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"Identifying Financial Autonomy and External Accountability of Higher Education Institutions; The Phase II Brain Korea 21(BK 21) Project in South Korea"

Master's Dissertation
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ABSTRACT

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One of challenges facing competitive higher education in South Korea is how to make a good balance between autonomy and accountability of higher education institutions by effectively utilizing limited public funds. Faced with this challenge, careful consideration of financial reform and allocation measures on higher education institutions from the government is needed and the financial resources from the private sectors should also be reconsidered.

This paper focuses on the financial autonomy and external accountability of higher education institutions under the Brain Korea 21 Phase II Project and identifies the relationship between the funding agency, the Brain Korea 21 and New University for Regional Innovation Committee, and the higher education institutions as to how the allocation mechanism of the Brain Korea 21 Project has been applied in the context of autonomy and accountability. In this study, a purposive sampling is used in order to access those people who have in-depth knowledge in a single case of Brain Korea 21 Project. The arguments for more market-oriented or new forms of governance can be understood in the context of analytical framework. But whether decentralization, openness, performance-based, and selective support to strengthen diversity and accountability produce quality or not remains a visible question.

In a formula-driven and block grant lump-sum budget from the Brain Korea 21 and New University for Regional Innovation Committee under the Brain Korea 21 Phase II Project has provided the minimum condition for education and research and somewhat enhanced the institutional autonomy of higher education institutions but financial autonomy has not been given too much compared with the Brain Korea 21 Phase I Project because most resources sticks to the stipends for graduate students as usual. And the external accountability of higher education institutions has been increased in a form of self-evaluation and self-reporting based on performance

index and external audit of the Brain Korea 21 and New University for Regional Innovation Committee.

This paper will help state policymakers and higher education administrators in making more informed decisions when designing and implementing performance indicators, reflecting on the trends toward innovative allocation mechanisms in the lights of international cases.

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ABBREVIATIONS AND ACRONYMS

BNC	Brain Korea 21 & New University for Regional Innovation Committee
BTL	Build-Transfer-Lease
BK 21	Brain Korea 21
DEA	Data Envelop Analysis
GDP	Gross Domestic Product
HE	Higher Education
HEI	Higher Education Institution
HEIs	Higher Education Institutions
IMD	International Institute for Management Development
IMF	International Monetary Fund
KCUE	Korean Council for University Education
KRF	Korean Research Foundation
MEST	Ministry of Education, Science & Technology
MoE	Ministry of Education and Human Resource Development
MOSF	Ministry of Strategy and Finances
MPB	Ministry of Planning and Budget
NPM	New Public Management
OECD	Organization for Economic Cooperation & Development
PBF	Performance-based Funding
PPI	Private & Public Infrastructure
SCI	Scientific Citation Index

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1. Introduction

1.1 Background to the Research

In recent decades, Higher Education Institutions (HEIs) in South Korea have grown immensely and have undergone profound changes similar to those in European countries. The massification of the private sector in HEIs has brought with it the quantitative growth at national level, but the quality level of Higher Education (HE) in regional areas has not been successfully achieved.[1]

With the changes in Korea's demographic structure due to low birth rates, which reduces the number of students seeking HE, and tuition being the main source of financing within limited government financial support; the public and private sectors of HE in capital cities and regional areas alike have been harshly affected. Based on the figures presented in the Organization for Economic Cooperation & Development (OECD) *Education at a Glance 2008*, the public expenditure in tertiary education in relation to the Gross Domestic Product (GDP) in Korea is only 0.6%. This is significantly lower than other OECD countries, which spend 1.3%. These figures suggest that one cannot neglect the mechanism through which public subsidies are being allocated to universities despite the fact that significant private funding needs to be available because governments are facing increasing claims on their funds for sectors like health care, national defense and pensions.

In other words, the foremost and the biggest challenges facing competitive HEIs in Korea are (1) how to permanently increase their finances, (2) how to secure a stable source of funding from the government, and (3) how to come up with an institutional framework that will

[1] According to the *world competitiveness yearbook* published by International Institute for Management Development (IMD), the quality level of Korean higher education is 53 out of 55 countries, 55 being the lowest grade possible. But, the ratio of completion of higher education is 4th from the top level (IMD, 2008).

effectively utilize these funds. Faced with these challenges, careful and close consideration of financial reform and allocation measures of the HEIs from the government is also urgently needed on the basis of equity, efficiency and effectiveness.

Due to the limited resources, public funding in South Korea is allocated competitively on the basis of research excellence determined by the performance indicators. Therefore, HEIs set their own research priorities encouraged by a government principle of "selection and concentration." However, this allocation mechanism may fail to achieve its goals of formula based funding, when it is not properly measured or funded by wrong or absent incentives or quality assurance system.

In addition, the financial resources for research and education overlap due to the fuzzy roles among Ministries. Hence, the Government of Korea has shifted the authority from the central government to individual agencies in order to foster institutional autonomy and accountability. One of the shifts regarding public funds is being accountable to the buffer organization called "Korean Research Foundation (KRF)."

1.1.1 The Funding Reform Process in Korean Higher Education

Funding is one of the most vexing political issues that the Korean governments and HEIs have to deal with. The Korean government recognizes the importance of funding. It is a critical issue affecting, sometimes even constraining, the development of a higher quality of HEIs.

Financial support from the government in South Korea has been established as a full-scale program since the reform of higher education system in the mid-1990s. The government began to enlarge the resources for the private sector of HEIs and established unitary support so that the HEIs would not deviate from the public and private sector funding. In addition, the government regulated the market competition for the "public good" and "social equity" despite the fact that the private sector of HEIs has to rely on the tuition fees for most of their finances and provisions.

However, when the economic depression of 1999 hit Korea, the Korean government

placed the market economy at the forefront of the funding principle to HEIs. Since the stewardship by the International Monetary Fund (IMF) in 1999, the Ministry of Education increasingly has pushed HEIs for deregulation and autonomy even though the amount of financial resources allocated to HEIs was not so enough to dislodge the current situation.

The 16th Korean Government's Educational Policy of 2003-2007 can be explained by the government's "three no's" policy which was established to assure equity and fairness. They are: (1) no entrance exam is to be given by a particular university, (2) there shall no donation for admission, and (3) no one will not take into account the students' high school rating with respect to entrance exam to an institution of higher learning. If a university does not follow the government's three principles, the government eliminates the quota recruiting system and reduces the university's funds. This is the government's way of trying to bring about a balance in regional development because regionalism and favoritism is a delicate issue in South Korea.

Because of its regimental nature and control, one of the negative effects of this policy is that it hampers the development of HEIs and limits competitiveness among them. Therefore, the 17th Presidential Undertaking Committee in 2008 composed a White Paper to foster institutional autonomy and to produce an authority shift from the Central Government to other agencies. Public and private institutions are taking steps to abolish the "three no's" policy by 2012. This shift implies also that, (1) the admission process is being handed over to the "Korean Council for University Education (KCUE)," the representative of rectors in HEIs. (2) The funds are accountable to the buffer organization, the "KRF" and (3) there is an effort to permit national universities to become public corporations in their own right.

The Korean government creates the incentives that force universities to behave according to the governments' objectives by linking government funding to performance in order to enhance flexibility and entrepreneurship to make efficient use of resources and effective use of knowledge exercised.

1.1.2 The Present Condition of Funding Higher Education in South Korea

This sub-section will provide the rationale for the increasing of public funds from the government. Financial support from the government to HEIs in South Korea, for the year 2007 is 13th out of 181 countries. This is inferior to the other OECD countries based on *Education at a Glance 2008*.

The <Table 1> and <Figure 1> diagrams show that the public support for tertiary institutions leaves much to be desired in view of their expansion. The annual expenditure on educational institutions per students for all tertiary institutions is $7,606. This is significantly lower than the other OECD countries, which spend on an average $11,512. This means that the expenditure for all tertiary institutions in Korea is only about 60-70% of other OECD countries. The cumulative expenditure per student over the average duration of tertiary studies is $26,089. It is significantly less than the average of other OECD countries, which is $47,159. This indicates that the scale of the expenditure invested in the students is the lowest level among the OECD countries. In addition, most of the sources are from the private sectors and only about 24.3% of all investments are from the public sector.

Table 1.1 A Comparison of Investments of Various Countries for Tertiary Education

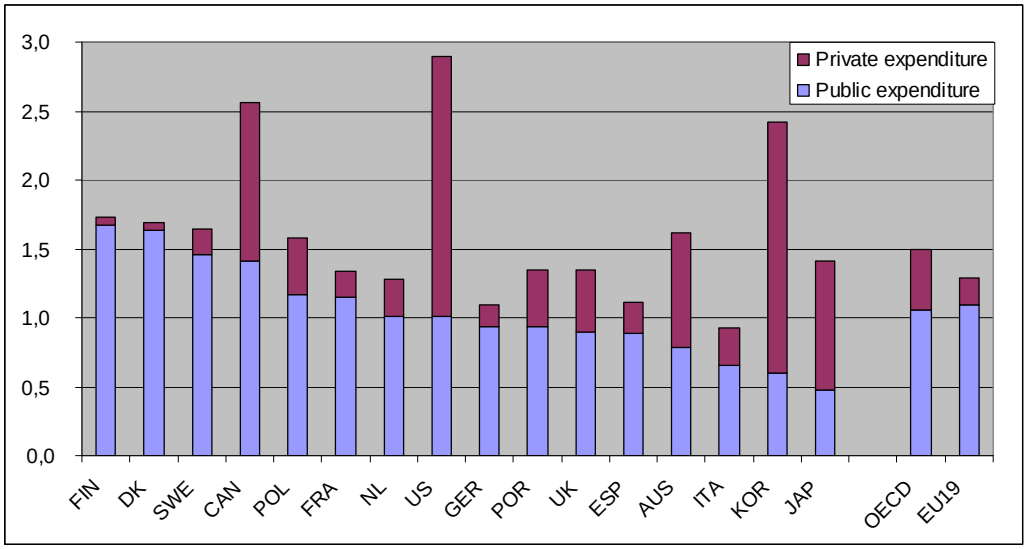
		OECD average	Korea	USA	Britain	Japan	Canada	Germany	France
Expenditure on tertiary institutions as a percentage of GDP (%)		1.5	2.4	2.9	1.3	1.4	2.6	1.1	1.3
Public source		1.1	0.6 (31st)	1.0	0.9	0.5	1.4	0.9	1.1
Private source		0.4	1.8 (2nd)	1.9	0.4	0.9	1.1	0.2	0.2
Relative proportions of public & private expenditure on education institutions, as a percentage for tertiary education	Public source	78.2	24.3 (28th)	34.0	71.0	43.1	58.6	91.3	85.6
	Private source	21.8	75.7(2nd)	66.0	29.0	56.9	41.4	8.7	14.4

Annual expenditure on educational institutions per student for all tertiary education	11,512	7,606(23rd)	24,370	13,506	12,326	M	12,446	10,995
Cumulative expenditure per student over the average duration of tertiary studies	47,159	26,089(19th)	m	58,654	50,167	M	66,758	44,202

In equivalent USD converted using PPPs for GDP, by level of education, based on full-time equivalent

Source: OECD (2008), *Education at glance*

Figure 1.1 Expenditures on Tertiary Education Institutions in 2005 as Related to the GDP



Source: OECD (2008), *Education at glance*

Johnston argues that faced with financial stringency and trades off, the government and HEIs in South Korea are faced with the following dilemma (1) to lower the cost of tuition using a loan scheme and (2) to consider other source of revenue (Teixeira P. et al. 2006, p.60). In groping for the direction of funding HEIs, the Korean government requires that the deployment of existing resources in the most effective manner and thus increases the resources from the government and lowers the burden for students and families.

1.1.3 Public Resource Flows into Institutions of Higher Learning in South Korea

The public funding of HEIs can be divided into graduate schools, undergraduate schools and colleges. The public finances for graduate schools aims to foster (1) “World Class Research Universities,” (2) “Regional Universities with Specialized Fields,” (3) “Phase II of Brain Korea 21,” (4) “High-tech Green-bio Research Towns,” (5) “Regional Research Institute.” For undergraduate schools and colleges the aims are to foster (1) “Teaching Centered Universities” vs. “Research Centered Universities,” (2) “New Universities for Regional Innovation (NURI),” (3) “University-Industry Collaboration,” (4) “Metropolitan Universities with Specialized Fields.”

However, the public funding given is mainly based on the stakeholders’ current plans and policies. They only create new plans and projects in order to increase their own budgets among various ministries. As a result, the role of Ministries as funding agencies has been imprecise and conflicted and the financial resources to HEIs often overlap among Ministries.

1.1.4 Overview of Brain Korea 21 (BK 21) Project in South Korea

In 2006, in South Korea, there were 221 four-year or greater HEIs. Among them, 175 were conventional universities, 11 teachers’ universities, 14 polytechnic universities, one Open University, and 20 other types’ of HEIs. However, there was no official classification other than the Korean government’s classifications of HEIs –this is according to the mission focus of HEIs (Shin, 2008, p. 4). The introduction of BK 21 program slated for the year 1999-2012 has contributed to define the classification of research universities.

The BK 21 Project is destined to cultivate high quality human resources among graduate schools and consolidate to the project for “World Class Research Universities”. This project is formulated in line with competitive and performance-based management. The project has had two phases of funding. In Phase I, from 1999 to 2005, the HEIs have been allocated about $ 1.4

billion. In Phase II, which began in 2006 and which will run to 2012, the HEIs have been allocated an additional $2.1 billion.[2]

1.2 Prior Research

The studies on allocation mechanism under the BK 21 Project are relatively limited and no literature in relation to autonomy and accountability of HEIs under the BK 21 has been found, because most research has been focused on the evaluation of the project as a whole. However, there have been several propositions and analyses on the funding principles in the context of Korean HE.

When the BK 21 Project was instituted in 1999, Kim (1999) analyzed the sustainable development strategies for community-based universities against implementation of the project. Another Kim in 2006 raised the question relative to quantitative efficiency of BK21 Project in South Korea. He tried to find out the relationship between the ratio of SCI papers and research funds, quantitatively comparing BK 21 universities and non-BK21 universities based on the Data Envelop Analysis (DEA).

One year later, Kim (2007) argued the problem of funding policy underlying the 1st Phase of BK 21 Project and Kim et al. (2008) analyzed effects and problems of the BK 21 Project based on the results of the Delphi survey. They proposed five performance criteria: (1) improving educational environments, (2) fostering manpower, (3) improving research abilities, (4) fostering

[2] First of all, the BK 21 Project was instituted in 1999 because the level of academic competence and competitiveness in HE was lower than that of the other OECD member countries, such as in international journal publications as registered in the *Scientific Citation Index* (SCI). In 1998 the journal publications by Scientifics were only 3.9% of American scientific publications in HEIs. Secondly, *Asia Week '99* reported that Seoul National University, which is the most competitive of the Korean universities, ranked third among the High Quality Universities in the Asian region. Thirdly, the Korean HEIs increasingly rely on universities abroad and cause about a 7 billion dollar deficit in national revenue and expenditure. For all of the above reasons, the South Korean government urgently needed to nurture high-quality human resources for the forthcoming "knowledge society." That is why the Ministry of Education and Human Resource Development (MoE) started BK21 Project in order to upgrade the quality of university research and elevate these institutions into "World Class Institutions" of higher learning.

international co-operation, and (5) co-operation between universities and industries.

In order to overcome the limitation of the previous studies and to consider the endogenity derived from BK21 participation, Paik and Park (2007) used the panel data of the year 1999, 2002, and 2005 and analyzed the research excellence of the 1st Phase of BK 21 Project. Seong et al (2008) recently developed a new evaluation model underlying the 2nd Phase of BK 21 Project in order to access the net effect of the program. There was also micro-level approach on the structural equality model in order to find out the relationship among various factors as to the satisfaction of participating students (Sohn et al., 2009)

But my study, which focuses more on autonomy and accountability of HEIs, will be different from the previous research.

1.3 Research Motivation & Problem Statement

This research was motivated out of concern about the rapid trends of marketization of HEIs in South Korea. The New Public Management (NPM) in the context of Korean HE policies aims to foster autonomy and accountability of HEIs as indicated in the previous section discussed regarding the research background. As earlier mentioned, the BK 21 Project also adopts a competitive and performance-based management. However, it is not clearly defined how the BK 21 Project has affected the autonomy and accountability of HEIs and whether its influence on autonomy and accountability of HEIs is in line with the national policy goals.

In addition, in a process of the BK21 project, the level of autonomy and accountability of HEIs can be somewhat changed depending on the allocation mechanism criteria the funding provider offers. The assessment or selection criteria of the BK 21 Project can also change when turning into the second phases. Therefore it would be invaluable to find out the relationship between the funding agency and the HEIs as to how the allocation mechanism of the BK 21 Project has been applied in the context of autonomy and accountability to HEIs.

This research on HEIs debates whether decentralization, openness, performance-based, and selective support strengthen diversity and accountability produce quality or not.

