Cooperation by Coercion: Institutionalizing the “Third Mission” of Universities in the South Korean Higher Education System*

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The rise of the knowledge-based economy has led to a global trend pushing universities to be competent in not only teaching and research but also the so-called “third mission.” At the same time, driven by New Public Management (NPM) regime, recent global university reforms have introduced and employed complex evaluation systems for its governance. Yet, there is relatively a scant interest on how the NPM approach has influenced the ways of institutionalizing the third mission of universities and its consequences. This paper tries to fill this gap with a case study of LINC (Leaders in INdustry-university Cooperation), which is one of the main South Korean university funding programs dedicated to the third mission. This paper examines the evaluation system of LINC and its multi-level operation that constitutes the Korean version of the entrepreneurial university. As a result, this study finds that the evaluation system of LINC has been steering university toward an “industry serving agency,” with persistent approaches of formalization and incentivization. This study presents a reflective interpretation of the direction where South Korean university-industry cooperation policy headed, leaving policy implications not only for South Korea but also for other countries that are adopting a similar policy.

Keywords: LINC (Leaders in INdustry-university Cooperation program); university reform; evaluation system; university-industry cooperation; institutionalization; industry serving agency

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List of Abbreviations

All-SET	All Support for EnTerprise program
BK21	Brain Korea 21 program (1999~2012, Plus: 2013~2020 (exp.))
Co-op	Co-operative education
CSC	Co-operative education Support Center
EEC	Entrepreneurship Education Center
ESC	Enterprise Support Center
FESC	Facility and Equipment Sharing Center
GRI	Government Research Institute
HUNIC	Hub UNiversity for Industrial Cooperation program (2004~2012)
IACF	Industry-Academic Cooperation Foundation
KPI	Key Performance Indicator
LINC	Leaders in INdustry-university Cooperation program (2012~2017)
LINC+	Leaders in INdustry-university Cooperation Plus program (2017~2022(exp.))
MEST	Ministry of Education, Science, and Technology (2008~2012: Lee Myung Bak administration)
MoE	Ministry of Education (~2007: until Roh Moo Hyun administration, 2013~: since Park Geun Hye administration)
NPM	New Public Management
NRF	National Research Foundation of Korea
RRC	Regional Research Center program
SCI	Science Citation Index
TTO	Technology Transfer Office
UIC	University-Industry Cooperation
UICProf	University-Industry Cooperation charged professor

1. Introduction

Entrepreneurial universities are becoming less entrepreneurial. With a burgeoning emphasis on university-industry cooperation (UIC),¹ the so-called third mission is assigned to universities,² mobilizing them for the national and regional economic development. Simultaneously, the entrepreneurial university became the concept that epitomizes university perceiving the third mission (Etzkowitz et al., 2000). This trend arguably started in earnest from the US, where the third mission is institutionalized in universities endogenously with few triggering external factors (Berman, 2012; Colyvas, 2007). However, as universities are recognized as the key institutions in the knowledge-based economy, soon paradoxical consequences followed; their autonomy was taken away from them, and they became more stressful with the overloading environment (Geiger, 2004). The paradox is more visible in countries other than the US, as governments introduced policies to steer universities to perform well in entrepreneurial activities, expecting them to be more accountable and even profitable for public support (Pinheiro et al., 2015a; Thune and Gulbrandsen, 2011; Woolgar, 2007). Indeed, what we observe in many countries is that the institutionalization of the universities' third mission is firmly promoted by the government policy (See, for example, Lockett et al., 2015), in line with New Public Management (NPM) regime of university governance reforms.³ Hence, while the entrepreneurial activities of universities have grown in recent decades, it may not be the universities'

¹ This paper uses the term *University-Industry Cooperation (UIC)* rather than other similar words like *University-Industry Relations* or *University-Industry Linkages*. This is because, in Korean, instead of using different words, *sanhakhyublyuk*, which could be translated literally to *industry-academic cooperation*, is the only word that has an inclusive meaning of UIC and the other similar words.

² The idea of the third mission of universities is broadly accepted as “the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments” (Molas-Gallart et al., 2002, p.iii-iv). In a broad sense, the third mission can be categorized into eight dimensions from transferring human resources to public understanding of science (Laredo, 2007), while the three categories (intellectual property, spin-offs, and contracts with industry) that could be classified as UIC received a much attention (Perkmann et al., 2013). In Korea, however, the term “third mission” can be used interchangeably with UIC, leaving out the other dimensions of the third mission. See Section 2 for further explanation.

³ NPM regime of university governance reforms was spawned from the United Kingdom's neoliberal turn in 1980s for its public sector governance. This study does not mean to ignore the abundant efforts of conceptualizing the NPM and delineating it from other models such as Neo-Weberian reforms (see, for a comparative analysis, Ferlie et al., 2008). However, this research refers to a more inclusive understanding of the concept that covers various characteristics of both means and ends of the NPM reforms: competitive funding, performance evaluation, and managerial self-governance of universities with external guidance to achieve better efficiency, productivity, and accountability (see, for a review of NPM reform in the university governance, de Boer et al., 2007; Enders et al., 2015; Leišytė, 2016; Lorenz, 2012). More specifically, this paper regards the program-based higher education funding framework (see Section 2) and the complex evaluation system of a certain university funding program (see Section 3) as the consequences of the NPM reforms of university governance in South Korea.

entrepreneurial spirit alone that boosted the change.

The recent debate on the third mission policy pivots around the heterogeneity and the regionality of UIC. The heterogeneity issue comes from the rediscovery of the academic engagement and the informal knowledge exchange (Grimpe and Hussinger, 2013; Perkmann et al., 2013). The third mission policy which tended to consider only academic entrepreneurship, namely, direct commercialization of university research through formal technology transfer, has been under the criticism of its narrow view. For instance, Pinheiro et al. (2015b) were concerned that the universities' third mission activities were assessed by the criteria that are related to the traditional functions of technology transfer offices (TTOs), that could limit the third mission for only the economic dimensions. Moreover, the regionality issue points out that UIC performance of universities depends highly on the regional context, which means that it is problematic to postulate the entrepreneurial university model as 'one-size-fits-all' (Benneworth et al., 2016; Sánchez-barrioluengo, 2014). Notably, Brown (2016) argued that it is the underperforming industry sector of Scotland which impedes productive UIC, not the universities. He advocated for promoting the absorptive capacity of small regional firms to utilize the universities' third mission activities, rather than pushing universities to perform better in UIC.

Literature that continued efforts of understanding UIC and giving recommendations for the related policy, however, lack an in-depth case study of the policy measures. Existing studies of UIC policy often set the policy as a background or context of the research (Leisyte, 2011), or regarded it as a single event factor such as legislation of relevant law and regulations (Berman, 2012). Kochenkova et al. (2016) organized the previous literature of UIC policy by dividing the topics of the literature into the design and the impact of policy, noting that both have concentrated on the policy related to intellectual property rights of university's discoveries and inventions. However, as some exceptional studies from few countries like the UK (Lockett et al., 2015; Rosli and Rossi, 2016) or Finland (Benneworth et al., 2015) have shown, there are more extensive efforts than the legislation of the law similar to the well-known Bayh-Dole Act from many national governments and universities. This paper fills the gap by focusing on the implementation process of these extensive forms of UIC policy and the actual practices of the policy subjects, i.e., UIC activities of universities. In particular, this study examines the evaluation system of LINC (Leaders in INdustry-university Cooperation program), which is a major performance-based funding program of South Korea (Korea hereafter) that is devoted to institutionalization and promotion of the third mission of universities. An inquiry of LINC also gives an opportunity to scrutinize how two recent trends in higher education – the institutionalization of the third mission and the NPM reforms of university governance – interact. This

research is based on various documents accumulated since 2010 when Korean government first introduced LINC and throughout its five years (2012-2017) of implementation as well as the in-depth interviews with the major actors involved in the program.

