraduate students and 916,500 graduates (including 811,300 master students and 105,200 doctoral students) were enrolled. Also, 3,022,100 people enrolled in adult education institutions.



	1949	1965	1978	1990	2000	2010	2012	2015	2016	2017	2018	2019
total school size	117	1095	2280	3820	12290	31050	33250	36470	36990	37790	38830	40020
gross enrollment rate	0.26	1.95	2.7	3.4	12.5	26.5	30	40	42.7	45.7	48.1	51.6

Figure 2.2 Total school size and gross enrollment rate of Chinese HEIs in 2019 (Ministry of Education, 2020)
Notes: Total school size is counted in thousand, while the value of gross enrollment rate is counted in percentage.

2.2.1.2 Higher Education founding principles: The Higher Education Act

In China, the setting and operation of higher education institutions are specified by the Higher Education Act, which is first released in 1998, and recently amended in 2015 and 2018 (Higher Education Act, 2018; Gu, Li and Wang, 2018). The Higher Education Act is divided into 7 chapters defining the founding principles of an HEI.

The general provisions (Chapter 1 of Act) describe the mission and managerial framework of Chinese higher education institutions. First, the development of higher education is part of a national strategy to support the development of the country by supplying talents and services (No.1-No.6). Second, the state council is responsible for the management of national higher education institutions (i.e. elite universities), while the regional government is responsible for the management of the regional higher educational institutions or authorized as an agent of the state council to manage the other institutions (No.13 and No.14). Third, the state makes higher education development plans to steer the development of the higher education system, to build multiple types of higher education institutions to support the needs of society (No.7).

The fundamental institutions (Chapter 2 of Act) specify the overall arrangement of higher

education programs, which can be divided into specialist, undergraduate, graduate, and doctoral programs. For each kind of education program, the organizational requirement of higher education institutions to run the program, the requirement for admission and graduation are specified. The organizational requirement focuses exclusively on the available facilities and competent faculties.

Chapter 3 of the Act describes the requirement and process to set up a higher education institution. First, the building of a new higher education institution should be consistent with the higher education development plan made by the state council. For instance, the national plan may set a goal for the number of new HEIs in different directions. Second, the applicant should be equipped with related resources, especially enough facilities, and competent faculties to conduct teaching and research activities. Third, the application needs to be approved by the government. The undergraduate and above-level higher education institutions need to be approved by the state council, the specialist-level higher education institutions need to be approved by the regional government and be put on record in the state council, while the other HEIs need to be approved by the regional government. In reality, the affiliated government is closely related to the reputation and funding resources of higher education institutions. Almost all the top universities are governed by the state council (ministry of education and a few other ministries), while only a few are governed by the regional government in big cities, which can provide a huge amount of funding to support local universities.

Chapter 4 of the Act stipulates the organizational arrangement and activities of higher education institutions. The recruiting plan of students is made by the higher education institutions according to social needs, institutions' conditions, and government-approval quota. In practice, the number of students is strictly regulated by the government, and higher education institutions can only variate the allocation of students to different departments. For example, the massive expansion in the 2000s is initiated by the government and then executed by the HEIs. For the performance evaluation, the higher education institutions are responsible for its evaluation of education level and quality, while the government will organize experts or third-party institutions to evaluate the performance of HEIs.

Chapters 5 and 6 specify the rights and responsibilities of faculties and students. Chapter 7 stipulates the fund-raising of HEIs. The resources are allocated by the affiliated government

according to the number of students and available funding. Generally, the national universities get higher input than regional universities, with regional universities in big cities as exceptions. The allocated fund is used for basic operation, the other funding is run as special projects. For example, every year the national or regional government provides funds for educational reform. The universities or the faculties can apply for the fund individually. Similarly, the elite initiatives, which entail 211, 985 and double first-class, provide additional funds for research universities to compete in the global higher education system.

The Higher Education Act provides a framework for the building and operation of HEIs. Next, recent reforms in Chinese HEIs will be introduced, which entail massive expansion, the building of world-class universities and governance reform.

2.2.1.2 Expansion of Chinese higher education

During the last half of the 20th century, expansion in higher education happened in most developed countries and many developing ones (Altbach and Umakoshi, 2004). China also follows this change. To adapt to the needs of a market economy, an unprecedented expansion of higher education has been taken place in China since 1998 (Wan, 2006; Gu, Li and Wang, 2018). During the period from 1998 to 2019, the enrollment of new regular undergraduate students on average grew by about 10.71% annually, increasing from 1.08 million in 1998 to 9.149 million in 2019 (Ministry of Education, 2020). As a result, the total enrollment of regular undergraduate students in Chinese higher education increased from 3.41 million in 1998 to 40.02 million in 2019, with the gross enrollment rate increasing from 9.76% in 1998 to 51.6% in 2019 (Ministry of Education, 2020).

Trow (1972) classified higher education development into three stages: elite, mass and universal higher education. According to his classification, the most important indicator of the development stages is the gross enrollment rate, which refers to the percentage of the 18-22 age group enrolling full-time in higher education. The cutoff point between elite and mass is 15%, while that between mass and universal is 50%. Thus, in terms of enrollment, Chinese higher education has just passed 50% (51.6% in 2019) and entered a universal higher education stage.

There are multiple reasons for the expansion. According to Mr. Lanqing Li, the vice-premier in charge of education at the time when the decision was made, there are four major

reasons (Wan, 2006):

1) The need for more talented personnel to sustain the rapid development of the Chinese economy;
2) The public demand for higher education is increasing and the government must meet their demand;
3) Enrollment expansion can both postpone the employment of high school graduates and increase educational consumption, which is an important means to stimulate domestic consumption and promote growth in related industries;
4) Enrollment expansion will reduce the pressure on high schools, discouraging test-oriented teaching and learning and promoting all-around education in elementary and secondary schools.

These reasons reflect the Chinese government's social and economic development strategy, in which education was important to economic development yet the needs of economic development preceded the needs of education itself, although Chinese scholars generally agreed on the long-term benefits of expansion in higher education. Especially in 1999, China survived the Asian financial crisis, and the expansion of higher education was implemented to stimulate domestic consumption. Similarly, in the current global pandemic of covid-19, more opportunities are provided for graduated students to study further as competition in the job market increases.

The expansion speeds up many reform efforts in Chinese higher education. The first one is decentralization and marketization, which increases the decision-making power of individual institutions, provincial and local governments, as they need to be more responsive to market demand and social changes. As the expansion places enormous financial constraints on HEIs, HEIs diversify their funding resources by funding from the provincial government, education fees from students, and various entrepreneurial activities. The second one is the rapid growth of private higher education institutions. Although private higher education institutions stay marginal to the public universities, they enroll 2,196,900 regular undergraduate students in 2019, accounted for 24% of the total enrollment (Ministry of Education, 2020). The last one is equity issues (Min, 2004; Hawkins, Jacob, and Wenli, 2008; Yeung, 2013). On one hand, the distribution of students from different social classes in the higher education system is uneven.

On the other hand, the tuition fee is a heavy burden for low-income families, especially students from rural areas.

2.2.1.3 Building of world-class higher education institutions in China

China's recent quest to develop world-class universities is a significant phenomenon within the worldwide transformation of tertiary education (Li, 2012; Gu, Li and Wang, 2018). The concept of a world-class university is ambiguous and debatable. Altbach (2003) emphasizes four characteristics: excellence in research, academic freedom and an atmosphere of intellectual excitement, a significant measure of internal self-governance and an entrenched tradition, and adequate facilities and funding. Similarly, Salmi (2009) proposes a more detailed definition: 1) a high concentration of talent; 2) abundant resources to offer a rich learning environment and to conduct advanced research; and 3) favorable governance features that encourage strategic vision, innovation, and flexibility, and that enable institutions to make decisions and to manage resources without being encumbered by bureaucracy. Four characteristics are central to the conceptualization of world-class universities: mission and vision, academic and educational excellence, governance and adequate sources of support (Li, 2012).

As early as 1983, Kuang Yaming, President of Nanjing University, began to appeal for national priority funding to build several research universities in China, which are characterized by the high quality of education, multiple disciplinary areas, and comprehensive coverage of knowledge (Kuang et al. 1983). Three major initiatives were implemented to provide special funds for leading universities, which entail "211", "985" and "double first-class".

Project "211" was released in 1993 and formally started in 1995, namely building 100 excellent universities in the 21st century. This initiative aims to improve the quality of teaching, research and administration. Three major areas are supported in this project (Li, 2012): overall infrastructure and faculty in selected institutions (i.e., funding for both hardware and software); key disciplinary areas in a wider range of institutions that respond to the demands of socio-economic development; and public service systems such as the development of national databases for education and research. In this project, 112 universities and 821 key disciplines were selected and received significant special funds to fulfill their plans. During this time, many universities merged to make them competitive to apply for a special fund.

Five years later, in May 1998, project "985" was launched during the Peking University's centennial celebration (Li, 2012). This project focused on a smaller number of research universities: 34 were selected in the first phase and 5 more universities in the second phase. All selected universities received high funds from both the central and local governments. Among the 39 universities, the distribution of funding is uneven, as the top two universities (i.e. Peking University and Tsinghua University) acquired a large part of the total funding.

Recently, the "Double first-class" project was launched in 2015 and implemented in 2017. It can be seen as both a combination and a substitution of the previous "985" and "211" projects, aiming to develop first-class universities and disciplines of the world. In this project, 42 universities were selected as first-class universities (among them 36 are A-type, 6 are B-type, namely, A-type is better than B-type), and 95 as first-class discipline universities. In total, 465 key disciplines were supported. Following this project, the arrangement of disciplines is adjusted to reduce overlaps and outdated research.

China's efforts to build world-class universities have largely improved the academic performance of leading universities. In the ARWU 2020 (academic ranking of world-universities), 2 Chinese universities appear in the top 50 (Tsinghua University 29, Peking University 49), and 6 universities are in the top 100 (the other four universities are: Zhejiang University 58, Shanghai Jiao Tong University 63, University of Science and Technology of China 73, Fudan University 100). In addition, 16 universities rank between 100 and 200, and 10 universities in the 200-300 range (ARWU, 2020).

2.2.1.4 Governance reform of Chinese HEIs

In higher education, governance is generally defined as how higher education is coordinated in a national system (Cai, 2010). Some scholars concluded two rounds of reforms in the Western higher education system (Maassen, 2003): the first round emphasizes marketization, privatization and decentralization, while the second one is driven to correct the flaws of the first round, featured by coordination, accountability, re-regulation and performance management.

The governance transition in Chinese higher education follows a similar pattern. Before 1980, Chinese higher education was a centrally planned system, in which the government is

responsible for resource allocation, personnel recruitment, student enrollment and job placement for graduates. Since the 1990s, the governance model has shifted from a "state" control model to a "state supervisory" model (Min, 1994). On one hand, more autonomy and flexibility are given to local governments in terms of student enrollment, funding support and personnel management. On the other hand, while the state exercises macro-control through legislation, funding, planning, HEIs are allowed more autonomy and decision-making power in education matters. For example, a university council is built for decision makings at the university level.

Drawing on the theory of global isomorphism, Cai (2009) concluded three mechanisms driving the governance reform of Chinese higher education. The first mechanism is international regulations, with UNESCO, World Bank and WTO being the most influential international organizations providing encouraging visions and financial aids. The second mechanism is consultancy involvement, especially the series of reports of the World Bank that provided policy recommendations for government reform including higher education. The last mechanism is mimetic learning, as China makes use of the time lag between developing states and developed countries to search for legitimate and successful solutions. Besides, governance reform is also called for by the urgent needs of the other development goals. For example, the expansion of student enrollment and the building of world-class universities call for diversified funding and decentralization to support the operation of HEIs.

Although Chinese higher education has turned from the Soviet model to the US model, Chinese higher education is still Chinese (Ma, 2009). Firstly, there are multi-government controls over HEIs. Most of the decisions on quality assurance, academic standards, core curriculum, and core finance are in the hand of the Ministry of Education, while provincial and local governments can practice control on the establishment of new academic programs, allocation of counterpart funds and enrollment of local students. Secondly, despite the similarity in the academic organization and commercial behavior, the governance structure and process of decision-making are quite different between Chinese and American universities. For instance, in China, presidents of leading universities are appointed by the Ministry of Education rather than the university board in western countries, such as America. Besides, there are not outside members in the university board, with all the members being vice presidents, deans and

directors in the university administration. Finally, although important decisions are made through the university council, they need to be reported to affiliated governments for approval or to be put on record.

2.3.2 Performance management system in Chinese HEIs

2.3.2.1 A hierarchical higher education system in China

The reform of Chinese higher education went through a process of both homogenization and diversification (Zhang, 2009). On one hand, all the specialized universities in the Soviet model restructure towards a more comprehensive pattern of knowledge, with all HEIs seeking to broaden their coverage (i.e., homogenization). On the other hand, driven by the differences in funding resources and research capacity, higher education institutions are structured hierarchically according to their functions and goals (i.e., diversification) (Gu, Li and Wang, 2018). On the top are the national elite universities that focus on research (research university), especially those selected in the elite initiatives (i.e. 211, 985 and double first-class). They are the "national team" to develop innovative research and to compete in the global higher education system. This kind of university holds a large fraction of doctoral programs. The universities in the second rank are oriented to both research and teaching (teaching-research university), focusing on master and bachelor students, with doctoral students only in a few specific disciplines. The third-rank universities are teaching-oriented and focus on educating bachelor students (teaching university).

Table 2.2 Comparison of three kinds of universities

University typology	Short description	Source of funding	Focus of Performance system
First rank: research universities	Elite universities which serve national needs and competing globally	State and provincial government	Research and social service performance
Second rank:	Teaching and	Provincial and	Research and

teaching-research universities	research-balanced universities that serve regional needs and competing nationally.	local government	teaching performance
Third rank: teaching universities	Local universities are teaching-oriented and focus on educating bachelor students.	Provincial or local government	teaching performance

As shown in Table 2.2, for each kind of HEIs, the performance system focuses on different performance indicators. The national elite universities are governed by the state council (Ministry of education and a few other ministries), whose performance was largely composed of research performance, namely publications, patents, projects and funding. These HEIs need to follow international trends and serve national socio-economic needs. The participation of local governments supports the localization of higher education and reforms that diversify the sources of funding. The second-rank HEIs are governed by provincial or local governments. Although these HEIs also conduct research, their functions are to serve part of national needs and largely focus on local needs. The third-rank HEIs are teaching-oriented, and their performance indicators focus on teaching performance.