1.4 Research Objective & Research Question

The purpose of this research is to review the public allocation mechanism to HEIs in the light of the Phase II of the BK21 Project in South Korea, by addressing and analyzing the financial autonomy and external accountability of HEIs at the governmental and institutional level. This research will provide information to assist state policymakers and HEI administrators in making more informed decisions when designing and implementing allocation mechanisms to distribute financial resources to HEIs, as reflected on the trends toward more innovative and competitive public funding in South Korea.

Based on the above considerations, the main research question of this study is as follows:

To what extent have the allocation mechanisms underlying Phase II of the Brain Korea 21 Project contributed to the financial autonomy and external accountability of Korean higher education institutions?

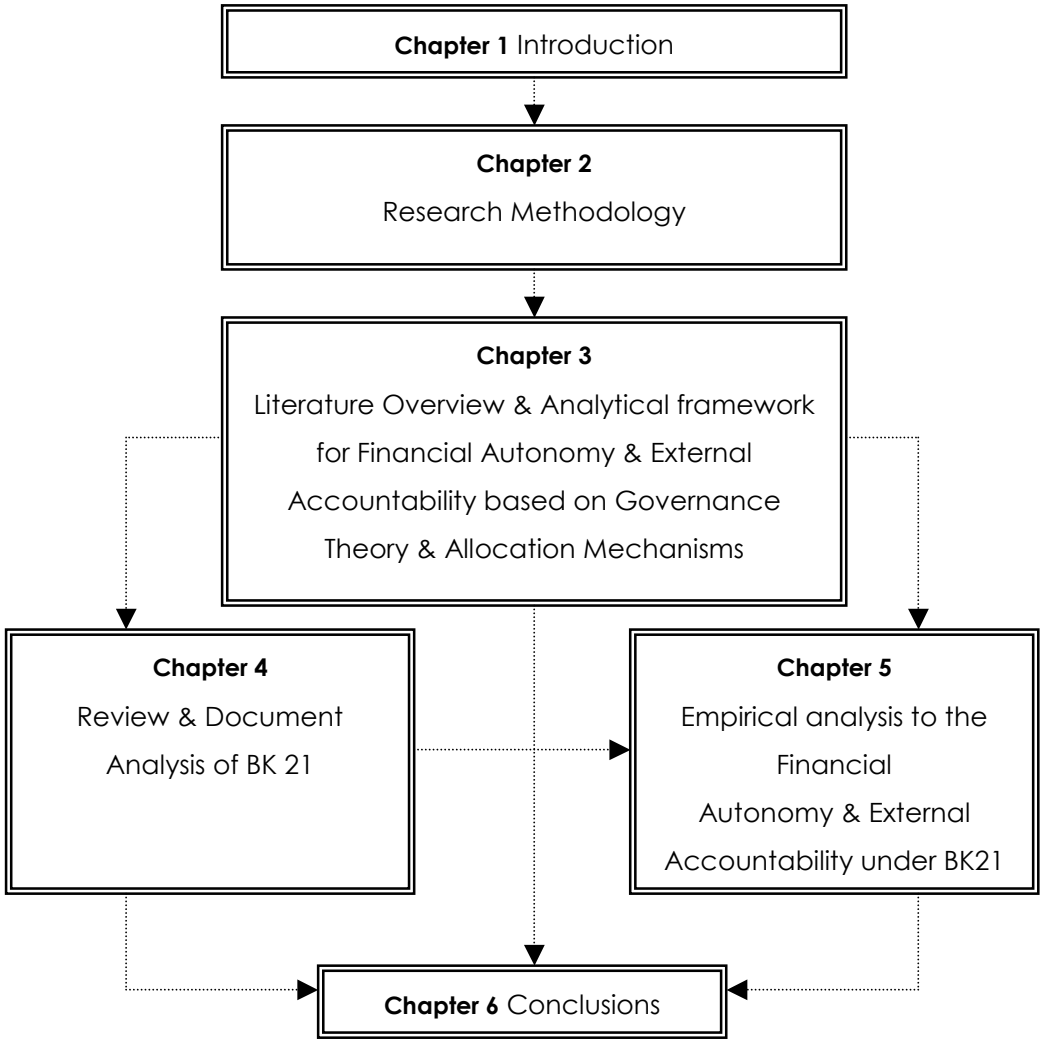
1.5 Structure of the Research

As a way to provide an organized analysis of the research question, five sub-questions are addressed in sequential order and the research is composed of six chapters (See Figure 1.2).

1) How can the funding and steering principles be interpreted and conceptualized in the light of relevant international literature on the subject of enhancing financial autonomy and external accountability of HEIs?
2) Does the BK21 Project measure up to its goals and instruments?

3) In what way and why has the government designed and adjusted its funding formula and selection criteria for the BK21 over time?
4) What is the role of buffer body Brain Korea 21 & NURI Committee (BNC) and how have universities participated in the BK 21 Project responded to the governance and funding system?
5) What lessons that can be learned from the BK 21 Project in terms of governing and funding instruments that it has made use of?

Figure 1.2 Structure of the Research



The main question discussed in Chapter 1 gives an overview of funding reform process in South Korea. In order to find out the role of BK 21 Project, it is essential to discuss on the current problems facing the HEIs in Korea and how the government approached these problems. In Chapter 2, in the research design and methodology section, why the inductive reasoning is used and an explanation of why are given.

The first sub-question will be explored in Chapter 3, where the governance theory and allocation mechanism for the analysis of financial autonomy and external accountability are discussed, and their central concepts are defined.

The second sub-question will be addressed in Chapter 4, which reviews and analyzes of public documents and literature in order to interpret the autonomy and accountability of HEIs underlined in Phase II of the BK 21 Project.

In Chapter 5, the fourth question will be interpreted from an empirical data. This will help clarify the financial autonomy and external accountability under the BK21 Project. First, the role of the buffer body, BNC, will be interpreted and how and why output based funding was more emphasized in BK21 Phase II than in Phase I. Hence, the BNC and universities response to the funding systems will help to consolidate my analysis. While analysis of outcomes might not be sufficient to generalize cause-and-effect relationships, this information can help researchers to decide whether or not the introduction of performance based management and evaluation helps financial autonomy and external accountability at the institutional level.

Finally, this paper will be concluded in Chapter 6, by presenting the lessons that can be learned from governing and funding models, and the ways forward while discussing the limitations of the study.

2. Research Methodology

2.1 The Qualitative Research Method

In order to examine the autonomy and accountability of HEIs, this study adopted a qualitative research method, which can use both qualitative and quantitative elements. However, this research is more conducted in an inductive reasoning process of survey questionnaire and telephonic interviews through the combining of various literatures available this subject.

In a process of inductive reasoning, it is important to find out whether the observation and data collected from the Brain Korea & NURI Committee (BNC) and HEIs were relevant to my theoretical frameworks. The inductive research data, although gathered in a relative short period of time, is fully adequate to investigate the autonomy and accountability of HEIs in Korea.

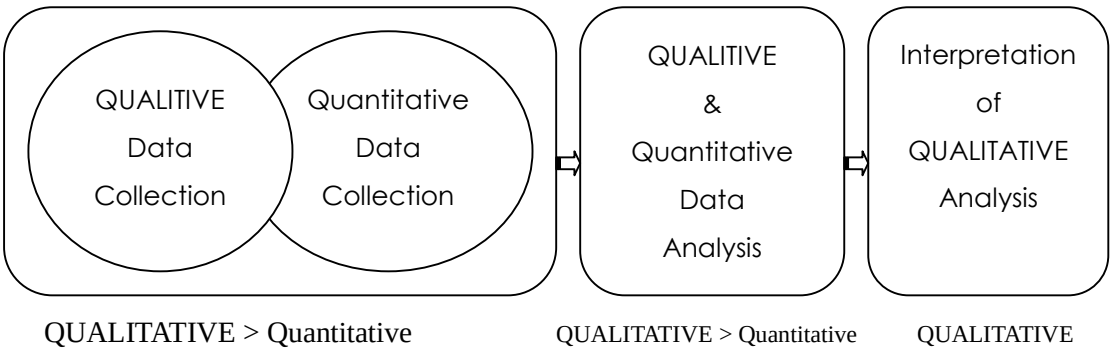
This study, that is primarily qualitative, is measured quantitatively in order to find out the level of financial autonomy and external accountability of HEIs, while comparing the governance and allocation mechanism of funds during the Phase I and Phase II of the BK 21 Project. And the use of quantitative data and measurement such as statistics and figures enhanced descriptive understanding of the phenomenon and a credible argument and strengthen internal validity of the research design.

2.1.1 The Concurrent Transformative Design

The *concurrent transformative designe* used in this study, in particular, aims to employ the method that will best serve the theoritical perspective of my research. The two types of data was collected at the same time during one data collection phase and the priority was given to typically qualitative data. And the different data was integrated during the anlaysis phase, although integration during the intepretation phase would be inclined to be more qualitative.

(Tashakkori & Teddlie, 2008, pp. 142-144).

Figure 2.1 The Concurrent Transformative Design of Research



By using two phases, this research desigine is able to give voice to diverse perspective, to better advocate the participants, to better understand the phenomenon of process of research results. This type of design is particularly desirable because many important variables of interests were not manipulable.

Given the considerations above, this research design is appropriate because one qualitative element alone will not provide comprehensive answer to the nature of main research question, which focus on the level of financial autonomy and external accountability during the Phase of BK 21 Project, and strengthened the findings when compared with international cases.

2.1.2 A Single Case Study

This study also adopted a single case of qualitative approach. Although the terms *qualitative* and *case study* are often used interchangeably, the case study research can involve qualitative data only, or both qualitative and quantitative elements (Yin, 1994). A case study is said to be an exploration of a bounded system or a case over time through detailed and in-depth data collection involving multiple sources of information rich in context (Creswell, 1998, p. 61).

The main consideration for choosing such a single case study of BK21 is that it can provide unique and detailed understanding of a phenomenon although it may challenge a theory or lead to an appropriate result if the data is insufficient. Yin suggested that multiple cases study could reduce a suspicion and limited value of a single case and allow for greater opportunity to generalize across several representations of the phenomenon (Yin, 2003, in Green L. et al., 2006, p. 115). As a general rule, qualitative researchers are reluctant to generalize from one case to another because the context of cases differs.

However, the generalizability of case study can be increased by the strategic selection of samples (Flyvbjerg, 2006, p. 229). My research objective is to achieve the greatest possible amount of information on a given problem or a phenomenon of BK 21 Project so that a representative case and purposive samples are the most appropriate strategy.

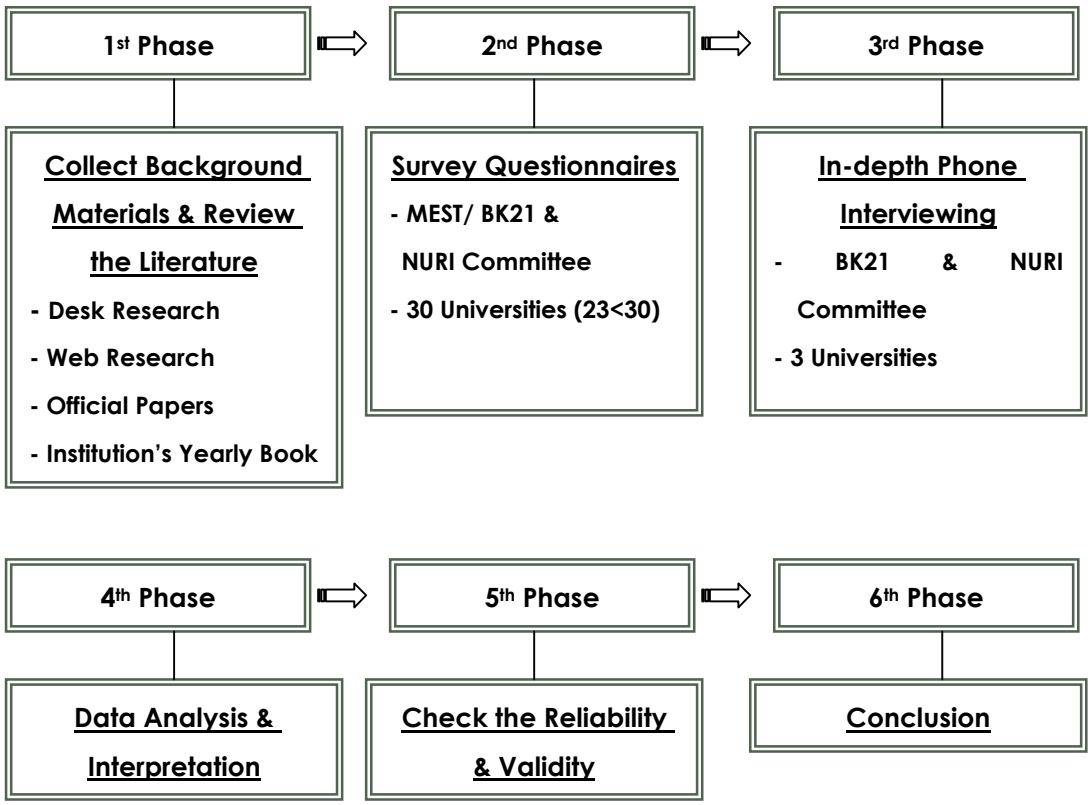
Hence, in this study, a purposive sampling used in order to access “knowledgeable people” those who have in-depth knowledge in BK 21 Project and allow me to concentrate on instances that would display a wide variety to illuminate research questions at hand (Cohen et al., 2007, p. 115). The success or failure of this unique and extreme case of BK 21 is dominated by the test whether different respondents fall with equal views on autonomy and accountability of HEIs. A critical case strategy used in this study can provide the possibility to formulate a generalization to permit logical deduction of the type; “If it is valid for this case, it is valid for all or many cases.” In its negative form, the generalization would be, “If it is not valid for this case, then it is not valid for any or only few cases” (Flyvbjerg, 2006, p. 230).

2.2 Research Procedure

First of all, this research discusses my data collection procedures, and then secondly, describes the techniques used to analyze the data to establish credibility in my findings; (1) the author collected background materials and reviewed them, (2) elaborated survey questionnaire,

(3) then made some in-depth phone interviewing and collected data, (4) analyzed and interpret them, (5) checked its validity and (6) finally came to a conclusion. The figure below shows my procedure in greater detail;

Figure 2.2 The Research Procedures



2.2.1 Data collection Procedure

In the first phase of research, the author collected background materials and reviewed the literature on the application of innovative public funding systems in other settings. The author elaborated on it, examined it and criticized it. In particular, the author examined the official documents of the "Plan to Operate the National Finance 2008 – 2012," the "Guide for BK21 Project" and the "Higher Education Funding Policy and its Policy Strategy." These documents are gathered from public web sites, government, and campus officials. The author also considered public statements of the OECD reports.

In a second phase of research, the author sent e-mails, a questionnaire survey to the representative of organizations of the direct public funding. The author contacted several officers on the supply side in the Ministry of Education, Science & Technology (MEST) and BK 21 & NURI Committee. On the demand side the author contacted thirty university groups who participated in the BK 21 Projects. These helped to determine the level of autonomy and accountability of HEIs and whether or not the current funding scheme made desirable effects on the autonomy and accountability of HEIs.

One of the important factors in determining the quality and the success or failure of my survey research was the response rates of the questionnaires. Low responses would decrease the statistical power and external validity used in Likert scale. If the statistical power of research was low, the study might have been too small to detect any differences. If the external validity was poor or unknown, the results of a recent research could not be reasonably generalized. Therefore, with a view to maximizing the response rates and minimizing response biases, the construction of an effective mail questionnaire was needed (See Appendix A and B). The instrument needed well-designed questions; it also had to have a format which encouraged respondents to complete it. In order to assure effective instruments the author pilot-tested a questionnaire to several universities before sending them to other respondents. Cover letters, introducing the researcher and the purpose of the study to the respondents, were made brief and to the point. Non-response to questionnaires was dealt with through follow-ups, notifications by mail and phone.

In the third phase of this research, the author analyzed the survey data, and conducted qualitative in-depth interviews with the senior administrator of BNC as to the direct funding on the supply side and on the demand side to several directors of research teams at several universities in order to consolidate my theoretical based analysis. As Oppenheim pointed out, it is not easy to generalize all variables with small, non-random samples. A response of twenty-three on the thirty questionnaires is not such a small sample (Oppenheim A. N., 1999, p. 71).

At the conclusion of each interview, the author asked the interviewee if there is anyone

else to speak with to gain additional insights. Each interview was guided by a series of questions in a restricted time.

It should be noted that the interview method had some drawbacks such as being relatively expensive in terms of time and money, and having the possibility of incorporating biases or subjectivity. However these drawbacks were to a large extent reduced by cost conscious budgeting on my limited financial resources. Intentionally leading questions were strictly avoided as a precaution to minimize unnecessary biases. The author referred to minimizing and not eradicating biases, because the issue of bias is complex. Despite the possible biases in the interview method, which were different from the questions in the questionnaire, where a participant could decide to discard a particular question or answer the question partially or incorrectly, sometimes the author supplemented the lack of response with an interview session.