Especially paying attention to the NPM-driven performance evaluation system of LINC that is the core of the program, this study reveals the constitutive effect (Dahler-Larsen, 2014) of the evaluation system of LINC at the macro level with two significant findings. First, LINC universities under the evaluation system have followed the isomorphic processes based on both a structural-organizational perspective and a rational actor perspective while leaving out historical-institutional consideration of universities (Maassen, 2017). LINC and its evaluation system were successful in making the formal and incentive structures of UIC, however, it is hard to tell that the third mission has diffused and institutionalized in the universities. Second, the core activities of LINC are found out to be shaped as a unidirectional support rather than cooperation. The university-industry relationship and the role of universities in the relationship have been reset during the implementation of LINC. Overall, this paper argues that LINC has steered the university toward an “industry serving agency,” which is similar to a quasi-governmental organization that is in charge of supporting small businesses.

2. LINC and its background

Since the path dependency is found in the regional higher education sector reform trajectory (de Boer et al., 2007) and it gives an insight for further understanding of a particular policy, , this section gives a brief introduction to the Korean context where LINC is placed. LINC was not the first funding program that is dedicated to promoting the institutionalization of the third mission of universities in Korea. However, in the context of two significant trends of Korean higher education system reform in recent decades, the introduction of LINC was a symbolic event that UIC became the mission of Korean universities explicitly: 1) higher education funding framework, which is characterized as *program-based funding* and 2) UIC policy initiatives that have increasingly moved to the center of the national agenda. These two streams are also accountable for the third mission to be stipulated as UIC in Korea.

The Korean government has been adopting a performance-based university funding extensively to implement its higher education reform plan of “stratification by classification (of universities)” and “specialization by stratification,” for which LINC was one of the crucial components (Jeon and Kim, 2017). This trend traces back to 1994, when the Korean government first introduced a “special purpose” funding program, and soon various special purpose funding programs have dominated the funding framework since 2004 (H.-H. Kim, 2014). This meant the universities could not get funded in the form of block grants (called “general purpose funding” in Korean) anymore, but they had to apply for the funding programs, compete with other universities, contract with the government (if selected), and get evaluated during and at the end of the program with predetermined criteria based on the specific purpose of the program (Byun, 2008). Brain Korea (BK) 21, a program started in 1999 and was founded for building research universities by supporting graduate schools and graduate students, exemplifies this kind of programs (Shin, 2009). LINC is not an exception.

Byun (2008) refers the program-based funding as one of the critical features of NPM reforms of Korean higher education, as it significantly reduces the substantive institutional autonomy of the universities. However, the program-based funding was not the only indication for the NPM reform, but it was also the tool for steering the universities more towards the government’s long-lasting higher education policy objective; *specialization* (Lee, 2015; Shin, 2005). Since 1995 when the government first announced the most comprehensive education reform plan and until now, how to specialize the universities regarding both missions and disciplines have been a vital issue for Korean higher education reforms (Kim and Lee, 2006). Thus, the program-based funding framework has built a quasi-market for the universities to specialize and locate themselves in the higher education system. Through specializing the universities, the government hoped to make an efficient higher education

system where the division of the roles has firmly settled.

While the NPM reforms were making progress from the 1990s, universities rarely conducted academic research until the 1980s, and it was the government-funded (and also government-established) research institutions (GRIs) that took the role of research at the time focusing on industrial research rather than academic research (Shin and Lee, 2015). The solid tie between the GRIs and large conglomerates (also called *Chaebol*) has led the Korean national innovation system in the period of its fast economic growth, but limited the universities' role in education and left UIC weak and inactive (Schiller and Lee, 2015). However, experiencing the economic crisis in the 1990s, the Korean government recognized the necessity of UIC and started to set the initiatives for it. The Roh Moo Hyun Administration (2003-2007) was the first to promote UIC vastly with various policy measures including legislation and relevant university funding programs, under the name of the "New UIC" initiative. The initiative laid a foundation of UIC in Korea, for example, the term UIC (*sanhakhyublyuk*) was defined in a law and a legal ground for the promotion of UIC was provided.⁴ Following administrations consistently emphasized UIC and finally, LINC started in 2012.

By allocating the largest budget among other university-industry-GRI cooperation programs (National Science and Technology Council, 2012),⁵ LINC not only became a representative policy measure of the Korean government's UIC initiatives but also completed the most recent version of the program-based funding framework. **Figure 2.1** shows that the government first stratified the universities by certain criteria such as publication counts and the number of graduate students. After that, the universities are specialized in their missions based on the stratification. This was, indeed, an explicit declaration of UIC as the third mission of universities in Korea.

⁴ See Industrial Education Enhancement and Industry-Academia Cooperation Promotion Act (Act no.6878), which was wholly amended on May 27th, 2003.
<http://www.law.go.kr/lsInfoP.do?lsiSeq=61692&ancYd=20030527&ancNo=06878&efYd=20030901&nwJoYnl nfo=N&efGubun=Y&chrClsCd=010202#0000> (accessed Jan 8, 2018.).

⁵ The allocated budget was about 100 million dollars, considering the distribution to about 50 universities and its implementation period (2012-2016).

Figure 2.1. University funding framework plan for 2012 (MEST, 2011a)⁶

The goal of LINC was to create and diffuse the leading models of UIC, by steering the universities toward the UIC-friendly university (see **Figure 2.1**). While it is arguably the UIC-friendly university that is meant by the leading model of UIC, the government did not provide a clear definition of the concept. Instead, the government demanded each LINC university to develop its own model, emphasizing the diversification, specialization, and sustainability of the models. Nevertheless, this did not mean that universities were free to use the support fund in their way. Urging accountability to the universities, the government introduced a complicated evaluation system which covers the various aspect of UIC from academic engagement (e.g., consultation, advice, and personnel mobility) to technology commercialization. The government selected a total of 51 universities with the evaluation, accounting them to be the leading model of UIC-friendly university. Also, the government dropped out 10 universities and selected 15 newcomers for the second phase through the evaluation. At last, LINC ended in the first half of 2017 and LINC Plus (LINC+), the successor to LINC, began in the summer of 2017.

3. Method & Data

Evaluation is at the center of LINC. Both staffs working in NRF alongside the LINC management officers of the universities mentioned that all of their works were *for the sake of evaluation system*. While the university manager monitors the KPIs (Key Performance Indicators) and the university's third mission activities (2A, 2017, pers.comm.),⁶ the LINC manager revised the evaluation manual toward the stakeholders' demand (1A, 2017, pers.comm.). Taking the evaluation system's salience in not only LINC but also for many public policy programs as NPM-based public sector reforms demanded more accountability, transparency, and efficiency to policy targets (Marginson, 2013), this paper tries to understand the implementation process of the policy program and its result of the third mission (or UIC) institutionalization through the evaluation system of LINC.

The term *evaluation system* that is used for indicating our research subject is intentional, implying that it consists of various explicit and implicit evaluations that operate at multiple levels. LINC has an evaluation system that consists of more than just the metrics. Quantitative metrics in the system are the KPIs, and they only take a proportion of 35% in the full evaluation system while the qualitative evaluation possesses the majority (see **Figure 3.1**).⁷ Also, because the LINC universities are evaluated with the KPIs based on each of their plan that submitted in advance, the stakeholders do not consider the quantitative evaluation crucial (1A, 2017; 1B, 2017; 1C, 2017; 2A, 2017; 2B, 2017, all pers.comm.). The whole scheme is drawn below in **Figure 3.1**. First, to a large degree, there is *the annual evaluation* conducted at the university level.⁸ Those universities opted in or out of the program were decided by the annual evaluation, and the evaluation also determined the allocation of the fund to the universities. Every year, NRF convened the four days and five nights "camp," inviting the evaluation committee and LINC university representatives to conduct the peer-review format of evaluation. The criteria of the annual evaluation is divided into four components: 1) the quantitative evaluation of the KPIs as its criteria (see **Appendix B** for the detail), 2) the qualitative evaluation by reviewing the result reports of each university (see **Appendix C** for the detail), 3) the demand side

⁶ See the last paragraph of Section 3 for the indications of the interviewees.

⁷ It should be noted even the qualitative evaluation of LINC also eventually draws on the number in the final process of the evaluation. Each member of the LINC evaluation committee scores the universities and the sum of the scores of all committee members decide the qualitative evaluation result.