With the fast expansion of Chinese HEIs, the maintenance and improvement of teaching quality face a great challenge. Besides, as the research becomes increasingly important for economic development and national competition, the planning and stimulating of high-quality research activities becomes a critical part of the national development strategy. Under such a background, a quality assurance system in higher education was gradually implemented. As Figure 2.3 shows, the system can be summarized into 1) external quality assurance systems, and 2) quality assurance systems within higher education institutions (Li, 2010).

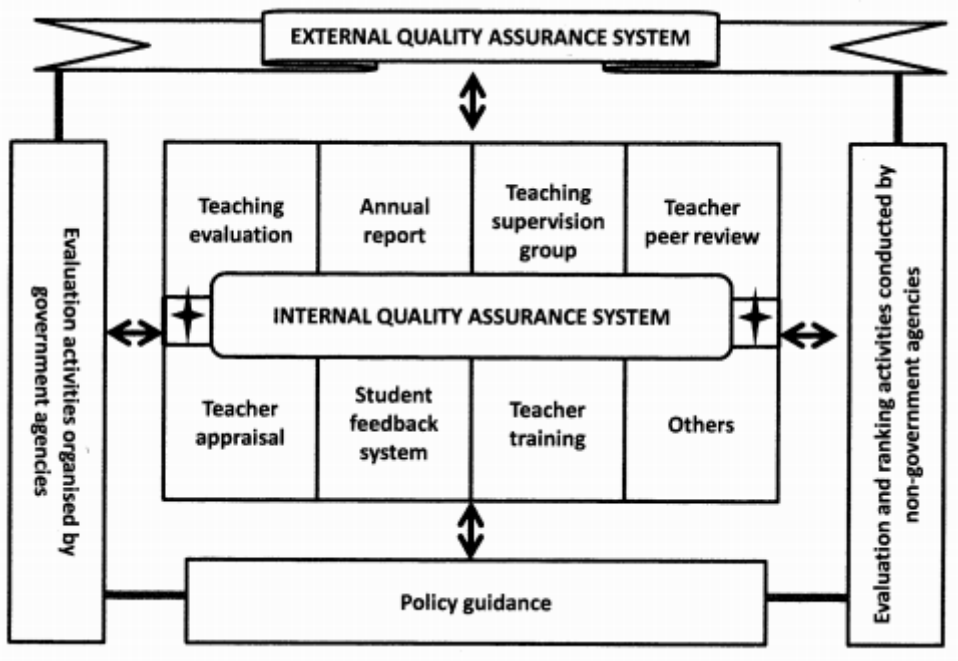


Figure 2.3 The structure of quality assurance in Chinese HEIs: external and internal quality assurance systems (Li, 2010, p.66)

2.3.2.2 The external quality assurance system

There are three main components of the external quality assurance system (Li, 2010):

1) the government's supervision through policy guidance, especially Project "211", Project "985" and "double first-class", in which national universities submit ambitious proposals to get special funding for performance improvement. Furthermore, a few grants are set for developing courses of excellence, learning-resource renovation, compiling textbooks of excellence, selecting and rewarding the "national outstanding teachers in teaching". In addition, the National Education Evaluation Centre was built to coordinate various kinds of quality evaluation activities.

2) the government's monitoring through various evaluations carried out by government agencies, among which the most influential ones are the national teaching quality evaluation and the discipline-based reviews. The education evaluation network in China has been based on evaluation agencies at both national and regional levels (Ding, 2008, cited in Li, 2010). The Evaluation Office of the Higher Education Department, Ministry of Education is responsible for national education quality evaluation, while most provincial governments also establish their education evaluation agencies. That kind of evaluation produces reports and rankings that

have a big impact on the reputation of HEIs.

3) the newly emerging non-governmental evaluation agencies and university rankings produced by various non-governmental institutions. These evaluations are supplementary to the evaluation organized by governmental agencies in China. For example, universities will report their performance in the rankings as a proxy of research capacity. Besides, some universities also hire private companies to evaluate their performance and to provide suggestions for further improvement. Sometimes, it can be a preparation stage for the government evaluation.

2.3.2.3 Quality assurance systems within Chinese HEIs

The increasing external pressure for accountability requires HEIs to build their quality assurance systems, which can monitor the education quality within HEIs on one hand, and respond actively to external evaluations on the other hand.

The common features of internal quality assurance systems in Chinese HEIs include (Ding, 2008; Li et al, 2008; NEEC, 2008; Shi et al, 2008, cited in Li, 2010):

- The establishment of institutional teaching evaluation centers, whose responsibilities are developing and operating the quality assurance system inside their institutions;
- The formation of teaching supervision/steering groups, who are the senior teaching staff or retired senior staff with expertise in teaching. These groups investigate problems in teaching by direct observation and talking with students and teachers, and provide advice about the solutions.
- Peer review. Teachers are encouraged to attend the other teachers' class, by which they can monitor and learn from each other to improve education quality.
- Student feedback. Surveys and interviews are conducted to collect students' opinions on the learning process and performance.
- Annual report. Self-review and report help to perceive the development of education quality and existing problems.
- Teacher training. This training includes pre-work training, in-service training and other types of training for teachers. Among them, pre-work training is considered to be most important and it is mandatory for all new teachers in Chinese HEIs.

2.3.2.4 Performance appraisal in Chinese HEIs and recent development

Following the similar international trend of performance funding, quantitative performance indicators dominate the performance appraisal process, which emphasizes publications in international journals, up-to-date laboratories, buildings, star professors, and additional funding (Mohrman, 2003, cited in Salmi, 2009; Gu, Li and Wang, 2018). However, these measures generate a few side effects (The state council, 2010). Firstly, the tension between quality and quantity arises. As it is difficult to evaluate the quality, quantity is taken as the main evaluation standard. Secondly, there is a lack of attention paid to teaching compared to research. As the research performance occupies the main part of performance indicators, the importance of teaching input and performance is undervalued.

To address those issues, a new policy was implemented to overhaul the performance appraisal of HEIs and teachers (State council, 2019). In the regulation titled "The overall solution for deepening education evaluation reform in the new era", the state council introduced customized evaluation schemes for different HEIs, in which the importance of teaching was also emphasized. Besides, peer review is promoted to supplement the narrowly measurable performance indicators. Furthermore, quality is emphasized and researches with high innovativeness or big socio-economic impacts are encouraged.

2.3.3 Main limits of performance management/measurement system in Chinese HEIs

2.3.3.1 The challenges of modern higher education institutions

The continuous changes in modern society make it difficult to define the role of HEIs precisely. Since its foundation, the university is considered the center of great minds, which creates and diffuses knowledge, delivers both knowledge and skilled students to society. With the booming of the knowledge economy and the increase of global competition, HEIs need to reposition and restructure themselves to respond more effectively to the changing social, economic, and political systems.

Traditionally, HEIs are responsible for two missions (Etzkowitz, 2004; Etzkowitz and Zhou, 2017). The first mission is research, whether fundamental or applied, without which it cannot play a leading role in higher education and knowledge creation. The other one is teaching, which is dedicated to training skilled students for the industry and society. With the booming

of the knowledge economy, compared to the traditional twin missions of teaching and research, nowadays more and more emphasis has been put on the third mission, which involves transferring and commercializing knowledge generated within the university and contributing widely to socio-economic development (Larédo, 2007; Etzkowitz and Zhou, 2017; Mejlgaard and Ryan 2017).

These three missions interplay and interact with each other (Zhang et al., 2018). As shown in Figure 2.4, research offers new findings and tools for continuously updating teaching courses (see link a). At the same time, teaching activities provide new ideas and experiences to support research goals and to review research plans (see link b). Teaching, as well as research, interacts with the third mission. Teaching activities deliver qualified graduate students to the society (see link c), which may find job opportunities in organizations or may decide to launch their ventures (third mission). Universities also get feedback from stakeholders, which supply inputs to redesign teaching courses (see link d). Research provides innovative processes, techniques, patents, and products to satisfy stakeholders' needs (see link e). Simultaneously, the third mission gives feedback by proposing new research ideas, projects and training programs (see link f). Ideally, these three missions lead to multiple reinforcing feedback loops, which can foster the achievement of university missions. However, as suggested by Zaini et al. (2015), there are multiple delays caused by the time needed to recruit faculty members to train students and to generate new knowledge and technology. As a consequence of these delays, the rate at which education and social services are delivered to society is affected. Furthermore, there are also trade-offs between the three missions as they are competing for the same pool of financial resources, faculties, facilities and time, leading to balancing loops, which would undermine the achievement of the missions without active intervention.

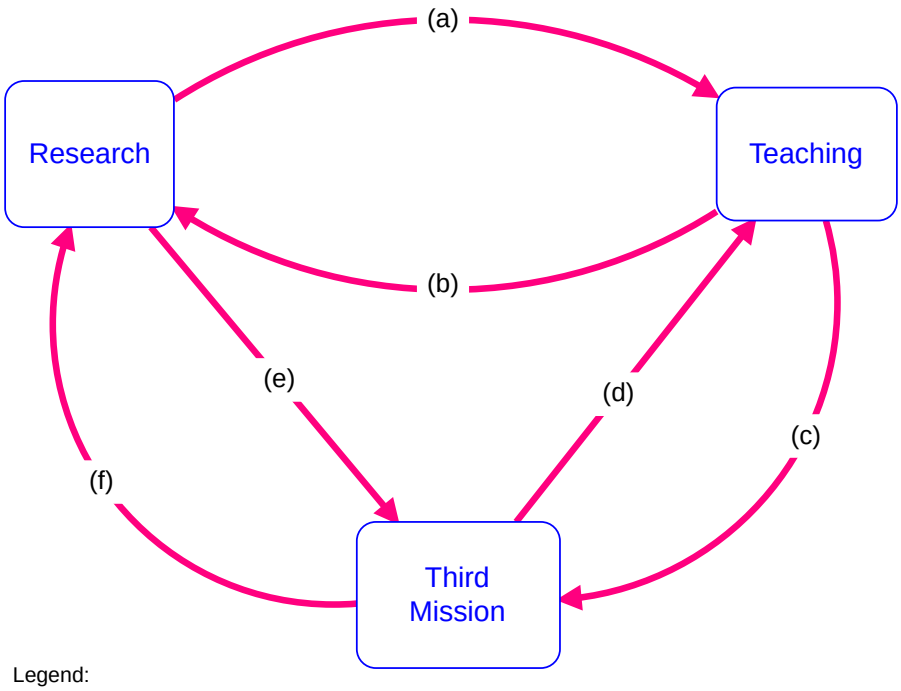


Figure 2.4 An ideal Framework of University Growth (Zhang et al. 2018)

However, HEIs cannot face the above challenge alone. In the World Bank report titled "The challenge of establishing world-class universities," Salmi (2009) emphasized the role of both government and private sector to support the development of the university in terms of funding and active participation. Zaini et al. (2015) also suggested that due to the enormous time delays needed for anchoring entrepreneurial activities and having them flourish and cause a measurable change, the trust and continuing support from the government is of great importance. To generate advanced knowledge needed by society and to provide high-quality services, HEIs have to promote partnerships and interactions with different stakeholders, including profit and non-profit enterprises, public organizations and citizens.

2.3.3.2 Main challenges faced by Chinese HEIs to improve their performance

The analysis of the literature shows three main streams of research on Chinese HEIs' performance management challenges.

The first stream of research focuses on the role of the governance dimension (e.g., the autonomy of each key-actor and their coordination) in HEIs performance management system. Xie and Yan (1998) examined the dynamics among administrative, academic and stakeholder

power, which are rooted in the evolving historical and social environment. They suggest HEIs separate administrative power from academic power, thereby improving the autonomy of academic power concerning the direction of development. Liu, Qu, and Kang (2020) investigated different kinds of governance in Chinese HEIs, including law, government regulation, intermedia evaluation by the third party, market, HEI-level management and school-level self-governance. They suggested that HEIs needed more autonomy about not only "how", i.e., the execution of development plans, but also "what", i.e. the direction of HEI development. In a similar vein, other scholars proposed to empower faculties with long-term career development and financial plans (Chen and Xie, 2020; Han and Hu, 2019).

The second stream of research addresses the existing distance between social needs and outcomes offered by current programs in HEIs. Ding (2020) criticized the lack of practical ability among students and proposed that HEIs should collaborate with the industry to provide practical courses and training. A few researchers proposed to update current programs with the latest development and the emerging needs of the society, especially the cross-discipline knowledge, practical ability and internationalization (Hu et al. 2017; Hu, 2019; Li, 2019; Xia and Zhao, 2017; Qi and Xu, 2019). Besides, the potential benefit of new technologies for educational improvement is emphasized, such as artificial intelligence and MOOC (Hou and Li, 2020; Wu, Guan, and Qu, 2015). In recent years, in the name of "New discipline", many National Teaching Steering Committees are planning and experimenting with new courses and programs in response to the calls for educational reform.

The last stream of research highlights the importance of students' teaching and management activities (e.g., lecturing, assignment corrections, tutorships, etc.) to improve HEIs' performance. You (2010) suggested building a cluster of interconnected courses by a team rather than separated individual courses to support the full development of student abilities. Similarly, worried about the side effect of fragmented learning in the mobile era, Li (2020) promoted "deep learning" by providing adequate after-class tasks and building a learning community among students. Du and Zhang (2016) proposed a new way of teaching called "dual-class", which is consisted of a half-class presentation and a half-class discussion to combine the strength of traditional lean presentation and the interactive flipped classroom (i.e., active learning). At last, a few researchers criticized the problem of traditional one-time paper-

and-pencil tests and proposed to update the evaluation process with a high frequency and multiple perspectives, especially they suggested embedding the evaluation in the learning process rather than only at the end of the course (Luo and Liu, 2014; Lin et al., 2020).

2.4 Research question

From the above analysis, it is possible to identify a few issues that Chinese HEIs need to address to improve their performance.

Firstly, four main limits tend to hinder the functionality of a PMS, which can be summarized as follows:

- inadequate performance indicators and measurements (Youngblood, 2003; Moxham and Boaden, 2008; Franco-Santos and Otley, 2018; Rua, 2019, etc.);
- lack of stakeholders' involvement and recognition (Weiss and Hartle, 1997; Pulakos and O'Leary, 2011; Lee, Townsend and Wilkinson, 2018, etc.);
- behavioral distortion and gaming (Bimber, Turopolec and Young, 1983; Simon and Eitzen, 1986; Smith, 1993; Bianchi and Williams, 2015; Mizrahi, 2017, etc.), and
- emphasis on silo accountability (Osborne, 2006; Denhardt and Aristigueta, 2008; O'Flynn and Wanna, 2008; Bryson, Crosby and Bloomberg, 2014, etc.).