The in-depth interview rather than focus-grouped interview was adopted when the author had phone interviews with the senior administrator of BNC and University officials. The time limit, the time difference, and long distance from the interviewee were some intervening factors.

The qualitative method of an in-depth interview enabled me to gather sufficient information to establish a theory, to help develop questionnaire items for survey research, and to understand the reasons behind a particular phenomenon. The author recalled that the in-depth interview was more beneficial to use than focus-grouped interview in that in-depth interview has a wealth of details to provide and more accurate responses on sensitive issue can be gathered.

2.2.2 Data Analysis Procedure

2.2.2.1 Data Measurement of Open Ended Questions and Closed Questions

The term “operational process” is usually used in quantitative research. It is the process of decomposing abstract concepts and designing a way of measuring variables and indicators in order to research hypothesis using empirical observations. The questionnaires to the HEIs was

asked in the following manner; multiple-choice questions, open ended questions, and, in general, contained fourteen statements to rate in terms of the five point Likert scale (Strongly Agree =5, Agree =4, Neutral =3, Disagree =2, Strongly Disagree =1). (See Appendix B).

The reason for using the Likert scale is that it is easier to use and understand both for the researcher and the respondent, and the coding as well as the interpretation is easier compared to other scales. It also takes less time to explain to respondents the rating system. Limitations with the Likert scale is that wording of the descriptive categories most probably affect the responses and artificial categories might not be sufficient to describe a complex continuous, subjective phenomenon. Furthermore, too many response categories may lead to difficulties in choosing and too few may not provide enough choice or sensitivity, forcing the respondent to choose an answer that does not represent the person's true intent. The author was well aware of that and so kept my questions to a minimum.

Finally, a total score from the Likert index may be the result of many different combinations of ratings, which leads to a loss of information about the scale items. But, the use of sum scores can lead to incorrect conclusions because of limited range of options. Therefore it was desirable to use the 7 or 10 points scale so that this appears consistent with other variables.

In order to supplement this quantitative limitation of the Likert scale, open-ended questions were used in the middle part of questionnaire. However, open questions are more desirable at the end of the closed-ended questionnaire so that people can write in a longer response if they wish to.

Oppenheim pointed out that open-ended questions, even though they are often easy to ask, are difficult to answer, and still more difficult to analyze (Oppenheim A. N.,1999, p. 112). When open questions were attached to a questionnaire, it tends to slow down the administration, be hard to record the long responses, be difficult to code especially if multiple answers are given, and enables respondents to raise new issues. Although the respondents felt great freedom that they were able to speak their mind with self-administered questionnaires, respondents might not be

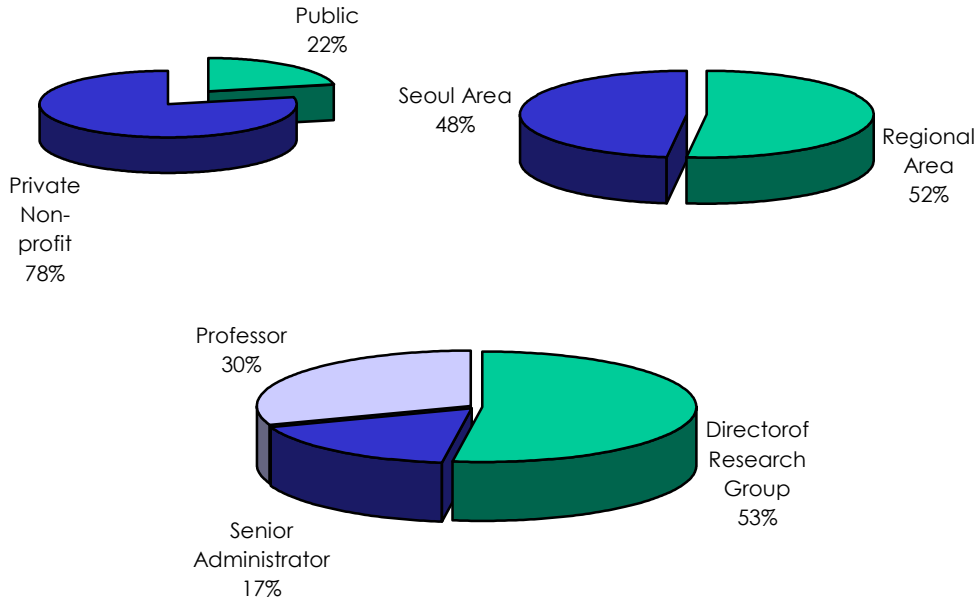
willing to write a long answer and decide leave the question blank. And finally, it was difficult to know the meaning of a blank answer when one came to the analysis of the responses.

On the contrary, closed questions like on the Likert scale tend to be quicker to administer so that they are often easier and quicker for the researcher to be able to record responses, tend to be easy to code. But they have a disadvantage in so far as respondents can only answer in a predefined way and that new issues cannot be raised. Respondents might be forced to answer in a way that may not match their actual opinion and may become frustrated. It can be concluded that closed questions were quick and easy to check off and might be more likely to be answered by the respondents.

2.2.2.2 Non-Probability sampling

In order to provide evidence validity on BK21 Project, the purposive samplings were sent to those people who were directly involved in the Phase I and II of BK 21 Project. With kind assistance from the universities, the author has received the questionnaire surveys from twenty-three participating universities in BK 21 Project for the year 2004-2009. The ratio of the respondents was 77% (23<30) after calculating the response rates with missing values for any of the variables used in the analysis. And the types of respondents are as follows;

Figure 2.3 Distributions of Respondents at HEIs



As the above figure shows, the samples collected might have variables between universities depending on public or private sectors, locations of the University, and the position of respondents. The samples of course imply a bias with respect to fields or disciplines with the highest and lowest proportion of research groups involved in BK 21 activities. These biases seem to have contrary implications, but qualitative in-depth interviews conducted in both BNC and HEIs covered these biases and helped to interpret the relationship between autonomy and accountability based on allocation mechanism and had a limited impact on the analysis of the financial autonomy and external accountability relationship between universities and funding agency.

Focusing on meso-level's interviews, the respondents told me little about the organizational structures' forces and historical changes. But based on the respondent survey and interviews, the analysis was conducted in a descriptive way to discover the relationship between autonomy and accountability.

2.2.3 Data Interpretation Procedure

In chapter 5, the author will discuss how well the empirical data fits the theory based analytical framework. It will be interpreted and generalized how BK 21 funds were allocated and how this allocation mechanism affected financial autonomy and external accountability of HEIs. While focusing on patterns, comparing results with the literature, official documents, survey questionnaire and interviews, the relevance of my theory was consolidated. Despite the empirical insights, the author made further findings to find out the performance-based management and related it to the financial autonomy and external accountability issues.

2.2.4 Reliability and Validity

In order to improve the *reliability* and *validity* of research and evaluation of findings, this study adopted *triangulation* method. The *triangulation* is defined to be "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study" (Creswell & Miller, 2000, p. 126). Researcher Patton also argued that the study could be strengthened by using triangulation of several kinds of data and sources which includes quantitative and qualitative approaches (Patton, 2001, p. 247). Engaging multiple methods such as a participatory research in the 1st Phase BK 21 Project as a graduate student from 1999 to 2000 as well as survey questionnaires and interviews collected from BNC and HEIs leads to more valid, reliable and diverse construction of findings.

The term of *reliability* and *validity* are common in quantitative research and it is reconsidered in the qualitative research paradigm (Golafshani, 2003, p. 597). Guba and Lincon (1985) proposed early a four-point criterion for judging the soundness of qualitative research and explicitly offered these as an alternative to more traditional quantitatively oriented criteria. But the criteria offered by them are problematical "because the belief in *multiple constructed realities*

rather than a *single tangible reality* is not consistent with the idea that criteria for judging the trustworthiness of an account." Acknowledging this problem, in later work (Guba and Lincon 1989, 1994) proposed a fifth criterion, "authenticity" (Lincoln & Denzin, 2003, p.173). The proposed quantitative criteria and the qualitative criteria are listed in the following table.

Table 2.1 Criteria for Judging Quantitative and Qualitative Research

Traditional Criteria for Judging Quantitative Research	Alternative Criteria for Judging Qualitative Research
Internal validity	Credibility
External Validity	Transferability
Reliability	Dependability
Objectivity	Confirmability

One can conclude that a concern with *credibility* should replace truth-value since "the most critical technique for establishing *credibility*" is through "peer review" or "member checks" (Guba and Lincon, 1985, p. 314). Therefore, key participants in the interviews were credibly consistent with their understanding of the BK 21 Project. In the table above, *transferability* replaces *external validity* as conventionally conceived; *dependability* is a replacement for *reliability* as conventionally conceived. All of this is to be fulfilled by peer-auditing procedures. Auditing is also useful in establishing *confirmability*, a criterion designed to replace the conventional criterion of *objectivity* (Lincoln & Denzin, 2003, p.172).

Lincoln & Denzin says that following the explanatory analysis, the internal validity of proposed model can be figured out. In order to reassure the analysis of this study to check the *reliability*, resamples from other HEIs was taken from the original data and check these variables if fitting can be repeated several times. The results of my research are most believable from the perspective of the participants and observation of BK 21 Projects. They are the only ones who can legitimately judge the *credibility* of the results. This study contains enough details for an

external reviewer to understand the BK21 Project and their relevance to other situations. The only way to establish *credibility* is to create a detailed description of empirical data and analysis in context so that others in a different situation can access the similarities and differences to their own situation. Therefore, the financial autonomy and external accountability of HEIs based on allocation mechanism can be generalized or transferred to other international contexts or settings. Finally, this research has a level of credibility and transferability based on the empirical analysis so that it verifies my theory in the end.

3 Literatures Overview & Theoretical Framework

The difference of governance varies from country to country. This means that there is a multifaceted nature of governance, where different dimensions of autonomy and accountability are practiced. Hence, the established governance procedure and resource allocation mechanism of Korea are the foundation for this research. The two theoretical frameworks of governance processes and allocation of funds will be taken as a two sides of same coin. They are adequate to describe the dimensions of governance and the effects of allocation mechanisms in the system of HEIs in Korea. Funding modes are tightly linked to the governance. That is, different forms of governance are practiced depending on the funding system in place. Depending on the system of governance chosen, corresponding funding system follows.

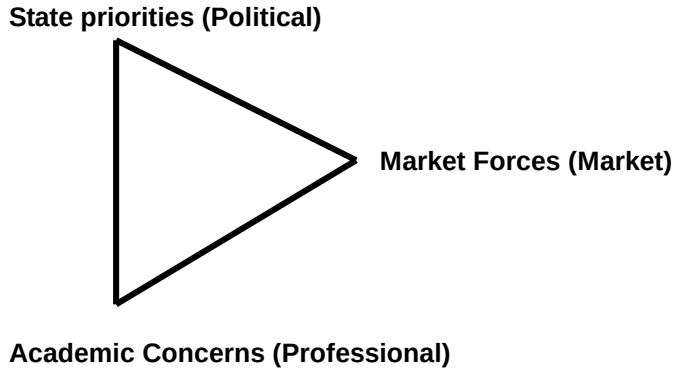
3.1 New Modes of Governance Defined

"Governance" is a "processes aimed at coordination, stability and structure in a world of actors of different size, power and resources" (Strehl et al., 2007, p. 22). The term of governance is related to the changing role of the state, the relations between the state and its institutions, society and economy and the political governing of these. It is an umbrella concept for a wide variety of phenomena (Pierre & Peters, 2004, cited in: Tiihonen, 2004, p.44).

The economic recession of the 1980s and early 1990s forced governments to adapt their governance and to put economic considerations at the forefront of their governance approach. Burton R. Clark proposed a simple but very influential model of coordinating system on HE. His triangle of governance (Clark, 1983, p. 143) represents three different forces operating in HE: the state, market and academia; and, in particular, the growth of influence of the market with an initiative of entrepreneurial universities. His governance triangle can be also related with substitutions to state priorities, academic concerns, and market forces in order to create an

accountability triangle (Burke, 2005, pp 21-24).

Figure 3.1 The Accountability Triangle of Burton R. Clark



(Source: Burke, 2005: 23)

Since the market also leads to an efficient allocation of goods and resources, governments have been changed influence over times in regulating the market failure.

Market failure occurs when freely functioning markets fail to deliver an efficient allocation of resources. The result is a loss of social and economic welfare. From the viewpoint of society, market failure exists when the competitive outcome of markets is not efficient. This is usually because the benefits that the free-market confers on individuals or businesses carrying out a particular activity diverge from the benefits to society as a whole (Riley, 2006).

A *quasi-market* arises when governments intervene to correct the threatened market failure. In HE, government use fiscal policies for under-informed ones.

Political science speaks about this shift. In political science literature, this newly defined role of national government is often referred to as *reinventing government* (Osborne and Gaebler, 1992, p. 427). This happens when the central government establishes broad policies, combines them with budgetary issues, and transfers responsibility for growth, innovation, performance and output to the decentralized institutions. At such time terms such as “competition”, “strategy development”, “result and goals orientation”, “customer orientation”, and “market orientation” become frequent and common in the public sector at large and are well recognized in fields of HE.

In HE the reinvention of government has been described as a shift-paradigm from the *state control* to the *state supervisory* model (Maassen and Van Vught,1994; Maassen 1996). The implicit assumption underlying this model is that a supervising role of a State leads to a better performance of HEIs than a controlling model.

In the late 1980s and 1990s the nature of governmental intervention changed and the shift from *state control* to *state supervisory* became clear. Guy Neave has termed this new form of state-driven intervention as the "Evaluative State" (Neave, 1998). The *Evaluative State* is a redistribution of functions between government and HEIs so that the functions previously vested in government are assigned to the individual institutions. This *Evaluative State* is linked to (1) lump sum budgeting, (2) contractual financing, (3) greater margins of discretion in internal budget allocation within the university, (4) the increasing importance of staff productivity and the means of verifying it, and (5) the assignment of responsibility for strategic development to institutional leadership and its supporting management (De Boer & Goedegebuure, 2003, p. 211)

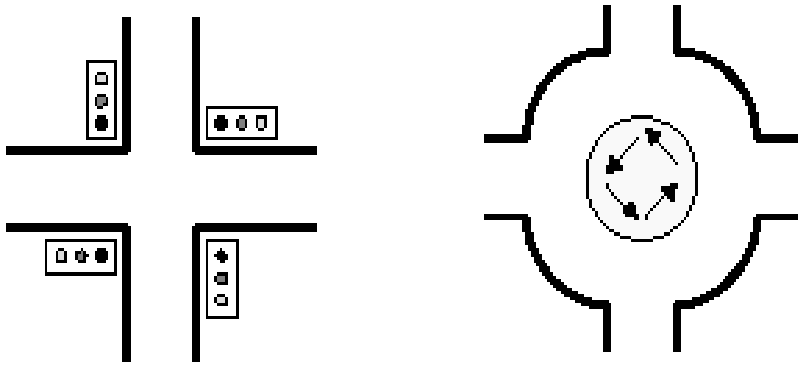
The above-discussed conceptual framework of governance shift from *state control* to *state supervisory*, that is, whether government should regulate the details of the market operation, is new. The detailed and centralized state regulation and the formal input oriented procedures of allocation have been changed so that the autonomy and responsibility rest on the single HEI in order to improve competitiveness, more efficient and effective use of state money and an improved capacity to meet market needs. One can see that the traditional governmental funding of HEIs is being questioned and newly defined role of government, in the sense of *lean government*, is being proposed. And the notions of 'less government and more governance' and 'from governing to governance' are proposed (De Boer et al., 2006; Neave, 2008).

However, totally free markets are not a realistic option in many of the sectors of economic activity, as illustrated by the recent breakdown of financial market in the neo-liberalism world of finances. An alternative option might be resumed in the following principle: 'Competition where possible, regulation where necessary' (Kay & Vickers, 1988, p. 287). This principle comes down

to repositioning government and striking a balance between competition and regulation. Such an approach is commonly named *performance based steering*. While retaining the 'light touch' character of governmental involvement, performance-based steering supplements market forces with persuasion and discretionary rewards and punishments, which are designed to nudge universities in directions judged to be in the public interest measure the doing so as not to overpower them. This steering protects the universities' autonomy while helping them balance public values with private market forces (Massy, 2004, p. 17).

The diagram below (Van Asseldonk et al. 1999; Jongbloed, 2004), although extremely simple, consolidates the ideas between a *state control* and a *state supervising* system.