⁸ The *annual evaluation* was comprised of multiple evaluations based on common evaluation schemes with some parts modified for specific needs of evaluations. As in **Figure 3.1**, there is the *selection evaluation* which took time in early 2012, the first year implementation of LINC. 51 out of 75 universities were selected to get funded and started the program. As LINC is divided into two phases (2 years + 3 years), there is also the *phase evaluation* which was substitutable with an *annual evaluation*.

(students and firms participated the programs under LINC) survey, and 4) the extra/subtracted points for reflecting other policy objectives of the government. The annual evaluation is, without a doubt, the most critical process in implementing the program.

Along with the formal explicit evaluations, the *consultation* also acts as an implicit evaluation. Consultation is a formal process that all LINC universities have to take from the consulting committee delegated by NRF. The consulting committee often includes the evaluation committee members as NRF has decided to use their expertise and experience in the evaluation committee. Also, the universities are obliged to report their reflection on the consultation result, which means universities have another feedback mechanism adding to the annual evaluations.

At last, the evaluation system applies not only at the university level, but also at the individual level. Two of the KPIs count the extent of UIC activities that are included in the *faculty performance appraisal* and *faculty promotion evaluation* (hereafter, together as UIC friendly performance appraisal, or the appraisal). They are two of the most difficult KPIs to attain, as it has potential to influence professors directly (2A, 2017, pers.comm.). Two research-intensive universities that applied for LINC gave up during the selection evaluation because of the obligation to apply the UIC friendly faculty performance appraisal. They claimed that there was a need to gauge between the international university ranking and LINC (Shin and Kim, 2012). This research examines the appraisal as included in the evaluation system of LINC because it is the evaluation that directly applies to the individual members of LINC universities, trickled down from the institutional level evaluation.

Figure 3.1. Overview of the LINC evaluation system¹²

⁹ The picture is drawn by the author

Considering the evaluation system as a whole, the current study finds the “formality-mechanisms framework” developed by Colyvas (2012) and the concept of “constitutive effect” proposed by Dahler-Larsen (2014) useful. Colyvas (2012) gives a full account of the evaluation system which consists of two levels: the design of performance metrics and its features, and the mechanisms of how performance metrics influence the practices. Paying attention to the recursive relationship between them, the framework is similar to the way of understanding how constitutive effects appear after an indicator takes place, which Dahler-Larsen (2014) conceptualized. He rejects the well-adopted idea of unintended consequences of performance metrics because it assumes that the metrics have the explicit intention and they are the precise definitions or the valid representations of existing concepts to be evaluated. However, this assumption is far from reality, and the meanings and the consequences of an indicator tend to be redefined after the indicator takes place (Dahler-Larsen, 2014).

Since their works are applicable to the criteria of qualitative evaluation, this study utilizes their framework and concept to analyze the evaluation system of LINC. As the model of UIC-friendly university, the goal of LINC, was not clearly defined nor exemplified, the KPIs, the qualitative evaluation criteria, and the evaluation system of LINC as a whole have room for discussion of their meanings and consequences. Thus, this study examines the model of UIC-friendly university – what did it become and how – by perceiving it as the constitutive effects of the LINC evaluation system.

To discover the constitutive effects of the evaluation system of LINC, this paper first utilizes abundant documents accumulated during the eight years (2010-2017) of introduction and implementation of LINC. Government and university documents related to LINC such as press releases, grey literature including internal and external reports, and presentation files and brochures of the events opened under the name of LINC are analyzed in this article. In the absence of all of the result reports of LINC universities that are used for the annual evaluations,¹⁰ the casebooks of the LINC universities’ best practices (MEST and NRF, 2012a; MoE and NRF, 2013; MoE and NRF, 2014; MoE and NRF, 2015a) were the most important sources to learn the actual activities that the universities have done.¹¹ Finally, news articles were analyzed as for the supplementary material.

¹⁰ Due to privacy and institutional secrecy issue, NRF and the LINC universities did not make the result reports that used for the evaluations public. Only one, Pukyong University has disclosed and sent the reports and two anonymous universities (indicated as X and Y, hereafter) have disclosed the reports only by visiting. Thus, this paper referred to the notes taken by the author during the visits for the last two universities, not the result reports directly.

¹¹ Since each casebook includes a large number of best practices, the citations for the best practices are not referred to the casebooks but to the name of university hereafter.

Interviews are another primary source of data, which give a deeper understanding of the experiences and the thoughts of the key actors in the LINC evaluation system. The interviewees are divided into two groups for their positions related to LINC. Group 1 consists of the program level managers of LINC, who participated in the evaluation committee or the consultation committee. Group 2 includes the university level managers of LINC, who are the staffs and professors of LINC universities. A total of ten interviews are conducted, five for each group (see **Appendix D** for the details of the interviews). Each interview lasted for 50 to 120 minutes, and some of them were supplemented by phone or e-mail with extra questions and clarifications. For anonymity, each interviewee is indicated with a combination of the interviewee's group number and randomly assigned alphabet (i.e., 2B) in the paper.

4. Main Themes

4.1. Approaches

You can tell that there was almost no UIC [before LINC]. The professor who has personal linkages with the firms might have done it at the individual level, but there were no such things as leading the UIC of a whole university. There is a big difference in the figures. I cannot say there was none of it, but almost none (2E, 2017, pers.comm.).

Although UIC in Korea was emphasized and reinforced all the time since 2003, multiple interviewees and documents shared the idea that UIC of Korean universities began in earnest with LINC (1B, 2017; 2B, 2017; 2D, 2017, all pers.comm.). “Its contribution to changing university structure UIC-friendly and settling the concept of UIC in university is well recognized.” (Lee, 2017) This is unsurprising because LINC had several unprecedented characteristics, for example, the scale of LINC was exceptional in both a number of participating universities and amount of funding (see Section 2). Stakeholders’ attributional bias also cannot be neglected. However, the approaches of the implementation of LINC are also attributable to the recognition of LINC’s contribution. This section pays attention to how UIC is institutionalized to the universities by tracing the process of LINC implementation. Following themes show that UIC is formalized and incentivized, finally becoming visible and tangible under the evaluation system of LINC.

Formalizing: new people, new organizations, and new relationship

To get an evaluation done, what to evaluate should be defined first. However, as the third mission activities are diverse and heterogeneous (Perkmann et al., 2013), criteria for the evaluation are difficult to define. The government nevertheless introduced KPIs and the evaluation manual based on the three previous programs’ KPIs and the best practices discovered before their merger. As a result, the complex evaluation system of LINC was established with 22 KPIs for the quantitative evaluation and the guidelines within four categories for the qualitative evaluation which requires a result report of up to 400 pages. On why it became so complex, one professor of Group 1 referred to two different ends of evaluation – rewarding/punishing and providing benchmarks – and gave weight to the latter for the case of LINC:

There was no such a program like this before, right? So each university does not know how to conduct the program, which means there is a need for providing the direction. That is possible with evaluation indicators. [The evaluation system] instructs the evaluation indicators to universities, saying ‘I wish you guys must do these stuff.’ If the number of indicators is only 10 or 20, then there would only be a few things for universities to refer. That is why [the evaluation] is being made in

detail. So the universities would realize 'this is how we get a high score,' but also at the same time, understand what LINC is. (1B, 2017, pers.comm.)

Thus, the function of the evaluation system of LINC was not only for resource distribution based on performance but also for the instruction of prescribed UIC activities.

