Science, Technology, and Society
Special issue of SOItmC 2020 (2020.01.07))

Special Issue on: 'Ambidextrous Open Innovation of Science, Technology, and Society'

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Time schedule
Deadline for submission of full paper : 31th July 10th 2020
Selecting 6 papers by honor EIC professor Venni Krishna until October 30th 2020.
Final revising until November 30th 2020.
Online publishing: 30th December 2020
Publishing 31 March 2021

We invited 16th papers on 'Ambidextrous Open Innovation of Science, Technology, and Society' among more than 170s SOItmC 2020 special session papers.

Shooting Method
Full paper Manuscripts should be submitted to managing guest editor, jhyun@dgist.ac.kr until July 10th after registering at SOItmC 2020, and sending full paper at SOItmC 2020 platform.

At 2020 SOItmC special sessions, we selected 16 papers. Among 16, 6 will be finally selected by Honor Editor-In-Chief, honor Professor Venni Krishna.

※ This special issue will be organized with 6 SOItmC 2020 special papers + 2 papers which were selected from out of SOItmC 2020 by EIC honor professor Venni Krishna.

No.	Paper title	Authors (* corresponding Author)	Corresponding Author
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2	Japan Myanmar cooperative industrial Innovation in the case of Mandalay	Yuri Sadoi	Yuri Sadoi
3	Adventure spirit, collaborative innovation and regional industrial upgrading	Yujin Wang, lin Zhao*, Wei Yu	lin Zhao*
4	A Study on the Analysis of the Appearance Factors of Unicorns	Aesun Kim, Yeji Yun	Aesun Kim
5	Delivery Open Innovation Business Model Platform-Reflective Comparing among Economies	Jinhyo Joseph Yun*, Xiaofei Zhao, Lei Ma, ZhiGuo Xu & Zheng Liu	Jinhyo Joseph Yun*
6	Corporate Control and Local Innovation of International Joint Ventures: Evidence from Korea	Jeonghwan Lee, Anvarov Sanjar, Kyuho Jin*	Kyuho Jin*
7	The impact of Social Capital on Korean National Innovation System	Kisoon Shin; Eungdo Kim*	Eungdo Kim*
8	Evolution of open innovation by value-based network perspective: The case of Korean smart home industry	Eungdo Kim* ; Kwangsoo Shin*	Eungdo Kim* ; Kwangsoo Shin*
9	System Analysis and modeling of the collaborative governance in post-disaster construction	Linlin Wang, Enzo Bovina, Haiyan Yan*, Jiayin Qi	Haiyan Yan*
10	A Study on the Performance of the Supply Chain Participant and the Moderating Effect of Open Innovation Activities	Yongjun Seo, Daesu Kim, Junghyun Yoon*	Junghyun Yoon*
11	Green Credit Policy and Corporate Debt Financing	Weian Li; Minna Zheng; Guangyao Cui*, Yaowei Zhang	Guangyao Cui*
12	The Dark Sides of Digitalization: Social Media Addiction	Kinjalben Patel, Prarthi Zalavadiya, Kinley Zam, Joo Y. Park*	Joo Y. Park*
13	Knowledge sharing and technology commercialization with a focus on R&D support policy	Kyung-nam Kang, Junghee Han	Kyung-nam Kang
14	The Comparative Start-up Studies on the Blockchain-	Soo-hyun Park, Ren Zong Chang, Assem	Sun-Young Park*

	based Sharing Economy Model between Korea and China	Rakhimova, Sun-Young Park*,	
15	The Effects of Incentive Policies on R&D Performances	Tae Youn Kim, Byung Yong Hwang; Daecheol Kim*	Tae Youn Kim
16	The Effect of the Elderly's Digital Usage Level on Life Satisfaction: evidence from panel data	Si-jeoung Kim, Sang-ok Choi*	Sang-ok Choi*

1.

The impact of government policy on macro dynamic innovation of the creative industries: Studies on U.K. and China's animation sectors

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1. Introduction:

With digitalization, technology advancement, open source collaboration, and policy support, the creative industries show rapid growth in the recent 20 years. The representative sector, animation industry emphasizes creativity and innovation, contributing significantly to the global economy and trading. While large companies have internal knowledge resource, open forms of collative learning and engagement with users and social network become popular to generate IPs and values. Government policies on the other hand can shape and influence the creative industries through subsidies, regulations, protections, and flexible indirect support.

While literature provides framework of innovation ecosystem and innovation policy, the impact of government policy in forming, developing and sustaining the creative industries are not clear. In particular, a comparison is needed between policies from countries with mature industry such as the U.K., and China where the initial innovation resources are limited. Thus, this paper aims to explore the role of government policy in innovation system, by studies on animation industry, a representative of the creative industries in the U.K. and China. There are three specific research questions. 1) What are dynamic features of innovation system in the animation industry? 2) What are the roles of government policy at each stage of the animation industry innovation system? 3) How can policies influence the transformation among different patterns of innovation system?

2. Literature Review:

2.1 Open innovation and innovation ecosystem:

While traditionally, large firms favor in-house R&D and innovation, known as close innovation, open innovation describes an emerging new model in which firms absorb resources and exchanging knowledge actively beyond boundaries (Chesbourgh, 2003). With public and user participation, the concept of social innovation emerges to connect creativity, solution development, business changes with social and environmental need, involving new forms of collaboration among individuals and organizations such as governments (Ayob et al., 2016). With digitization, innovation is no longer conducted as a linear process, but with more feedbacks of people, organizations, and sectors, which co-create an ecosystem (Bogers et al., 2018). At macro level, there are interactions among open innovation system (OIS), close innovation system (CIS), and social innovation system, known as the dynamic model of open innovation economy system (OIES) (Yun, 2015). Open innovation is also observed as territorial dynamics of cultural and creative industry (Beraud et al., 2012). On one hand, creative industries are based on knowledge resources, innovation and entrepreneurship ecosystem (Beraud et al., 2012). On the other hand, interactive relationship can be formed within and outside the sectors, industries, institutions and users, which results in cross-boundary knowledge exchange (Dahlander and Gann, 2010; Beraud et al, 2012). Through case study on a Chinese animation firm, it is found that whereas large companies develop internal R&D resources, through open platform and flexible project management, SMEs can build up capabilities collaboratively (Ma et al., 2018). This provides an approach for latecomers with limited IPs originally (Ma et al., 2018).

2.2 Government policy:

Innovation policy tools can be divided into supply-side and demand-side (Edler and Georghiou, 2007). Supply-side or technology-push policies aim to influence innovation generation, whereas demand-side innovation policies speed up knowledge diffusion through increasing demand and market (Edler and Georghiou, 2007). In addition, environmental-side tools refer to law, finance and tax system to improve the regulation environment for innovation (Ma at al., 2016). Dynamically, science, technology and innovation policies have experienced evolution from Frame 1 (Policy 1.0) innovation for growth meaning centralized policies to promote production and consumption, to Frame 2 (Policy 2.0) national systems of innovation, meaning decentralized policy to encourage entrepreneurship and network, and now towards Frame 3 (Policy 3.0) transformative change emphasizing social needs and sustainability (Schot and Steinmueller, 2018).

As for the creative industries, national policies can define the legal and institutional conditions, including ownership, content regulations, intellectual property, and communications infrastructures (Flew, 2013). Government can support dedicated infrastructure, accompaniment structure,

complementary competence, business resources such as financial support, technology resources including university and research institution collaboration (Dang and Duxbury, 2007). Public procurement, investment, public-private partnerships, regulations, fiscal and financial policies can also influence the degree of openness and innovation in the creative industries (Beraud, 2012). With digitization of media content, there is debate on the degree of IP protection (Flew, 2013). While the Hollywood models favor strong IP protection, public education of the value of creative industries, encouraging local innovation, and developing sustainable strategies are important in developing countries (Flew, 2013).