Secondly, scholars emphasized three key challenges in Chinese HEIs' PMS:

- lack of autonomy in HEI and academic power concerning the direction of HEI development (Xie and Yan, 1998; Liu, Qu, and Kang, 2020; Chen and Xie, 2020, etc.);
- unbalance between social needs and current programs (Hu et al. 2017; Hu, 2019; Li, 2019; Xia and Zhao, 2017; Qi and Xu, 2019, etc.);
- lack of attention to students' teaching and management (You, 2010; Luo and Liu, 2014; Du and Zhang, 2016; Lin et al. 2020; Li, 2020, etc.).

As it is showed in Table 2.2, the four limits are also the causes of the three challenges in Chinese HEIs' PMS indeed. Inadequate performance indicators and measures place not enough weight on students' teaching and management, and teachers game the system to get "good" performance, while the emphasis on silo accountability induces fragmentation of governance, which is the reason why there is a lack of autonomy in the HEI and academic power concerning the direction of HEI development. Secondly, the unbalance between social needs and current

programs is caused by a lack of industrial involvement to co-design and co-develop programs. Finally, these shortcomings reduce the stakeholders' involvement and recognition and thereafter behavioral distortion and gaming emerge, which further worsen the situation.

Table 2.3 Cause and effect relationship between Chinese HEIs PMS limits and HEIs challenges

Limits of Chinese HEIs' PMS		Chinese HEIs' Challenges
Inadequate performance indicators and measurements;	----------→	Lack of attention to students' teaching and management.
Lack of stakeholders' involvement and recognition	----------→	Unbalance between social needs and current programs;
Behavioral distortion and gaming, and	----------→	Lack of autonomy in HEI and academic power concerning the direction of HEI development;
Emphasis on silo accountability.	----------→	

Furthermore, with the increasing importance of knowledge for economic development and global competition, HEIs also need to reposition their functions and be more responsive to the changing social needs. Chinese HEIs face great challenges in all three missions (i.e., teaching, research and the third mission) on one hand, and compared with the western counterparts, they are constrained by the massive expansion of student enrollment and lack of autonomy concerning the direction of development in a more centralized and pragmatic system on the other hand (Gu, Li and Wang, 2018). In such a system, the economic concern dominates the development strategy over academic value and the government places close control over the hierarchical higher education system.

To enhance the performance of Chinese HEIs, collaborative governance can be a promising way (Smith et al., 2006; Horstmanshof and Moore, 2016; Henderson and Trede, 2017;

Zhang *et al.*, 2020; Ding, 2020). Firstly, collaborative governance can increase broad stakeholders' involvement and participation, which is crucial to overcome the limits of traditional performance management systems. Secondly, the attainment of HEIs goals, especially the increasing emphasis of the third mission, requires the involvement of a wide range of external stakeholders/partners. Finally, the collaborative governance with external stakeholders (including the government) can provide extra resources and support, which helps Chinese HEIs to overcome the constraints of limited resources and lack of autonomy.

However, as the literature review shows, the use of a collaborative governance approach in HEIs is rare (Hunter, 2008; Zhang *et al.*, 2020). Current research focuses primarily on university governance from the perspective of the government or outside stakeholders (Amaral and Magalhaes, 2002; Kennedy, 2003; Saiti, Abbott and Middlewood, 2018). They highlight the managed relation between government and HEIs, shifting the focus from internal to external actors. However, a few scholars have paid attention to introduce a collaborative governance perspective in HEIs, and the role played by external stakeholders (Zhang *et al.*, 2020**)**. Therefore, collaborative governance is not included as a part of the HEIs' PMS as the current PMS only considers the accountability of different silos without taking external relationships, interactions and impacts into account. To fill this gap, two research questions are here investigated:

RQ1: How to foster collaborative governance in Chinese HEIs?

RQ2: How can collaborative governance support Chinese HEIs to enhance their performance?

In the next chapter, I will highlight a conceptual framework to enhance the performance of HEIs through collaborative governance. In doing so, I will apply the Dynamic Performance Management perspective (Bianchi, 2016). Then in Chapter 4, through the Dynamic Performance Management approach, I will discuss a comparative study of a consulting project and a joint lab modeling the collaborative governance between HEIs and external organizations.

Chapter 3 A conceptual framework to enhance the performance of Chinese HEIs through collaborative governance： A Dynamic Performance Management approach

3.1 Introduction

In Chapter 2, research on performance management and Chinese HEIs is summarized. Performance Management is critical for organizations to align employees' behaviors and daily activities with organizational goals and strategy. The information generated from the PMS can be used for performance evaluation, rewarding of performance, performance improvement, and goal setting and planning. However, the implementation of a successful PMS is not straightforward. The formula for effective performance management remains elusive because of four limits in the PMS, which entail limits of performance indicators and measurements, lack of stakeholders' involvement and recognition, behavioral distortion and gaming, and emphasis on silo accountability.

Because of the above limits, Chinese HEIs face challenges in three aspects: lack of autonomy in HEI and academic power concerning the direction of HEI development, the imbalance between social needs and current programs, and lack of attention to students' teaching and management. These challenges also have a deep root in the organizational and cultural context of Chinese HEIs, namely, massive expansion of student enrollment and the dominance of economic concern over academic value in the HEI development strategy. Besides, in the knowledge economy and globalization era, HEIs also need to be more responsive to the changing social and economic needs than before.

Collaborative governance is a promising way to improve the performance of Chinese HEIs. It can help to overcome the limits of PMS and to bring stakeholders' involvement and additional

resources to HEIs. Although the potential benefit of collaboration with external stakeholders is well recognized, the reporting of collaborative governance in HEIs is rare. Thus, this thesis aims to investigate the following research questions: (1) How to foster collaborative governance in Chinese HEIs? (2) How can collaborative governance support Chinese HEIs to enhance their performances?

This chapter will highlight a conceptual framework to enhance the performance of Chinese HEIs through collaborative governance. As the implementation of collaborative governance is a complex and dynamic process with high cost, risks and uncertainty, a Dynamic Performance Management (DPM) approach (Bianchi, 2016) here is suggested and applied.

3.2 Dynamic Performance Management

To foster the implementation of collaborative governance in Chinese HEIs, the dynamic complexity of organizational growth, bounded rationality and their interactions must be taken into account. To handle this issue, the DPM approach is introduced in this section. This section begins with the discussion of organizational growth and dynamic complexity which DPM aims to address, followed by a brief introduction of the three views of DPM.

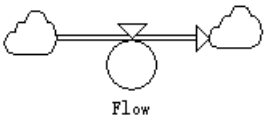
3.2.1 Organizational growth, dynamic complexity and learning

Managers tend to work in a fire-fighting way, occupied by urgent current needs with underinvestment of the time and resources in future planning and crisis prevention (Senge, 1990). The less time they spend sensing early symptoms of crises, the more frequent and severe the future crises are. There are two interconnected reasons for such kind of organizational behavior. On one hand, the human and organizational rationality for information collection, decision making and policy implementation are bounded, whose decision-making processes are characterized by heuristics, rules of thumb (Simon, 1957), searching and adaption (Cyert and March, 1963), and incremental changes rather than consistent and deliberate planning (Mintzberg and Waters, 1985). On the other hand, it is also the other side of the coin that the environment is changing continuously, featured by dynamic complexity. The traditional view of complexity is static, which focuses on a large number of variables and relationships, where both relationships and variables tend to remain stable over time (Bianchi, 2016), while dynamic

complexity is associated with the uncertainty of interconnections, caused by delays, nonlinearities, coupling effects, and multiple feedback loops that drive the behavior of the system (Sterman, 1994; Morecroft, 1998). Besides, the effect of bounded rationality and dynamic complexity is amplified by political bargaining (Lindblom, 1959) and an illusion of control (Langer, 1975).

"To transform intractable problems into tractable ones" (Simon, 1979, cited in Bianchi, 2016), different tools and methods are developed to frame and model the problems, such as organization chart (Rummler and Brache, 2012), balance scorecard (Kaplan and Norton, 1992), and stakeholder analysis (Freeman, 2010). Different from the traditional operation research methods which simplify the complexity of the system to fit the method, System Dynamics (SD) is a popular method to manage complexity without over-simplification (Sterman, 2000), which represents real systems by variables and causal relations. Table 3.1 summarizes the symbols and related meaning in a typical system dynamics model (Sterman, 2000), which entails stock, flow, converter and causal link. A stock is a state of the system which accumulates or depletes over time, a flow is the changing rate of stock, which is measured by the change of stock divided by time, a converter is a variable that can be changed instantaneously but not a flow, while a causal link represents a causal relationship between two variables. The SD models can provide a virtual environment to frame the problems and test assumptions, which can fasten the learning process of decision-makers and stakeholders, i.e. improving their mental models of the real world by double-loop learning (Argyris and Schon, 1978; Sternman, 1994), which emphasizes not only perceiving the change of environment and updating information input but also examining underlying decision rules and hidden mental models.

Table 3.1 Summary of System Dynamics Symbols and Explanation

 Stock	An element of a system that accumulates or drains over time. Stocks are the memory of a system and are only affected by flows.
 Flow	The movement of people or things between stocks within a system boundary or across the model boundary and thereby into or out of the system (through sinks and sources); changes in stocks over time.
 Converter	A variable that is not a flow and is capable of changing its value instantaneously.
 Causal link	A relationship between two variables with the direction of causality and the direction of impact.

DPM is a combination of SD and performance management. Besides SD, DPM also draws lessons from the resource-based view (Penrose, 1959), the especially dynamic resource-based view (DRBV). DRBV emphasizes the building up and development of strategic resources to maintain competitive advantages over time. Especially, DPM distinguishes between strategic resources, performance drivers and end results (Bianchi, 2016). Strategic resources are distinctive resources that are generated by management (internal) routines and cannot be purchased in the market directly, which entails both tangibles and intangibles. Typical strategic resources include liquidity and equity, perceptions that stakeholders have about the organization (i.e., reputation), and intellectual capital. Performance drivers are critical success factors that are shaped by the endorsement of strategic resources and in turn determine the achievement of end-results. It is a ratio between organizational strategic assets and that of a benchmark. For example, a delivery delay ratio measures the performance of delivery service compared with average delivery delay or competitors' performance. End results include both outputs and outcomes, which provide an endogenous source inside an organization for the accumulation and depletion processes that affect strategic resources.

To overcome the myopic view and inconsistency in the plan and control process, Dynamic Performance Management (DPM) emphasizes searching consistency between the internal, external and time perspectives (Bianchi, 2016). Under the internal perspective, balanced growth emerges from the search for consistency between different subsystems, sectors, and departmental/functional areas of an organization, or of a system of organizations. While under

the external perspective, a balanced growth should be associated with performance rates crossing the three most relevant 'dimensions' of organizational success, i.e.: (1) financial; (2) competitive, and (3) social (Coda, 2010). Another perspective to assess sustainable growth is time. In this perspective, an improvement in short-term performance should not be obtained to the prejudice of long-term results.

In conclusion, DPM is an approach that enables organization decision-makers to frame the causal mechanisms affecting organizational performance over time (Bianchi, 2016). This framework is developed based on two converging methods of inquiry: Performance Management and SD modeling. To achieve sustainable growth under the constraint of bounded rationality and dynamic complexity, DPM proposed three inter-connected views of organizational performance, i.e., instrumental, objective and subjective, which will be introduced next.

3.2.2 Three views of Dynamic Performance Management

There are three views of organizational performance in the DPM approach, which entail instrumental, objective and subjective views. The instrumental view is concerned about "what" (i.e., the causal mechanisms driving organizational performance), the objective view asks about "how" (i.e., the processes and activities to achieve organizational results), while the subjective view connects those two views with "who" to be responsible and accountable for the goals, processes, and activities (i.e., the division of work and collaboration scheme among different organizational actors).

The instrumental view implies that alternative means for improving performance be made explicit. Firstly, it is necessary to identify both end-results and their respective drivers. To affect such drivers, each responsibility area must build up, preserve, and deploy a proper endowment of strategic resources that are systemically linked to each other. This view asserts that if the rate at which end-results change the endowment of corresponding strategic resources remains balanced, the organization will achieve sustainable growth. To meet this end, on one hand, management needs to gradually increase the mix of strategic resources rather than a bounded group of them. On the other hand, resource increase is not obtained by reducing the endowment of the wider strategic resources in the local area or industry, in other words, the organization

develops in an environmental-friendly way.

However, the instrumental view frames the causal relationships among factors portraying organizational performance over time in an aggregate way, without integrating DPM into formal PMS. To go further and deeper, another two views are needed:

- How the organization is expected to meet the performance drivers and the end-results identified through the instrumental view (the objective view of performance), and
- Who, in the organization, is responsible for the fulfillment of the activities that will allow one to deliver the associated "products" (the subjective view of performance).

In the objective view, the chain of final and intermediate products delivered to both external and internal clients should be fully mapped. It also requires that the underlying processes, responsibility areas, assigned resources, and policy levers be made explicit. The identification of internal clients and intermedia products helps to understand the impact of back-office units on delivered services and to map the interactions both inside the organization and with stakeholders in the broader system. Besides, identifying a final package of the product can overcome the limit of silo accountability and serve external clients as a whole. Finally, the identification of "product" and the related macro-processes characterizing the objective view enhances the planners' ability to improve the focus of performance drivers that were initially outlined on a corporate level according to the instrumental view.

The subjective view provides a synthesis of the instrumental view and the objective view, because it makes explicit, as a function of the pursued results, both the activities to undertake and the related objectives and performance targets to include in plans and budgets for each decision area. This view requires that performance measures—i.e., drivers and end-results—associated with the delivery of products are made explicit, and are then linked to the goals and objectives of decision-makers to make them accountable for either intermedia or final results. This view relates goals and activities to different decision-makers, which can make clear their responsibilities and expected contributions to overall organizational goals.

Originated from strategic planning of a public utility company (Bianchi and Montemaggiore, 2008), DPM has been applied in many areas, including societal aging (Bianchi, 2015), management of academic institutions (Cosenz and Bianchi, 2013; Cosenz, 2014), performance management in local government (Bianchi and Rivenbark, 2014; Bianchi and

Tomaselli, 2015; Bianchi and Williams, 2015), SME management (Bianchi, Cosenz and Marinković, 2015; Bianchi, Winch and Cosenz, 2018; Bianchi and Vignieri, 2020), urban transportation (Noto, 2016), agriculture management (Leon, 2018), crime control (Xavier and Bianchi, 2019), disaster management (Wang *et al.*, 2020) and healthcare (Bivona and Noto, 2020).