One of the instructions the government gave to the universities, even before selection of LINC beneficiaries, is to employ UICprofs (University-Industry Cooperation charged professors). UICprofs, by definition, are “faculties who have had work experience from the industry sector [more than ten years], devoted to conducting UIC related education and research, supporting employment and start-up of students, and finally evaluated by the outcomes of UIC activities.” (MEST, 2012b) The introduction of this people-in-charge was one of the old wish lists of the Korean government.¹² Finally, the government made more than thirty-fold increase of the number of UICprofs in a year by making it mandatory for LINC applicant universities (MEST, 2011b). Also, as the number is counted as one of the KPIs, it increased from 2,052 in 2012 to 4,932 at the end of the program (NRF, 2017). In this, the government has made a new profession in universities. However, due to their ambiguous roles and duties, the government kept putting efforts to institutionalize it by presenting and publicizing the role models of UICprofs afterward.¹³

After the selection evaluation, selected LINC universities started to conduct the program by establishing several designated organizations that are responsible for UIC activities. First of all, the LINC foundation and its management office are organized in each university to manage the support fund and take charge of a general administration. Then the evaluation system of LINC mandated the LINC universities to install new organizations under the leadership of the program foundation and the office: Co-op Support Center (CSC), Entrepreneurship Education Center (EEC), Enterprise Support Center (ESC), and Facility and Equipment Sharing Center (FESC). As their names indicate, each center was specialized in prescribed UIC activities of LINC. The universities had to report the

¹² The history of UICprof traces back to 2003 when ‘New UIC’ initiative was announced. A policy report which introduced UICprof for the first time recognized that universities couldn’t conduct UIC substantially because the professors are overburdened and they are not an expert anymore in UIC that is becoming complex in nature (Park, 2003). The report set the foundation of the definition, the roles, and the basic characteristics of UICprof, and further suggested changing the law for its legal foundation. The legal amendment, however, only be realized in 2011 while the government was preparing for the introduction of LINC. See Article 15.2 of Higher Education Act of South Korea (Act no.10866), which is amended on July 21th, 2011. <http://www.law.go.kr/lsInfoP.do?lsiSeq=114939&ancYd=20110721&ancNo=10866&efYd=20120722&nwJoYnInfo=N&efGubun=Y&chrClsCd=010202#0000> (accessed Jan 9, 2018.).

¹³ For example, MEST has distributed the material named "Cases of UICprof's role" and opened a workshop for activation of UICprof policy on August 24th, 2012.

organizational structure and composition of these centers and even the status of the center leaders to prove that they are well-formed.

Thus far, LINC universities have prepared new people and organizations that would be accountable for UIC related tasks. However, where will they send students to get co-operative education (co-op) experiences? What enterprises will they support? Who will they share the facilities and equipment with? The obligatory passage point that universities should go through in the LINC evaluation system is the *partner firm* [가족기업].¹⁴ An enterprise becomes a partner firm of a university if the enterprise registers to the network of the university.¹⁵ The evaluation system made all relationships between the universities and the enterprises formal, not only for counting the number of partner firms as one of the KPIs but also for making other KPIs and UIC activities auditable. As enlisting the firms as partner firms became a necessary condition for every outcome, the number of partner firms of all LINC universities recorded 64,141 at the end of LINC in February of 2017 (NRF, 2017), which is more than 1,000 per one LINC university on average.

LINC universities did not only conform to the required formalizations of new people, new organizations, and new relationships. They stepped further to show the advancement of formalized structures by reproducing and reinforcing the similar approaches to their internal governance of UIC. Activities of the centers are again formalized in the universities: co-op, capstone design, and entrepreneurship courses became mandatory for students. Even student clubs preparing for start-ups, namely start-up clubs, became formal and official organizations that the universities started to count the number and provide support. Some universities introduced a new position such as UIC charged vice-president (Ajou), and others established new organizations, for example, Industry Coupled collaboration Center (Chungbuk) and UIC Cluster (Sogang).

Moreover, LINC universities reinforced the established formalities by developing and applying a management strategy and system in their operation. Ajou University has cultivated their own KPIs with the strategic management method named “Balanced Score Card.” A more common practice is the web-based program that assists the specialized centers to manage their works. For example, for

¹⁴ Partner firm is a liberal translation of *Gajokhwesa*, or also called as *Gajokgieop*. In literal translation, they are both *family firm*, which has a totally different meaning in English. However, the universities often categorize the partner firms into several groups, and some has named one of the category as *Partner* (See next subsection). Note that this makes the expression awkward because it is written as *Partner partner firm* in this paper.

¹⁵ Partner firms not only include business enterprises but any corporate body without a university affiliation (e.g., GRIs), can be a partner firm of university. Universities require a business license of the partner firm and the written agreement between a university and the firm to register it as a partner firm (NRF and MoE, 2016).

CSC, LINC universities opened web pages that match their students with the partner firms for co-ops based on their information, records the attendance and the results of mutual evaluations, and therefore serves as the database of the participants. The programs did not only help the centers to supervise their organizational works orderly and efficiently, but also made co-ops more similar to other regular courses in universities. By utilizing the database, some universities advanced the program to the career management system, for instance, by issuing their students' reports on extra-curricular activities, just like the grade reports on students' academic performance (Chonbuk; Pusan).

Incentivizing: carrot-and-stick make the system go around

Incentivizing was also the salient approach found in the implementation of LINC to make the formalities perform. At first, the program-based funding system, where LINC is grounded, is to incentivize universities that follow the reform agenda of the government of making UIC-friendly universities. Next, as the amount of support fund in the next year was decided by the result of the annual evaluation of the year prior, LINC universities are incentivized to perform better than others do. However, when the resource is limited, an incentive on one side becomes a punishment on the other side. The evaluation system of LINC applied this principle of competition when giving the support fund. Therefore, the universities got the graded financial aid from the government, which became more substantial as the program progressed. In addition, the phase evaluation has dropped two universities that were lagging behind out of the program, giving new universities an opportunity to participate in the program (see **Appendix A**).

The evaluation at the university level has trickled down to the individual level too, by introducing the UIC-friendly professor performance appraisal. Multiple Group 1 and 2 interviewees pointed out the appraisal as the most noticeable change LINC has made in universities:

University professors tended to only focus on writing papers. (...) They change only if they realize that they will receive high praise and get promoted by doing UIC activities rather than writing papers. I don't know if you have an experience in an organization, but people in organizations are to follow the promotion evaluation or something similar. LINC changed [the appraisal], and that is the biggest contribution of LINC (1C, 2017, pers.comm.).

One of the most significant achievements of LINC is that it forcibly changed the university system. Making professor performance appraisal to reflect UIC activities, professors' interest [in UIC] increased. I think it did well to do that by force. Professors are very sensitive to the appraisal (2E, 2017, pers.comm.).

Through seeing how the appraisal incentivized the UIC activities, one could find more clearly what changes it tried to induce. Here, what two relevant KPIs (see **Appendix B**, #3 and #4) have

calculated was not the absolute degree of inclusion of UIC activities in the appraisal. Rather, it was the relative value of the points that the professors get from participating in UIC activities compared to the points they get from their research outcomes, a publication on SCI (Science Citation Index) journal. Pukyong National University, for instance, while giving 200 points to professors who wrote SCI publications, it also allocated 500 points on international patent registration, 200 points on starting a new business of her or his own, and 25 points on enlisting new partner firm (Pukyong National University, 2013; Pukyong National University, 2014). The values calculated for the evaluation are, then, 2.5, 1, and 0.125, respectively. The commensuration by SCI publication of the appraisal gave a signal to the faculties that they can participate in UIC activities instead of writing manuscripts.

While relevant KPIs only reflected the appraisal that universities set as a rule, qualitative evaluation focused on the actual utilization cases of the appraisal. The best practices reported by the universities were the professors who got promoted or renewed their employment contract by substituting the mandatory research outcomes with UIC activities (Chosun; University X, 2017, University Y, 2017). The appraisal, therefore, encouraged professors to utilize the changed appraisal strategically by performing various UIC activities.

Meanwhile, LINC universities have introduced the incentive system toward their partner firms, too. To raise the number of partner firms, Sung Kyun Kwan University gave a point to each of their partner firms that recommend another firm to register as a partner firm.¹⁶ Because each partner firm's engagement of UIC activities would be counted as a university's performance, the universities should have moved one-step further than just enlisting. They had to make partner firms more active and participate in actual UIC activities. LINC universities, therefore, have introduced a membership system dividing partner firms in grades by their involvement levels (Namgung, 2015). The partner firms of Chonnam University, for example, are classified into *General* (enlisted), *Core* (participated in more than one of four UIC activities), and *Partner* (transferred and commercialized technology from the university). While the university supports the General partner firms by employee education and technological advice and consultation, the Core partner firms are assisted in designing the prototypes and participating the exhibitions. At last, the university backed the most privileged *Partner*

¹⁶ See the introduction webpage of ESC of Sung Kyun Kwan University. <http://ranbiz.skku.edu/?p=55#open> (accessed Jul 13, 2017.).

partner firms with making and commercializing prototypes.¹⁷ This three-grade membership is adopted in many universities, as University X (2017) also classifies its partner firms into *Member*, *Partner*, and *Influential* with similar differentiated benefit. Their criteria were the number of UIC activities the firm took, and the numbers of businesses for each classification at the end of the program were 625, 27, and 24, respectively (University X, 2017). Ironically, as the numbers of each membership grade shows, not more than 10% of the partner firms were actively involved in UIC activities with the university.