3. Research Design and Methodology:

From literature review, it is seen that at the macro level, innovation system combines features of close innovation, open innovation, and social innovation. However, how it can be interpreted in the context of the creative industries is unknown. Meanwhile, research shows the significant influence of government policy on the creative industries. However, how different policies can drive innovation and system changes are underexplored. OIES theory has been improved through simulation (Yun, 2015), however, there is limited validation through empirical studies on specific industrial sectors. This paper aims to explore the role of government in forming and developing innovation ecosystem in the creative industries, with comparison between U.K. where the industries are more developed, and China where the industries is emerging. Qualitative method is adopted for theory building, as it provides in-depth understanding to on-going issues which are underexplored. The animation sector is selected in this studies, due the following reasons: 1) this sector delivers tangible product and intangible service. 2) It shows clear consistency with the creative industry value chain, from design, production, distribution, to service. 3) The animation industry is growing fast globally, and demonstrates different characteristics at national level. Thus potential comparison can be made from national policy levels. 4) This industry is recently reformed with technology advancement, digitalization, platform based collaboration, user engagement, showing dynamic innovation features.

For the research process, firstly, through literature and document review on U.K. and China's animation sector, innovation activities are identified along with the value chain of creation/design, manufacturing/production, distribution/marketing, and communication/service. This is then generated into a framework of innovation ecosystem in terms of CIS, OIS, and SIS. Secondly, review on government policies related to the animation industry in China and the U.K. since 2000 are conducted with content analysis. Policies are categorized according to supply, demand, and environmental instruments summarized from literature (Table 1). Further links are made among the policy instruments and the macro innovation systems of CIS, OIS, and SIS, with emphasis on interaction mechanism at each development stage.

Table 1. Innovation policy categories

Policy category	Sub-category
Supply-side	S1: Public funded R&D and mission-led research (Ma et al., 2016; Schot and Steinmueller, 2018) S2: Fiscal/financial support and subsides (Li et al, 2017; Schot and Steinmueller, 2018) S3: Favorable tax treatment (Ma et al., 2016; Schot and Steinmueller, 2018) S4: Establishing science hubs and industry clusters (Ma et al., 2016; Schot and Steinmueller, 2018). S5: Supporting SMEs and start-ups (Li et al, 2017; Schot and Steinmueller, 2018) S6: Infrastructure support e.g. improving research centers (Ma et al., 2016; Li et al, 2017) S7: Education for research careers (Schot and Steinmueller, 2018) S8: Personnel training. (Ma et al., 2016).
Demand-side	D1: Stimulating private demand for innovation. (OECD, 2011) D2: Public procurement (OECD, 2011; Li et al., 2017) D3: Pre-commercial procurement (OECD, 2011) D4: Innovation inducement prizes. (OECD, 2011) D5: Industry-university-R&D institution collaboration. (Li et al., 2017) D6: Standardization and regulation. (OECD, 2011; Li et al., 2017)
Environmental-side	E1: Law, finance, tax system to improve environment. (Flew, 2013; Ma at al., 2016 Li et al., 2017) E2: Content regulations, quota, IP protection (Flew, 2013; Messerlin and Parc, 2014; Li et al., 2017) E3: Administrative, sharing platform, infrastructure and service support. (Li et al., 2017, Ma et al., 2019) E4: User-involvement as producers, legitimates, and demand contributor. (Schot and Steinmueller, 2018). E5: Improving alignment and cross-sectorial coordination (Schot and Steinmueller, 2018; Grillitsch et al., 2019) E6: Promotion of entrepreneurship and innovation culture. (Flew, 2013; Schot and Steinmueller, 2018). E7: Soft-law and governance, leading to self-regulation. (Flew, 2013) E8: Public education of the industry values with the aim of sustainability (Flew, 2013)

4. Findings and Discussion:

4.1 Macro innovation system of the animation industry

Table 2. Features of three types of innovation system in the animation industry

Creative industries' value chain	Close innovation system (CIS)	Social innovation system (SIS)	Open innovation system (OIS)
Creation/ design	Large firms conducting R&D internally Large firms leading the industry, with SMEs under the roof IP protection and management Co-developing product with long-term supply partners Backward integration with creation/design studios	General stakeholder involvement (non-for-profit organization, industry, university, government) Product featuring social needs Social innovation and collective creation	Triple Helix innovation. e.g. U.K. screen industry Crowd sourcing and innovation events Open innovation based on digital platform, leading by large companies Knowledge spillover effect
Manufacturing/ production	In-house production Long-term collaboration Outsourcing with strict control	Industrial association and NGOs involvement for standardization and social concerns	Outsourcing and subcontracting with multiple partners Co-production among large firms and SMEs on the digital platform
Distribution/ marketing	Distribution through major online and offline media, e.g. TV, Amazon Market and monetary value delivery	Marketing with social events Social media and social network e.g. YouTube, Twitter, Facebook	Distribution through various interactive forms. e.g. Netflix, Amazon, YouTube, Twitter, Facebook Crowd voting and user engagement Using social media and social network
Communication/ service	Cross sector integration e.g. animation IP further expand towards game industry, consumer product, theme park, hotel business, with IP control	Service featuring social need and community engagement Considering user experience in product development and expansion Festival to encourage communication	User-content creation University entrepreneur Product spillover effect

4.2 Government policies in the U.K and China's animation industry

Summaries and comparison can be made with U.K. and China's creative industry related policies from 2000 to 2010.

Table 3: Analysis of animation industry related policies.

Government policy instruments (S, D, E) with detailed content	Impact on macro innovation system (CIS, SIS, OIS)

4.3 Macro dynamic view of innovation system

From the above analysis, the U.K.'s animation industry shows the feature of close innovation (leading firms already having IPs) → open innovation (SMEs) → social innovation (interaction among large firms, SMEs, and the society) almost at the same time. China's industry follows the paths of open innovation (SMEs learning from limited innovation resource) → close innovation (leading firms are formed through resource integration) → social innovation (society contribution to the industry). Based on the macro dynamic innovation model (Yun, 2015), adaptation can be made as Figure 1. In particular, the role of government can be identified in transforming among three innovation system patterns.
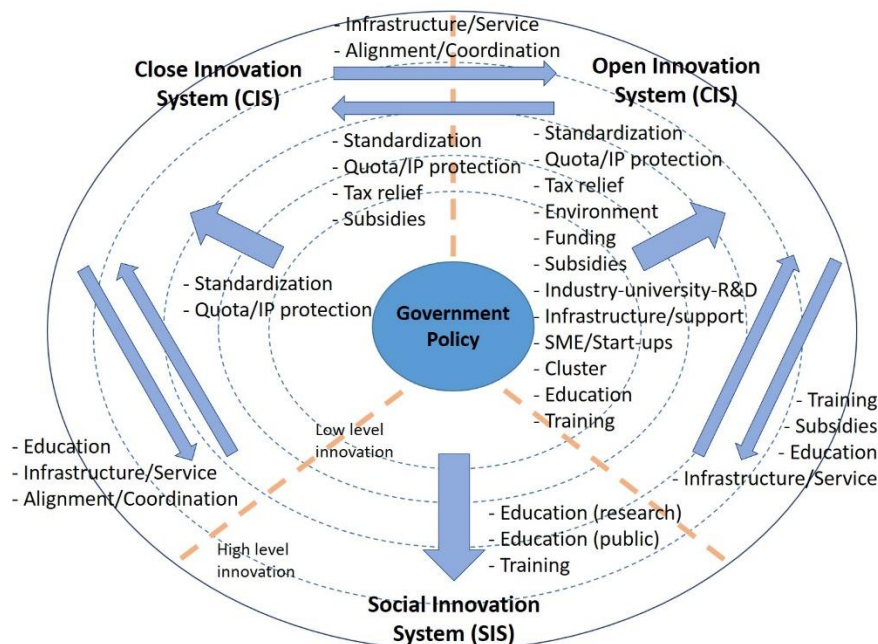
Figure 1: Macro dynamic evolution of U.K. and China's animation industries

4. **Conclusion**:

The creative industries have experienced huge transformation nowadays, with features of flexibility, social and user engagement, technology advancement, platform and digitalization, and project-based short life cycle. This happens particularly in the animation sector, which has extended value chain from design, production to commercialization, delivering both tangible product and intangible service. Online media and games, tablet and mobile phones, and user experience can all be connected by digital platform, which reforms the sector in terms of innovation. While traditionally companies highlight close innovation and IP protection, open innovation emphasizes exchanging with external sources for knowledge creation and absorption. Knowledge spillover, product extension, and user contribution are further innovation effects of the creative industries.