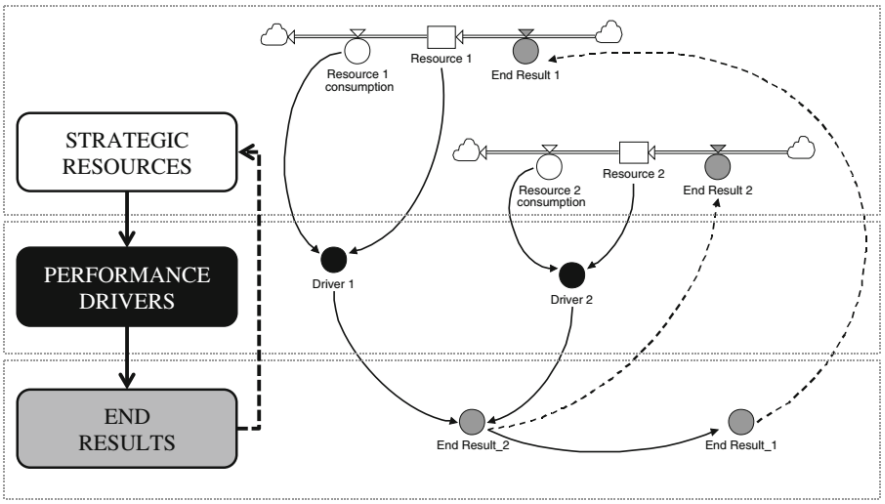


Figure 3.1 The instrumental view of performance (Bianchi, 2016)

The instrumental view of DPM will be used to design the conceptual framework. The instrumental view is consistent with the collaborative governance framework proposed by Emerson et al. (2012), in which the system context is first specified, then the drivers, collaboration dynamics, and impacts are articulated.

As Figure 3.1 shows, this perspective suggests identifying the causes affecting the desired objects through the chains of end-results, performance drivers, and strategic resources. This instrumental view begins by framing the critical performance indicators of the organization. Then alternative means for improving performance can be made explicit. After identifying both end-results and their respective drivers, each responsibility area must build up, preserve, and deploy a proper endowment of strategic resources which are systemically linked to each other. Figure 3.1 shows how the end-results provide an endogenous source inside an organization for the accumulation and depletion processes that affect strategic resources. End-results can be modeled as in- and out-flows, which over a given period change the corresponding stocks of strategic resources, as the result of policies implemented by decision-makers, while

performance drivers are converters connecting strategic resources and end-results.

3.3 A conceptual framework to enhance the performance of HEIs through collaborative governance: A Dynamic Performance Management approach

As we discussed in section 2.3.3.1, three interconnected missions can be identified in HEIs, which entail teaching, research and the third mission. Therefore, this thesis firstly develops a DPM chart related to each mission to foster collaborative governance in HEIs. The development of such a framework consists of two steps. First, end results, performance drivers and strategic resources are identified based on the instrumental view of the DPM approach. Next, collaborative governance is examined to support the achievement of the three missions, i.e., to enhance HEIs' performance through collaborative governance. Finally, an integrated framework is proposed to synthesize the impact of collaborative governance on the three missions of HEIs.

3.3.1 Fostering collaborative governance in HEIs: teaching mission

Teaching is the traditional mission and a central part of HEIs' responsibility. However, the links and transition points from education to employment are weakly articulated (Altbach and Peterson, 1999; Henderson and Trede, 2017). Thus, the relative employment rate is taken as an outcome measure of teaching, while the number of graduate students is an output. It is worth noting that the employment rate is not measured in absolute terms, but relative terms. For this reason, employed graduates are compared with the number of available employment positions that may fit with the knowledge and skills acquired by the HEIs graduates.

It should be noted that not all teaching activities are suitable for collaborative governance. As the concept of collaborative governance suggests, this process is of high cost in time and resources, so it should be adopted only when there is an urgent need or the problem cannot be solved by a single organization acting alone. For example, the basic and introductory courses are self-independent and their contents remain stable, while the advanced or applied courses evolve quickly. Therefore, collaborative governance is more suitable for advanced courses.

Performance drivers are critical success factors that determine the achievement of end-results. In this case, the performance driver of the relative employment rate is course quality,

which enables student's ability to be qualified to work. Such a driver also impacts the fit between students' knowledge and skill offered by HEIs and those requested by the market (measured, for instance, through the number of available employment positions with the same typology of knowledge and skill). To develop high-quality courses, an appropriate bundle of strategic resources is required, i.e., faculty, facilities and financial resources.

According to Table 2.1, the motivations to foster collaborative governance include resource interdependency, pooling existing resources and leveraging new resources. Firstly, HEIs and external organizations are interdependent. External organizations hire students who graduate from HEIs, and HEIs need to find job opportunities for their students. Secondly, the teaching resources provided by HEIs and practical experience from external organizations can be pooled to offer high-quality courses. Finally, the agreements between HEIs and external organizations can provide internship opportunities for students.

The DPM framework reported in Figure 3.2 helps to examine the effect of collaborative governance on teaching. Collaborative governance contributes to the increase in course quality and provision of internship opportunities. When the reputation of HEIs improves, further collaboration can be implemented. In this case, the evaluation of the change in course quality, internship opportunity and students' ability can be gauged to guide the direction of further collaboration. Besides, the change in HEI reputation provides an endogenous source for the accumulation and depletion of strategic resources, which are critical for the improvement of collaborative governance between HEIs and external organizations.

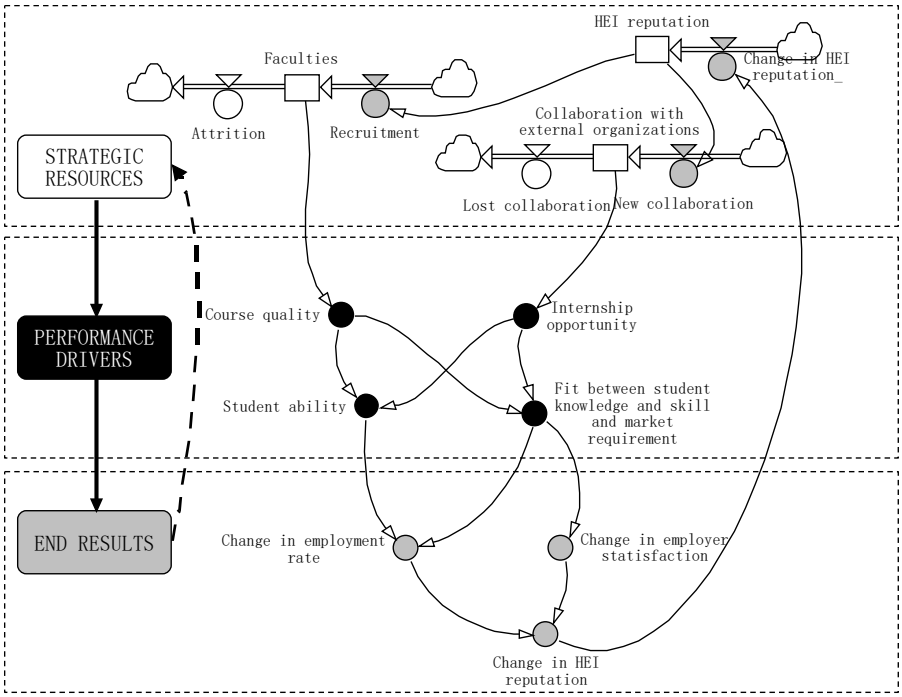


Figure 3.2 Fostering collaborative governance in the teaching of HEIs

3.3.2 Fostering collaborative governance in HEIs: research mission

The overarching goals for HEIs have generally associated with the generation of both basic and applied knowledge from research. Basic research aims at expanding the existing base of knowledge, thereby increasing the actual level of knowledge. On the contrary, applied research puts to practical use the current level of knowledge to unsolved problems. The performance of research can be measured by the results produced over time. Nowadays, a high emphasis is played by research citations and journals with a high impact factor (Diem and Wolter, 2013). High citations, although with some distortions and biases (Leydesdorff, et al., 2016; Aksnes, Langfeldt and Wouters, 2019), often means being well recognized by the research community. Thus, citations can be assumed as an outcome of the research, while the number of published papers is the output of research. The performance driver, which may contribute to improving the number of citations, is the relative quality of papers, compared to those contributions offered by other HEIs' faculty members operating in the same research area. Top qualified researchers are required to improve such a driver, as well as publication opportunities, sufficient support and funding (for instance, to present the latest research results at conferences).

Similar to teaching, a research collaboration governance between HEIs and external organizations shows mutual gains. External organizations cannot conduct all the research inside

the organization, especially basic and explorative research, which cannot generate income in a short term. This may represent a proper motivation to support joint research centers and to share the latest research from HEIs. At the same time, HEIs also benefit from field research, advanced facilities, and additional funding.

Figure 3.3 shows the conceptual framework to foster collaborative governance in higher education, focusing on research. The effect of collaboration can be evaluated in two aspects, research productivity and relevance of research, which are critical factors impacting paper quality. Highly qualified faculty members on the one side, and field research opportunities provided by external organizations on the other side, can contribute to increasing research productivity. In addition, as suggested by the Triple Helix of university-industry-government relations, the participation of external organizations in research activities is likely to influence the quality of the study and to make the research more advanced both in the academic and in the industrial context (Etzkowitz, 2004; Etzkowitz and Zhou, 2017). Therefore, HEIs research performance improvement can lead to positive change in end-results, such as citations, HEIs' reputation and external organizations' satisfaction, which in turn can foster further collaborations with external organizations.

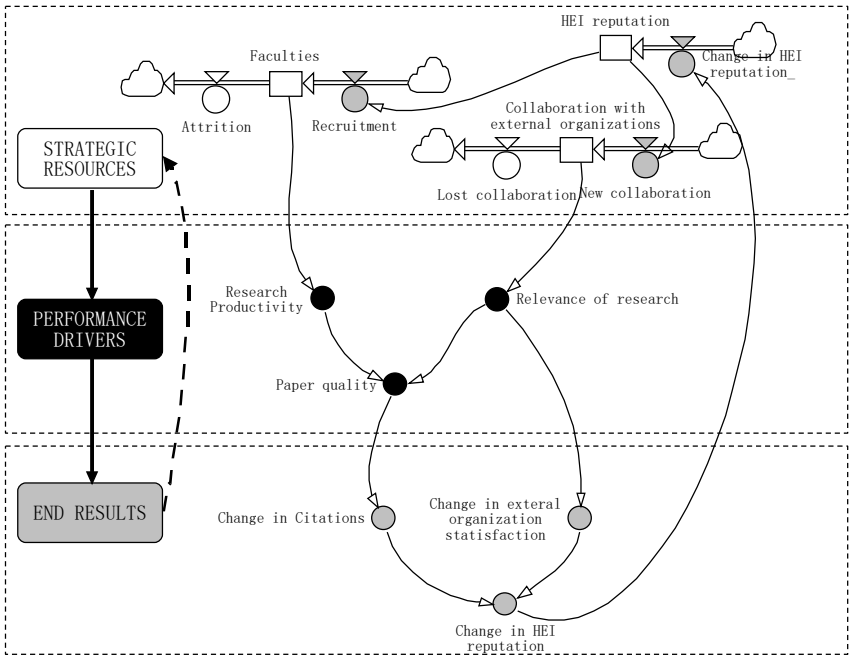


Figure 3.3 Fostering collaborative governance in the research of HEIs

3.3.3 Fostering collaborative governance in HEIs: the third mission

The third mission is about the application of generated knowledge, either by commercialization or provision of products and services to the society, including governments, public, private, and non-profit organizations and citizens. The performance of the third mission can be evaluated by the social and economic benefits provided by HEIs to the society at large. In this case, social and economic benefits appear as outcomes, while the amount of services delivered is the output. The service capability of HEIs to respond to the requests and needs of society positively can be considered as a key performance driver. Advanced research, qualified faculties and students, and innovative facility are needed to improve service capability.

The delivery of the third mission services can also benefit from the adoption of collaborative governance. Similar to the concept of co-production of new products and co-design of new public services (Voorberg, Bekkers and Tummers, 2014), a partnership with external organizations can facilitate the process of delivering new products and services and improve the achievement of the third mission goals. On one hand, external organizations can contribute their knowledge to develop services that fit their requirements. On the other hand, the application of developed services needs internal cooperation to integrate it with organizational contexts, such as timing, culture and organizational routines.

As it is possible to observe from Figure 3.4, the collaboration with external organizations enables faculty members to be more productive. Moreover, the participation of external organizations helps HEIs to deliver social services more efficiently. The higher the service capability, the higher the social and economic benefits result. The increase in external organizations' satisfaction also contributes to the improvement of HEI reputation, which tightens the collaboration with external organizations. More specifically, when initial collaboration succeeds, external organizations will raise their expectations for further collaboration, and more resources and opportunities will be provided for HEIs to stimulate the process.

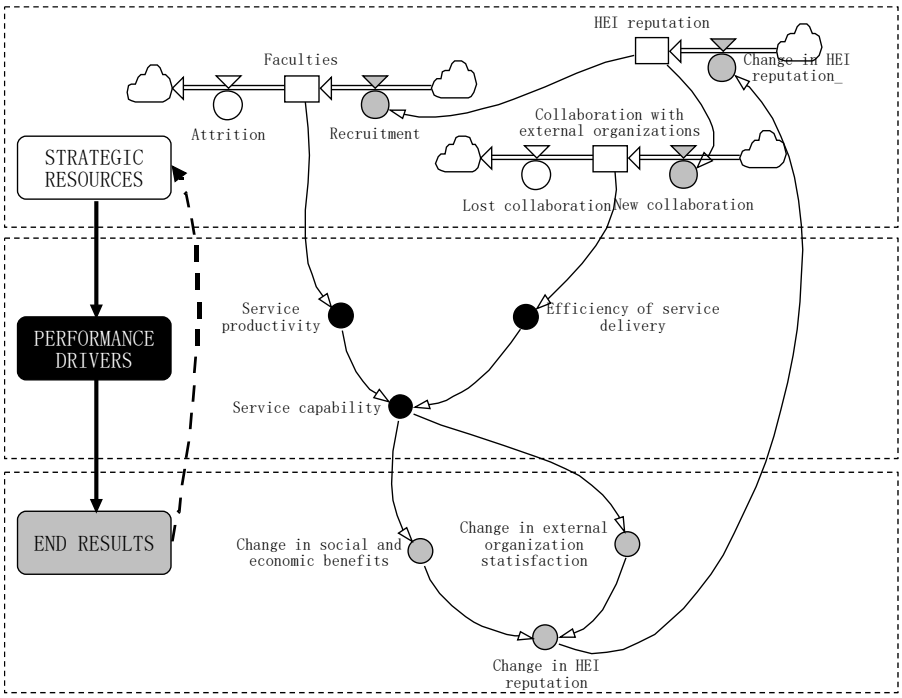


Figure 3.4 Fostering collaborative governance in the third mission of HEIs

3.3.4 Fostering collaborative governance in HEIs: An integrated framework

The three missions of HEIs are interconnected. On one hand, they share the same resource pool of HEI reputation and faculty. On the other hand, all of them contribute to the change in HEI reputation and facilitate the realization of the other two missions. Besides, these three kinds of activities are often conducted together without a clear demarcation line. For example, a consulting project funded by external organizations is both research activity and social service. Many students may also participate in the project and the experiences from the project can add to the teaching mission with new cases. Therefore, an integrated framework is drawn to synthesize the impact of collaborative governance on the achievement of three missions.