Figure 3.2 Coordination Systems; the Crossing versus the Roundabout



Source: Jongbloed (2004: 90)

On the left part, a diagram is shown depicting a traffic junction with traffic lights on all four corners regulating the flow of traffic. Creating acceptable queuing times requires substantial effort in terms of programming the traffic lights. One first has to study the intensity of the traffic at that exact location, incorporate "real time" information on traffic flows in response to the duration of red and green signals, install traffic lights for pedestrian crossings, and prevent the lights from turning green all at the same time (Jongbloed, 2004, p.89) This complex procedure

resembles the state controlled funding model based on line-item budgets.[3]

The right side of the diagram, a roundabout or traffic circle, aims to represent the state supervision model. There are no traffic lights and only one simple rule regulating the traffic flows. That rule is: the traffic on the roundabout has priority. This system of coordinating traffic flows does not require an extensive information system. The flow of traffic is much smoother compared to the intersection traffic lights system. But what's more important is that those participating in traffic feel more in control and interact directly with other participants (Jongbloed, 2004, pp. 89-90). This provides a different set of incentives for behavior and leads to the idea of Performance-based Funding (PBF), which allocate a small amount of funds, based on the performance indicators in a form of block grants.

3.2 New Modes of Allocation Defined

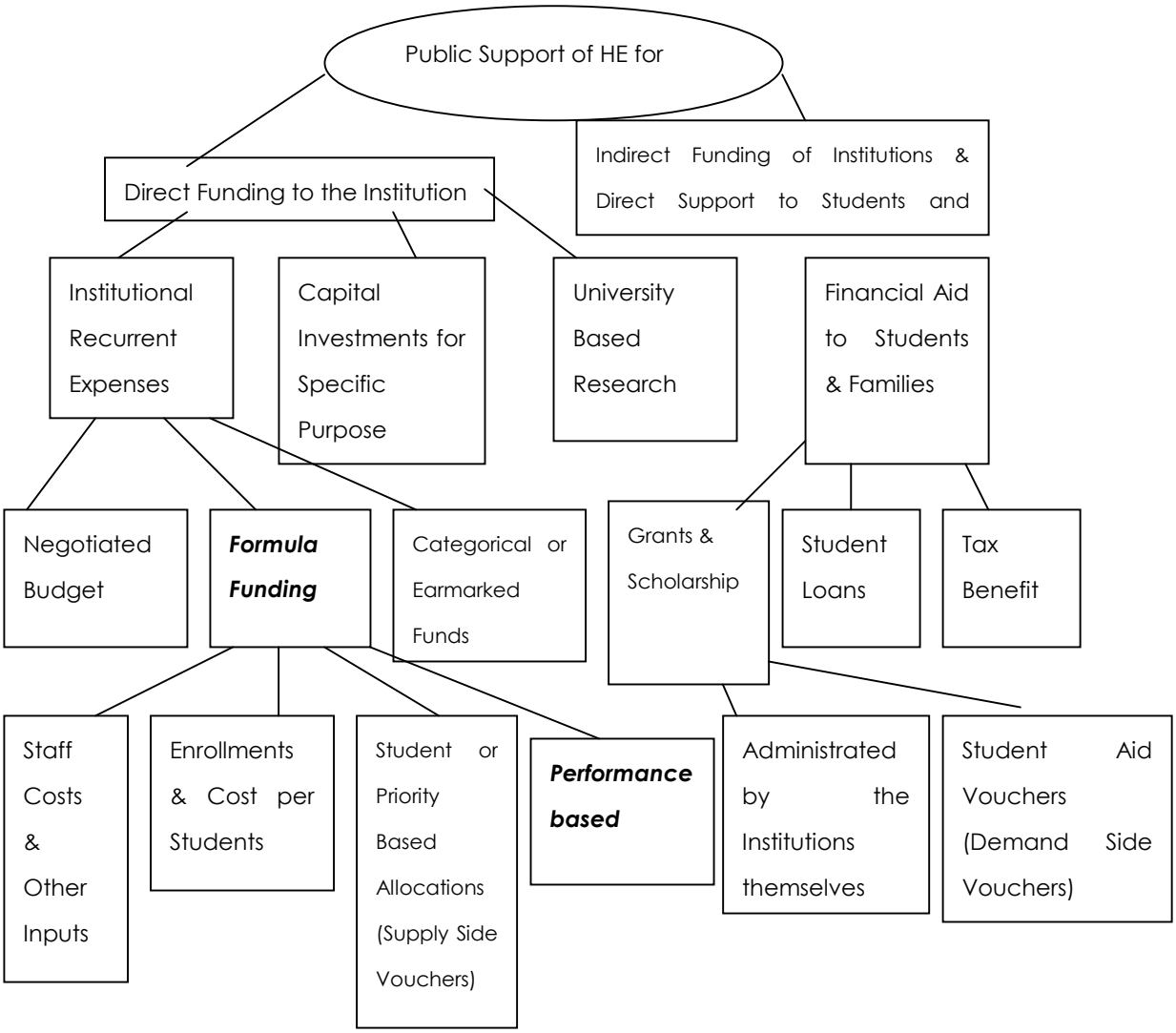
In the public sphere, resources are allocated according to the availability of financial resources dependent on fiscal policies and regulations. Therefore, the role of the government is to deploy existing resources in the most efficient and effective manner and lower the burden of tuition of students and families. In order to arrive at clear notion of the allocation mechanism of Brain Korea 21 program, one needs to focus first on resource flows of public support to HEIs.

3.2.1 Types of Funding Mechanism

The following figure indicates how public support is provided to the supply side of HEIs and the demand side of the students and families.

[3] In line-item budgeting, public funding is allocated to particular items or types of expenditure that are the major inputs of the production processes. These include salaries, capital investments, travel expenses, and building maintenance. After the budget period the government reviews income and expenditure in order to find out whether the funds were expended on the objects for which they were appropriated (Kivistö, 2007, pp. 103-104).

Figure 3.3 Resource Flows of Public Support



In the figure above, the government provides public support to universities for three principal purposes: (1) to finance the cost of instruction and operation with recurrent expenses, (2) to give some capital investment for specific purposes, (3) and to encourage university based research (Ziderman & Albrecht, 1995; Salmi & Hauptman, 2006). The former researchers suggested four basic types of allocation mechanism: negotiated funding, input-based funding, output-based funding, and student-based funding. And Na Min-Joo (1997) integrated the previous researches and categorized them into three types of allocation mechanisms: (1)

negotiated funding, (2) formula funding and (4) market-based funding. The key issue addressed here is how the level of public funds is allocated among the various institutions.

· **Negotiated budgets or negotiated funding**: Negotiations between government and institutional officials are the traditional means by which HEIs funded. The levels of funding are decided by a negotiation process based on input criteria (e.g. historical trends) and on performance-based criteria. If performance-based criteria are used, the result of the negotiated process is typically a performance agreement. Performance agreements are regulatory agreements between government and respective HEI in which, in addition to budget level, objectives are determined. Independent from the allocation mechanism, the budget is then typically distributed to institutions as line-item budget or block grant budget.[4]

· **Categorical or earmarked funds**: Categorical funds usually involve the government designating a particular institution or group of institutions to receive funds for specific purposes, for instance, to correct the past under-financing.

· **Formula funding:** Many countries over time have moved away from negotiated budgets and earmarked funds toward some other form of formula to allocate funds to an institution. The formula differs between countries and varies according to the basis on which the criteria are used. The criteria used in determining formula funding traditionally include inputs such as (1) the size of staff, (2) the number of enrolments and (3) the cost per student. Some formula funding is non-traditional and innovative. They are typically priority-based funding and use performance-based components. Priority-based funding is an approach in which adjustments of the formula are made to reflect the national and regional priorities which the labor force needs. Another non-traditional formula funding approach is when performance measures are used to determine all or a portion of the funding formula, in which governments pay for the outcome or results.

· **Competitive funds:** Competitive funds are an alternative to the more traditional approach of establishing categorical funds. These are usually funded on a project-by-

[4] Block grants are basically a specified sum of funds without restriction and can be used for whatever purposes the recipient agency or institution deems relevant. Specifically, funds can be transferred from one budget category to another and from one year to the next. In more restricted case, the budget is still subdivided into broad budget categories, and transfer of funds from one budget category to another will have to be approved by the funding agency. In contrast to block grants, when line-item budgeting systems are put into effect, the funding agency retains the power of resource allocation. There are no transfers of budget category and no inter-annual financial carry-over feasible (Herbst, 2008, pp. 68-69).

project basis for the purposes of improving quality and relevance, promoting innovation and fostering better management objectives that are difficult to achieve through formula funding or categorical funds. The allocation of competitive funds is based on peer review.

Traditional and performance-based allocation mechanisms of government funding are shown in the table below.

Table 3.1 Comparison between Traditional and Performance-based Allocation Mechanism

Traditional	Performance-based
Negotiated budgets: The state allocates funds that are negotiated between government agencies and institutions.	**Performance agreements**: Governments enter into regulatory agreements with institutions and set mutual performance-based objectives.
Categorical funds: Categories of institutions designated as eligible for funds for specific purposes including facilities, equipment and programs.	**Competitive funds**: HEIs compete on the basis of peer-reviewed project proposals against the backdrop of a set of objectives.
Funding formulas based on size of staff or number of students enrolled.	**Funding formulas** based on output (e.g. number of graduates per year) or outcome measures (e.g. academic ranking of HEIs)

(Source: Salmi, J. and A. M. Hauptman (2006), Resource Allocation Mechanisms in Tertiary Education: A Typology and an Assessment, *in Global University Network for Innovation (ed.) Higher Education in the World 2006. The Financing of Universities*, Palgrave MacMillan, Basingstoke, U.K., p. 64)

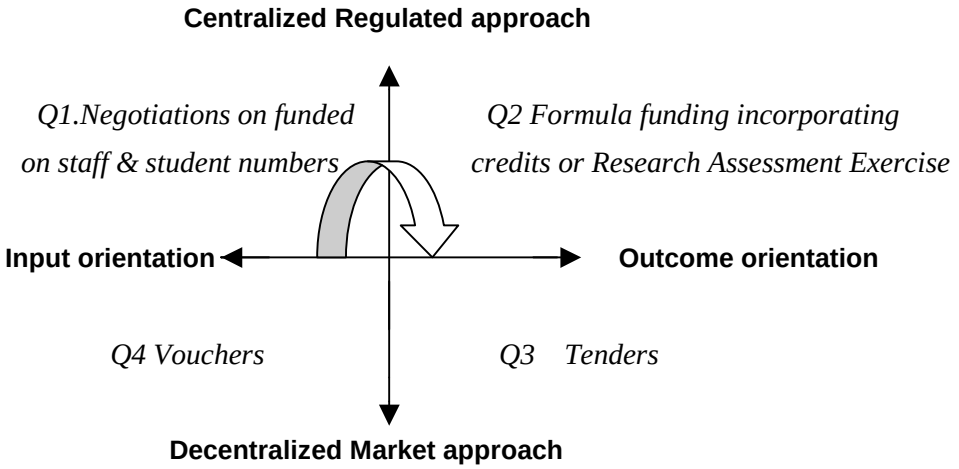
3.2.2 Tendencies of Resource Allocation

As discussed above, PBF focuses on measures of outputs and outcomes rather than traditional input oriented allocation in order to steer universities (Jongbloed & Vossensteyn, 2001; Geuna and Martin, 2003). The following figure, formulated by Jongbloed & Koelman

(2000), will help us understand the current trends of allocation as it classifies the mechanisms.

One can see in the figure that the vertical axis depicts the degree of decentralization and the horizontal axis expresses the degree to which governments are paying for the outcomes instead of inputs.

Figure 3.4 Examples of Four Funding Models



(Source: Jongbloed 2004: 5)

In the above four quadrants one can see four funding models. There is a gradual clockwise movement from the quadrant 1(Q1) towards the quadrant 3(Q3). This movement coincides with the trend towards of *steering from a distance* or more self-steering model as in the roundabout metaphor presented Figure 3.2 (Jongbloed 2008, p.16). More clearly, there is a move away from the negotiated line-item budgeting (Q 1) towards a more transparent and rational performance-based funding mechanism (Q2) which replaces block grants for research and leads to competitive contract funding (Q3). This trend affects established government and HEIs relationships as well as the traditional mode of operation within HEIs. Considering the current trends of funding mechanisms of other OECD countries, the direction of moving toward a more market oriented encourages institutions (1) to be more efficient, (2) ensures that they deliver value for money, (3) raises the quality of services, and (4) stimulates them into generating

revenues from entrepreneurial activities.

3.2.3 Review of Performance-based Funding

PBF represents one of the innovative allocation mechanisms in HE financing in recent decades. HEIs up until recently had been funded through traditional methods that focus on input from the government. Such inputs include the number of students enrolled multiplied by costs per students. Contrasted to input related criteria, the output-based performance funding tends to be more transparent than other financing mechanisms if performance indicators are publicly developed and readily available. PBF allows for greater linkage between funding and public objectives, and encourages greater accountability in the expenditure of the public funds by linking results to funding level (Salmi, J. and A. M. Hauptman, 2006).

However, the research conducted by Jongbloed and Vossensteyn (2001) on government policies for funding HEIs in 11 OECD countries shows that very few countries use performance indicators in their funding mechanisms. This can be explained by the fact that indicators are always proxy measures, which may, in turn, lead to distortion of the activities they are suppose to represent and may have undesirable effects on quality. Negatively, the trend towards inflexibility in the application of funding can lead to a greater year-to-year variation in funding if performance results vary, may discourage institutional diversity if many institutions collectively pursue similar incentives, and this is often linked to reduced institutional autonomy in the expenditure of public funds relative to other financing methods. In order to succeed this financing method, the institutions must have sufficient management capacity and autonomy to respond to the incentives and the mandates of the PBF. Adequate quality assurance mechanism must be in place and careful planning should be undertaken to avoid or reduce unforeseen consequences.

3.3 Analytical Framework for Brain Korea 21 Project

Funding, autonomy, and accountability of HEIs have long been the subject of international debate, and researchers. It is evident that enhanced institutional autonomy has produced higher levels of accountability as well as more stringent and detailed procedures for quality assurance (CHEPS, 2006, p. 26). In this respect, balancing increased autonomy with accountability in response to increasing demands on the part of governments for cost effectiveness and public assurance of quality are the major challenges for HEIs today.

The financial autonomy and external accountability of HEIs can be influenced by the following factors:

a) The degree of control the government exercise
b) Sources of income
c) Allocation mechanisms through which institution is received;

From the previous sections all the aspects have been discussed and now the author wishes to apply the theory with variable concepts and new analytical schemes based on my main research question.

3.3.1 Academic Freedom, Autonomy and Accountability

The concepts of *academic freedom* refers to the freedom of individual academics to study, teach, research, and publish without being either subject to or to cause undue interference (e.g. Tight, 1988, p.132; Caston, 1992, p. 1295). More broadly, academic freedom is the freedom of academics to think and act within a particular HEI, within the HE system, and with national societies (Kivistö, 2007, p. 72). Academic freedom is seen as a responsibility as well as right and it

must be exercised in conformity with certain obligations to the academic institutions and its rules and standards involved (Shils, 1993, p.189)

Autonomy is the term used in most international literature to refer to an ideal or aspiration that the university protect its independence from the interests of state and of the private sector in order to preserve its academic freedom. Autonomy refers to the power to govern without outside control. This autonomy, often referred to *institutional autonomy*, is commonly thought of freedom the university has to steer itself and determine its goals and priorities, and to put these into practice in order to serve society. However, this concept is not that easy to define. In an effort to clarify the autonomy issue, Berdahl (1990) discusses two types of autonomy – *procedural* and *substantive*:

> *Substantive autonomy* is the power of the university or college in its corporate form to determine its own goals and programs – it is the ***what*** of academia. *Procedural autonomy* is the power of the university or college in its corporate form to determine the means by which its goals and programs will be pursued – ***the how*** of academe (Berdahl, 1990a, p. 172).

An element of Berdahl's *procedural autonomy* is the vertical shift of authority, in other words, the distribution of authority from the national government to the institutions, running along a continuum from *centralization* to *decentralization* (Van Vught, 1988). *Institutional autonomy* is closely tide to the understanding of both the purpose of HE and the way in which the State exercises authority with shift from "State Control" to "Self-regulation" of the institutions, with a "Supervising State" (Askling et al., 1999, p. 178).

Aacademic freedom and *institutional autonomy* are not synonymous or nor are they unrelated. The main distinction between the concepts of *academic freedom* and *institutional autonomy* is that *academic freedom* relates to individual faculty members, whereas *institutional autonomy* relates to universities and their employers. The existence of *institutional autonomy* does not necessarily guarantee the existence of *academic freedom*, and a university, which is not autonomous, might still be able to safeguard *academic freedom* (Ashby, 1966, pp.290-293; Tight,

1988, pp. 122-123; Berdahl, 1990, p. 172, cited in Kivistö, 2007, 73). *Academic freedom* tends to be less when the academic institution is autonomous.

In order to further understand the notion of *financial autonomy*, which might hamper the idealistic expectations of lump-sum budget, one must clarify the distinction between *formal* and *factual autonomy*. *Formal autonomy* refers to the fact that HEIs have the competence to decide how public money is spent for equipment or additional staff. The *factual autonomy* is not finally determined by that competence, because it is not clear if the HEIs are really free in their decision. There might be regulation rules such as politically determined staffs plan and other financial rules that might reduce the available scope of the decision-outcomes. Economic effects always depend on the realized factual autonomy. But isn't this kind of autonomy an illusion? (Ziegele, 1998, pp. 1-2).