Through this in-depth study on U.K. and China's animation sectors, this paper aims to find out the impact of government policy on macro innovation systems. There are three main findings. 1) The macro OIES model can be implemented to the animation industry, with features along the value chain, showing different patterns of CIS, OIS and SIS. 2) The innovation experiences dynamic evolution. in U.K. there is a trend from CIS to OIS and SIS. In China, with resource accumulation, transformation from OIS to leading companies' CIS is observed. 3) Government policies can facilitate changes of the macro innovation systems Supply-side instruments such as favorable tax and funding, cluster support, training and education can promote OIS. Especially at early stages where the innovation resource are limited, government can play a dominant role. As the industry become mature, government act as a facilitator to promote idea exchange across industries. Service providers and industrial associations are also intermediaries. When industry experience convergence stage, environmental-side polices such as IP protection can encourage CIS and value chain integration and reconfiguration, moving to the next level of innovation. Cross-sectorial integration and coordination can be achieved through public sourcing and contribution. At this point, government can guide the direction through standardization, soft-law and governance, leading to self-regulation.

Findings enrich the OIES model, contributing to the theory of government innovation policy and in the context of creative industries. The research can be useful to practitioners and policy makers, including countries where the industry has already demonstrated competitive advantage, and areas where the creative industries are emerging yet challenged by resource constraint. Based on the theory framework, it is recommended that U.K. government can focus on bottom-up policies, to capture social value and deliver product and service to the public. Technology infrastructure improvement and linkage among various innovation actors are also future directions. There are

some limitations of the research, as it mainly focuses on the role of government policies in U.K. and China's creative industry innovation ecosystem. Other countries' practice also need to be compared. More macro factors such as technological, industrial, social, and cultural elements can help to generate a holistic understanding. In the future, more micro-level research including case studies can enrich the understanding of creative industries' innovation from product, service and business model perspectives.

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2.

Japan Myanmar cooperative industrial Innovation in the case of Mandalay

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Abstract

Purpose/ Research Question:

Since the economic opening of Myanmar in 2012, Japan has been a major country to cooperate for industrial development in Myanmar.

The major Japan-Myanmar government cooperation is for Myanmar Japan Center for human resource development as a port of ODA (official development assistance).

However, the SMEs in manufacturing industries lag behind for their technologies and innovative mind.

How can SMEs innovative learning activities in Mandalay be Started?

Key Literature review

Goh, Ah Bee; Chakpitak, Nopasit (2015) Embracing the ROFO Principle before Implementing Lean Production: A Chief Operating Officer's Experiences and Reflections. Quality Innovation Prosperity / Kvalita Inovácia Prosperita. 2015, Vol. 19 Issue 2, p161-181. 21p.

The purpose of this paper is to highlight to CEOs (chief executive officers) that implementing the continuous improvement (CI) program requires a gradual overhaul of the entire organiza

Nguyen, Nguyen Thi Duc, Aoyama, Atsushi (2015) The impact of cultural differences on technology transfer. Journal of Manufacturing Technology Management. 2015, Vol. 26 Issue 7, p926-954. 29p.

This paper quantitatively evaluate which of the elements of five management practice constructs – management commitment, quality practice, team-based work, training, and sharing and understanding – can significantly lessen the adverse impact of cultural differences on efficient technology transfer.

Design/methodology/approach – Exploratory factor analysis, confirmatory factor analysis, and structural equation modeling multi group analysis are used to analyze structured survey data from 223 Japanese manufacturing subsidiaries in Vietnam.

Braguinsky, Serguey (2015) Knowledge Diffusion and Industry Growth: The Case of Japan's Early Cotton Spinning Industry, Carnegie Mellon U, Industrial and Corporate Change, August

The diffusion of technological knowledge is key to industry growth. But not all knowledge is created equal. By using a nanoeconomic approach to examine knowledge diffusion-based growth in the Meiji-era Japanese cotton spinning industry, which enjoyed remarkable success after a decade of initial failure.

By tracing sources of technological knowledge to individual engineers, successful technology diffusion was required the right kind of human capital embodying and transmitting knowledge, and a competitive environment that rewarded talent while weeding out incompetence.

Design/ Methodology/ Approach:

This research monitor the improvement results by using the cases of the Japanese advisedly activities.

Spinning industry in Myanmar was taken as an example of improving activities.

The CEO of a spinning company received CEO training in Japan in March 2019 and improved its production activities after the training. By using the case, this paper analyses the impact of CEO

Findings

Following findings are expected

CEO or MD plays an important role for HRD

Quality improvement methods needs impact and influence from outside (overseas).

Research implications

This research can be applied for other industries and developing countries.

Keywords: Myanmar, Innovation, Improvement, Kaizen, 5S

Reference

Goh, Ah Bee; Chakpitak, Nopasit (2015) Embracing the ROFO Principle before Implementing Lean Production: A Chief Operating Officer's Experiences and Reflections. Quality Innovation Prosperity / Kvalita Inovácia Prosperita. 2015, Vol. 19 Issue 2, p161-181. 21p.

Nguyen, Nguyen Thi Duc, Aoyama, Atsushi (2015) The impact of cultural differences on technology transfer. Journal of Manufacturing Technology Management. 2015, Vol. 26 Issue 7, p926-954. 29p.

Braguinsky, Serguey (2015) Knowledge Diffusion and Industry Growth: The Case of Japan's Early Cotton Spinning Industry, Carnegie Mellon U, Industrial and Corporate Change, August 2015, v. 24, iss. 4, pp. 769-90

3.

Adventure Spirit, Collaborative Innovation and Regional Industrial Upgrading

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Abstract

Purpose/ Research Question

The Chinese economy has transformed from high-speed development to high-quality development, which has become the fundamental requirement of formulating industrial policies and implementing macro-control. Industrial upgrading is the fundamental guarantee for high-quality development, and innovation is a prerequisite for industrial upgrading. The central government attaches great importance to the role of technological innovation, especially multi-agent collaborative innovation in industrial upgrading. The report of the 19th CPC National Congress clearly stated that "innovation should be taken as the lead in the upgrading and optimization of traditional industries", and the focus was on "establishing a technological innovation system with enterprises as the mainstay, market as the orientation, and a deep integration of enterprises, universities and research institutes". Collaborative innovation is not only the need to implement the national strategy of industrial upgrading and high-quality development, but also the need for enterprises to avoid risks and achieve sustainable growth. At present, collaborative innovation has become an important engine for regional industrial upgrading. According to the statistics of the National Bureau of Statistics, in 2017, 131,000 enterprises implemented collaborative innovation in China, accounting for 65.1% of the enterprises that carry out technological innovation activities.

The essence of collaborative innovation in organizing innovation resources to obtain innovation results is the technological spillovers between different innovation subjects through the collaborative interaction of innovation entities such as enterprises, universities, research institutions, governments, and financial intermediaries in various regional innovation systems. From the perspective of the innovation value chain, previous researches paid more attention to innovation spillovers from "universities and research institutions" to "enterprises" or innovation spillovers within similar organizations, while ignoring the feedback path and circular effects of innovation value chains, such as the driving effect of corporate innovation on universities and research institutions. Therefore, constructing a theoretical model of collaborative innovation among governments, universities, and scientific research institutions, and verifying its effect has become a significant subject of theoretical research.

Existing researches show that there is a strong correlation between adventure and innovation, and adventure is a key factor driving innovation subjects and implementing innovative behaviors. In areas with a strong risk-taking spirit, their innovation subjects have stronger incentives for collaborative innovation, thereby inspiring governments, enterprises, universities, and scientific research institutions to implement collaborative innovation, and then promoting regional industrial upgrading.

In recent years, the relationship between collaborative innovation and regional industrial upgrading has gradually attracted the attention of academia. However, each region is usually regarded as an independent system, and the correlation effect between systems is not considered. However, the innovation factors have significant inter-regional mobility characteristics. Collaborative innovation activities in a certain region will not only affect local industrial upgrading process, but also have cross-regional effects on industrial upgrading activities in surrounding areas through the inter-regional mobility of innovation factors, that is, spillover effect. Ignoring the spatial spillover effect of collaborative innovation, it will be difficult to accurately measure the impact on industrial upgrading.

Listed companies are the main body of regional collaborative innovation and regional economic development, and are the key to achieving industrial upgrading and high-quality

development. Due to the shortcomings of the existing research system, the researches on listed companies is mainly focused on the micro level, while the research on the meso level of the region is paid little attention. Therefore, it is urgent to build a theoretical model linking micro and meso to explore the mechanism and effect of the combined effects on regional industrial upgrading.