As shown in Figure 3.5, there are three strategic resources in HEIs which entail HEI reputation, faculties, and collaboration with external organizations. HEI reputation contributes to the recruitment of new faculties and the building of new collaborations. In terms of performance drivers, faculties help to improve course quality, research productivity and service productivity, while collaboration with external organizations provides support by internship opportunities, the relevance of research and efficiency of service delivery. These first-layer drivers further help to achieve student ability, fit between student knowledge and skill and market requirement, paper quality and service capability. In terms of end results, there are five

first-layer results which entail a change in employer satisfaction, change in employment rate, change in citations, change in external organization satisfaction, and change in social and economic benefits. These first-layer end results induce changes in HEI reputation, i.e., the change in strategic resources, which forms a few closed loops among strategic resources, performance drivers, and end results.

Traditionally, DPM is used for the performance management of a single organization. However, as Figure 3.5 shows, the collaborative governance in HEIs spans different organizations. The collaboration with external organizations is not only a strategic resource of HEIs but also a strategic resource of external organizations. Thus, it can be seen as a shared strategic resource in the community, shared by the involved organizations, which may contribute to leverage local area common goods growth (Bianchi and Vignieri, 2020).

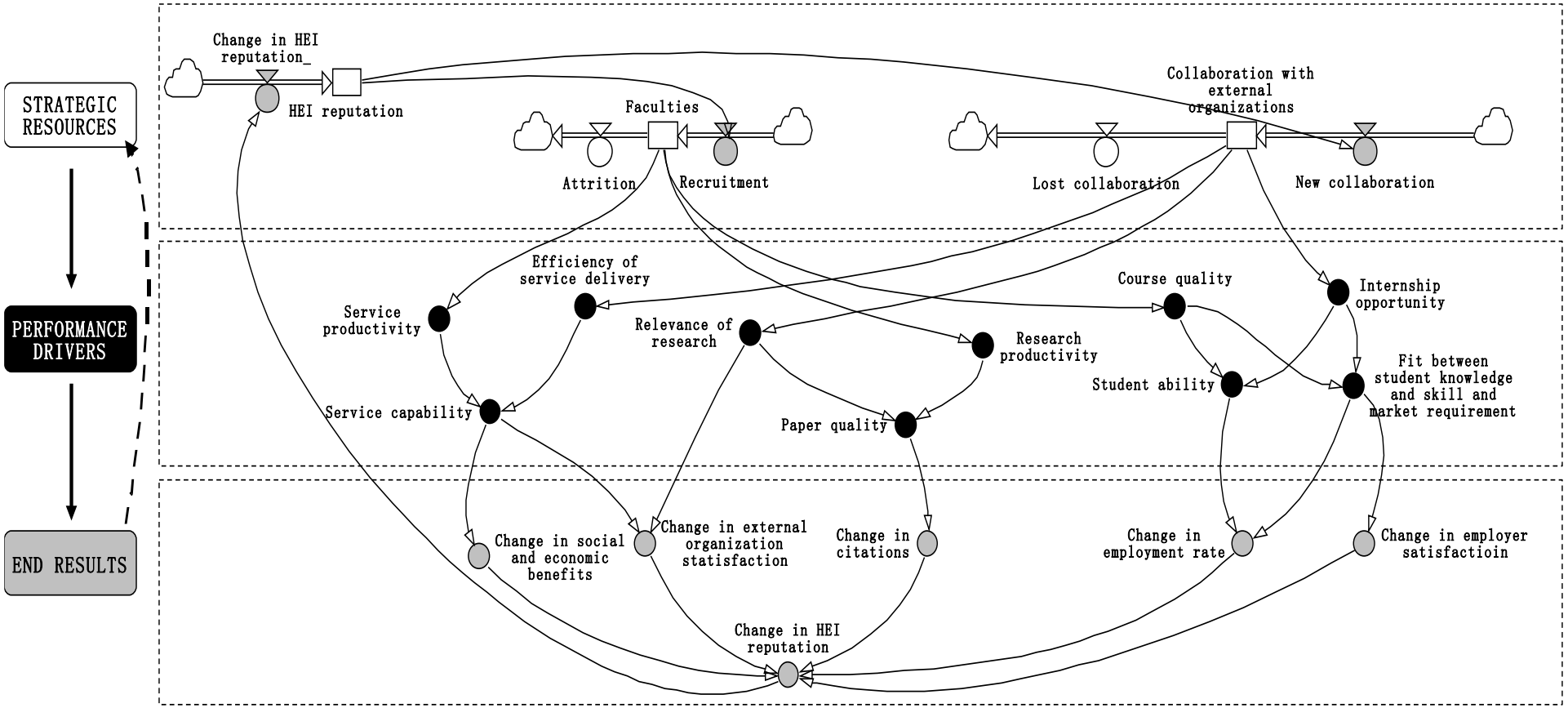


Figure 3.5 Fostering collaborative governance in HEIs: An integrated framework

3.4 Summary: a conceptual framework to enhance the performance of HEIs through collaborative governance.

Addressing the two research questions proposed in Chapter 2, i.e., (1) How to foster collaborative governance in Chinese HEIs? (2) How can collaborative governance support Chinese HEIs to enhance their performances? This chapter proposes a conceptual framework to enhance the performance of HEIs through collaborative governance.

As the implementation of collaborative governance is of high cost and deep uncertainty, a Dynamic Performance Management approach is suggested and applied. DPM leverages the strength of SD and performance management to achieve sustainable organizational growth under bounded rationality, which makes explicit the causal mechanisms driving system behaviors (i.e., HEIs' performance). Besides, DPM emphasizes achieving sustainable growth by maintaining consistency among different subsystems and different dimensions of organization success (i.e., financial, social and competitive). Finally, there are three views of organizational performance in DPM, which entail instrumental view, objective view and subjective view. The instrumental view concerns about "what", i.e. the causal mechanism driving performance, the objective view asks about "how", which makes explicit the activities and processes to achieve performance, while the subjective view synthesizes the above two views with who to be responsible for the decision areas and goals.

The instrumental view is used to develop the conceptual framework, which visualizes the underlying mechanisms by causal chains of end-results, performance drivers and strategic resources. For each mission of HEIs (i.e., teaching, research and the third mission), the performance factors are identified firstly. Next, related performance drivers that produce end-results are illustrated. Finally, the strategic resources needed to develop such performance drivers are made explicit. In each mission, how to foster collaborative governance and the impact of collaborative governance on the HEI performance are discussed. Finally, an integrated framework is drawn to synthesize the potential of collaborative governance to enhance HEIs' performance regarding three missions.

The conceptual framework can provide preliminary answers to the two research questions.

RQ1: How to foster collaborative governance in Chinese HEIs?

There are three aspects that the proposed conceptual framework can contribute to foster

collaborative governance in Chinese HEIs. Firstly, it provides a framework to map and model the structure and process of collaborative governance. This can help decision-makers to make explicit expected end results, performance drivers and respective strategic resources. Secondly, with the causal loop diagrams depicting the underlying processes and mechanisms, the conceptual framework can engage HEIs and external organizations in a learning process to form shared understanding, consensus and to build commitments. Finally, the conceptual framework can facilitate the implementation or improvement of collaborative governance practice by cascading overall organizational goals among different actors and analyzing alternative policies with the "learning device".

RQ2: How can collaborative governance support Chinese HEIs to enhance their performance?

On one hand, external organizations provide extra strategic resources for the realization of the three missions, such as research funding, internship opportunity, field knowledge, and projects. On the other hand, the participation of external organizations improves the productivity and efficiency of HEIs. For example, the joint design and development of courses help to improve the fit between student knowledge and market needs, which can increase students' employment rate. Besides, collaborative governance stimulates the building process of critical strategic resources endogenously, such as HEI reputation and collaborations with external organizations, which further improve the collaborating processes and related outcomes.

To test furtherly the validity of the above discussed conceptual framework in enhancing collaborative governance between HEIs and external organizations, in the next Chapter, such a framework is used to investigate a comparative study of a consulting project and a joint lab.

Chapter 4 Modeling collaborative governance between HEIs and external organizations: A comparative study of a consulting project and a joint lab

4.1 Introduction

In the last chapter, a conceptual framework is proposed based on the Dynamic Performance Management approach to enhance HEIs' performance through collaborative governance. Although the goals of the three missions are identified, and related performance drivers and strategic resources are made explicit, the conceptual framework is too general to provide specific insights for practical collaborative governance. To make it actionable, environmental dynamics and organizational context must be provided. In this chapter, empirical studies are conducted to examine the validity and usefulness of the conceptual framework in a Chinese HEI.

With the development of new technologies and globalization, the environment of the social-economic system is changing rapidly, which imposes a great challenge for all organizations, including HEIs. To deal with uncertainty and change, organizations need to adapt in a fragile way, i.e., to learn and act promptly. As the concept of "wicked issue" suggests, no single organization can address this kind of challenge alone, collaborative governance beyond a single organizational boundary has been a popular choice to handle this issue.

As discussed in Chapter 3, there is a great potential for HEIs and external organizations to collaborate. On one hand, HEIs are the center of knowledge generation and technology development, which contributes to cost-effectively developing new knowledge and technology. On the other hand, external organizations face the market directly and thus they have urgent needs and a good sense of the application of new knowledge and technology. Gray and Wood (1991) define collaboration as "a process through which organizations who can see different aspects of a problem can constructively explore their differences and search for solutions that

go beyond their limited vision of what is possible." The collaborative governance between HEI and external organizations fits well with this definition.

In practice, the collaboration between HEI and external organizations is becoming more and more popular in China. The research funds from enterprises and other sources have been increasing continuously, which promoted the cooperation between scientific technology and the economy (Gu, Li and Wang, 2018). Especially in the applied science, some faculties even get more funding from external organizations than from the government budget. The duration of the cooperation is one of the most important features of the collaboration (Gray and Wood, 1991). Based on the length of duration, the collaboration can be classified as short-term and long-term. A short-term collaboration is running as a project, which has a specific goal and defined duration. This kind of collaboration ends after the goal has been achieved at the expected date. A long-term collaboration runs in a different way, such as joint labs, joint agreements, and joint start-ups. In the long-term collaboration, a long-term goal is defined and the collaboration exists continually for a relatively long period.

In this chapter, based on the conceptual framework in Chapter 3, a comparative case study of a consulting project and a joint lab is conducted. A consulting project is a case of short-term collaboration with a specific goal and predefined beginning and ending time, while a joint lab is a case of a long-term collaboration, which is built to achieve a long-term goal. A comparative case study is conducted to generalize the findings and to examine the differences under different contexts (Yin, 2009).

4.2 Research methodology

There are three situations where a case study is better than the other research methods (Yin, 2009). First, the research problem is about how and why, which calls for in-depth investigation rather than broad surveys. Second, the researcher can’t place control over the object, which exceeds the limit of the experimental study. Third, the research phenomenon is happening currently, so historical study is not proper for it. In this chapter, the two cases are happening currently and not under the control of the author. Besides, the research is about the process and dynamics (i.e. how and why) of collaborative governance, rather than cross-section surveys to find out what has happened. Therefore, case study research is chosen.

The case study is conducted in three steps. First, participants in the collaboration are interviewed with semi-structured questions. Next, interview transcripts are written according to oral interviews. After the interviewee confirms the transcripts, they are coded to find themes and relationships. Finally, the conceptual framework in Chapter 3 is applied to depict the process of the collaboration, especially the strategic resources, performance drivers and end-results of collaborative governance and the dynamics in the process.

4.3 A comparative study of a consulting project and a joint lab

4.3.1 Case 1: a consulting project

The telecommunication technology is developing quickly, which begins from 2G to 3G, further to 4G, and now 5G is deployed on a large scale globally. However, there are still many users who use the old-generation technologies, which prevents telecommunication carriers from abandoning old-generation technologies and implementing the latest technology quickly. Thus, a leading telecommunication equipment manufacture, LtdX (The name of the company LtdX has been changed to maintain confidentiality. This also applies to UniB), wants to investigate the evolving process of telecommunication networks to optimize the production, sales and after-sale maintenance of different-generation equipment. The company searched intensively for related experts and finally, they got in touch with a team in UniB. A consulting project is funded by LtdX to support the UniB team investigating the network evolving process in the telecommunication industry, especially in the carriers.

These are brief introductions of UniB and LtdX.

- UniB, founded in 1955, is a Chinese university directly under the administration of the Ministry of Education (MoE) and co-built by the Ministry of Industry and Information Technology (MIIT). It is one of the first “Project 211” universities. Besides, UniB has also joined the “Project 985 Innovation Platform for Superior Discipline”. UniB is a comprehensive university with information technology as its main feature, engineering and science as its main focus and a combination of engineering, management, humanities and sciences as its main pursuit, which becomes an important base for fostering high-tech talents.
- LtdX was Founded in 1987, which is the world's leading provider of ICT (information and

communications) infrastructure and smart terminals. This company is committed to bringing the digital world to everyone, every family, and every organization, and building a smart world with all things connected. Currently, LtdX has approximately 194,000 employees, operates in more than 170 countries and regions, and serves more than 3 billion people.

To describe the process of collaboration, a semi-structured interview was conducted with two responsible researchers in UniB. The interview began with the initiative and execution of the consulting project and then moved on to reflections and plans. The interview was recorded, and an interview transcript was written after the interview. Next, the transcript was sent to the interviewees for confirmation. Finally, the confirmed transcript was used for coding. In this thesis, a three-step coding scheme is applied, which entails open codes, axial codes, and selective codes (Corbin and Strauss, 2008). First, a few concepts were derived from the data based on open codes. In other words, they were extracted in "a grounded way" from the original text. Then, based on the content, the study classified the extracted concepts into different thematic categories according to axial codes. The summary of collaborative governance-related concepts in Table 2.1 was used as a guide to classify the extracted concepts. In the last step, the causal links between the themes are added to synthesize the case. Based on the summary of collaboration governance in Table 2.1, the content is coded into three themes, which entail motivation, organizational features and results. Besides, as a few concepts focus on future challenges and uncertainty, a new theme, difficulty, is added.