Behind formalities and incentives

LINC evaluation system has promoted the UIC activities of universities with newly introduced formalities and incentive structures. The way of executing the third mission of the universities was strictly defined, delineated, and then encouraged relatively to other missions. However, the formalities and incentives often came out with their limitations. Sometimes they were found out to be ineffective, and there were also some issues that they have concealed.

New formal organizations established in LINC universities, which mainly ran with the support money from LINC, have frequently suffered from the sustainability issue:

The problem is that these [centers] always are left as program-dependent organizations, therefore, if the program ends, then the survival of center and the job stability for the workers of the center become uncertain. So it operates mainly with contract workers, which hampers the accumulation of expertise that could only be realized when [the workers] work for a longer period (1C, 2017. pers.comm.).

Since the centers were just the add-ons to the universities, they could also be easily removed.

UICprofs bumped into the similar issue with the add-on organizations, but theirs was more complicated. While the centers were dedicated to given tasks, UICprofs had to face the questions on their identity as a sole profession. Most of the time when the interviewees were asked about UICprof, the answers started with, “Well, actually, they are not professors,” showing the general perception of UICprofs in LINC universities. Even though the government put much effort to discover the role models and provide the guidelines for UICprofs, they are often mobilized and invested to trivial works in order to improve the KPIs (1D, 2017, pers.comm.), for example, by visiting regional small businesses to enlist them as a partner firm of the university (2C, 2017, pers.comm.). Some UICprofs

¹⁷ See the introduction of its partner firm policy from the webpage of Chonnam University's ESC. <http://c4u.jnu.ac.kr/index.php?code=0201> (accessed Jul 13, 2017.).

were only considered as instructors for introductory courses of business administration or even as staffs of the LINC related centers (1C, 2017, pers.comm.). UICprofs' ironical status – named professor but not recognized as a professor – is a direct example of the limitation that the formalization approach has reached.

Multiple university managers declared that the number of partner firms is meaningless (2B, 2017; 2D, 2017, all pers.comm.). Nonetheless, to increase the number, universities recruited partner firms calling all personal connections such as the enterprises with prior engagement experiences and the firms founded by their alumni (2B, 2017; 2C, 2017, all pers.comm.). They lowered the barrier of registration¹⁸ and gave benefits to the partner firms with the aforementioned grade membership system. Universities also actively liaised regional firms to make them register by visiting (Pukyong University, 2014; 2C, 2017, pers.comm.), which is unsurprisingly done by UICprofs for their appraisal (University X, 2017; University Y, 2017). However, as mentioned beforehand, this made the numbers of family firms overly inflated, compared to the numbers of partner firms that actually participated in UIC activities. The number of valid linkages with the partner firms did not exceed 1/3 of the whole number when the university managers were asked (2A, 2017; 2E, 2017, all pers.comm.). As only some of the partner firms participate in UIC, universities regarded the entire group of partner firms as the pool for surveying industrial needs and demands, not substantive cooperation partners (2B, 2017, pers.comm.). Hence, both formalities and incentive structures trapped into a self-fulfilling prophecy that only increased a number of partner firms.

UIC-friendly performance appraisal was recognized as one of the effective policy measures according to multiple interviewees. However, at the same time, it was pointed out that the participation of professors is still low. One university manager said the impact of the appraisal is limited because professors are already burdened with other activities which they are used to. Therefore, there is no reason to risk starting new activities for professors (2D, 2017, pers.comm.). This is consistent with the concentration of UIC activities to only some professors (2A, 2017, pers.comm.). Only a few professors with prior experience could strategically utilize the incentives of the appraisal.

The limitation of the incentivizing approach, however, made the university managers consider the introduction of a “stick,” making a certain degree of UIC activities mandatory. Due to the pressure to

¹⁸ Each LINC university introduced a website that is devoted only to the implementation of LINC, which usually has address as "linc.university domain" (see, for example, <http://linc.pusan.ac.kr/> for Pusan University). One could easily register for the partner firm through the website.

improve the overall performance of the university in UIC, one of the interviewees thought the mandatorization as a remedy to avoid the saturation of the university's performance in UIC (2A, 2017, pers.comm.). Another manager planned to introduce the new appraisal with some obligations on UIC performance, but it foundered as the university failed to be selected for LINC+ (2B, 2017, pers.comm.). Chungnam University has already applied the mandatory weight of UIC activities in the appraisal for all professors regardless of their department.

The mentioned examples show that the approaches to promote the UIC activities and to institutionalize the third mission of universities are bounded to formalization and incentivization. Even though there were the limitations of these approaches, they were also expected to be overcome by reinforcing the same approaches. This is in line with the responses that a number of interviewees showed about the KPIs. Fulfilling adequate KPIs was not an issue for them because they could have somehow attained the numbers (1C, 2017; 2D, 2017, all pers.comm.). Formalization and incentivization were effective to increase the KPIs indeed, and this strategy persists as a belief.

4.2. Practices

In LINC, the best practice is one of the most important concepts for several reasons. First, it served as a measure of the degree of achievement of the goal of LINC. As the goal of LINC was to develop the leading model of a UIC-friendly university, the universities had to prove their model's effectiveness through reporting the best practices each year. Indeed, the best practices for each subprogram and activity became the essential criteria for the qualitative evaluation that the universities had to emphasize in their result reports and presentations. Second, best practices functioned as benchmarks that the universities could look up each other. They were the only materials that made in public about the actual activities that LINC universities conducted. The consultation committee referred them a lot while their work and the universities are also encouraged to share their best practices through the gathering events such as poster fairs. Third, and most importantly, they are the excellent measures for the constitutive effects of the LINC evaluation system. Group 1 interviewees have acknowledged that the criteria of qualitative evaluation, which is highly associated with the best practices, are quite subjective, though they claim that it is not so problematic because the consensus is reached in most times. This means that the best practices are likely to be developed and selected by the LINC stakeholders' perceived idea of the UIC excellence, rather than by the fixed format. Therefore, the best practices could be understood as the constitutive effects of the LINC evaluation system.

In this section, the four casebooks of the best practices (MEST and NRF, 2012a; MoE and NRF, 2013; MoE and NRF, 2014; MoE and NRF, 2015a)¹⁹ and the presentation materials and the posters of the best practices that are presented at the gathering events are first analyzed to discover the core activities of LINC. Total 144 best practices are identified from the innovation-centric LINC universities' best practices, and they are sorted by the type of the practice by reading through all of their content. As a result, All-SET (All Support for EnTerprise program), in a broad sense, outnumbered other best practices in frequency. With a large gap with the former, co-op followed after, and without a big difference, other activities such as Capstone Design course, entrepreneurship education, and UICprof came after. This study focuses on the first two types of activities that are found out to be the core activities – All-SET and co-op. Then, the two core activities are examined with not only the best practice materials but also with a various source of data including interviews and news articles that gives a full account of these activities.

All-SET: all support for enterprise

All-SET is an enterprise tailored support subprogram of LINC, however, without a clear definition. The most detailed explanation was found in the presentation file that was used for the introduction of LINC: “when supporting small businesses through UIC, [All-SET] supports the whole process of market survey, financial support > core technology development > production and design > defect examination and launching > marketing.” (MEST, 2011c)²⁰ Even the guideline for the result report and the qualitative evaluation manual only stipulates it as a responsibility of ESC without other information (Namgung, 2015).