Based on this, this article mainly answers the following questions: First, from the perspective of spillover effects, how do regional adventure spirits, collaborative innovation levels, and listed company innovation affect industrial upgrading? What is the mechanism? Second, how to measure the level of collaborative innovation to accurately measure its effect? Third, under the national strategy of revitalizing Northeast China, taking the lead in the East, rising in the Central China and developing the West, how effective is the spirit of adventure and collaborative innovation in promoting regional industrial upgrading? Fourth, how to stimulate the adventurous spirit, innovation of listed companies and drive regional collaborative innovation, thereby realizing industrial upgrading strategies and promoting coordinated regional development?

Key Literature Reviews (About 3~5 papers)

Based on the perspective of value chain, Zhao et al. (2015) decompose the innovation process into interrelated sub stages, namely knowledge innovation and product innovation. The study found that, on the one hand, based on the overflow of value chains of innovation activities, knowledge innovation output provides the basis for technological transformation, and product innovation activities are positively affecting knowledge innovation by increasing input and optimizing allocation of resources; on the other hand, from the perspective of spatial spillovers, the geographical dependence of innovation subject makes the innovation behavior geographically concentrated and diffused. The interaction of two different spillover effects together constitutes a systemic effect of innovation. This research provides important reference for understanding the value chain overflow and space overflow of collaborative innovation.

On the basis of Zhao et al. (2015), Bai et al. (2015) used the capital exchanges between the entities in the innovation system to express their collaborative innovation relationship, and demonstrated the relationship between collaborative innovation and innovation performance from a flow perspective, and considered different spatial linkages between regional innovation

systems. This article provides a basis for measuring the level of collaborative innovation from a flow perspective.

Joaquín et al. (2017) examines the succession of formal and informal channels of university-industry knowledge transfer and finds that collaborative innovation between universities and enterprises to achieve dynamic knowledge transfer and interaction can promote regional economic development and technological upgrading. This essay demonstrates the mechanism and empirical relationship between the collaborative innovation of industry-university-research and technological upgrading, which lays the foundation for the follow-up research on collaborative innovation to promote industrial upgrading.

Wang et al. (2018) used a hierarchical regression analysis model to test the inherent relationship between R&D investment, entrepreneurial risk propensity, and company innovation performance, and found that risk propensity has a regulating effect on the relationship between R&D investment and innovation performance. This article examines the driving role of adventurous spirit on innovation from the perspective of micro-enterprises, which has important reference value.

Sun et al. (2019) clarified the spatial spillover mechanism and spillover effect boundary formation mechanism of collaborative innovation on regional industrial upgrading. The spatial Durbin model was used to empirically test the impact of collaborative innovation on industrial upgrading. However, using the existing data to measure the level of collaborative innovation, it is difficult to effectively measure the interaction between different innovation subjects.

Compared with existing researches, the contributions of this paper are mainly reflected in the following: first, the risk-taking spirit and the innovation of listed companies are embedded in the theoretical model of industrial upgrading, revealing the "black box" system of regional innovation; second, constructing an indicator system based on the perspective of the stock of regional innovation performance and the flow of regional collaborative level to comprehensively measure the capacity of regional collaborative innovation; third, based on China's regional development strategy of revitalizing Northeast region, taking the lead in the

East, rising in the Central region, and developing the Western region, to verify the effect of adventurous spirit, listed company innovation investment and collaborative innovation on regional industrial upgrading; last but not least, considering how to promote regional industrial upgrading from the perspective of stimulating the spirit of regional adventure, improving the innovation level of listed companies, and collaborative innovation.

Design/ Methodology/ Approach

Taking into account the differences in economic development stages, technological innovation capabilities, and resource endowments in different regions of China, this article divides China into four regions: east, central, west, and northeast according to the four regional strategies. The research period is from 2000 to 2018. The data are mainly from "China Statistical Yearbook", "China Statistical Yearbook of Science and Technology".

（1）Model specification

Considering spatial correlation, we set up a spatial Durbin model (SDM):

$$\ln ind_{it} = \delta \sum_{j=1}^{N} W_{ij} \ln ind_{jt} + c + \beta_1 \ln syn_{it} + \beta_2 \ln adv_{it} + \beta_3 \ln lci + \beta_4 fdi_{it} + \beta_5 \ln fin_{it} +$$

$$\beta_6 \ln gov_{it} + \beta_7 \ln tra_{it} + \beta_8 \ln lcs + \theta_1 \sum_{j=1}^{N} W_{ij} \ln syn_{jt} + \theta_2 \sum_{j=1}^{N} W_{ij} \ln adv_{jt} + \theta_3 \sum_{j=1}^{N} W_{ij} \ln lci_{jt} +$$

$$\theta_4 \sum_{j=1}^{N} W_{ij} \ln fdi_{jt} + \theta_5 \sum_{j=1}^{N} W_{ij} \ln fin_{jt} + \theta_6 \sum_{j=1}^{N} W_{ij} \ln gov_{jt} + \theta_7 \sum_{j=1}^{N} W_{ij} \ln tra_{jt} + \theta_8 \sum_{j=1}^{N} W_{ij} \ln lcs_{jt} + \mu_i + \lambda_t + \varepsilon_{it}$$

Among which, *W* represents spatial weight matrix, ε_{it} represents error term and δ represents spatial autoregression coefficient.

（2）Variable selection

type	name	abbreviation	measurement
explained variable	industrial upgrading	ind	$ind = \sum_{i=1}^{3} \sqrt{l_i} \times k_i (i = 1, 2, 3)$ k_i represents proportion of output value of various industries in regional GDP, l_i represents labor productivity by industry

	collaborative innovation	syn	innovation performance & coordination level
explaining variable	adventurous spirit	adv	number of new private companies in 3 years *10000/number of population aged 15~60
	innovation input of listed company	lci	average innovation input of listed company
control variable	foreign direct investment	fid	total foreign direct investment
	financial level	fin	gross financial product
	government behavior	gov	government expenditure /GDP
	infrastructure conditions	tra	density of road network
	scale of listed company	lcs	number of listed company

Note: collaborative innovation (syn) will be measured by indicator system which is composed of two parts, innovation performance and coordination level.

（3）Spatial weight matrix

①Geographical distance weight matrix

$$W_d = 1/d^2, i \neq j \text{ ; } W_d = 0, i = j$$

Among which, d represents the distance between two regions.

②Human resource weight matrix

$$W_h = W_d diag(\bar{H}_1 / \bar{H}, \bar{H}_2 / \bar{H}, ..., \bar{H}_n / \bar{H})$$

$$\bar{H}_i = \frac{1}{t_1 - t_0 + 1}\sum_{t_0}^{t_1} H_{it}, \bar{H} = \frac{1}{n(t_1 - t_0 + 1)}\sum_{i=1}^{n}\sum_{t_0}^{t_1} H_{it}$$

Among which,

$\bar{H}_i$ represents the average stock of human resource in region i; $\bar{H}$ represents the average stock of human resource of all regions.

(Expected) Findings/Results

（1）Measuring the degree of industrial upgrading

（2）Measuring the level of collaborative innovation

（3）Constructing a theoretical model of regional adventure spirit and listed company innovation driving regional collaborative innovation, and then promoting industrial upgrading

（4）Verifying the different effects of the spirit of adventure, the innovative investment of listed companies and the level of collaborative innovation on regional industrial upgrading in the four major strategic regions of China

This article predicts that regional adventure spirit and the innovation investment of listed companies will have an important impact on the level of collaborative innovation of various entities in the region, and thus promote regional industrial upgrading.

Research limitations/ Implications

The spatial spillover effect of collaborative innovation often occurs within a certain geographic range. Geographically nearby areas help to achieve cross-regional collaborative innovation and technology sharing. The knowledge transmitted by collaborative innovation is sticky, especially the spillover of invisible knowledge requires face-to-face communication. Marginal costs are higher beyond a certain range. Further research should explore the regional boundaries of the spillover effect of regional adventure spirit and collaborative innovation.

Keywords: Adventure Spirit, Collaborative Innovation, Regional Industrial Upgrading, Spatial Spillover, Spatial Econometrics

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4.