Accountability is strictly related to autonomy and directly affects it. Therefore one must first define this nomenclature. The concept of accountability has been developed over time. The term *accountability* is a term which was originally limited to a given educational institution to demonstrate that public funds had been spent responsibly. In the 1970s and 1980s, the concept was broadened to include the demonstration that the objectives of a given institution had been met in the most efficient way in order to measure the relationship between outcomes and resource utilization (Hüfner, 1991, p. 48). Hüfner describes the *accountability* as "the responsibility to demonstrate the achievement of certain ends by employing the most efficient means". According to him, *accountability* has become a concept that catches the attention of the public and the politicians who have to fund the increasing cost of public HE in many countries. *Accountability* is also considered as a "requirement to demonstrate responsible actions to one or more external constituencies" (Van Vaught, 1994, p. 355). And Merriam-Webster defines *accountability* as "an obligation or willingness to accept responsibility or to account for one's actions" (Merriam-Webster, 2003). *Answerability* is its closest synonym (Schedler, 1999, p. 14).

The important questions raised by *accountability* are the following; Who is accountable to whom, for what purposes, for whose benefit, by which means, and with what consequences? (Trow, 1996; Behn, 2001; Lingenfelter, 2003; Huisman & Currie, 2004). Professor Trow has made some distinctions between the different aspects of *accountability*. One is the difference between a *legal* and *financial accountability* and *academic accountability*. *Legal* and *financial accountability* is the obligation of universities to report how government-provided resources have been used. This clarifies whether what the university is doing is required by law, and whether its resources are being consumed for the purposes for which they were provided. *Academic accountability*, on the other hand, is the obligation to demonstrate that operational expectations are being met. *Academic accountability* answers the questions about what has been done to further teaching and research, and to what effect (Trow, 1996. p. 316. cited in Kivistö, 2007, pp 71-72).

There are also different types of accountability such as *upward, downward, inward,* and *outward*. They represent types of connections between principals and agents in HE and other public services (Corbett, 1992; Vidovich and Slee, 2000; cited in Burke 2005, p. 3).

(a) Upward accountability represents the traditional relationship of a subordinate to a superior. It covers *procedural, bureaucratic, legal,* and *vertical accountability*.

(b) Downward accountability focuses on a manager being responsible to subordinates in the participatory decision-making of *collegial accountability* in HE.

(c) Inward accountability focuses on agents acting on professional or ethnical standards within an institution and often appears in organizations dominated by professionals, such as in colleges and universities, where it becomes *professional accountability*.

(d) Outward accountability means responding to external clients, stakeholders, supporters, and in a democratic society, ultimately, to the public at large. It includes *market* and *political accountability*.

Therefore, in the context of HE, when one think about accountability practically, it is more complex and contested than the common sense of ‘answerability’ and ‘responsibility’ and have to

reconsider the following dimension in the concept of accountability again (Virtanen, 1997, pp. 3-4):

(a) Who is accountable?
(b) To whom are we accountable?
(c) For what are we accountable?
(e) What form should the accountability take?
(f) And *how is* accountability *assessed*?

And one can summarize that *financial autonomy* includes all definitions of *procedural, institutional, formal and factual autonomy*, while *the external accountability* covers all definitions of *legal, financial, academic, upward, and outward accountability.*

From all the concepts discussed earlier, one can now finally get the exact meaning of what is the *financial autonomy* and *external accountability* based on the research focus. *Financial autonomy* is a way to operate that allows HEIs to fulfil specific functions. It is an instrument to serve *academic autonomy* and can be fully achieved when HEIs have freedom to dispose and use the resources within budget flexibility.

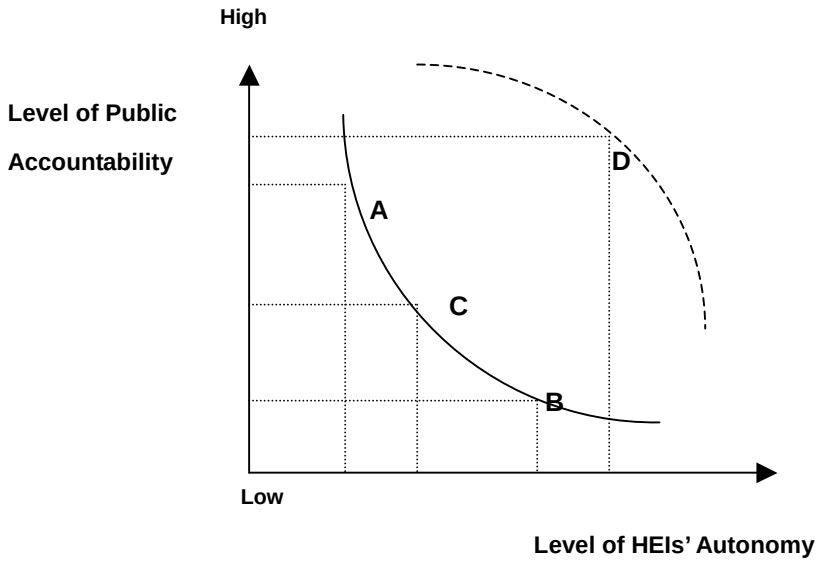
External accountability, which perceives the external demands of HEI, is used to requirements of funding or regulatory agencies while *internal accountability* is used to internal student learning within courses and programs. *External accountability* is an obligation of HEIs to their supporters, and ultimately society at large, to provide assurance that they are pursuing their missions properly, that they are using their resources honestly and responsibly, and that they are meeting legitimate expectations. Therefore, e*xternal accou*ntability is something like an audit, giving grounds for confidence and continued support, while *internal accountability* is a kind of research (Trow, 1996, p.7). *External accountability* can also be a threat to the freedom of professionals to manage their own time and define their own work. When *external accountability* applies common standards and criteria to many institutions, it can work against diversity among them (Trow, 1996, p.6).

3.3.2 Relationship between Autonomy and Accountability

As the fusion between public funding and the HE sectors as service provider grow stronger, no two issues are more critical than those of HEIs autonomy and accountability. Though it is acknowledged that both autonomy and accountability are desirable on the basis on the outcomes of government and HEIs relationship, it is important to discern what level of accountability and autonomy is not only desirable, but attainable to the effect that positive outcomes of government and HEIs relationship can be maximized and negative outcomes kept to a minimum.

The following figure depicts the tension between autonomy of HEIs and accountability of government along a trade-off line stretching from a combination of a high level of HE autonomy and a low level of public accountability to a combination of a low level of HE autonomy and a high level of public accountability.[5]

Figure 3.5 Autonomy & Accountability in the Relationship between Government and HEIs



[5] In a Frumkin's framework, the public accountability refers to accountability of the government. And HEIs' autonomy is replaced by nonprofit organizational autonomy.

(Source: Adjusted from Frumkin 2001: 5)

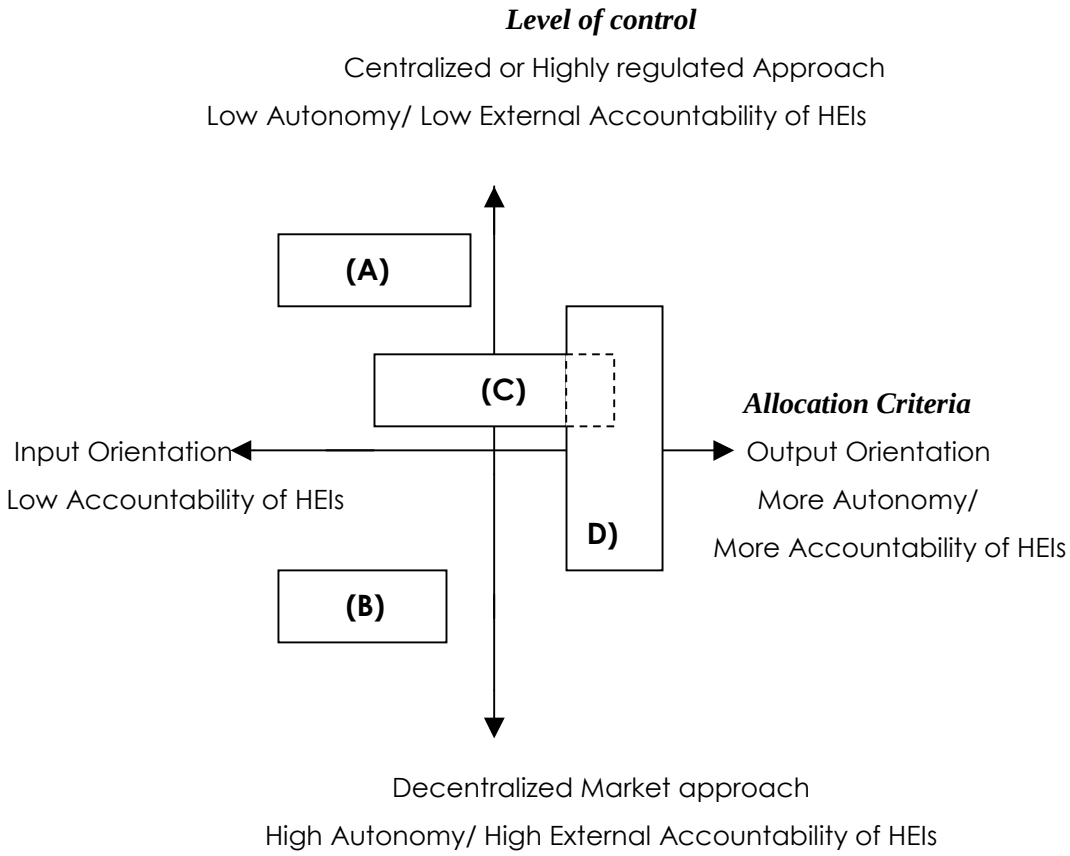
Traditionally, in most countries, governments have exercised considerable control and strongly regulated HE sector with a belief that they could promote the efficiency and effectiveness of HE. However, experience in many countries has demonstrated that HEIs lost their ability to be flexible and responsive to the environmental societies. In the above figure 2.5, the traditional strong *state control* has staked out a position somewhere close to point A on the trade-off line, while HEIs have moved more on the direction of point B. In this case, the tension can be resolved in a sort of compromise between government and HEIs for less accountability and less autonomy. The resulting trade-off is that both sides move toward point C. However, the neither is satisfied with the option of political compromise. A central challenge present in the governance of HE comes down to finding a fourth alternative to this dilemma that allows HEIs to simultaneously maximize both autonomy and accountability dimensions (Frumkin, 2001, pp. 4-5). Point D is the combining point which maximizes the balance between control and autonomy while at the same time maintaining a high level of accountability, ensuring the performance, especially in contributing to the national objectives.

Prumkin's framework with regards to the relationship of autonomy and accountability of HEIs is comparable to the central concept of research question, financial autonomy and external accountability. He argued that the government made the performance-based contracts between government and non-profit organizations in order to reach point D as to steer and maximize the autonomy and accountability of non-profit organizations.

3.3.3 Relationship between Funding Modes, Autonomy and Accountability

The discussion so far leads us to understand the relationship between funding modes and governance with respect to financial autonomy and external accountability of HEIs.

Figure 3.6 Funding Modes Conducive of Financial Autonomy & External Accountability of HEIs



An explanation of the diagram:

(A): Input based funding based on earmarked or line item budget
(B): Demand Side Vouchers
(C): Formula Funding
(D): Output-based funding based on block grant or lump-sum budget

(Source: Adjusted from Jongbloed 2004: 5)

In the above mentioned figure at the top one can see the most regulatory form of state-institutional relationship in which the government is firmly in control of how public funds are allocated, spent, and raised, as well as how most or all institutional decisions are made. These highly regulated approaches entail a significant reliance on state support and low or non-existent tuition, with public funds devoted to student aid or loan program. Arthur M. Hauptman (2008, p.

38) argued that in these kinds of systems, there is little *financial accountability* beyond a governmental insistence on compliance with rules and regulations, since institutional officials have little autonomy and hence cannot reasonably be held responsible for results such as in a case of US and Canada.

(A) represents a centralized system of funding, which is known to be using a more traditional type of budgeting mechanism. In this case, the institutions receive all, or most, of their income in the form of line item or earmarked budgets, which are strictly adhered to, and are unlikely to have any incentives or the opportunity to generate additional income through entrepreneurial initiatives.

In most OECD countries, the governments realize that they cannot or should not control all aspects of HE institutional operation and tend to move to the next stage on the regulatory-market continuum with hybrid forms of governmental steering. In this model, the HEIs are given more autonomy in how they raise and spend funds based on the belief that more autonomy can achieve better results (Hauptman, 2008, pp.38-39). In return for receiving more autonomy, the HEIs' accountability is gradually shifted from a government to HEIs. "This is a way to reinforce government discourses on the need for greater accountability of HEIs to serve the national economic interests" (Vidovich & Slee, 2001, pp. 122-134). A primary feature of this model is that HEIs typically receive block grants or lump-sum budget from the government, often through funding formulas, rather than line item budgets. And they have discretion in how they spend the funds by making efficient and effective resource allocation decisions (Ziegele, 1998, p.3). In addition, HEIs have more authority to set tuition fees, retain those fees and decide how to spend them.

The funding formula, which belongs to (C) is still part of a centralized system but the criteria on which funding is allocated depends on whether it relies on more inputs than on outputs. In many recent cases, the funding formula includes performance criteria, which are related to the outputs rather than inputs achieved by an institution over a previous period (Eurydice, 2008, p. 52).

The budget flowing to the HEIs is in the form of formula funding in order to achieve its policy objectives. And vise versa, the return for maintaining the recipients' autonomy forces it to take decisions within institutional budget flexibility. The HEIs accept external accountability as a result. This means a new approach to governance with less *ex ante checks* and greater *ex post accountability* of HEIs for quality, efficiency and the achievement of agreed objectives. For universities, this requires new internal governance systems based on strategic priorities and on professional management of human resources, investment and administrative procedures (Ploeg and Veugelers, 2008, p. 113).

The funding mechanism which belongs to (D) is an output based governance and more outcome-oriented system. In most cases, the outcome is funded but is difficult to determine and can be influenced by many factors beyond control due to the complexity of the social system (Schenker-Wicki, 2008, pp. 4-5). This mechanism attempts to maximize a balance between financial autonomy and external accountability of HEIs in regards to distributing the lump-sum budget or block grants to HEIs. This also means that universities are allowed to cross-subsidize their budgets and to save their funds for other uses. And with this 'hands-off' approach certain outcomes are prescribed and transparency is demanded in so far as the resources will be available contingent on the reported performance. Therefore, in this model mechanism, public funding is seen as a double-edged sword or a Janus-like head for HEIs. It sustains HEIs in its role as a service provider, but at the same time the demands that come with funding can diminish the HEIs' autonomy to carry out its other vital roles.

In this case the HEIs are encouraged to compete with one another to provide education, training, and research to meet national objectives. Research funds can be awarded through research councils or buffer organization instead of the government. This system makes use of contracts signed between the funding agency and HEIs, with the latter agreeing to deliver graduates for targeted labor market needs, or research outputs targeted at strengthening the innovative capacity of the country.

Hence, if allocation of government funds is based on performance, HEIs are forced to comply with *government managerial accountability* regimes as they compete for increasingly scarce resources. Because the total funding from governments is inadequate, HEIs have been forced to find private sources of income and hence they have entered the marketplace. In this marketplace, HEIs have been using *government accountability indices*, such as published performance data and quality rankings, to convince customers to purchase their services, which assure *market accountability*. In this instance, *market accountability* embeds managerial accountability devices and a 'culture of performativity' penetrates more deeply into universities. Concurrently elite universities are actively working to decrease their financial dependence on government and thus position themselves to reject managerial forms of accountability. This means a shift towards more 'pure' market accountability as government financial levers disappear. Left in suspense is the question of whether or not universities will use their marketing tools if they are not participating in government accountability mechanisms (Vidovich & Slee, 2000).

Therefore, one can conclude that where institutional autonomy is high, there is great tension around and resistance to external accountability mechanisms and there tends to be more autonomy in internal accountability mechanism (Shanahan, 2009, p.8). This trend explains that the government’s objectives have shifted from efficiency to quality productivity being responsive to public priorities and market demands.

4. Brain Korea 21 Project in South Korea

From the preceding section, one found out that the level of autonomy and accountability of HEIs can be fixed by different modes of governance that have different forms of allocation. In this section, the author will review the BK 21 Project mainly based on related official documents, evaluation reports and reviews as the first source of evidence and clarify why the Korean government has designed and adjusted the funding formula over time from the Phase I to Phase II. One could conclude that the different forms of funding formula are practiced on the one hand and the principles of performance-based management on the other are practiced like a veiled carrots and sticks approach to steer the HEIs under the Brain Korea 21 program.