Table 4.1 presents the themes and responding content about the themes. Among the 134 coded concepts, organizational features account for 46.3%, following by difficulty (26.8%) and motivation (18.7%), while the result accounts for 8.2%. The motivation consists of two parts, which entail enterprise needs and the strength of the UniB research team and resources on one hand, and the need of UniB to explore new research areas on the other hand. It is noted that the fit between enterprise needs and HEI ability plays a critical role in the initiative of this consulting project. Critical success factors include the adaptiveness of the HEI and the support of LtdX in the consulting process. In the beginning, because of the difference in organizational culture and management routine, the UniB team is under great pressure to meet the requirements of LtdX, who demands frequent reports and fast progress. Then, the UniB team

gradually recognizes the efficiency of the LtdX and accelerates their progress. Based on this, mutual understanding and trust are built. LtdX provides more support by inviting external experienced experts and matching related resources for the needs of the project, which contributes a lot to the success of this project. In terms of the results, collected reports and models are provided to support LtdX to optimize the operation management process and to increase the quality of customer service. For UniB, a good understanding and relationship with LtdX is built, which helps to foster further collaboration and future projects. Finally, there are many difficulties and challenges in the process. For example, the building of initial contact is difficult, as LtdX searched intensively on the Internet and finally called the fixed line of UniB lab. Besides, as this project is new for UniB, the UniB team experiences a lot of pressure in the process, either because of the urgent demand from the enterprise, or the uncertainty of research caused by data limitation. Furthermore, many students are participating in the project and the faculties need to coordinate students' input with the research process.

Table 4.1 Coded concepts of the interview on a consulting project

Theme	Number of coded concepts	Content
Motivation	25 (18.7%)	Enterprise needs, potential benefit, devotion to domestic enterprises, the opportunity for faculty and students, opportunity for research transformation, research achievement, research team, social capital, data resources, fit between requirement and ability, economic income, brand reputation
Organizational features	62 (46.3%)	Adaptiveness, all-in participation, articulation of needs, control mechanism, enterprise participation, shared goals, interaction and learning, match resources for needs, mutual trust and understanding, the participation of multiple stakeholders, preparation before coordinators' transfer, the realization of project

		needs, understanding of the industry
Results	11 (8.2%)	Admiration of enterprise culture, application for operation support, collected reports, customer service quality, further collaboration, teaching-research project, the calibrated model
Difficulty	36 (26.8%)	Initial contact, change of research paradigm, change of project coordinator, data limitation, the difficulty of communication, the difficulty of SD method, high pressure, project and operation, the uncertainty of research exploration, low quality of student input, the trade-off in project requirement and project input

Based on the coded concepts, the conceptual framework in section 3.3.4 was used to identify the strategic resources, performance drivers, and end results in the consulting project. Strategic resources include enterprise expectation, student input, data resources, HEI adaptiveness, mutual understanding and supporting staff. It is noted that the first one is provided by LtdX, and the following three are provided by UniB, while the supporting staff comes from both sides, including both employees and faculties. Performance drivers are trust, joint effort, efficiency and fit between HEI and enterprise. The interview shows that after a shared understanding is built, LtdX and UniB coordinate to match resources for needs and the progress was achieved quickly. Finally, end results include change in calibrated model, change in operation support, change in enterprise expectation, change in research project, change in recognition of enterprise culture and change in HEI adaptiveness.

Next, based on the causal relations, an insight model was built to synthesize the interaction among strategic resources, performance drivers and end results. There are three types of models in System Dynamics, which entails conceptual, detailed stock-and-flow and insight models (Lyneis, 1999; Bianchi, 2016). The conceptual model depicts the feedback loops explaining system behavior, with no quantitative data or simulation. The stock-and-flow model is quantitative, which usually implies a high level of detail, accuracy and an extension of explored system boundaries (often broader than in conceptual model). An insight or small policy-based

model is a more aggregate model with the intent to offer users new "insights" in the investigated phenomenon, rather than perfectly mimic the reality of historic time series. Therefore, relatively simple models might be valid, and just as effective as a detailed model (Arthur and Winch, 1999; Lyneis, 1999; Ghaffarzadegan, Lyneis, Richardson, 2011; Bianchi, 2016).

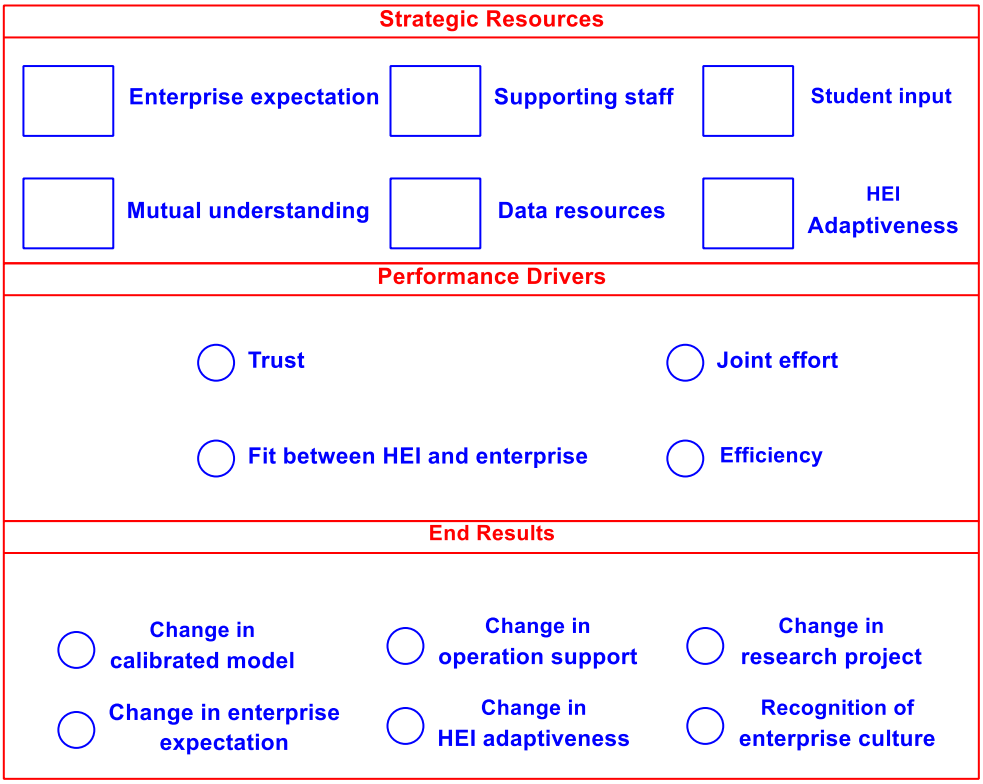


Figure 4.1 Strategic resources, performance drivers and end results of a consulting project

The insight mode in Figure 4.2 fits well with the conceptual framework in 3.4.3 to foster collaborative governance in the third mission. This project begins with the needs of LtdX, which looks for consulting teams to investigate the evolving process of the telecommunication network. Beginning with the needs, LtdX and UniB co-design the goal and organizational arrangement of the project. As time goes by, mutual understanding and trust are built, LtdX is driven by the loop of enterprise expectation to provide more resources and support, while UniB increases its adaptiveness to search related data and to make more efforts, both of which increase the joint effort and efficiency, contributing to the achievement of end-results, which entails change in calibrated model, change in operation support, change in research project and change in recognition of enterprise culture. In conclusion, the collaborative governance process

of this project is driven by two reinforcing loops, i.e. enterprise expectation and HEI adaptiveness. After the formal interview, the faculty also remarked that "based on this consulting project, we build a good relationship with LtdX, who is willing to explore more opportunities for future collaboration". Besides, as this project also produces new knowledge about telecommunication operation, this project also enriched the teaching mission by new knowledge from the field, based on which a new teaching project has been initiated to update course materials.

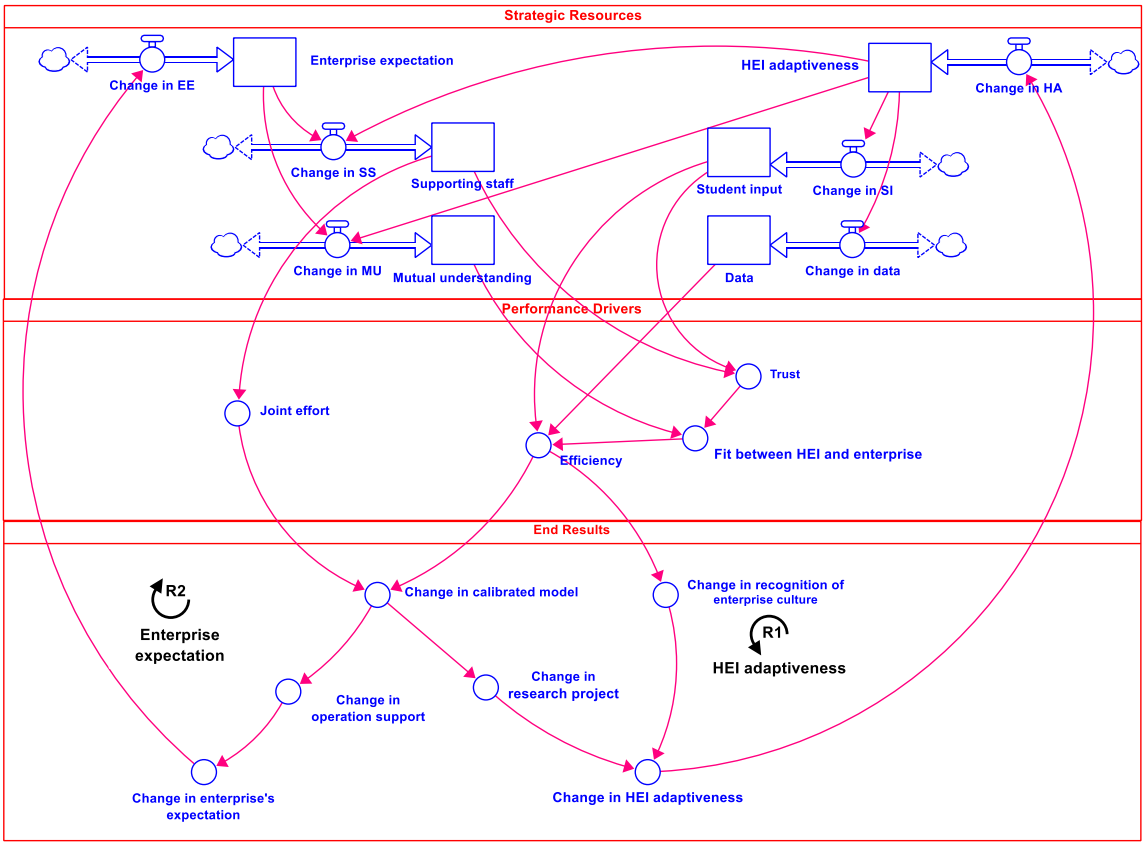


Figure 4.2 An insight model of a consulting project

Next, the two research questions are addressed in the above consulting project.

RQ1: How to foster collaborative governance in Chinese HEIs?

There are a few lessons learned in this consulting project regarding how to foster collaborative governance in Chinese HEIs. First of all, more can be done to create opportunities for collaborative governance. For example, as the LtdX searched intensively on the Internet and finally reached the lab by fixed phone, HEI should pay more attention to the promotion of their

research and service capacity. Besides, the UniB team used to work independently and respond to the demand passively at the beginning, under the pressure imposed by LtdX. Only after intensive communications, LtdX understood the needs of the UniB team and invited external experts to participate in the project. Thus, mutual understanding and trust should be built right at the beginning to coordinate joint efforts. Finally, there are some conflicts between UniB and LtdX on the expected delivery results. LtdX expects a fully developed model that can predict the change of users of different generation technologies accurately, while UniB is only willing to provide a prototype model based on which managers can perceive driving mechanisms and developing trends. Although there is some uncertainty in the project, a clear discussion of expectations and required inputs can facilitate the communication process and the achievement of expected results.

In this regard, the proposed conceptual framework can be beneficial to foster collaborative governance in this project. On one hand, the elicitation of end results, performance drivers and strategic resources can help decision-makers in both HEIs and external organisations to depict the process and to set important milestones that can be used to gauge the progress of the project. On the other hand, the underlying mechanisms (i.e., enterprise expectation and HEI adaptiveness) indicate the importance of mutual understanding, trust and joint effort. This can help to coordinate their inputs and set appropriate expectations for the project output and outcomes.

RQ2: How can collaborative governance support Chinese HEIs to enhance their performance?

This consulting project offers a few benefits to support UniB to enhance its performance. Firstly, this project provides research funding and field research opportunities for UniB faculty to conduct relevant research. Secondly, in the project, LtdX and external experts also assist the UniB faculty with industrial experiences and data, which increases the research productivity, relevance of research and service delivery efficiency of UniB. Finally, this project also helps to improve teaching performance. On one hand, involved students benefited from project experiences through learning by doing, which is crucial to increase the fit between student ability and market needs. On the other hand, a teaching project is initiated based on this project, which contributed to add new cases and knowledge to the current course.

4.3.2 Case 2: a joint lab

With the popularity of Fintech in recent years, finance companies are eager to try and experiment with the applications of new technologies, and HEIs also invest a lot in the development of cutting-edge technologies. Therefore, a joint lab is built by university UniB and a large finance company, LtdY (The name of the company LtdY has been changed to maintain confidentiality. This also apply to UniB), to collaborate on the development and application of Fintech. This is a brief introduction of LtdY (the introduction of UniB can refer to Case 1 in Section 4.3.1).

- LtdY was established on November 1, 1999. Its business covers almost every aspect of the finance industry, which entails banks, securities, leasing, consumer finance, etc. On September 28, 2012, with the approval of the State Council, the company was restructured into a company limited by shares. It was listed on the main board of the Hong Kong Stock Exchange. As of the end of June 2020, LtdY's total assets reached RMB 1,731.514 billion (262.033 billion US $), and its net assets reached RMB 168.027 billion (25.428 billion US $). In the first half of 2020, the total revenue reached RMB 45.688 billion (6.914 billion US $).

To describe the process of collaboration, a semi-structured interview was conducted with the director of the join lab in UniB. Same as Case 1, the interview began with the building process and the achievement of the lab in the past few years, and next moved on to the perceptions and reflections on the collaboration. The interview was recorded, and an interview transcript was written accordingly. Next, the transcript was sent to the interviewee for confirmation. Finally, the confirmed transcript was used for coding according to the three-step scheme introduced in section 4.3.1 (i.e., open codes, axial codes and selective codes). Similarly, the contents are coded into four themes, which entail motivation, organizational features, results and difficulty.