A Study on the Analysis of the Appearance Factors of Unicorns

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Abstract

Recently, Unicorns, a startup with a corporate value of more than $1 billion, have been surging. However, unicorn studies have shown a majority of case studies, and insufficient studies have been done to identify the causes of unicorn appearance. This study identified the appearance factors of unicorns in major countries where many unicorns appear. As a result, there were large economies, many unicorns (U.S., China), and few unicorns (Korea) with small economies. In addition, as a result of the classification of types through the combination of economic size weight and regulatory policies, four categories were: large and medium effective markets (upper), medium effective markets (lower), and small effective markets.

Purpose/ Research Question:

This study aims to analysis the appearance factors of unicorns among major countries (※ State Scope: United States, China, U.K., India, Germany, Korea, Japan).
The questions in this study are as follows.
1. Is the number of unicorns related to GDP?
2. Does regulatory policy affect the number of unicorns appearing?

Key Literature Reviews:
Until now, unicorn studies have been mostly global unicorn trends and business case studies, and academic studies, such as unicorn appearance factor studies, have been insufficient.

<table1> Preceding Research

domestic research		overseas research	
Software Policy & Research Institute	Current Status and Implications of Global	Hurun Research Institute (2019.1.24.)	Hurun Greater China Unicorn Index 2018

(2019.4.19.)	Unicorns		
Software Policy & Research Institute (2018.1.31.)	Global Unicorns Trends	Harvard Business Review (2016)	How Unicorn Enterprises Grow
Science and Technology Policy Institute (2017.11.21.)	U.S. Startup Ecosystem, Unicorns		

Design/ Methodology/ Approach:

In this study, fuzzy-set qualitative comparative analysis (FS/QCA) is used to identify appearance factors of unicorns. The fuzzy set analysis methodology is a qualitative comparative analysis (QCA) presented by Zadeh (1965) of the University of Berkeley, one of the case study methods. Recently, scholars such as Ragnar and Kvist have been applied to various fields of social science (Shenneide and Rohlping, 2013: Choi Young-joon, 2009). Fuzzy Set Analysis Methodology is a method developed by Quality Comparative Analysis (QCA) Method (Ragin, 2000), which has been consistently used in social science. The Fs/QCA focuses on a joint causal system that fully permits the interaction effects between each characteristic in the case rather than on how other independent variables are considered constant and the effect of one cause on the dependent variable is taken into account. For example, the Fs/QCA does not validate the weight of economic scale by country and the independent effects of national regulatory policies as a causal condition for 'unicons'; it creates a causal condition and analyzes the relationship between the combined conditions and unicorns.

<table2> setting of variable

Areas	category	Variables	References
Economy	(E) economics	GDP	IMF data(2018)
	(I) innovation	Number of unicorns	CB insights data(2019.7)

Society	(A) activation	regulation	Positive regulation
			Negative regulation

<table3> Average number of unicorns versus GDP

nation	GDP(Trillion $)	economies of scale(%)	Number of unicorns	Unicon number per 1trillion $
SUM	74		369	
United States	21	28.4	179	8.5
China	13	17.6	94	7.2
U.K.	2.8	3.8	19	6.8
India	2.7	3.6	18	6.7
Korea	1.7	2.3	9	5.3
Germany	4	5.4	9	2.3
Japan	5.1	6.9	2	0.4

<table4> classification of unicorn type

	Positive regulation	Negative regulation
economies of scale(%) small	Small effective market Korea	Medium effective market(upper) U.K., India
economies of scale(%) Large	Medium effective market(below) Germany, Japan	Large effective market United States, China

Effective Market Criteria – (GDP/GDP Total)* Regulatory Policy

(Expected) Findings/Results:

The results of this study are as follows.

First, the number of unicorns appearing in each country differed depending on the proportion of economic size and the combined terms of regulatory policies. For example, there were large economies, many unicorns (U.S., China), and few unicorns (Korea) with small economies. Therefore, it was confirmed that the weight of economic scale and regulatory policies were correlated as appearance factors for unicorns.

Second, the combined share of economic scale and regulatory policies were classified into four types of effective markets.

- Large effective markets: economies of large proportions and negative regulatory countries (ex. United States, China)

- Medium effective market (upper): Small proportion of the economy and negative regulated countries (ex. U.K., India)

- Medium effective market (below): Large economies of scale and positive regulatory countries (ex. Germany, Japan)

- Small effective market: small economic of scale and positive regulatory countries. (Korea)

Research limitations/ Implications:

This study was conducted under the spatial constraints of the state. However, there has been no analysis of specific technologies and types of BMs that are correlated with the explosion of unicorns, not just the external variables of the country in the development of enterprises. Therefore, further study is needed.

Keywords: Unicorn, Effective Market, Negative regulation, positive regulation

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IMF GDP data

https://www.imf.org/external/datamapper/NGDPDPC@WEO/OEMDC/ADVEC/WEOWORLD/VNM

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5.

Delivery Open Innovation Business Model Platform
- Reflective Comparing among Economies

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**1. Research Question, Research Scope and Method**

1.1. Research Question

As the appearance of 4th industrial revolution, smart delivery industry is increasing based on smartphone app platform in nearly all capitalist countries(Lee et al., 2018). Restaurant industry is representative service open innovation area, and open innovation of this industry is explosively increasing with the smart delivery platform and application(Chesbrough, 2011; Mina, Bascavusoglu-Moreau, & Hughes, 2014). So smart delivery industry will motivate new emergence in addition to complexity during open innovation dynamics(Yun, Won, & Park, 2016). Smart delivery industry is giving effects not just to food industry but also to diverse manufacturing, and service industries. In the near future, the effect of smart delivery industry will be expanded to nearly all industries. We want to answer the following research questions

Is there any difference in open innovation business model of smart delivery industry according to the maturation of capitalism economy?
If then, how about the difference of open innovation business model of smart delivery industry between Korea with Bemin or Yogiyo, China with Meituan or Ele.me, and UK with Delivero or Uber-eats?

In 21st century, as the 4th industrial revolution give different effects to capitalist economy according to the maturing of capitalism, we want to know the difference of open innovation and business model of smart delivery industry among matured capitalist country United Kingdom, late capitalized country South Korea, and national monopoly capitalism country China.

1-2. Research Method, and Scope
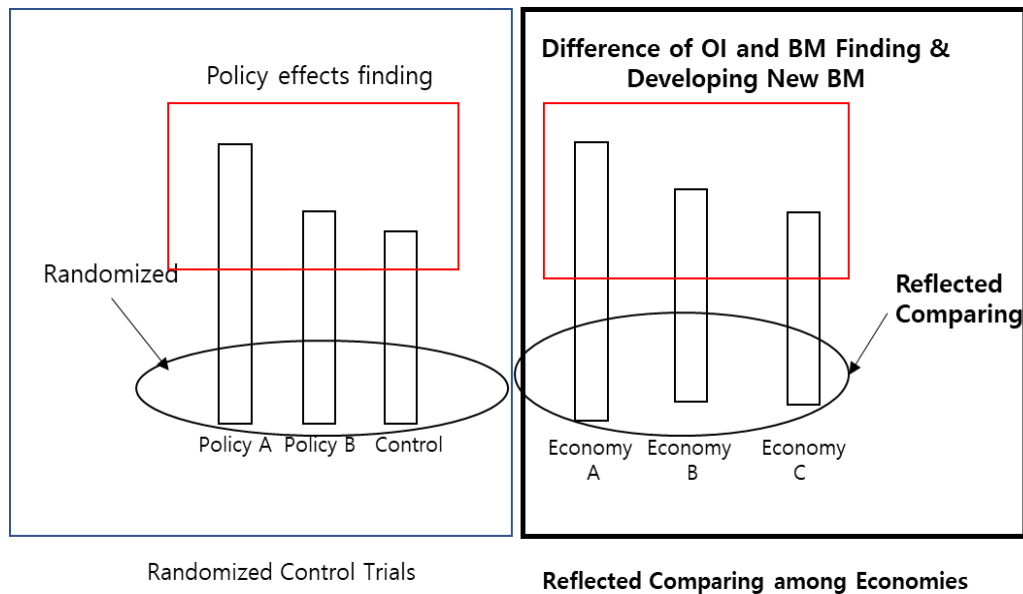
<Figure 1> Reflected Comparing among Economies

2019 Noble economy prize winners used randomized control trials(RCT) to find out well operating poverty policy(Banerjee, Banerjee, & Duflo, 2011, pp. 34-36). Poor economists selected several randomized policy target groups, applied different poor policies each group including one group which was not applied any policy, and compared the policy effects among randomized groups to find out the difference of policies, and find out most effective poor policy like left parts of Figure 1. Until recent, not just in poverty policy but also in diverse social experiments such as health insurance, prisoner rehabilitation, labor supply, worker training, and housing subsidies et al. used randomized field trials(Burtless, 1995). In fact, there are several deficiencies of RCT including improper allocation of overhead costs, absence of sensitivity analyses, and a near-zero correlation between the economic completeness and the quality of research scores(Adams, McCall, Gray, Orza, & Chalmers, 1992).