Still, the adjectives other than “tailored” used in the best practices of All-SET reported by LINC universities showed their understanding of the program: “systemic,” “one-stop,” and “step-by-step.” In line with these adjectives, LINC universities have utilized the management system, which is different but related with the membership system described above, to provide what one university manager stated as “customer service” (2A, 2017, pers.comm.). For instance, Kangwon University divided partner firms into the groups by their capacity and growth stages and named them as Research reinforcement group and Field centered group to provide them a differentiated support (Namgung,

¹⁹ The government (MoE and NRF) didn't make the casebook for 2016 the last year of the program, but published a different kind of report (NRF and Council of LINC Foundations, 2016), which is closer to the comprehensive organization of the outcomes of LINC rather than the casebook. Therefore, this study only included these four casebooks for the analysis.

²⁰ The marks “>” here have same meaning with the arrow signs.

2015). Managing the database of the partner firms, visiting and advertising to induce more partner firms to participate in actual UIC activities, and convening workshops for networking were well-adopted practices that LINC universities conducted. UICprofs, who usually take charge of these customer services for the partner firms, are cautioned not to make the partner firms uncomfortable nor uncooperative (2A, 2017, pers.comm.). The universities always had to mind that the partner firms directly take part in the evaluation system by answering a satisfaction survey (see **Figure 3.1**).

LINC universities supported the partner firms through All-SET not only by the supporting activities mentioned by the government but also with the following methods: advice sessions and consultations for both technological and business issues (Chonnam), prototyping (Sung Kyun Kwan; Chungbuk), attending exhibitions and conferences (Hanyang ERICA), Corporate/Brand Identity designing (Chonbuk), and human exchanges (Kyungpook). All-SET, therefore, became the concept that encompasses various activities of the universities' direct supporting to the partner firms. With this variety of supporting methods and aforementioned management system that is similar to a customer care, LINC universities tended to emphasize a few close connections with the partner firms. For instance, Kangwon University conducted the one department-five companies and one professor-one company projects, while Pusan University introduced the "family doctor" program which a professor consults one designated partner firm for a long time.

In this, LINC universities have perceived how much and well they served their partner firms and how much benefit the partner firms got as the best practices. Sung Kyun Kwan University has provided a serial support from prototype development to marketing of selected partner firms. It emphasized the amount of money that the university sponsored: 370 million won per partner firm that participated in its All-SET program. Other universities also have mainly reported the amount of sales and employment growth of their partner firms (Chosun; Sung Kyun Kwan; Gyeongsang). Some universities have focused on winning a contract of another governmental R&D project by organizing a team with partner firms (1C, 2017, pers.comm.; Chonnam; Yeungnam). Thus, All-SET is not only what the government forced universities to do, but it was also the strategic response of the universities to satisfy a number of criteria together, and also to meet the demand of being a UIC-friendly university.

However, while the universities boasted about the economic impact they made through the family firms, All-SET has also brought a puzzling consequence. Several partner firms, which are competent and promising, are enlisted by multiple universities and exhausted by the universities' request for maintaining the UIC linkages and participating the UIC activities. One university-level program manager commented on these "good" partner firms:

It would be easy to co-work with the firms that have the capability to increase the sales or transfer patents so that it could be reported as [the university's] outcome. These firms are popular. (...) It is bit ironic because they don't need support but [universities and the government] give them money for their performance. (...) [Good companies] might feel tired, or might enjoy [the attention] because they keep getting money. It differs by case, but if it is too much, they feel bothered (2E, 2017, pers.comm.).

One interviewee echoed by introducing an anecdote about a CEO of his acquaintance, who complained that seven universities called him for lunch (1D, 2017, pers.comm.). What this shows is the distortion of the meaning and practice of All-SET. Since the universities perceived the market performance of their partner firms as their performance, enlisting “good companies” as its partner firms became important.

Co-op: cooperative education or dispatching workforce?

Co-op is an education program that provides students a workplace experience by sending them to the partner firms for several weeks or a whole semester. In Korea, the co-op has burgeoned and diffused extensively through the implementation of LINC. They were not new at the time when LINC was introduced (see MEST and NRF, 2012b), but the number of students that have completed co-op made about 168% increase from 2011 to 2015 in all universities (MoE and NRF, 2016) while LINC universities made more than triple at the same period. LINC universities often obliged their students to take these courses, incorporating the programs into regular curricula, arguably for their improvements in relevant KPI (see **Appendix B**, #9).

Since co-op is a popular program that various education institutions over the world adopt, LINC universities mostly reported the expansion of the program as the best practices. The co-op has been expanded in terms of participating departments, especially from engineering to humanities and social sciences (Hanyang ERICA; Sogang), participating partner firms (Gyeongsang), and length of co-op term (Kangwon). Some universities presented an online management system (Hanyang ERICA; Chonbuk). While All-SET was an apparent one-way support from universities to the partner firms, the co-op was considered as one of the few contributions of partner firms to universities. Improving an employment rate through expanding co-op was the ideal model presumed by LINC universities.

However, a status report about co-op announced by one labor NGO in September of 2014 put the brakes on the expansion of co-op. Two major findings of the report received massive attention from media, provoking a controversy: 1) co-op participant students got only 351,994 won per month even though their office hours were similar to the full-time workers, which meant that they only got 1/3 of the minimum wages, and 2) co-op participant firms often substituted simple labor with students,

without any proper education (Youth Union, 2014). Although the sample size used for the report was small, the impact was huge because the issues were, in fact, prevailing in reality (2D, 2017; 2E, 2017, all pers.comm.).

Shortly afterward, the 4th LINC forum held in December 2014 dealt with the issue. Woo-Seung Kim, the leader of Hanyang ERICA University LINC foundation and who was the main presenter of the forum, pointed out that co-op lacked the legal foundation and the majority of co-op students (87%) didn't get paid from the partner firms while about half of the students (54%) were supported by the universities (W.-S. Kim, 2014). Both Youth Union (2014) and W.-S. Kim (2014), with a different reason, called for the official guideline and argued for the paid co-op. The discussants, who attended the event the Youth Union opened, unanimously contended that co-op is labor; therefore, the students should be paid. Meanwhile, W.-S. Kim (2014) opposed to taking it as labor but claimed that making the support fund from the partner firms to the students would leave only spontaneous co-op, which is appropriate for its sustainability.

It took several months for the government to establish the co-op guideline for universities. On July of 2015, the government held the public hearing for the co-op guideline proposal, which reflected much of W.-S. Kim's (2014) argument. However, as the government let the support fund to be calculated based on the regulation on minimum wage; multiple discussants of the hearing expressed the concern of recognizing co-op as labor (MoE and NRF, 2015b). Moreover, the discussants, who were mainly the leader of the LINC foundation of the university, were worried that the firms would not participate in co-op if they have to pay for it. Considering their concerns, the government has finally enacted the guideline to calculate the support fund based on the comparison between the partner firm's burden on educating the students and the value of the outcomes that the students made (MoE and The Institute for University-Industry Cooperation Policy, 2017).

The debate related to a co-op that lasted for three years after the Youth Union brought up the issue was not a simple problem-solving process. It was a debate about the identity of co-op, and it was also the case that showed the political relationship between partner firms, universities, and students. Even though there were two issues that the Youth Union initiated, the debate only focused on the money issue. Within the dichotomous thinking of co-op as education or labor, LINC managers quickly settled that it is not labor but suffered from the payment issue.

The "partner firms pay" argument was based on the fact that partner firms benefit from hosting co-op students, which is assuming co-op students are a labor force. On the other hand, the "universities pay" argument is concerned that partner firms will not participate if they have to pay. However, both arguments reinforced the labor characteristics of co-op while neglecting its educational

meanings. One university manager said it is almost impossible to supervise co-op courses together with the family firms because now co-op is held on a large scale (2E, 2017, pers.comm.). Facing the reality of co-op, one member of the program-level evaluation committee argued that universities should pay partner firms because it is an outsourcing of education (1D, 2017, pers.comm.). Finally, the compromise plan has virtually recognized co-op as labor, lightening the burden of both universities and partner firms. The plan did not solve either of the problems of the low wages and the faded educational meaning of co-op, leaving the students in trouble until the first year of LINC+ (Park, 2017). Co-op, indeed, was no more than universities sending the workforce (i.e., students) to partner firms.