4.1 Identifying the Goals and Missions

As stated above, BK21 has had two phases. Because the goals for 1st Phase BK 21 have evolved over time, the linkages among goals and missions have not been stated clearly. The ultimate goals of the 2nd Phase BK21 are (1) increasing the size and capability of the research manpower pool in order to create new knowledge and technologies and (2) fostering globally competitive graduate departments and research universities in specific academic disciplines.

In order to achieve these goals, four missions have been undertaken. They include (1) supporting excellent research groups; (2) building the institutional infrastructure for globally competitive graduate programs; (3) enhancing university-industry links; and (4) strengthening local universities (Seong et al., 2008, pp. 27-31).

Number (3) and (4) above addresses the equity concern and aims to distribute resources to local universities. It may be at odds with fostering of core research groups and institutions that are globally competitive. Strengthening local universities may create a dilemma for policy makers and evaluators when they are thinking about the goals of the project and devising metrics

with which to evaluate the program performance (Seong et al., 2008, p. 29). The missions are also too vague and difficult for institutional administrators to understand. From an interview with one of the institutional administrators participating 2nd Phase BK 21 in Seoul area and who was in favor of producing world-class research universities, the following was pointed out;

> *With a limited and earmarked budget allocated from the MOSF to the BNC, it's difficult to satisfy all the universities in a given region, based on the social and regional equity principles, for this situation will not promote world-class research universities (R1).*

Since 2008, in order to overcome the limitation of the 2nd Phase BK 21, the government has initiated a program called "World Class Universities", which focuses on a smaller number of universities. The comparison between two programs is as follows;

Table 4.1 Comparison between "World Class Universities" and "2nd Phase BK 21" Programs

Classification	"World Class Universities"	"2nd Phase BK 21"
Scale	100 billion KRW annual funding to 10 – 15 Univ.('08-'12).	290 billion KRW annual funding to 74 Univ.('06-'12) We can see that this is a much smaller sum.
Objective	Management by objectives to create World Class universities.	Cultivate high-quality human resources among graduate schools
Funding area	The university free to choose and to invest as it wishes.	In order to establish global campus in the area of science & technology, liberal arts & social science, and specialized service
Use of Funding	The university is free hire foreign faculty.	Scholarships and stipends are allocated to graduate students, post-doctoral fellows, and contract based research professors Resources are allocated based on the number of the graduate students
Institutional reform	Consider priorities to achieve	Promote university reform in line with

	objectives of *World Class Universities*	specialization of the university Consolidate services in order to improve the graduate research and education
University-Industry Collaboration (Applied Science)	To be considered, if necessary, during the reform process	Improve the matching funds from industrial resources Strengthen the university-industry collaboration to increase the employment ratio
International Collaboration	Free to be decided by university itself Secure highly qualified professors from abroad	Encourage graduates to study abroad in the short and long term
Structure	Exclude from the reform the research groups of each universities Autonomy & accountability to the university rectors	Organize department-level research groups
Performance Management	Adjust and halt the funding by annual and interim evaluation Distribute the resources to the new competitors from the universities that were performing extremely poor	Adjust and halt the funding by annual and interim evaluation Distribute the resources to the new competitors from the research groups that were performing extremely poor

Source: Song (2008: 19), *Study on Higher Educational Finance Reform in South Korea*

4.2 Performance Milestones

Ministry of Education (2006a) initially provided three guidelines for evaluating the effects of the Phase II project. The project aims to produce ten "World-Class Research Universities" by 2012 and wants to improve the nations' SCI publications. It aims at raising the ranking of research universities from 13th in 2005 to 10th in 2012. One problem, of course, is that the standard definition of "World-Class Research Universities & Leading Departments" is not clearly defined. Ten globally competitive research universities sound like political rhetoric rather than a serious aim by objective. Seoul National University could strive for university-wide excellence;

but the other universities can best pursue excellence in selected departments.[6]

Phase II Project aims to double the rate of technology transfer from university to industry from 10 percent in 2004 to 20 percent in 2012 and improve Korea's Institute for Management Development ranking in technology transfer from university to industry from 21st in 2004 to 10th in 2012. The 2nd Phase BK21 funds are more focusing on the transfer of technology, but the level of support is limited, of course. Therefore, the linkage between the performance milestone and project input is not strong enough. This occurs through criteria of the selection of recipients. The 2nd Phase BK 21 aims to support more than 20,000 graduate students and young researchers annually and the program reached this milestone with the selection of 36,322 recipients in 2006 (MoE, 2006).

4.3 Recipient Selection Criteria

In this sub-section, how the research groups or teams are selected in the 2nd Phase BK 21 funding will be discussed. As a prerequisite condition for the 2nd Phase BK21 funding, research groups must have doctorate programs with enrolled PhD candidates and meet the minimum number of necessary participating professors in the research groups, as follows;

Table 4.2 Recipient Selection Criteria Based on Disciplines

[6] In the US, for example, the "Carnegie Classification," originally developed by the Carnegie Commission on Higher Education, is extensively used in academic research as well as policy development. It defines universities by the number of doctoral degrees granted annually and the levels of research activity and funding. It is not clear whether this classification could be applied to the universities in the context of Korea. *The times Higher Education Supplement* also rates graduate programs and disciplines. *The Shanghai Ranking* is based upon research capabilities. Shin (2008) in his analysis suggests that forty-seven Korean universities with doctoral programs were classified respectively as "research universities" (7 universities), "active research universities" (14 universities), or "doctoral universities" (26 universities) by research performance.

Science & Technology											Liberal	Highly Specialized Service			Core
Math	Biology	Physics	Chemistry	Earth Science	IT	Applied Life science	Electronics	Chemistry Engineering	Material Science	Architecture	Interdisciplinary Studies	Arts & Social Science	Medical Science	Business	Dentistry	
10					25	15		10		15	10	7	20	10	10	3

According to the selection process, Liberal Arts and Social Science Research Groups must have at least seven participating faculty members. Basic Science Groups must have at least ten members. Applied Science Groups must have ten to twenty-five members. Participating professors must have at least ten international publications in the prior three years. In addition, the public resources are not provided any more if the research group doesn't meet the performance of the international publication (BNC, 2009).

Research groups need to secure matching funds from their universities equal to at least 5 percent of the level of 2nd Phase BK 21 funding that they seek. Applied science and interdisciplinary science research groups must secure matching funds from industry sources equal to at least 10 percent of the BK21 funding. Regional university research groups must secure matching funds from local government equal to 3-5 percent of BK21 funding, depending on the discipline (BNC, 2009). This is a way to increase the accountability from the government to HEIs. The mechanism of fixed earmarked block grants and the matching funds, which lead to increase partnership with other agencies, are the gauges of cost-savings and benefits for the government and HEIs.[7] In return for matching funds, the government also provides other agencies similar

[7] BK21 funding is not a program for funding research projects. It gives most of its funding for graduate student fellowship. Hence, research groups are supposed to find other funding for research projects, equipment, and facilities. Through this process, it may serve as financial leverage for recipients to obtain other funding, especially by signaling academic excellence (Seong et al., 2008, pp. 34-35).

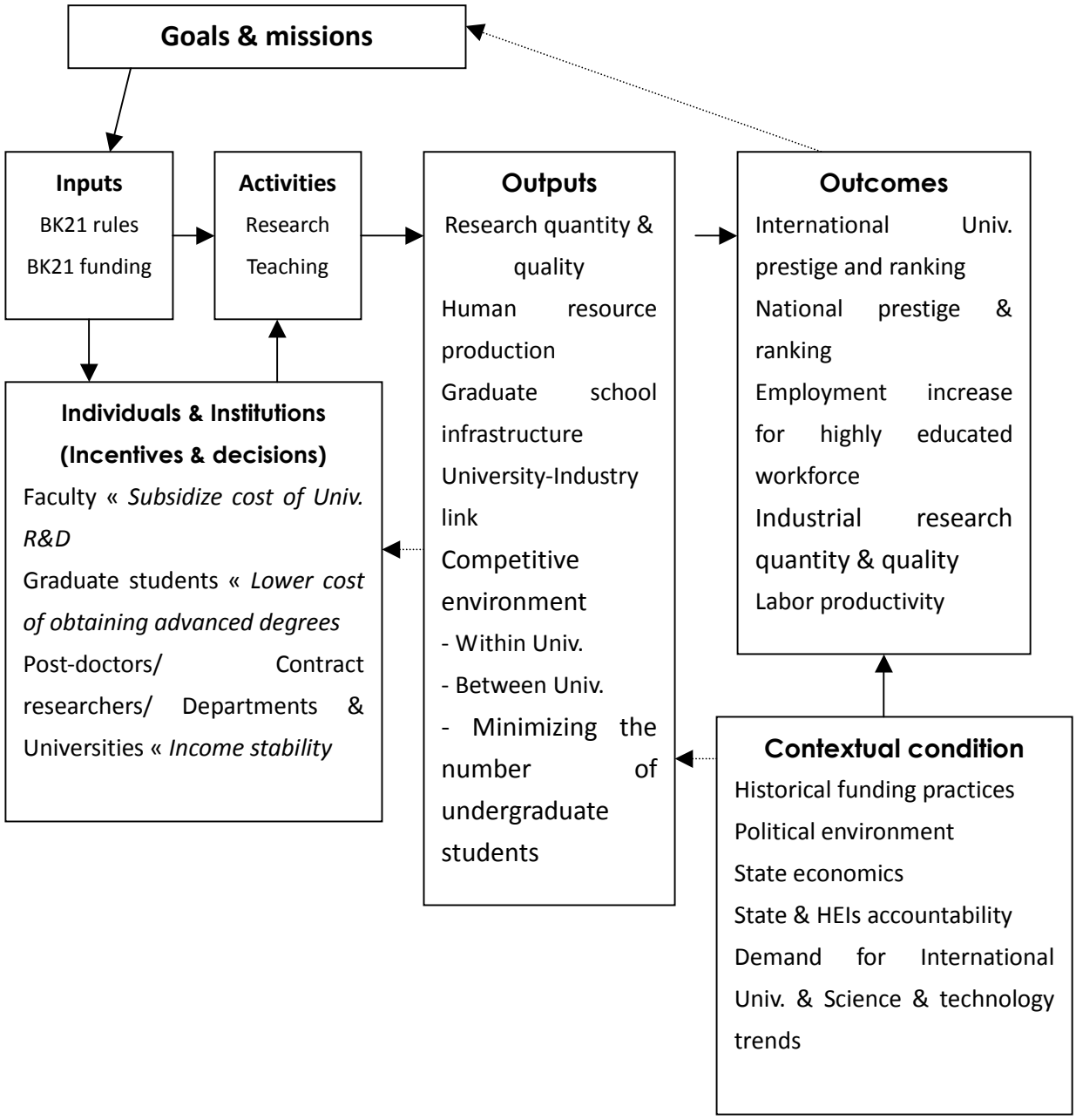
incentives through tax deduction.

Research groups or teams (*Sa-up-dan*) are selected on merit. This is called the "competition rule." The post-selection criteria are based on whether *Sa-up-dan* meets the requirement of performance. Research groups are ranked within each academic discipline. Ranking criteria are weighed differently for different groups. For the applied science groups, criteria are weighted equally. For basic science groups, education, research and development excellence are weighed equally and given slightly more weight than university reform and specialization, while industry links are not considered. (Seong et al., 2008, p. 41). It is noted that the amount of resources is basically proportional to department size for the BK 21 recipients.

4.4 Funding Model of Brain Korea 21

Under the BK 21 Project, mixed input and output formulas are used. The universities are funded in the form of formulas based on input, output and outcome models. The following is a logical model for BK 21 Phase II when formulating a performance indicator.

Figure 4.1 Logical Model for BK 21 Phase II Conducive to PBF Funding Mechanism



Source: Adjusted from Seong et al. (2008: 24)

The formulas have been adjusted and improved during the course of project depending on the disciplines and put more emphasis on outputs rather than inputs when evaluating the performance. Other than BK21 programs, the other public resources are allocated only on input. The following table compares the "formula driven" funding with the "performance based" model

in the US, in Europe and in Korea. International experiences will help to clarify and validate the BK21 funding model.

Table 4.3 Characteristic of Funding Model (Formula Driven or Performance Based)

Characteristic	US Model	European Model	BK21
Subject Matter	Education only	Education & research	Education & research
Funding Form	More Incentive based	More Formula based	Formula based (Input + Output) + Incentive Based
Original Funding Mode	Block grants	Line item approach	Block grants ***(Other than BK21, Line item budget)***
Changing Direction	Toward Line item approach	Toward Block grants	Block grants
Original Locus of Power	HEIs	Ministry or Buffer Organization	Ministry or Buffer Organization
Changing Direction	Toward Government	Toward HEIs	Toward HEIs

Source: Adjusted from Herbst (2008: 81-83)

4.5 Performance Evaluation by the External Agency

Research groups are evaluated annually for their adherence to contractual terms and their progress in proposed work plans. The government has developed performance indicators publicly introduced and has used them as rewarding and punitive instruments. At the 1st Phase of interim evaluation the government had provided incentives to the excellent performing institutions and reduced 10 - 20% of funding to the institutions that didn't meet the performance level. At the 2nd Phase interim evaluation by the BNC left out 12% of research groups from the project and selected new ones. In 2008, the research groups that were performing at the bottom of their field

competed with new competitors to stay in the project. And 70 research groups out of 567 have automatically been left out because they are performing extremely poorly (MEST, 2009). The dropout rates have greatly increased compared with the 1st Phase of interim evaluation. The evaluation was based upon the performance of the past two years plus the expectation of this program for the rest of the years to come (See the table of performance indicator for applied science research groups in appendix C).

5. Empirical Insights on Financial Autonomy and External Accountability of Higher Education Institutions under the BK21 Project

In this section, an analysis will be conducted consistent with the research objectives and research question and how well the empirical data fits my theoretical and analytical framework. In analyzing the empirical data, which are obtained from the questionnaire survey and interviews with senior administrator at BNC and the BK 21 participants at HEIs, the author tries to interpret the level of financial autonomy and external accountability by comparing the difference between BK 21 Phase I and Phase II.

The role of buffer organization, the BNC, will be discussed specifically and in what way the BNC has contributed the autonomy and accountability of HEIs as compared with the direct control from the government during the Phase I.

5.1 Role of Buffer Organization in BK21-NURI Committee

With the challenge of finding a balance between autonomy, accountability and performance, the public funding have been awarded in a stable lump sum to department-level research groups by the buffer or intermediate body, the BNC, within the KRF under the care of Ministry of Education, Science & Technology (MEST) since the Phase II. In this circumstance, the role of government has been typically focused on setting national strategies, determining total funding for the HE sectors, doing policy analysis and problem resolution and holding BNC accountable. The BNC, on the other hand, has focused on the distribution of public funding, on advising government as to policy for and development of HE sectors and ensuring accountability and monitoring the performance in HEIs.

With the lump sums, the university doesn't have *substantive autonomy* by which the university has the power to determine its own BK 21 goals and programs but has *procedural autonomy* to determine the means to pursue the goals and programs. And the *institutional*

autonomy is more maximized and the regulation have been somewhat alleviated in the Phase II than Phase I. In an interview one of research groups at HEIs in Seoul metropolitan area, pointed out the following problems;

> *The most problematic issue of the 1st Phase BK21 program is the lack of academic freedom and the outcome usually puts an emphasis on the performance in international journal publications as registered in Scientific Citation Index (SCI). The BK21 Guide from MoE and the Overseas Advisory Boards strongly recommended, "Ministry of Education & Human Resources Developments should provide as much flexibility as possible so that the universities set the standards for the rules, regulations of publications. Researchers are expected to use their creativity and imagination without being constrained by the bureaucratic stifling." (R2)*

The intermediate body, the BNC, limits direct political influence on the institutions and the potential for political interference in academic affairs and management. For direct involvement from the government in determining funding allocations to HEIs can result in a situation where HEIs can be made subject to follow political objectives of the Ministers or Governments dependent on the changing of Ministers or Governments. The BNC, where the funding decisions remains, plays the important role of protecting the HEIs against the short-term political strategies. Therefore, it can be concluded that the BNC reduced the public accountability of the government, took it, shifted it to HEIs and maximized the level of *external accountability* of HEIs under the Phase II.

5.2 Public Allocation Mechanism of BK21 Project

This sub-section will discuss whether the degree of control the government exercises, the sources of income, and the allocation mechanism have impacted on financial autonomy and external accountability in the HE sector. While analysis of outcomes might not be sufficient to

establish cause-and-effect relationships, this information can consolidate the analytical framework, introduce more competitive allocation mechanisms, and impact the level of financial autonomy and external accountability.