So, we organized reflected comparing among economies (RCE) which developed from RCT in that it is comparing social groups, and it tries to find out something from comparing target groups. But RCE is different from the RCT in several aspects such as it agrees that the comparing research groups are different at the starting point, and cannot be randomized, and that it does not compare the policy results, but compare the results of the effects of diverse capitalist economy situation by setting up reflective and high meaning-having groups which should be compared. RCE is a kind of qualitative research method which includes case study, interview which use semi structured questionnaire, or descriptive statistical analysis et al. We will catch the effect of capitalist economy on the diversity of open innovation and business model in smart delivery industry.

First, research team pointed out target places where were near DGIST in 1 km, and counted the delivery of food from 10 am to 1 pm on October 8th, 10th, and 14th in 2019 which will be used to measure the development level of smart delivery industry. And Similarly, we counted the delivery of food at places near Nanjin science and technology university in 1 km from 10 am to 1 pm on September 20th, 21st, 22nd in 2019. *Last, we counted the delivery of food at places near South wales university in km at the same time on January 9th, 10th, and 11th in 2020.*

Second, research team visited restaurants in near 200 m boundary near DGIST, Korea inside 5 km except small cases on October 15th 2019, and asked the usage of delivery platform, and the number of delivery platform which they use to measure the statistic amounts of the usage of delivery platform by Korea restaurants. In addition, research team interviewed 20 restaurant Chef, manager, or president, and 22 deliverer who use smart delivery plaltofrm with semi structured questionnaire about the usage of delivery platform, the style of usage, the benefits and cost of delivery platform, and the interactions or open innovation with delivery platform and deliverer. Research team asked the usage of delivery platform, and the number of delivery platform of China restaurants near the Nangjing science and technology university on September 24th 2019 to obtain statistical data about the usage of delivery platform by China restaurants, and interviewed intensively 15 China restaurants Chef, manager, of president, and 22 deliverer who use smart delivery platform around there on September 19th, 20th, 21st, 22nd, and 23rd 2019 with semi structured questionnaire. *We counted the statistical data on the usage of delivery platform by UK restaurant Chef, manager, or president on January 12d 2020 near the South Wales University with the same condition of*

Korea, and China restaurants. And we interviewed the UK restaurants 15 persons, and 20 deliverer who use smart delivery platform on January 9th – 14th with same semi structured questionnaire under the same condition of Korea, and China cases.

Third, research team surveyed the usage of smart delivery platform by 43 DGIST Korean students with the questionnaire about the usage habits and trends of delivery app, and interaction or open innovation with delivery platform\ or deliverer on September 7th 2019. We did same survey with 40 Nanjing science and technology university students with same questionnaire on September 23rd 2019. *We also did survey with 30 South Wales university students with same questionnaire on October – November 2019.*

2. Literature Review and Research Framework

2.1. Literature Review

As the rocket shooting of online-to-offline(O2O) food ordering and delivery market, numerous independent restaurants are competing for orders proposed by customers via smart online food ordering platforms(He, Han, Cheng, Fan, & Dong, 2019). Even though most studies on O2O food delivery platform have focused solely on the technological merits of mobile applications, there are researches which focuses on the moderating role of moral obligation in meal preparation, customers, restaurants, or deliverer(Roh & Park, 2019; Zheng, Ma, Guo, Cheng, & Zhang, 2019). Delivery riders or deliverers, an emerging occupation as a results of the booming of online commerce in China have gained social controversies for the prevanence of unsafe riding and high rates of crash involvement in China, and poor working conditions of delivery riders in Korea(Zheng et al., 2019). Diverse smart delivery platforms have been studied not just big platforms such as Uber-eats, Meitian, Ele.me, Deliveroo, but also Zomato, Swiggy, IFOOD, Memin from several countries(da Silva Monty, 2018; Raina, Rana, & Thakur; Todolí-Signes, 2018). Online-to-offline food delivery platforms give powerful effects on the restaurants sales through word-of mouse(WOM) which has not been introduced in restaurant industry before the appearance of smart delivery platform, and which appears as the number of reviews and ratings of customers on the platforms, which can be a kind of customer trust on the food and delivery system itself(Sumi & Kabir, 2018; Zhang, Liu, & Feng).

2.2. Research Framework
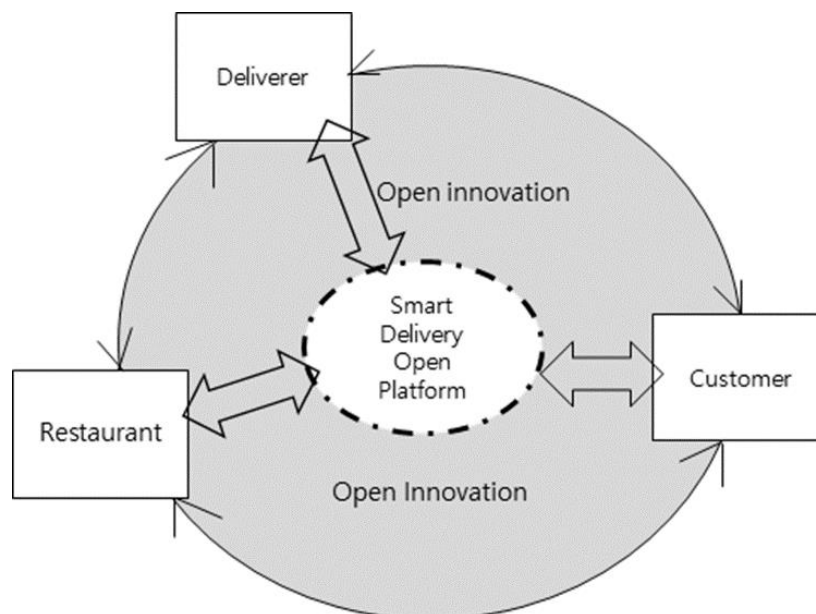
<Figure 2> Structure and Actors of Smart Delivery Open Innovation Platform

Smart delivery industry is evolving based on open innovation with deliverer, customer, and restaurant like Figure

2. We will analyze 3 open innovation between smart delivery open innovation platform, and restaurant, customer, and deliverer from the perspective of comparing the difference of 3 economies. In addition, we will analyze the interaction of 3 factors restaurant, customer, and deliverer by comparing the interactions of 3 economies.

From this we will answer to 2 research questions, and try to find out new business models which will be required to increase the sustainability of capitalist economy with smart delivery industry

3.   Smart delivery industry of UK
4.   Smart delivery industry of China
5.   Smart delivery industry of Korea
6.   Discussion; Comparing of 3 economies in smart delivery industry
7.   Conclusion

<Appendix 1>

Semi-structured questionnaire to interview restaurant CEO, Chef, or manager

1.   How long did you operated this restaurant? (   )Months

2.   When did you start using the delivery platform or companies?

        From (   ) /using for about (year) (Months   )

3. Questions about the using conditions of delivery platorms

 1). Which delivery companies are you using now?

   *If you are using the multi-platform, please write down all platform names and their using ratio.

 2). What is the ratio about delivery revenue in total revenue?(%)

4.   How do you think about the delivery system which you are using now?

   Please tell us some delivery calls allocation process or method.

 1). Delivery restaurant registration process :

 2). Calls reception time allocation:

   From call reception to delivery driver(cooking time): (   )mins

   From delivery driver to customer(delivering time): (   )mins

   Others

 3). Delivery platform usage fee:

   Total revenue's (%) should pay to the platform

   Promotion activity discount share: platform (%); restaurant (%)

   Others: tax; insurance and etc.