5. Discussion

Innovation became an irresistible goal for any society, and the university is not an exception. This study is not to ask whether or should universities contribute to innovation. Instead, it asks *how*. As Geuna and Muscio (2009) correctly indicate, recent large interest in UIC is not because universities started something new than before. Rather, it is due to the institutionalization of UIC that more universities are directly engaged in serving the third mission, while they always have been doing it to some extent. As institutional logic underlying the support and conduct of academic science changed towards a market logic (Berman, 2012), UIC became a strategic means for both government and universities to pursue regional and national economic development and academic prominence and resources, respectively (Geiger and Sá, 2009). This paper has examined the *how* question within the context of the early stage of UIC development, where the government and its policy exercise a great influence.

First, this study has revealed that the approaches prevailing under the implementation of LINC could be understood in two ways, formalization and incentivization. However, their limitations were also noted. This could be discussed in a larger context of the intra-university governance issue. Maassen (2017) has recently provided the way of understanding what he calls “the university’s governance paradox,” that is the phenomenon “the more university leaders take on and operate in line with reform agendas’ underlying ideologies, the less effective they appear to be in realizing the reform intentions.” (p.290) Three theoretical perspectives on the university governance which Maassen (2017) has unfolded – structural-organizational, rational actor, and historical-institutional - are also useful to understand and discuss the institutionalization of UIC in Korean universities.

In particular, the formalization approaches of LINC and the structural-organizational perspective, and the incentivizing approaches of LINC and the rational actor perspective correspond to each other. The issue of the former mainly comes from how to deal with the complexity of the governance where the “add-ons,” the specialized centers of LINC, coexist with the traditional organizational structures of the university, the departments. On the other hand, the issue related to the latter is the decoupling of academic disciplinary and university organizational incentive structures. Maassen (2017) points out that the reason these issues come up is that the LINC evaluation system and most university reform agenda, in general, lack the consideration of the universities’ historical-institutional foundation. As expressed in the term “add-ons,” the formalization approaches only addressed the introduction of new organizations, people, and relationships, not touching the department and their well-grounded organizational works. Also, the UIC-friendly performance appraisal considered research activities as what professors can give up for their promotion in university, however, this is not the case if one

considers that the professors are also the members of academia, not only of the university.

The second part of this paper addressed the best practices of LINC, which are the constitutive effects of the evaluation system. The most notable finding from the two core activities of LINC (i.e., All-SET and co-op) is that the UIC activities were full of universities' unidirectional support of small businesses. One professor who served as a program-level manager of LINC said:

So it becomes a one-sided help, not cooperation. (Interviewee: With small businesses?) That's right. Small businesses, then, should contribute to the university education, but there is nothing to learn for students by doing an internship there (1B, 2017, pers.comm.).

Through conducting All-SET and expanding co-op courses, LINC universities were mostly concerned how to serve their partner firms well. In this, market performance of the companies that the universities supported, rather than the economic impact solely made by the universities, became the achievements of the program and the universities. Moreover, even though co-op is primarily an education, the discussion on students' experience during co-op was absent while the debate only continued around the character of the support fund and the benefit of participating firms.

Another core activity that backs the interpretation of UIC becoming unilateral is FESC. FESC did not outnumber others in the casebooks as the best practice, but it is the one that partner firms most often utilized from the universities. In LINC universities' words, this is also a participation of the partner firms in UIC activities. FESC, by definition, is established to share research facilities and equipment of university with the partner firms. It is expected to be a means of mutual benefit as universities could make a profit by lending facilities and equipment to the partner firms, and the firms could save their money from buying them by borrowing them. However, it is found out that FESC turned into a cluster of product test facilities and equipment that the interest of the partner firms and student start-ups mostly reflected. Finally, the operation of FESC was similar to the *leasing service* rather than sharing.

One university manager explained that his university buys new facilities with the money from LINC funding based on the survey from the partner firms rather than sharing existing ones (2A, 2017, pers.comm.). Other universities did not follow the way of constructing FESC with the partner firm survey but acknowledged that it is usually operated by the facilities and equipment for the product test (1D, 2017; 2E, 2017, all pers.comm.), which are more in the interest of the partner firms and student start-ups. This is due to the inherent differences between the facilities and equipment that are used for academic research and commercial product development (2A, 2017, pers.comm.). Some interviewees criticized that one of the evaluation criteria of FESC, spatial integration, was the result of considering

only the partner firms' convenience but neglecting university researchers opinion (1D, 2017; 2B, 2017, all pers.comm.). Considering the other findings together with the case of FESC that is operated in a more similar way to a leasing service, UIC pursued by LINC was found out to be similar to a unidirectional aid rather than cooperation. At the same time, LINC universities, which were demanded to be the leading models of a UIC-friendly university, became organizations that support the small businesses.

6. Conclusion: university becoming “industry serving agency”

The implementation of LINC was, indeed, the succession of the evaluations. It started with the selection evaluation that filtered 51 out of 92 applicant universities, continued by the annual and the phase evaluations each year that made a change in the list of LINC universities and their support fund. Finally, it ended with the selection evaluation of the follow-up program named LINC+, while the comprehensive evaluation of the whole LINC program is expected to be finished by the end of 2017. Moreover, the faculties of LINC universities also became the subject of the evaluation, which is the UIC-friendly performance appraisal, including UIC activities as appraisal criteria. The Korean government aimed to discover the leading models of a UIC-friendly university by introducing the evaluation system that consists of the consecutive multi-level evaluations rather than demonstrating the prescribed best model. This makes difficult to understand and explain the consequences of LINC with the dichotomous ideas of whether they are intended or unintended and of whether they are conducted by top-down or bottom-up process. Instead, it is more accurate to interpret the results as the constitutive effect of the evaluation system of LINC and its stakeholders (Dahler-Larsen, 2014) or as the outcome of the recursive process between the design and the practices of the evaluation system (Colyvas, 2012).

To scrutinize the constitutive effect of the LINC evaluation system, this study has focused on the approaches taken and the core activities conducted by the LINC universities while adjusting and responding to the evaluation system. First, the LINC evaluation system started to institutionalize the third mission by formalization such as: establishing new organizations (i.e., CSC, EEC, SEC, and FESC), employing new workers (i.e., UICprofs), and making university-industry linkages explicit (i.e., partner firms). LINC universities embodied similar approaches in their internal governance. Afterwards, various incentive structures were considered as the solution for making the UIC formalities to function well. Incentives and deterrents are widely used to steer universities and their members to be more friendly to UIC. The approaches on how LINC was implemented, however, were not without the problems. To borrow the words from Maassen (2017), the implementation of LINC was dominated by the approaches of the structural-organizational perspective and the rational-actor perspective but neglecting the historical-institutional perspective of university governance.

The analysis of the core activities of LINC showed what practices are perceived as an excellence of UIC. Through conducting All-SET and expanding co-op courses, LINC universities were mostly concerned how to serve their partner firms well. In this, market performance of the companies that the universities supported, rather than the economic impact solely made by the universities, became the achievements of the program and the universities. Moreover, even though co-op is primarily an

education, the discussion on students' experience during co-op was absent while the debate only continued around the character of the support fund and the benefit of participating firms. Considering together with the case of FESC that is operated in a more similar way to a leasing service, UIC pursued by LINC was found out to be similar to a unilateral aid rather than cooperation.

Finally, this study has found that the policy measure profoundly affects the institutionalization process and its result in the third mission of universities. After the government applied the excessive evaluation system, its various constitutive effects have shaped and pursued the LINC universities as an *industry serving agency* in the way of their service of the third mission. The government's goal of the program, the leading model of a UIC-friendly university, was realized in the form of a quasi-governmental organization that supports the regional small businesses.