5.2.1 Fixed Earmarked Formula and Block Grant Funding

Formula funding is awarded in a lump sum to department-level research groups by the buffer organization, BNC, within the KRF under the planning of MEST since 2006. The total budget is calculated on a top-down basis according to the total ministry budget available, not on a needs-basis to finance educational needs. About 60-70 % of BK 21 funds go for scholarships and stipends to graduate students, post-doctoral fellows, and contract based research professors. The remainder is spent on international collaboration and other expenses, much of which also benefits recipient students and researchers. The funding can supports professors for their participation in international workshops and seminars only when they accompany graduate students. From an interview with one of the directors of research groups at HEIs in a regional area, it was pointed out;

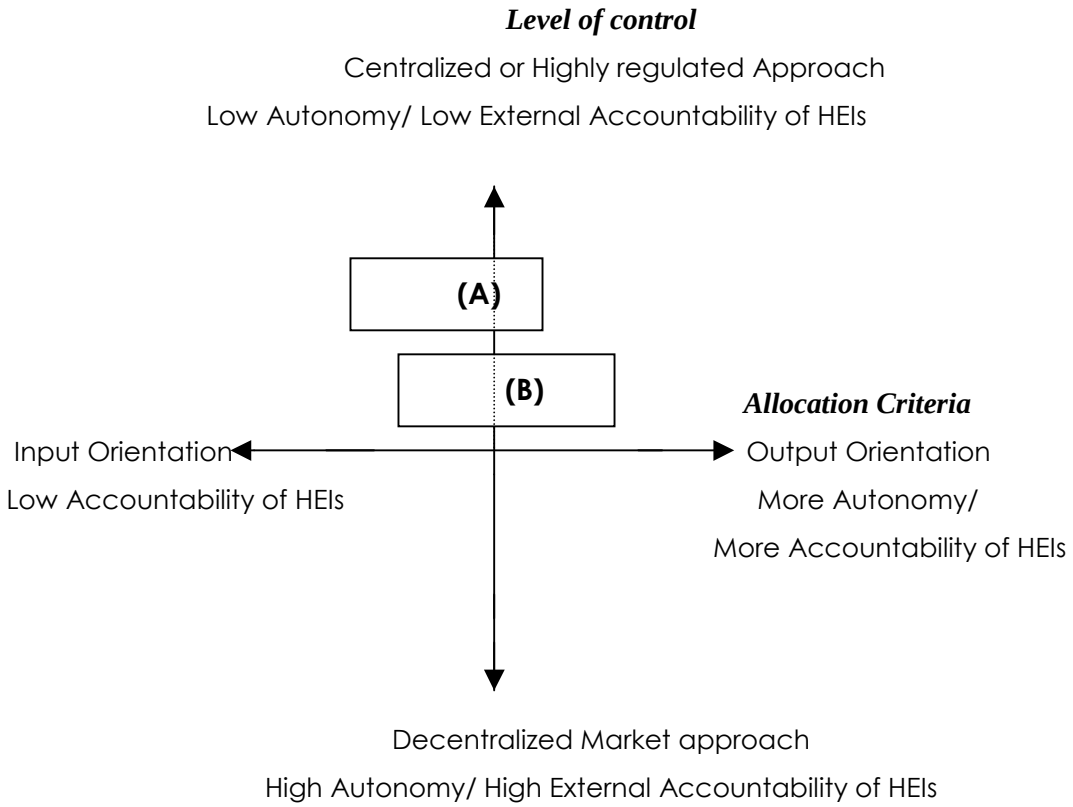
> *In the 2nd Phase BK21 the autonomy to use the resources within a research group has been significantly increased as compared with 1st Phase BK21. The director of a research team can determine how to use the financial resources within his team. But there still remain financial rule that the minimum ratio of 60% of the expenses should be spent for graduate students because the main purpose of BK21 project is to cultivate high quality human resources among graduate students and the resources are used as a loan scheme by the national standards and objectives. There is little resource distribution to scholars as for their research expenses. The university has less freedom to decide how to distributed resources received to subordinates as compared with 1st Phase BK 21 regardless of lump-sump budget. This means there is no way to cross budget lines among research teams within an institution (R3).*

Therefore, professors who participate in the 2nd Phase BK21 need to find other funding to cover their other research costs, including those for their own labor, travel expenses, equipment, and other overhead costs. In this respect, BK21 funds are originally designed to subsidize a university costs, lower the cost of getting PhDs and master's degrees, and stabilize the income of post-doctoral students and young researchers in early career transition.

5.2.2 Comparison of Funding Modes in BK21 Phase I and Phase II

The funding mode of both BK21 Phase I and Phase II is the lump-sump budget. BK21 Phase II is still part of the centralized system but the criteria on which funding is allocated differs in that BK21 Phase II relies more on outputs than on inputs. As discussed earlier, the accountability is shifted from government agencies during Phase I to BNC and HEIs during Phase II. The BNC reduced the public accountability as a buffer body and shifted it to HEIs. Hence, the level of external accountability of HEIs is increased in the Phase II as opposed Phase I, due to more output oriented performance evaluation and management.

Figure 5.1 BK 21 Funding Modes Conducive of Financial Autonomy & External Accountability of HEIs



An explanation of the diagram:

(A): BK 21 Phase I based on input and output formula funded by Government

(B): BK 21 Phase II based on input and output formula funded by BNC

(Source: Adjusted from Jongbloed 2004: 5)

5.2.3 Measuring the Level of Financial Autonomy and External Accountability between Phase I and Phase II

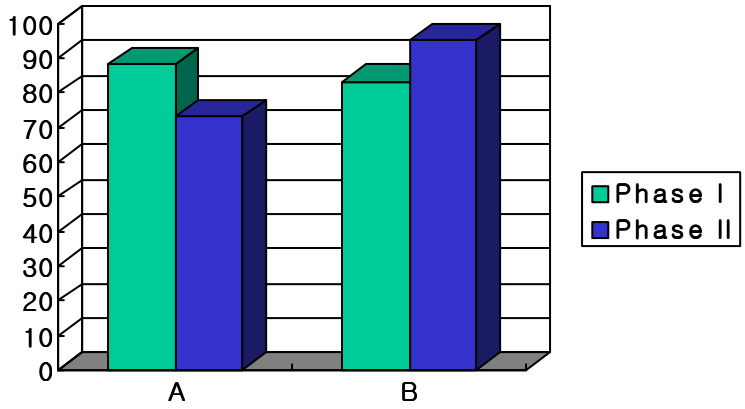
The Phase I and Phase II programs are very different from each other in my analysis. The funding formula and their selection criteria are different from each other. Phase I emphasized university-level excellence, while Phase II emphasizes department-level excellence. The focus on department-level excellence in Phase II is based on one of the principles in HE policy –

“specialization” and “concentration” of universities. Instead of pursuing excellence in all fields, each university is encouraged to choose the priorities where it wants to concentrate its resources and differentiate itself from other universities. This is for the purpose of competitive funding by valuing more output-oriented governance. Due to the small amount of earmarked budgets to cover all the institutions of the nations, the government adopted a self-limitation of budgetary discretion by means of lump-sum budgeting. Under this premise, the government agency tries to do away with as much hidden influence as possible, and yet, regulative restrictions are maintained, the level of accountability of HEIs is maximized and the *legal and financial accountability* is shifted to HEIs.

For example, the university has obligation to formulate an annual report where it gives statistical information on how the BNC provided resources and how they have been used. During Phase I the university also had the responsibility to report for their results of performance to government. In order to be selected for a next evaluation, the university needs to establish internal quality assurance and follow a transparent guideline. Of course at all times the university is subjected to the external quality assurance in the form of performance indicators. It is notable that *academic accountability* is more pronounced in Phase I than in Phase II. During Phase I the curriculum reform for diversification is considered more because the aim is “world-class research universities”.

The following figure shows a comparison between Phase I and Phase II with regards to *academic and external accountability* of HEIs based on the mean values of survey questionnaire 23-30 to HEIs. The percentage of the vertical line is calculated from the numerical mean values of five point Likert scales, which adds up the total values of 23 universities and gets as average based on the statement.

Figure 5.2 The Level of Accountability of HEIs



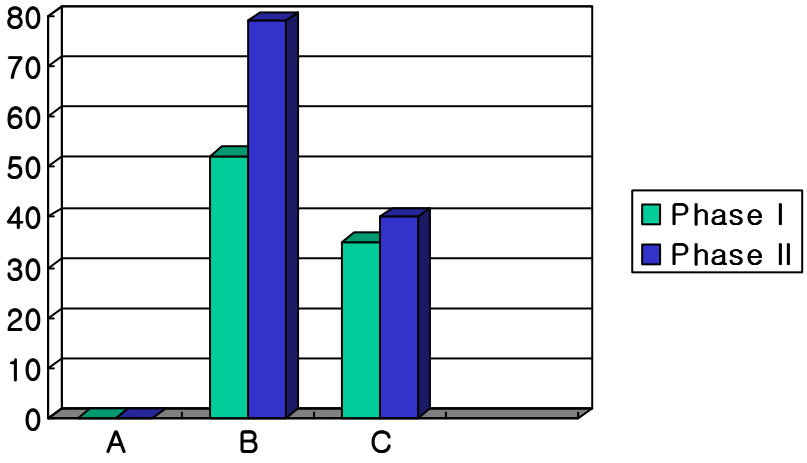
(A): Academic Accountability

(B): External Accountability

The Phase II research groups, the *sa-up-dan*, are limited to a department of a single university; whereas the Phase I research groups were composed of scientific investigators of the same academic discipline from multiple universities. Usually there was one leading university and one or more other participating universities. Therefore there was less *institutional autonomy* during Phase I than Phase II. Both in Phase I and Phase II, the university had *formal autonomy* but didn't have much *factual autonomy*. In other words, a given university was not really free in their decision to use the resources due to other financial rules, even though the research team had, in part, the freedom to set up academic payment and conditions of the BK 21 program. One of the rules prescribed was to distribute 60% of the financial resources for graduate students within an HEI. While the resources were distributed on the basis of input, that is, according to the number of graduate students, they were adjusted every year depending on performance results. One of the important characteristics of Phase II is that the performance-based index strongly emphasizes university-industry cooperation more than Phase I and research groups must secure the matching funds from public and private sectors. The following figure is a comparison of the level of autonomy of HEIs between Phase I and Phase II, based on the mean values of survey

questionnaire 10-13 HEIs. The percentage of the vertical line is calculated from the numerical mean values of five point Likert scales, which adds up the total values of 23 universities and gets as average based on the statement.

Figure 5.3 The Level of Autonomy of HEIs



(A): Substantial Autonomy
(B): Institutional Autonomy
(C): Financial Autonomy

With the block grant formula funding to the HEIs, the government can achieve its policy objectives of letting a university differentiate itself. And vise versa, HEIs can maintain their autonomy and take decisions within budget flexibility. The HEIs do accept *external accountability* as a result. This is a new governance approach with less *ex ante checks* and greater *ex post accountability* of HEIs for quality, efficiency and the achievement of agreed policy objectives.

5.3 Synthesis of the Research Findings

As earlier discussed, in the BK21 project, the government has gradually decreased direct

control through a buffer organization called BNC, which has enlarged the financial autonomy of HEIs in the form of lump sum budgeting. The top-down based lump sum budget to HEIs used in the BK21 Project has decreased the political tension between Ministries for now they are allotted public resources from Ministry of Strategy and Finances (MOSF). However the factual autonomy of HEIs has not considerably increased and the formula of block grant funding based on performance has been used as another mechanism to control HEIs. This allocation mechanism has stimulated and guided merging of or minimizing activities so as to ensure competitiveness of HEIs in accordance with national priorities.

Performance based formula and block grant funding under the 2nd Phase BK 21 Project gives wide room for political maneuverability and prioritization of government policies. Hence, the HEIs receive their core funding only when HEIs have fulfilled the national priorities. As the HEIs landscape becomes fairly homogenous and composed of high number of providers, the policy based on “selection” and “concentration” can be efficient mechanism to maximize the accountability of HEIs in a form of self-evaluation and self-reporting based on performance index. But, on the other hand, the reporting requirements and internal and external audit of conditional funding has imposed an extra burden on HEIs and impair institutional planning and structure when the contract and funding period completed and the research team was dissolved.

In its basic formula, the block grant arrangements under the BK 21 Project provides the minimum condition for education and research and enhances the institutional autonomy of HEIs. But it is only true when the budgets are relatively large enough in proportion to total national revenue. Under this allocation mechanism, the resources do not give a significant degree of flexibility to use within an institution when more financial resources are needed.

Ad hoc funding for infrastructure development is another challenge in increasing financial autonomy because most resources are allotted as stipends for graduate students. Even though matching funds can alleviate this challenge, the problems still remain in basic disciplines such as Humanities or Social Sciences, which are by nature difficult in procuring matching funds.

Simple, understandable, and flexible guidelines to promote the external accountability and transparency; a formula index with clear measures of the disciplines involved so as to show what is being achieved, is needed with the funds provided. And it is desirable to encourage HEIs to differentiate between national and private sectors, especially to give incentives to the public sectors in HEIs which are eager to change into a corporation.

After being made into a clearer corporation, the national universities are expected to self-manage and self-finance. They have property rights for they are a corporation and they can issue bonds. In addition, the institutions are expected to find ways to generate new sources of revenue. It is hoped that the enlargement of autonomy and flexibilities from the bureaucratic constraints will produce savings and the ability to compete with the private sectors. Finally, it is assumed that it can lead to some positive effects to make a balance between autonomy and accountability if the government provide proper incentives and create a balanced development between disciplinaries.

For this reason, accountability relationships between funding agency, the BNC, and the HEIs and the flow of information should not be obscured by the design of funding model.

6. Conclusions

This study has attempted to find out how and to what extent the BK 21 Project has affected the financial autonomy and external accountability of HEIs and whether or not the influence on financial autonomy and external accountability of HEIs is in line with national policy goals. In the establishment of the BK21 Project, the level of financial autonomy and external accountability of HEIs has changed due to the role of the buffer organization, BNC, and the trends toward more output-based funding policies during the second phase.

In this final chapter the lessons will be presented that can be learned from governing and funding modes, and the ways forward while discussing the limitations of the study.

6.1 The Issue of the "Institutional Unit Support" and the "Individual Research Team Unit Support"

The issue of the funding modes between "institutional unit" and "individual research team unit" with regards to financial autonomy and external accountability under the BK 21 Project suggests the followings.

For the small amount of earmarked resources to cover all the universities participating in the BK 21 Project is still a problem awaiting a solution. The issue of allocation mechanism to HEIs has to be raised, namely, should the BNC prefer to support individual institutions or individual research teams? Funding can be overlapped between the projects only when allocated to a team-based support. It is not easy to expand and improve the infrastructure of HEIs when focusing on team based support rather than on the institutions' own organization. Individual team based support can promote the university's ranking depending on the research outcome that focuses on research and increases the financial autonomy within the research team. On the other hand, the funding modes toward individual institutions may cause educational insolvency and impede the specialization because most universities seek to become research universities.

Furthermore, it impedes the settling down of specialization for the policy shifts each time the financial resources vanish.

Lee and Kim (2007) have also pointed out that the performance-based formula funding scheme, which centers on institutional unit support, aims to secure the financial autonomy and external accountability of HEIs. It provides a stable financial aid when the HEIs meet the national objectives. However, it can reduce the autonomy of HEIs when the funding stops and the resources vanish. Performance-based funding has a hard time in procuring objective evaluation when the budget is allocated to individual institutions and the performance index is not clearly classified between disciplines. The institutional unit support, which gives its subsidies as a block grant, strengthens government regulation and is easier to evaluate. The individual research team support, where the budget is allocated line-by-line, is more difficult to manage. In this respect, following issue of subsection would be an alternative to achieve success in the BK 21 Project while seeking a new balance of autonomy and accountability of HEIs.

6.2 Possible Uses of Supply Sided Vouchers & Build-Transfer-Lease (BTL) Scheme

In this subsection, the strength and weakness of the voucher system is highlighted and states why the demand sided voucher is undesirable as an alternative to allocation system in Brain Korea 21 Project. The question of demand sided vouchers is to be dealt with carefully within a policy context of HE financing mechanism.

Vouchers are generally common in compulsory education and some other government functions such as public support of infrastructures and as a means of paying for HE. But as in all public functions, the purpose of adopting the voucher policies is to promote a greater competition among providers. The voucher system in general provides public support indirectly through the consumers. In this regards, vouchers can be contrasted with more centralized allocation mechanism in which students apply directly to government once enrolled in an institution. In a

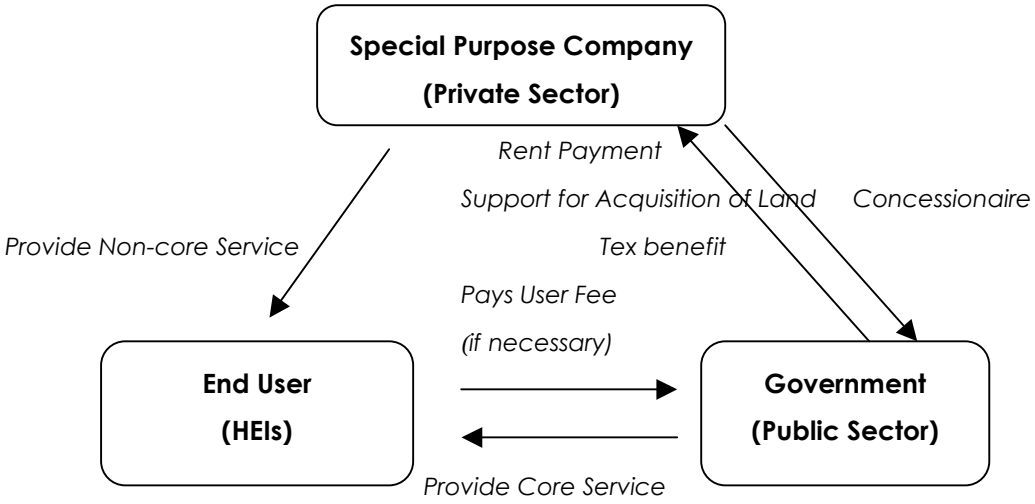
knowledge-based society students have more freedom to design and plan their own, custom-built programs relevant to the idea of voucher system.