4). Feedback to platform (On the platform, do you have any channel to send your suggestions or your problem during the delivering process to the platform?)

5.   How and when do you pay the delivery calls at the moment you use the delivery platform?

Do you pay to the platform, to the drivers directly, or others?

6.   Is there any change both in the benefits including income and some other intangible changes like company promotion, reputation, service promotion, customer satisfaction and etc. after using the delivery platform ?

<Appendix 2>

Semi-structured questionnaire to interview deliverer (delivery rider)

1.   How long have you been a delivery driver? (   ) months

 1). Which delivery platform are you serving for?

  If you are using the multi-platforms, please write down all platform names and their using ratio.

 2). What is your pre-job before the delivery driver? (   )

2.   What are the main items for delivering?

 1st(   ), 2nd(   ), 3rd(   ), 4th(   )

3.   Please explain the delivery process(including the driver registration, accept calls, calls allocation,

          delivery evaluation and etc.)

  1) Driver registration process including platform registration, delivery driver training program, morning or fixed term meeting , health certificate, ID certificate, Bank information et al. , go to company to have an interview or not and etc.   )

  2) Calls allocation including plaform allocation, driver application, platform allocation & driver application, et al.

  3) Delivery evaluation including Evaluation by restaurants, Evaluation by customers et al.

  4) Feedback to platform (On the platform, do you have any channel to send your suggestions or your problem during the delivering process to the platform?)

4.   How is the average income per day?

 Average income per day,   Average calls reception per day,

 Call revenue style (according to the distance, stable payment of every call, or others)

 Insurance (paid by yourself, or by platform, or by others)

5.   How long do you work a day?

 Average Total (   ) hours, In general, from (:   ) to (:

6.   Please tell some your experienced customer reflections about this delivery platform.

 1). If you have any special experience, please talk to us.

 2). If you have any special suggestion to the platform, please talk to us.

<Appendix 3>

Questionnaire for survey of university students' usage of delivery platform

1.   How many times per week do you order food on delivery platform(including supermarket order, medicine order and etc.) ?

2.   Which delivery platform do you mainly use? Can you list the platforms that you are using and their using ratio? Would you please introduce the platforms that you use and its' characteristic and the reason of using it in addition?

         1st (   ); ration (00 %), Using reason (   ), 2nd (   ); ration (00 %), Using reason (   )

         3rd (   ); ration (00 %), Using reason (   ), 4th (   ); ration (00 %), Using reason (   )

3.	Which kind of things do you often order?

How about the order times in this year, compared to the last year this time,?

Is it increased or decreased? What is the increasing or decreasing ratio?

4.	How much is the delivery charge?

Who pays the delivery charge (restaurant, platform, delivery drivers, free, etc.)

How do you pay? (Delivery platform, cash to driver, food included)

How do you decide to order a delivery food in a restaurant?

For example, according to the restaurants evaluation results on the platform

Or the advertisement on the platform, incentives on the platform

Or your own favors?

Or restaurants you already know offline and etc.

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6.

Corporate Control and Local Innovation of International Joint Ventures: Evidence from Korea

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Abstract

We explore how the innovative performance of international joint ventures (IJVs) in the local market is determined. Using the panel data of 48 IJVs founded in Korea during the periods between 2000 and 2010, we find that control by foreign parent firms measured by equity ownership and CEO nationality decreases innovation for the local market or local innovation. We also find that this relation strengthens as IJVs mature, but weakens as R&D expenditure of foreign parent firms increases. The findings suggest that foreign parent firms have fewer incentives and local-market-specific capabilities to develop local innovation and that the incentives are altered by their and IJVs' attributes. This study offers information on how to design IJVs to enhance their innovative output for the local market.

Purpose/ Research Question:

We focus on innovation for the local market or "local innovation" (Cooke, 2016; Mahmood & Zheng, 2009; Witt, 2016). Local innovation is important to both local and foreign parent firms in achieving their goals. In general, local firms are considered to engage in IJVs with foreign firms in the hope of acquiring advanced knowledge and technology from their foreign partners, so that they could use them on their own in the future. The developmental process of local innovation within IJVs helps the local firms better accomplish this goal inasmuch as it is grounded in tight collaboration between local and foreign parent firms through which an advanced technology offered by foreign parent firms is customized for the local market and then tested and experimented in regard to market acceptability (Cohen & Levinthal, 1990).

Key Literature Reviews (About 3~5 papers)

- **International joint ventures and local innovation**

An inquiry into local innovation is of value because it may represent how successful the focal IJV is. From the local parent firms' viewpoint, local innovation could be one indicator of whether local parent firms enhance their innovative capabilities via IJVs. Literature suggests that local firms pursue IJVs with foreign firms as a way to get access to advanced technology, know-how, and innovative capabilities. However, to develop an innovation, it is not adequate for local firms to merely gain access to these advanced technology and capabilities of foreign partners. Local firms should assimilate, absorb, and internalize them completely, so that they can assume a major role in developing and commercializing local innovation instead of just being a passive contributor of knowledge and information on the local market to foreign partners (Cohen & Levinthal, 1990).

- **Control distribution and local innovation**

Foreign parent firms tend to have fewer incentives to develop local innovation because its value declines in their home markets. At the same time, they, as outsiders of local networks for innovation, have less knowledge and ability to develop local innovation. Therefore, as they exercise greater control over IJVs, local innovation generated by the IJVs will decrease. Taking all these together, we hypothesize:

H1a: Equity ownership of foreign parent firms is negatively associated with local innovation.

H1b: Foreign CEO is negatively associated with local innovation.

- **Moderating effects of longevity of IJVs and R&D expenditure of foreign parent firm**

We maintain that, to foreign parent firms, local innovation is one way to attain legitimacy in the local market. It could send a signal to the local market constituents and institutional agents about their commitment to become a good citizen in the local environment (Bhanji & Oxley, 2013). As such, local innovation enables them to alleviate the potentially harsh institutional pressure during the initial periods of IJV formation and engineer more favorable sentiments of the local market. However, this institutional pressure in general decreases over time as the information on the foreign firm is increasingly available and thereby the legitimating process is set in motion (Kostova & Zaheer, 1999). This implies that as IJVs age, foreign parent firms will have fewer incentives to commit resources to local innovation as a guard against the institutional pressure. Thus, we hypothesize:

H2a: The relation between equity ownership of foreign parent firms and local innovation is

moderated by the longevity of IJVs in such a fashion that the negative relation becomes stronger as IJVs age.

H2b: The relation between foreign CEO and local innovation is moderated by the longevity of IJVs in such a fashion that the negative relation becomes stronger as IJVs ages.

At the same time, when foreign parent firms have a large amount of R&D expenditure in their home market(Patra and Krishna, 2015), their expectation of IJVs' marginal contribution to the innovative activity for their home market will decrease. Then, they may care less about the potential variance in the value of local innovation generated by their IJVs than if they have small R&D expenditure. This implies that the perceived loss of the value of local innovation in their home market likely tapers off. Taken together, such a shift in the viewpoint on the main objective of IJVs derived from large R&D expenditure would escalate the perceived net value of local innovation. Accordingly, their incentives to engage in local innovation will rise. Thus, we hypothesize:

H3a: The relation between equity ownership of foreign parent firms and local innovation is moderated by R&D expenditure of foreign parent firms in such a fashion that the negative relation becomes weaker as foreign partner's R&D capabilities increase.

H3b: The relation between foreign CEO and local innovation is moderated by R&D expenditure of foreign parent firms in such a fashion that the negative relation becomes weaker as the foreign partner's R&D capabilities increase.

Design/ Methodology/ Approach

Then, we gathered financial information of the sample from the KISLINE and COMPUSTAT databases. KISLINE, which is equivalent to COMPUSTAT in the U.S., provides an extensive set of firm-level financial and other qualitative information. Its credibility and reliability have been well established by its wide use by prior studies (e.g., Chang, 2003; Chang & Hong, 2000). We selected IJVs founded during periods between 2000 and 2005 and constructed their panel data from 2000 to 2010. We used the COMPUSTAT database to retrieve financial information on the foreign parent firms. After this procedure, our final sample consisted of 48 IJVs.