As Table 4.2 shows, among the four themes, organizational features account for 56.1%, motivation accounts for 19.8%, results account for 19.8% and difficulty accounts for 8.6%. The motivation comes from two aspects. On one hand, the development is consistent with the developing trend of Fintech, which is promising for mutual benefits. On the other hand, both UiB and LtdY can provide their distinctive resources for collaboration, i.e., pooling of resources,

which entail funding, data resources, new technology, students, and application scenario of new technology. In terms of critical success factors, the UniB needs to learn about the business model of LtdY and to explore the application of technology, while the LtdY provides support for the exploration and development with data resources, supporting environment and experienced employees. The interviewees also emphasized the importance of mutual trust and initial success, which build a valid base for further collaboration. Regarding the results, the UniB achieved student ability, job competitiveness, papers, awards, and research projects, while the LtdY benefited from applied technology and developed systems, both of which helped to foster tighter collaboration. Finally, the collaboration also faced some difficulties. As the top managers and responding contact person in LtdY changed during the process, this created interruptions into the collaborating process. Secondly, as LtdY is a big firm, the communication process took a relatively long time and required a big effort, particularly for UniB to interact with LtdY. Besides, even though the data resources from LtdY are rich, it was still uncertain if the data was sufficient and it was hard to overcome the limits of data constraints.

Table 4.2 Coded concepts of the interview on the joint lab

Theme	Number of coded concepts	Content
Motivation	23 (19.8%)	Funding, data resources, developing trend (social needs), new technology, technology and research accumulation, the potential for improving students' ability, technological exploration, students, application scenario of new technology
Organizational features	65 (56.1%)	Learning of business model, communication, understanding, trust, recognition of lab contribution, employee participation, evaluation and feedback, joint effort, initial success, support in research environment and resources, exploration and preparation, valued by top managers
Results	18(15.5%)	Student ability, job competitiveness, research

		project, paper, joint awards, patents, developed system, tighten cooperation
Difficulty	10(8.6%)	Change of top managers, change of contact person, data limitation, the organizational difference between HEI and enterprise, slow company process, time-consuming communication

Based on the coded concepts, the conceptual framework in section 3.3 is used to identify the strategic resources, performance drivers, and end results in the joint lab collaboration. Strategic resources include funding, data, application scenario, technology, participated students and supporting staff. The first three are provided by LtdY, the following two are provided by UniB, while the supporting staff comes from both sides, including employees and faculties. Performance drivers are trust, joint effort, efficiency and fit between HEI and enterprise. The interviews showed that it took a long time and high cost for them to learn with each other and to find common ground for joint efforts. Finally, end results include change in joint award, change in developed system, change in research impact, change in enterprise's satisfaction and change in university input.

As Figure 4.4 shows, the collaboration is driven by two reinforcing loops. The first loop is driven by enterprise satisfaction. As the joint effort and efficiency increase, the developed system generates more benefits for LtdY, which satisfy the enterprise and it continues to support the collaboration with more resources, which entails funding, supporting staff, data and application scenario. Similarly, the second loop is driven by university input. When the trust is built and initial success is achieved on joint awards, papers and research impact, the university tends to invest more in technology development and students' participation. The insight model also highlights the importance of initial success, mutual trust, and fit between HEI and enterprise, which are critical for further participation and more allocations of inputs resources from both sides.

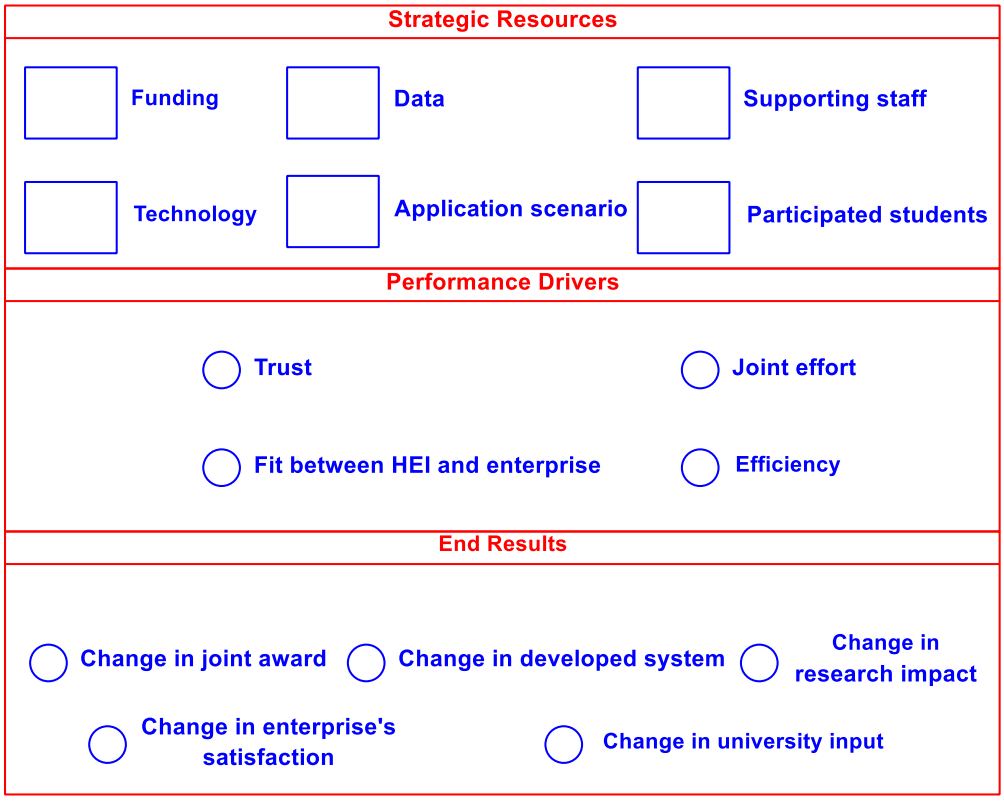


Figure 4.3 Strategic resources, performance drivers and end results of the joint lab collaboration

Although right from the beginning, LtdY signed a long-term contract to build a joint lab, the investment and support were gradually increased. In the first few months, only staff in the IT department participated and only a small sample of data was provided for the experiment. Later, when mutual trust is built, the other departments, such as business, risk control, also took

part in the joint lab, bringing more data and application scenarios. In addition, because of the uncertainty in technology development, at the beginning of the collaboration, the expected results were not defined in detail. The joint lab spent one year exploring alternative technologies and they rebuilt everything in the second year as they found the initial system design obsolete. In order to avoid such a re-work phenomenon, a joint committee was set to coordinate the design and evaluation of technology development and application.

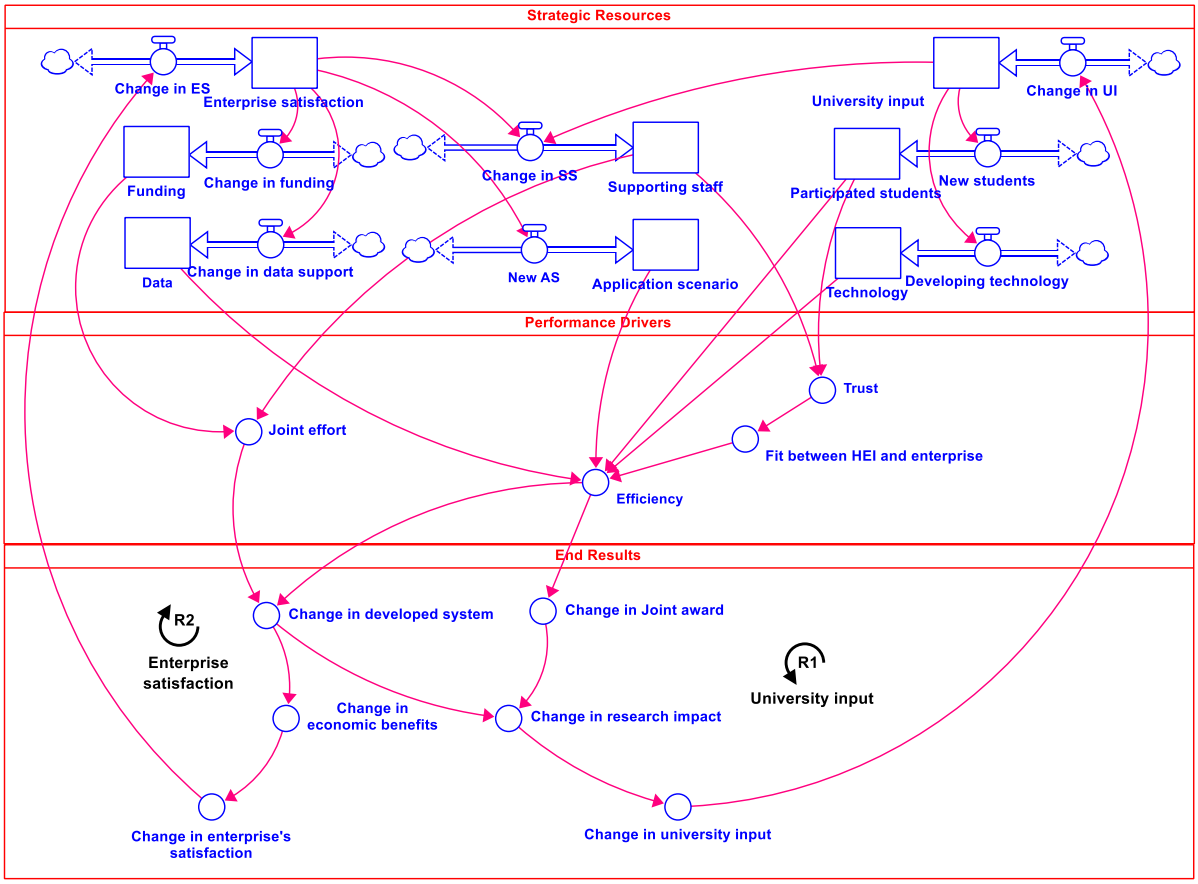


Figure 4.4 An insight model of the joint lab collaboration

Next, the two research questions are addressed in the above-discussed joint lab case study.

RQ1: How to foster collaborative governance in Chinese HEIs?

Similarly, there are a few lessons learned in this joint lab regarding how to foster collaborative governance in Chinese HEIs. Firstly, HEI should pay attention to state of art technologies that are of high market potential. In this case, UniB invests a lot in Fintech, which attracts LtdY to build a joint lab to support research and development. Secondly, mutual understanding and trust should be built to improve collaborating efficiency and relevance of

research. Because of a lack of understanding of LtdY's business model, the initial system design and development were abandoned. Finally, collective identity and commitment are critical for the success of collaborative governance. After initial success, UniB and LtdY built a joint committee to coordinate their efforts, which smoothed their joint efforts and productivity. As time goes by, the joint lab gained more and more recognition and many more employees of LtdY joined the lab.

In this regard, the proposed conceptual framework can be beneficial to foster collaborative governance in the joint lab. For example, the causal chain of end results, performance drivers and strategic resources can make explicit the decision areas and expected inputs from both parts, which can help decision-makers of both organizations (UniB and LtdY) to plan for the development of the joint lab. Besides, the reinforcing loops of enterprise satisfaction and university input suggest the importance of their inputs to foster further collaboration, which provides an endogenous explanation of a successful joint lab. Finally, the conceptual framework also suggests a broader decision boundary involving both UniB and different departments of LtdY, which may prevent unnecessary trials in the first year of developing a limited application that resulted to be obsoleted.

RQ2: How can collaborative governance support Chinese HEIs to enhance their performance?

The joint lab offers a few benefits to support UniB to enhance its performance. In terms of research, the joint lab provided additional funding, data and field knowledge to develop cutting-edge technologies. For the third mission, the joint lab applies developed technologies to the industry, which generated both social benefits for the industry and economic benefits for HEIs. Finally, the projects in the joint lab provided internship opportunities for students to gain a sense of industrial technology development, which contributed to increase the fit between student ability and market needs. As the interviewees reported, students who participated in the joint lab developed a higher level of knowledge, which led to a competitive advantage for job-hunting.

4.4 Discussion of the two cases

4.4.1 Comparison of two cases

The above two cases show multiple common aspects. First, both the consulting project and the joint lab began from mutual needs and the pooling of resources. They pooled the resources, either field experts, state of art technology or crucial data support to enable the achievement beyond the limit of any single organization acting alone. Second, in both cases, a high level of learning and adaptation processes took place during the collaboration. In case 1, UniB tried to adapt to the reporting requirement of LtdX, while LtdX team learned the needs of UniB and invited external experts to support them. In case 2, UniB spent a lot of effort understanding the business model of LtdY and designing technology solutions accordingly. These learnings and adaptions helped to build mutual understanding and trust and further increase the fit between the two organizations. Such a fit between the two organizations (Uni and Ltd) represents a critical performance driver to achieve end results. Finally, both cases achieved the main expected end-results to meet the requirement of enterprise and to generate spillover effects to benefit UniB. In case 1, the consulting project provided opportunities for further collaboration and new knowledge to improve teaching. In case 2, the joint lab contributed to increasing research papers, patents and joint awards to UniB.

An important aspect of collaborative governance is decision boundary. As the collaboration forms a temporary group across organizations, participants need to expand their decision boundaries to include all the others. For example, in Case 1, LtdX met initial difficulties to understand the real needs of the project. Collaborative governance learning processes helped LtdX to identify required experts to support the UniB team. Also, in Case 2, as the application scenarios increased, the faculty needed to learn about the whole business model of LtdY, which was essential for the systematic design and development of Fintech application. As the joint lab worked for a relatively long-term goal, the collaborative governance decision boundary was broadened, larger than the consulting project, which is often task-driven.

In terms of learning and adaption, case 2 is more tolerant and flexible than case 1. On one hand, case 1 is task-driven, which has a clear definition right at the beginning to support the improvement of operation management, while the joint lab in case 2 is exploratory, which

allows for more trials and experiments. On the other hand, a consulting project is temporary and will end shortly (in one year in the investigated case), while a joint lab is a long-term collaboration, sharing resources and risks for a longer period. Especially, in the second year, employees in LtdY volunteered to participate in the joint lab as they recognized the benefits of the collaboration to their work performance.

Regarding the reinforcing mechanisms fueling collaborative governance aimed at enhancing HEI performance, it is possible to identify multiple phenomena at the enterprise and university level in both cases. At the enterprise level, collaborative governance in case 1is driven by enterprise expectation, while in case 2 it is driven by enterprise satisfaction. The reason is that LtdX raised expectations as the project went on, and LtdY benefited more and more from the developed technology. Similarly, at the UniB level, collaborative governance in case 1 is driven by HEI adaptiveness, while in case 2 is driven by HEI input. In the consulting project, the team of participated faculties and students were certain, and what matters were their understandings and efforts, which were influenced by their learning and adaptiveness capabilities. In case 2, as time goes by, they found more opportunities and resources were increased accordingly, which entailed researchers and students.