However, in Korean context, there are somewhat negative aspects to the voucher system. Most HEIs are not prepared for competition in the market when resources allocated directly to the students. It causes inequality in the opportunity distribution and becomes a political and social issue beyond educational development, moving into arena of political protest and bargaining.

When the HEIs receive resources in a form of voucher, funds might be eaten by the beautiful proposal documents. The resources are often spent for infrastructure rather than the preferred recipients, the students for whom the education system exists. The government justly considers this a “wrong behavior.” The documents and contracts say one thing and the behavior is different. Therefore, one questions the morality of it all.

Taking into consideration all the above, the following suggestion should be considered for the design of funding model under the BK21 Phase II Project. In order to maximize financial autonomy and external accountability of HEIs, one must (1) restructure the governing system of public university into independent organization from the government organization, (2) use loan aids type demand side voucher both for public and private universities so that they can build social trust for the future human capital by inviting private capital to the public investment, and (3) improve the basic infrastructure of HEIs and reduce tax burden such as in the implementation of Build-Transfer-Lease (BTL) scheme in order to set capital investments of the university. BTL is a type of scheme to utilize private funding and to concentrate on the distribution of appropriate facilities at earliest convenience.

Figure 6.1 Public & Private Partnership in a Form of Build – Transfer - Lease (BTL) Scheme



Source: Ministry of Planning & Budget (2006:11), Korean Private & Public Infrastructure (PPI) System

As the above figure shows, ownership of the infrastructure facility is transferred to the government upon completion of construction, and the concessionaire is granted the right to operate the facility and receives government payments based on its operational performance for a specified period of time. The BTL Scheme is applied to those facilities where the concessionaire has difficulty in recovering its investment through user fees. Facilities eligible for BTL Scheme mainly consist of social infrastructure facilities such as schools, military residences, welfare facilities, etc. Therefore, government can provide new options for public service delivery under fiscal constraints and HEIs have more freedom to focus and use their budgets on the teaching and research. In this respect, the BTL Scheme can promote autonomy and accountability of HEIs.

6.3 Limitations of the Study and Further Research

This study has several limitations. First, the analytical framework on financial autonomy and external accountability applied to BK 21 program did not cover all the international cases.

Depending if a country pursues more socialism, egalitarianism, or collectivism than capitalism or individualism, the level of external accountability relative to financial autonomy depending on allocation mechanism will be somewhat different. In this respect, it is possible that the empirical analysis might not have been able to identify all meanings of the analytical framework provided. It's not easy to apply the same regulations and restrictions to all the cases because of the economic and cultural differences of each country.

The second limitation is that the empirical data gathered from the survey questionnaire implied a bias with respect to public and private sectors of HEIs. The fields or disciplines with the highest and lowest proportion of research groups involved in BK 21 activities were considered separately.

Finally, due to the time limits and long distances from South Korea, the number of institutions included prevents the completeness of this study. Further research based on a superior dataset would allow for a broader scope, and therefore, provide a more far-reaching and dependable set of conclusions. Any future work would also need to consider omitted variables depending on the regions and the size of HEIs. Other possible research topics such as comparing *Exezellenze Programs* in Germany with BK 21 Project in South Korea would be the next step to test the explanation and prediction of my theory.

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APPENDICES

Appendix A. Questionnaire to Brain Korea 21 & NURI Committee

PLEASE Return this Form to the Following E-mail Address
within a Week
dl86702@uta.fi/ or dongseol@student.uv.uio.no

- A Questionnaire on BK 21 Program -

My name is Dong-Seob Lee and I'm a graduate student of Erasmus Mundus European Higher Education program. I'm currently doing my Master Thesis on the BK 21 program for the University of Tampere in Finland. This questionnaire is directed to Brain Korea 21 & NURI Committee (BNC). The information obtained from this questionnaire will remain anonymous and will be used for research purposes only. The time to complete this questionnaire is approximately 30 minutes. Your response will be invaluable for my research and the development of BK 21 program. If you have any questions or issues raised in the questionnaire, please contact me by E-mail: dl86702@uta.fi,. I deeply appreciate your participation in my research.

1. Position of Respondent:

Head of Institution ( ) Senior Administrator ( )
Administrator ( ) Researcher ( ) Others ( )

*** The following table lists are aspects of possible roles played by the central government, the BNC or other organizations. Please tick (√) or specify to what extent the government or BNC has performed corresponding roles in the planning and implementation of 2nd Phase of Brain Korea 21 project. If the roles are overlapped, you can indicate the level of degree with a percentage (Government: 80%, BNC: 20%). If you don't know exactly the information, you don't have to answer all the questions.**

2. Role of Government authority and Buffer Body "Brain Korea 21 & NURI Committee (BNC)"

	Government	**BNC**	**Other Public Agencies**	**Universities Participating in BK 21 Project**

(a) Strategic Planning regarding to agreeing on the size and shape of BK 21 program.				
(b) Setting the vision & goals for BK 21 program				
(c) Policy analysis & problem resolution				
(d) Higher Education Institutions' mission definition				
(e) Academic program review				
(f) Budget development				
(g) Funding advice & allocation				
(h) Financial auditing				
(i) Program administration				
(j) Assessing the quality of teaching and research				
(k) Monitoring performance				
(l) Quality assurance & standard reviews				
(m) Deciding the total number of student admission				

*** Please tick (√) or circle (O) one or more options in multiple-choice questions and write answers for the open questions in the spaces provided. If you don't know exactly the information, you don't have to answer all the questions.**

(1) How has the resources been allocated from the government authorities to the institution during **the 1st Phase of BK 21**?

(a) Line-item budget (b) Block grants (c) Input based Formula

(d) Output based Formula (e) Input + Output funding Formula (f) If others

_____

(2) During the BK21 Phase I, there was one leading university and one or more other participating

universities. If so, how had the resources been allocated; had the financial resources been allocated to one leading university in a form of lump sum budget concerning the research theme and had the leading university distributed to each universities depending on the number of students or size of the faculties? Or had the resources been distributed to each university independently from the funding agency?

(3) If the allocation mechanism underlying the **1st Phase BK21** is based on the input or output formula, how the formulas consist of? (For Example: the number of students (80%) + performance index (20%))

(4) How has the resources been allocated from intermediate agency, the Brain Korea 21 & NURI Committee (BNC), to the institution during **the 2nd Phase of BK 21**?

(a) Line-item budget (b) Block grants (c) Input based Formula

(d) Output based Formula (e) Input + Output funding Formula (f) If others

(5) The BK 21 Phase II emphasize department-level excellence rather than university level excellence. If there are several research teams within one university, how had the resources been allocated? Have the financial resources been allocated to the university in a form of lump sum budget, that is institutional unit support, or distributed to each research team independently from the funding agency, that is individual research team unit support, in a form of line item budget?

(6) If the allocation mechanism underlying the **2nd Phase BK21** is based on the input or output formula, how the formulas consist of? (For Example: the number of students (80%) + performance index (20%))

(7) What performance indicators are particularly included during the **2nd phase of BK21** which index or criteria is more emphasized?

(8) Was the total budget of the BK21 project calculated on a top-down basis according to the total budget available or on a needs-basis based on financial needs from the HEIs?

(9) To what extend can universities spend their BK21 financial resources on their intended purposes underlying **2nd Phase BK 21 program**? If there are any restrictions within a university, what are the particular reasons?

Appendix B. Questionnaire to Universities participating Brain Korea 21 Project

PLEASE Return this Form to the Following E-mail Address
within a Week
dl86702@uta.fi/ or dongseol@student.uv.uio.no

Financial Autonomy & External Accountability Underlying BK 21 Program in Higher Education Institution – A Questionnaire

My name is Dong-Seob Lee and I'm a graduate student at the Erasmus Mundus European Higher Education program. I'm currently doing my Master's thesis on *the BK 21 program* for the University of Tampere in Finland. This questionnaire is directed to universities who have participated in BK 21 program. The information obtained from this questionnaire will remain anonymous and will be used for research purposes only. The time to complete this questionnaire is approximately 25 minutes. Your response will be invaluable for my research and the development of BK 21 program. If you have any questions or issues raised in the questionnaire, please contact me by E-mail: dl86702@uta.fi. I deeply appreciate your participation in my research.

1. Profile

(a) Name of Institution: _____

(b) Position of Respondent:

Head of Institution ( ) Professor ( ) Senior Researcher ( )

Post-doc Researcher ( ) Administrator ( ) Other position ( ) _____

2. This section aims at finding out the information on what level of *financial autonomy* is exercised at the Higher Education Institutions using the 2nd Phase BK 21 program, which is based on allocation mechanism. However there are some questions, nevertheless, with respect to the 1st Phase of the BK 21 program. If you don't exactly hold all the information, you don't have to answer all the questions. Please put a check (√) *for True* one or more options in the multiple-choice questions, and write long-hand answers in the spaces provided.

(1) Who determines, at your institution, how to use the financial resources of the **1st Phase of BK21?**

(a) Dean of the faculties (b) Head of department (c) Director of research team

(d) Research staff (e) others _____

(2) Does the University have a freedom to decide how to distribute the resources received to the

subordinates without any restriction, as stated **1st Phase of BK 21**?

_____

(3) If there are some restrictions, what are the particular reasons?

_____

(4) Who determines, at your institution, how to use the financial resources of the **2nd Phase of BK21?**

(b) Dean of the faculties (b) Head of department (c) Director of research team

(d) Research staff (e) others _____

(5) Does the University have the freedom to decide how to distribute the resources received to the subordinates without any restriction with the **2nd Phase of BK 21**?

_____

(6) If there are some restrictions, what are the particular reasons?

_____

(7) **Other than the BK 21 programs,** how are the other public resources allocated?

(a) Line-item budget (b) Block grant (c) Input based formula

(d) Output based formula (e) Input + Output funding formula

(f) If other mechanisms are used, please specify _____

(8) Does the government audit university accounts of the **1st Phase BK21 program**?

(a) Yes (b) No, internal auditing is used (c) There is no auditing

(9) Does the government audit university accounts underlying **2nd Phase BK21 program?**

(a) Yes (b) No, auditing by BNC committee

(c) No, internal auditing is used (d) No auditing whatsoever

*** Please check (√) if you agree or disagree with the following statements. If you agree strongly you check box number 5 (5 =Agree strongly). Box 4 for agree, 3 if you are neutral, 2 if you disagree, and 1 if you strongly disagree.**

	1st Phase of BK21	**2nd Phase of BK21**

	1	2	3	4	5	1	2	3	4	5
(10) University is regulated according to national standards.										
(11) The budgets from government or BNC are centrally controlled and disbursed within the university.										
(12) The university has the freedom to set up academic payment and conditions underlying the BK 21 programs.										
(13) The research team has the freedom to set up academic payment and conditions as stated in this BK 21 program.										

3. This section aims at finding out the level of *institutional autonomy* exercised at your Higher Education Institution from an administrative academic side.

(14) Do you think that the autonomy of your institution under **Phase II of the BK 21 program** is protected from…

(a) The government interference Yes ( ) No ( )
(b) Political interference Yes ( ) No ( )
(c) Bureaucratic interference Yes ( ) No ( )
(d) University interference to the research team Yes ( ) No ( )

(15) Who designs the curriculum and courses under **Phase I of the BK 21 program**?

(a) The professors (b) The deans (c) The vice-chancellor
(d) The group research team of the university (e) others _____

(16) Who designs the curriculum and courses under **Phase II of the BK 21 program**?

(a) The professors (b) The deans (c) The vice-chancellor
(d) The group research team of the university (e) others _____

(17) Who decides the admission policy during **Phase II of the BK 21** program?

(a) An individual institution (b) Other universities participating in this program (c) BNC
(d) The government (e) other regulatory bodies _____

(18) Who determines the number of students taken in under **Phase II of the BK 21** program?

(a) An individual institution (b) Other universities participating in this program (c) BNC
(d) The government (e) other regulatory bodies _____

(19) Who determines the graduate fee structure under **Phase II of the BK 21** program?

(a) An individual institution (b) Other universities participating in this program (c) BNC
(d) The government (e) other regulatory bodies _____

(20) Who determines the workload during the **2nd Phase BK21** program?

(a) An individual institution (b) Other universities participating in this program (c) BNC

(d) The government (e) other regulatory bodies _____

(21) Who determines the appointment of new researchers in the **2nd Phase BK21** program?

(a) An individual institution (b) Other universities participating in this program (c) BNC

(d) The government (e) other regulatory bodies _____

(22) Who determines the norms or qualification for appointment of new researchers in the **2nd Phase BK 21** program?

(a) An individual institution (b) Other universities participating in this program (c) BNC

(d) The government (e) other regulatory bodies _____

4. This questions the accountability relationship between HEIs and the Government. Please check (√) if you agree or disagree with the following statements. If you agree strongly you check box number 5 (5 =Agree strongly). Box 4 for agree, 3 if you are neutral, 2 if you disagree, and 1 if you strongly disagree.

	1st Phase of BK21					**2nd Phase of BK21**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
(23) The university has the obligation to do an annual report and give statistical information on how government provided resources have been used.										
(24) The university is subject to the *external quality assurance arrangement*.										
(25) The university has to establish an internal quality assurance arrangement.										
(26) MOE/ BNC requires the performance results of BK21 program.										
(27) It is the responsibility of MOE/ BNC to lay down transparent guidelines to install better measure of output performances.										
(28) MOE/ BNC offer financial incentives according to the result of performance.										
(29) The university has an obligation to establish the relationship with other industries.										
(30) The university has an obligation to prepare policies on access and equal opportunities.										

Appendix C. Performance Indicator for Applied Science Research Groups: Phase II

Areas	Weighting Scheme	Indicators
Education (32%)	Curriculum (3%)	Excellence of curriculum contents and plan
	Degree Completion (3%)	Percentage of MSc. PhD completion by BK21 Funding
	Employment of graduates (3%)	Percentage of graduate hired, excellence of employment support plan and goals
	Publications & presentations by graduate students (19%)	Number of papers per student published in SCIE journals and other journals registered at Korean Research Foundation in past two years, number of presentations per students in past two years, excellence of plans to support these activities.
	Globalization of graduate education (4%)	Share of English only lectures, percentage of foreign faculty, percentage of foreign students
Research & Development (33%)	Government-funded R&D (9%)	Pre-faculty R&D funding sponsored by the government in past 2 years, excellence of plan to link BK21 fund and other government programs
	Faculty research performance (19%)	Per-faculty SCI papers published in past 2 years and their impact factors, plans for per-faculty paper publications and impact factors, per-faculty patents in past 2 years and future plan for them
	Excellence in international activities (5%)	Excellence in performance of international academics and researches
Links to Industry (21%)	Results from the financial matching funds from industry (9%)	Per-faculty funding and projects from industry in past 2 years and future plans in domestics or abroad, excellence of linkage between the industry projects and research and education in the department
	Industrial Property (7%)	Per-faculty research registration results in relation to industrial property including patents
	Technology transfer (5%)	Per-faculty technology transfer cases in past two years, commercialization performance and future plans
	Excellent case of University-industry collaboration (3%)	Specialized staff for university-industry collaboration and plan for hiring them, support systems and other activities to commercialize research results

Graduate Reform & Specialization (11%)	Invest in human resources & specialization to become a research university (2%) Investment in physical infrastructure (2%) Research groups' structure, evaluation plan, institutional reforms to be research universities (7%)	Ratio of faculty to graduate students, ratio of faculty to undergraduate students, plan for improving student-faculty ratio Ratio of full time professors, institutional reorganization at university level, ratio of graduate students to undergraduate students Ratio of matching funds from the university's own investment to the BK 21 funding, plan for managing the matching fund portion of the contract Emphasis on human resource production and excellence in goals Linkage between the research group & the department, influence of the research group leader on the department's decision-making, institutional reorganization at department level Plan for self-evaluations and evaluations by outsiders Centralized system of fund management, performance based faculty evaluation system, plans for improving these systems -1% demerit mark when changing the research group leader
Additional score to excellent universities in regional area (10%) **Excellence in University-Industry collaboration research groups (±3)**		

Source from BNC (2008)