Previous literature on UIC has relied on the model of the entrepreneurial university that has spawned from the US. The model was understood as the universities' strategic exploitation of opportunity pursuing both resource and prestige by serving the third mission (Geiger and Sá, 2009). The role of the government and the policy was limited to providing these opportunities, for example, by lowering the barrier of academic patents (Berman, 2012). However, the findings of this study drew an explicit contrast to the existing studies on UIC. This calls for UIC studies to be more contextualized, especially to be considerate of policy measures. Future research on the countries and regions that are at the early stage of the institutionalization of UIC are highly encouraged as it will expand our understanding of both the theory and the practices of UIC.

This study provides several well-timed policy implications not only for Korea but also for the countries, regions, and universities that are more interested in strategic policy and management of UIC these days (see, for example, Benneworth et al., 2015; Bychkova, 2016). Korean policymakers and university managers, especially those who are involved in LINC+, should take time to examine and reflect on the general impact that LINC has brought. The fact that LINC+ started even before finishing the comprehensive evaluation of LINC could be troublesome because it abets a "lock-in" of only a few ways of institutionalizing the third mission (Stensaker and Benner, 2013). For stakeholders of university policy outside of Korea, the various constitutive effects described in this paper are referable when designing and implementing the similar policy.

Appendix A. List of innovation-centric LINC universities

University Name	Region	Public/ Private	Phase	Evaluation Result and Amount of Support*				LINC+
				2012	2013	2014	2015	
Hanyang (ERICA)	Capital Area	Private	1&2	Very Good	Very Good	Very Good	Very Good	Y
Sung Kyun Kwan		Private		Very Good	Very Good	Very Good	Very Good	Y
Ajou		Private	2			Good	Good	Y
Hanyang (Seoul)		Private				Normal	Normal	Y
Sogang		Private				Good	Very Good	N
Kangwon	Daegu-Gyeongbuk-Gangwon Province	Public	1&2	Good	Normal	Normal	Normal	Y
Kyungpook		Public		Very Good	Very Good	Good	Good	N
Yeungnam		Private		Normal	Good	Very Good	Good	Y
Chungnam	Chungcheong Province	Public	1&2	Normal	Good	Normal	Good	Y
Chungbuk		Public		Good	Good	Good	Good	Y
Kongju		Public	1	Good	Dropout			Y
Chonnam	Southwest Province	Public	1&2	Good	Normal	Good	Normal	Y
Chonbuk		Public		Very Good	Normal	Very Good	Very Good	Y
Chosun		Private		Normal	Normal	Normal	Normal	Y
Gyeongsang	Southeast	Public	1&2	Good	Good	Good	Good	Y
Pusan		Public		Good	Good	Good	Good	N
Pukyong		Public	1	Normal	Dropout			Y
Total 17 Univs.	5 regions			14	14	15	15	14

*Note that financial support is linked to the prior evaluation result, and the evaluation result for the final year (2016) was not announced. The ranges for the graded support fund are as below (unit: billion won).

	2013	2014	2015	2016
Very Good	5.5 to 5.7	5.1 to 5.8	5.3 to 6.0	5.3 to 5.65
Good	4.8 to 5.2	4.2 to 5.2	4.2 to 5.0	4.1 to 4.8
Normal	4.3 to 4.5	3.8 to 4.3	3.3 to 3.8	3.25 to 3.6

Appendix B. List of Key Performance Indicators of LINC

No.	Name of KPI (unit)	Dist. marks
1	Graduate employment rate (%)	25
2	Number of partner firms (#)	15 (1 st phase) 10 (2 nd phase)
3	UIC incl. in faculty performance appraisal (pts)	15 (1 st phase) 10 (2 nd phase)
4	UIC incl. in criteria for faculty promotion (pts)	15 (1 st phase) 10 (2 nd phase)
5	Profits from research facility share (Won)	20/25
6	Status of UICprofs' employment (pts)	30 (1 st phase) 25 (2 nd phase)
7	Ratio of IACF permanent employee (%)	15
8	Ratio of IACF professionals/employee (%)	15 (1 st phase) 0 (2 nd phase)
9	Number of students completed co-op (#)	20 (1 st phase) 25 (2 nd phase)
10	Capstone design courses (hour(s))	20 (1 st phase) 25 (2 nd phase)
11	Entrepreneurship courses (hour(s))	10
12	financial support for entrepreneurship (won)	10
13	place support for entrepreneurship (m ²)	5
14	Workforce support for entrepreneurship (#)	5
15	UI collaborative research (#)	10
16	UI collaborative research expense (Won)	15
17	Number of technology transfer contract (#)	15 (1 st phase) 20 (2 nd phase)
18	Profit from technology transfer (Won)	15 (1 st phase) 20 (2 nd phase)
19	Graduates in specialized fields (#)	20
20	technology development in specialized fields (#)	20
21	UIC friendly curriculum (#)	15 (1 st phase) 25 (2 nd phase)
22	Technology commercialization (#)	20
23-25	3 Self-set KPIs	N/A
Total		350

Appendix C. Prescribed table of contents of the LINC result reports

Categorization		Distribution of marks
VISION		100 (1st Phase) 50 (2nd Phase)
Program goal		40
	Adequacy of the plan and the implementation system	
	Connectivity between the university's long-term plan and its program type and specialized fields	
	Appropriateness of the participant departments of the university and their performance	
	Structure and operation of LINC management office	
	Implementation and performance of UIC leading model	
Diffusion and Sustainability		30
	Interest and willingness of university members of implementation	
	Diffusion and sustainability of outcomes	
Plan for next year		30
SYSTEM		250 (1st Phase) 150 (2nd Phase)
UIC-friendly reform of university system		90
	Faculty appointment and evaluation system for UIC promotion	
	Reorganization and operation of UIC-friendly university structure	
	Construction and application of UICprof policy	
Strengthening capacity of IACF		50
	Strengthening IACF organization and operation of professional employee	
	Connectivity between IACF and LINC management office	
Expansion of UIC Infrastructure		60
	Establishment and operation of EEC (Entrepreneurship Education Center)	
	Establishment and operation of CSC (Co-op Support Center)	
	Operating system of sharing equipment and its corporate support	
	Performance of university facilities and institutions for corporate support	
Plan for next year		50
COMPONENT		150 (1st Phase) 250 (2nd Phase)
UIC-friendly reform of education curriculum		40
	Reform and performance of industry needs reflecting education curriculum	
	Adequacy of management and operation of co-ops	
	Adequacy of management and operation of capstone design	
	Workforce training and support for employment and start-up	
Differentiated employment support programs		20
	Development and performance of differentiated start-up support program	
Specialized field(s)		50

	The adequacy of organizing and operating the organization in the characterization of the characterization	
	Development and operation of specialized field education, workforce training, and corporate support programs	
Plan for next year		40
LINK		100 (1st Phase) 150 (2nd Phase)
UIC linkage system		25
	Comprehensive support system for partner firm	
	Accuracy and Operation Performances of Industrial-Industrial Cooperation Council Building	
Corporate Support		45
	Support for technology development	
	Establishment of All-SET system	
Plan for next year		30
Total points		600

Appendix D. Interviewee list

<i>Indication</i>	<i>Occupation/Position related to LINC</i>	<i>Interview date</i>	<i>Recording</i>
<i>Group 1: Program-level manager of LINC</i>			
<i>1A</i>	NRF Officer, LINC program manager	2017.7.3.	No
<i>1B</i>	University professor, Program Management Committee, Evaluation Committee, Consulting Committee member	2017.7.10.	Yes
<i>1C</i>	University professor, Evaluation Committee and Consulting Committee member	2017.7.18.	Yes
<i>1D</i>	Patent attorney, Evaluation Committee and Consulting Committee member	2017.10.19.	No
<i>1E</i>	University TTO manager, Evaluation Committee Member	2017.11.14.	Yes
<i>Group 2: University-level manager of LINC</i>			
<i>2A</i>	University LINC management officer	2017.6.28.	No
<i>2B</i>	University LINC management officer	2017.6.30.	No
<i>2C</i>	University UICprof (part-time employee)	2017.7.18.	No
<i>2D</i>	University professor, LINC manager	2017.9.28.	No
<i>2E</i>	University professor, LINC manager	2017.11.2.	Yes

**All interviews were conducted by the author, under the consent of KAIST IRB (KH2017-28)*

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