4.4.1 Reflections on the conceptual framework

As suggested by Arthur and Winch (1999), there are three dimensions of model validity. The first assesses the reliability of the content of the model – relative to a clear purpose (i.e., substantive validity). The second considers the value of the modeling process (i.e., constructive validity). The third evaluates the model's ultimate impact (i.e., instrumental validity). For the proposed conceptual framework, the substantive validity means that the model should represent the reality, the constructive validity emphasizes the learning and insights, while the instrumental validity asks about the outcomes and impacts generated by the model. In this regard, the purpose of the proposed conceptual framework is to serve as a learning device to frame the collaborative governance process and to trigger dialogues between HEIs and external organizations, i.e., the constructive validity and instrumental validity overweight the substantive validity in this thesis.

The above two cases demonstrate the power of the conceptual framework to foster collaborative governance in HEI to enhance performance. Beginning from the end-results,

related performance drivers and strategic resources are identified, and an endogenous explanation of the self-strengthening process is provided by depicting the reinforcing loops. Specifically, the identification of strategic resources helps to find mutual interdependence and potential opportunities for collaboration. Besides, the performance drivers are critical for the achievement of end-results, which can be gauged to evaluate the progress of the collaboration process. Finally, the expected end-results and unexpected by-products further increase the strategic resources and their mutual trust. Indeed, collaborative governance is naturally fit for HEIs, as their performance is partially defined by external organizations. For example, as the employers evaluate the quality of graduates and social service, collaborative governance with employers provides valuable feedback to support the achievement of the teaching mission and the third mission in HEIs.

However, the cases also show that carefulness is needed to apply the conceptual framework. On one hand, the concepts in the framework are general and thus need to be specified in detail according to different contexts. For example, a long-term joint lab is different from a short-term consulting project in the dynamics of resources and collaborating process, as the available resources remain unchanged in the short term. On the other hand, the other elements need to be taken into account, such as decision boundary, tolerance, initial success and time, which are critical for the success of collaborative governance.

Finally, something can be added to the conceptual framework. For example, in the consulting project, because of high pressure and difficulties, the UiB gamed with LtdX to avoid some requirements in the project. Although the request to lower the requirements is rejected, this is also an important part to understand the collaborating process. I argue that this kind of gaming is common in the initial stage, as the building of a deep mutual understanding, trust and a shared collective identity takes time. Without careful treatment, this kind of gaming can hamper the success of a collaboration. However, the gaming behavior also sends a signal to LtdX that UniB has difficulty fulfilling all the expected requirements and they invited external experts to help UniB. Besides, the conceptual framework doesn’t describe the organizational arrangement of collaboration. For example, in case 2, UiB and LtdY built a committee involving experts from both parts to supervise the progress of collaboration and the direction of development. This formal organizational arrangement contributes to orient the direction and the

quality of research and development.

The importance of organizational arrangement is also emphasized by the subjective view of the DPM approach (Bianchi, 2016). In the subjective view, the organizational chart is used to examine the process and activities, and related decision-makers are made accountable accordingly. However, in the subjective view, the organizational chart is formal and static, while in collaborative governance, the organizational arrangement also evolves with the dynamics in the process and involves informal relationships. For example, the committee was initially built in a joint conference without clear planning. After the conference, they found it helpful and made it a permanent organization to support the operation of the joint lab. Therefore, the dynamics of the organizational arrangement also need to be analyzed, as it is both an indication of their mutual trust and a crucial strategic resource to improve mutual fit and joint efficiency. To some extent, the joint committee serves as a backbone support organization (Kania and Kramer, 2011) in the collaborative governance of joint lab.

4.5 Conclusions

In this chapter, the proposed conceptual framework is applied to two different cases, i.e., a short-term consulting project and a long-term joint lab. First, the participants are interviewed and the themes in the collaborative governance are identified, which entail motivations, organizational features, results and difficulties. Next, the strategic resources, performance drivers, and end-results are identified according to the proposed conceptual framework. Finally, an insight model is built for each case to depict the process and dynamics of collaborative governance.

The two cases demonstrated the power of the conceptual framework to foster collaboration governance between HEIs and external organizations to enhance HEIs' performance. Strategic resources created mutual interdependence and collaborating opportunities, performance drivers can be used to gauge the progress of collaboration, while end-results contributed endogenously to increase strategic resources, which entail expectation, satisfaction, HEI reputation, etc.

Finally, the cases also showed that the concepts in the framework are general and needed to be specified in detail according to the industrial and organizational context. For example, it is important to distinguish between short-term and long-term collaboration. Besides, a few extra

elements can be added to enrich the framework, which entails decision boundary, tolerance, initial success, gaming and the dynamics of organizational arrangement.

Chapter 5 Discussion and conclusion

This chapter will summarize the discussions in this thesis and discuss the contributions to the theory and management practice. The limits of research and future research opportunities will also be presented.

5.1 Summary of discussions and findings

The potential of collaborative governance to enhance Chinese HEIs' performance has been discussed in the thesis. The discussion focus on two research questions: (1) How to foster collaborative governance in Chinese HEIs? (2) How can collaborative governance support Chinese HEIs to enhance their performance? A Dynamic Performance Management approach is used to propose a conceptual framework and next a comparative case study of a consulting project and a joint lab is conducted to show the validity of the framework and how collaborative governance can enhance Chinese HEIs' performance. In the next, the main discussions and findings in the previous chapters will be summarized.

Chapter 1 introduces the background, research methodology and thesis outline. With the development of the knowledge economy, knowledge generation and application have been a powerful engine of economy and society. As the central hub of knowledge and innovation, the importance of higher education institutions has been recognized by all the countries and great pressure has been imposed on HEIs to improve their performances in terms of teaching, research and the third mission. Therefore, this thesis addresses the problem of enhancing HEIs' performance in the era of the knowledge economy. Theoretical development and case study are used to deal with this problem.

Chapter 2 reviews current research on performance management in Chinese HEIs, based on which two research questions are proposed to fill the gap in the literature. The literature review follows a general-to-specific approach, beginning from general concepts and ending with specific challenges in Chinese HEIs' performance management system. The content is presented in three sections.

In section 1, the research on performance management is introduced first, and its

application in the public sector and especially in higher education are discussed. Performance management is a systematic process of performance appraisal and performance improvement, whose goal is to align individual performance and daily activities with organizational goals and strategy. Different from the private sector, PM in the public sector focuses on a broad variety of performance indicators and must report performance information for external accountability. Especially in HEIs, the performance is connected to funding under the reform of the Performance-Based Funding System and Total Quality Management is implemented to control the quality in HEIs.

Next, the limits in the performance management system are concluded, which entail limits of performance indicators and measurements, lack of stakeholders' involvement and recognition, behavioral distortion and gaming, and emphasis on silo accountability. The design of performance indicators is hard to include all important aspects of performance without bias and there is often a lack of inputs from stakeholders in the design and implementation process, because of which organizational actors may not behave as expected. Besides, the NPM paradigm overlooks the tradeoffs and interactions among different silos, which causes fragmentations and conflictions in the policy design and implementation process.

Finally, a promising way to overcome the limits of PMS, collaborative governance, is introduced. Collaborative governance emerges when a single organization cannot solve the problem alone, and different organizations pool their resources to address the shared problem together. Collaborative governance operates across different organizations, involving mutual understanding, trust, leadership, dialogue and sometimes a collective identity. Expected results of collaborative governance not only include solved problems and mutual gain but also partnership, shared norms, shared vision, etc. Although it is promising, the implementation process is of high cost, uncertainty and risk. Especially, current research on higher education management highlights the managed relation between government and HEI, shifting the focus from internal to external, without paying enough attention to collaboration governance in HEIs and the active participation of external stakeholders.

In section 2, the literature on the performance management of Chinese HEIs is reviewed.

Firstly, the institutional framework of Chinese high education is introduced. Comparing with western universities, Chinese HEIs have less academic freedom and institutional autonomy.

In the Chinese cultural tradition, HEIs are part of the bureaucratic system to serve the development of the society. The development strategy of Chinese high education is pragmatic and economic concern dominates the needs of education. The setting and operation of HEIs are guided by the Higher Education Act and they are closely supervised by the government. With the opening and reform of the Chinese economy, China expands its higher education quickly, which is considered the largest in the world now. Besides, a series of elite initiatives are implemented to provide special funds to build world-class universities, which entails "211", "985" and "double first-class". To support the expansion of higher education and building of world-class universities, the funding sources are diversified, and local government and HEIs are allowed more autonomy and flexibility to support the reforms.

Secondly, the performance management system in Chinese HEIs is summarized. There are three types of universities in the current Chinese higher education system, which entail research-oriented national elite universities, research and teaching-balanced universities, and teaching-oriented local universities. For each kind of HEIs, external and internal quality assurance systems are implemented to evaluate their performance. The measurable performance indicators used to dominate the performance appraisal process, such as buildings, star professors and publications, which cause tension between quality and quantity. A new policy was released recently to supplement the current PMS with the peer-review process and to emphasize the quality of research and its social impacts.

Finally, the challenges of PMS in Chinese HEIs are discussed. On one hand, shared with the other HEIs worldwide, Chinese HEIs need to be more responsive to changing social needs and active interactions with external stakeholders are required. On the other hand, three challenges are prominent in the Chinese HEIs, which entail lack of autonomy in HEI and academic power concerning the direction of HEI development, unbalance between social needs and current programs, and lack of attention to students' teaching and management.

In section 3, the connections between the limits of the performance management system and the three challenges of Chinese HEIs' PMS are articulated. The limits are the causes of the three challenges, which also have a root in development history, cultural tradition and national development strategy. Collaborative governance is a promising way to overcome the limits, but the report of collaborative governance practices in HEIs is rare. Therefore, two research

questions are proposed to fill the gap: (1) RQ1: How to foster collaborative governance in Chinese HEIs? (2) RQ2: How can collaborative governance support Chinese HEIs to enhance their performance?

Chapter 3 proposes a conceptual framework to foster collaborative governance in Chinese HEIs to enhance their performance. A Dynamic Performance Management approach is used to develop the conceptual framework, which leverages the strength of System Dynamics and performance management. Firstly, for each mission of HEIs, end results, performance drivers and strategic resources are identified and the underlying mechanisms driving performance are examined. Next, an integrated framework is proposed to synthesize the impact of collaborative government on HEIs' performance.

The conceptual framework provides preliminary answers to the two research questions. (1) how to foster collaborative governance in Chinese HEIs? The conceptual framework helps to map and model the process of collaborative governance, which can fasten stakeholders' learning and facilitate the planning and improvement of collaborative governance. (2) How can collaborative governance support Chinese HEIs to enhance their performance? Collaborative governance provides additional resources and stakeholders' participation to improve performance and thereby generates crucial strategic resources endogenously to support further collaboration.

Chapters 4 presents a comparative case study of a consulting project and a joint lab. The two cases demonstrate the power of the conceptual framework to foster collaboration governance between HEIs and external organizations to enhance HEIs' performance. Strategic resources create mutual interdependence and collaborating opportunities, performance drivers can be used to gauge the progress of collaboration, while end-results contribute endogenously to increase strategic resources, which entail expectation, satisfaction, HEI reputation, etc. Besides, the difference between the two cases is discussed, including the tolerance of failure, decision boundary, gaming and the dynamics of organizational arrangement.

5.2 Contributions of this study

In the era of the knowledge economy, great pressures are imposed on HEIs to respond to changing social, economic and political needs. Previous research on university governance

focused on the managed relationship between government and HEIs, shifting from internal to external, which emphasizes increasing reporting demands and accountability overlooking the benefits of collaborative governance between HEIs and external organizations. Collaborative governance is a promising way to improve HEIs' performance but is rarely reported. To the best of our knowledge, this thesis is the first study to enhance Chinese HEIs' performance through collaborative governance.

First, four limits of PMS are found to cause the failure of a PMS, which entail inadequate performance indicators and measurements, lack of stakeholders' involvement and recognition, behavioral distortion and gaming, and emphasis on silo accountability. In particular, four limits cause three challenges in Chinese HEIs, including ack of autonomy in HEI and academic power concerning the direction of HEI development, unbalance between social needs and current programs, and lack of attention to students' teaching and management.

Next, a conceptual framework is proposed based on a Dynamic Performance Management approach to (1) frame the process of collaborative governance by causal chains of end-results, performance drivers and strategic resources; (2) engage broad stakeholders in the learning of underlying mechanisms and (3) facilitate the communication and planning of collaborative governance in HEIs. This conceptual framework can be used to foster collaborative governance between HEIs and external organizations and thereby to examine how collaborative governance can enhance HEIs' performance.

In addition, the case study shows that collaborative governance can enhance Chinese HEIs' performance by (1) providing additional resources to support the research activities, such as funding, field research opportunities, data and application scenarios; (2) improving the efficiency of service delivery and relevance of research with field knowledge and external stakeholders' active participation; (3) contributing to the improvement of teaching through new cases, new knowledge and learning-by-doing opportunities in projects. Furthermore, the active interactions with external stakeholders build mutual understanding, trust, shared norms and good relationships, which creates crucial strategic resources for further collaborations in the future.

Finally, this research also suggests Chinese HEIs develop state of art knowledge and technologies that are needed by the society and promote their research strength and service

capacity in the market, which can create more opportunities for collaboration. Once an initiative is built, a joint organizational arrangement can be used to coordinate the inputs from both parties preventing gaming behaviors and unproductive trials.

5.3 Limitations and future research

There are a few limits in this research, which also leave opportunities for future research.

Firstly, this study refers to Chinese HEIs and a conceptual framework is proposed accordingly. The proposed framework requires some adaptations in a different HEI system/country. Future research can examine the conceptual framework in the non-Chinese HEIs.

Secondly, only the instrumental view of DPM is used to develop the conceptual framework, which focuses on the causal mechanisms without considering the processes and activities and the responsibility of different decision-makers. Future research can extend the conceptual framework with the objective view and the subjective view of DPM.

Besides, in terms of model validity, the constructive validity and the instrumental validity overweight the substantive validity in this research. Future research can build a simulation model to strengthen the content validity of the model, which can be helpful to examine the consistency and representativeness of the conceptual framework to frame the collaborative governance process in HEIs.

Finally, only two cases in a Chinese HEI are conducted to investigate collaborative governance in research and the third mission. Collaborative governance in teaching is also a promising area to be investigated.

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