For empirical analysis, we used a random-effects negative binomial estimator. we opted for the Negative Binomial model instead which relaxes the restrictive equi-dispersion by introducing an individual, unobserved heterogeneity into the conditional mean function of the count variable (Greene, 2012).

(Expected) Findings/Results

Equity ownership of foreign parent firms is negatively associated with local innovation at $p<0.01$(H 1a). We also find support for hypothesis 2a ($p<0.05$) and hypothesis 3a ($p<0.05$). We introduces foreign CEO into the baseline model. We find partial support for hypothesis 1b. We find no support for hypothesis 2b and 3b ($p<0.05$).

Research limitations/ Implications:

This study has some limitations that may provide directions for future research. First, this study assumes that the influence of equity ownership is linear and does not go deep inside the inner-workings of IJVs. However, equity ownership may have non-linear effects as can be seen in the research on the stability of IJV which reveals that an analysis on consequences of the IJV control is far more complicated and calls for introduction of broader theoretical lenses allowing for dialectics, internal tensions, interfirm rivalry, and managerial complexity (Das & Teng, 2000; Park & Ungson, 2001). Future studies should continue to consider these various sorts of factors in understanding the determinants of innovative performance of IJVs.

Keywords

International Joint Ventures; Corporate Control; Local Innovation; Local Embeddedness

Reference

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7.

The impact of Social Capital on Korean National Innovation System

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Background

In a knowledge-based society, many countries are focusing on national innovation systems(NIS) to foster high value-added industries.

Aim

The purpose of this study is to analyze the inefficiency of the system by analyzing the input and output factors of the national innovation systems of OECD countries.

In particular, we analyze how social capital affects the efficiency of the national innovation system.

Contribution

The study identifies how NIS investments affect not only economic performance but also scientific performance and people's quality of life.

Data

OECD, World bank database, World Value Survey

Method

two-stage approach (SFA, Multi-regression, Tobit regression)

Research Question

"knowledge" is a major resource of economic growth.

- Determining the growth rate of ideas is "the amount of human capital devoted to research sector" and stock of existing knowledge.(Paul Romer, 1990)
- Production of knowledge-absorption capacity-utilization-application-recreation is more important than the financial or physical capital. (WB Zhang, 2018)

scientific achievement ≠ Economic development ≠ quality of lives

- Even if number of patents increases due to investments in R&D, low capabilities that utilize technology do not lead to innovation and economic development.
- Economic development does not directly lead to the quality of people's lives.

Identify the inefficiencies of the national innovation system

- This study measures the efficiency of national innovation systems in major countries and identifies the sources of inefficiency.
- Analyze how efficiently the investing resources in the national innovation system contributes to scientific performance (number of patent registrations), economic performance (GDP per capa), and quality of life (QOL index).

Literature Review

Endougenous growth

- Economic growth is the result of increasing ideas (=knowledge, Technology) (Paul Romer, 1990)
- The difference in economic development level is the difference in knowledge accumulation (Fagerberg and Srholec, 2009).

National Innovation System(NIS)

- a system of all the components and linkages that interact in the production, diffusion and utilization of new, economically useful knowledge (Lundvall, 1992, Nelson, 1993, OECD 1997)

Social capital (SC)

- Social capital determines relationships and social costs and, as a result, economic levels(Putnam, 1993).
- Structured networks support the creation of new knowledge by promoting the exchange and sharing of resources by enhancing 'accessibility to the necessary knowledge' (Nahapiet and Ghoshal, 1998).

This study...

- analyze the inefficiency of the system by analyzing the input and output factors of the national innovation systems of OECD countries.
- we analyze how social capital affects the efficiency of the national innovation system.

Method

1. Measure technical efficiency among OECD countries

- Data: OECD, World bank data
- Method: Stochastic Frontier Analysis
- Purpose: Analysis of economic impact, NIS construction and quality of life
  - ▶ Identify the **characteristics** of **R&D** in **each country** and
  - ▶ compare the efficiency of each purpose.

2. Comparison of efficiency by Groups

- Classification: Income inequality (top 20%)
- Data: OECD, World bank data
- Method: Meta Frontier Analysis

3. Identify the cause of inefficiency

- Data: OECD, UNESCO, World bank data
- Method: Multiful Regression
- Purpose: Analyze the impact of **social capital**

Research model

Innovation Ecosystem

Institutional Subject
Industry — University
Government

Institutional Capital
Policy | Rule, Acts
Support System | Venture Capital
reducing the transaction costs

Infrastructure
SOC | Facilities
IT infra | accessibility

Social Capital
Trust | network | Norm

The norms & relations contained in the social structure

Technology
R&D Expenditure
R&D personnel

Sustainable development
- Scientific
- Economical
- Social

- IP increase
- GDP and The share of high value-added industries
- Satisfaction of quality of life

OECD 2001; Porter, M. 1998; Freeman, C. 1987, Warner, M. 2001; Evans, P. 1996, Kenworthy, L. 1995; etc.

Variables (1. SFA)

We analyze the development of science, technology, economy and society in OECD countries.

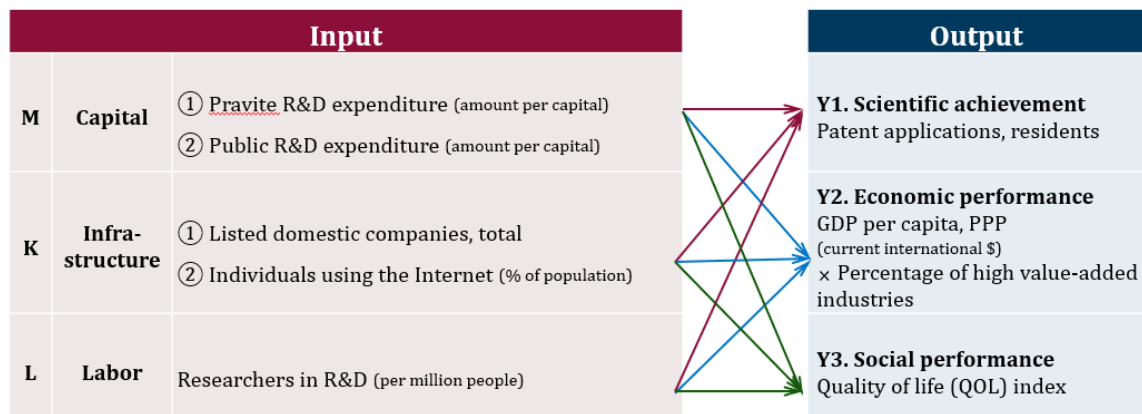|		Input	Output	
M	**Capital**	① Pravite R&D expenditure (amount per capital) ② Public R&D expenditure (amount per capital)	**Y1. Scientific achievement** Patent applications, residents	
K	**Infra-structure**	① Listed domestic companies, total ② Individuals using the Internet (% of population)	**Y2. Economic performance** GDP per capita, PPP (current international $) × Percentage of high value-added industries	
L	**Labor**	Researchers in R&D (per million people)	**Y3. Social performance** Quality of life (QOL) index	

Data (inefficiency analysis) (1/2)

INDICATOR_NAME	Variable 구분	Source
Health expenditure (% of GDP)	Social capital (대리지표)	OECD_Going to Growth
Minimum wage (% of median wage)		OECD_Going to Growth
Foreign direct investment, net inflows (BoP, current US$)		World Bank
Net income replacement rates for unemployment (first year)		OECD_Going to Growth
Net income replacement rates for unemployment (after 5 years)		OECD_Going to Growth
Public expenditure on active labour market policies (ALMPs) per unemployed (% of GDP per capita)		OECD_Going to Growth
Research and development expenditure (% of GDP)	STI	World Bank
Gross capital formation (% of GDP)		World Bank
Charges for the use of intellectual property, payments (BoP, current US$)		World Bank
Charges for the use of intellectual property, receipts (BoP, current US$)		World Bank
Scientific and technical journal articles		World Bank
Patent applications, residents		World Bank
Public investment (% of GDP)		OECD_Going to Growth
Direct public funding of business R&D (% of GDP)		OECD_Going to Growth
Indirect government support through R&D tax incentives (% of GDP)		OECD_Going to Growth
Market capitalization of listed domestic companies (% of GDP)	Y	World Bank
GDP per capita, PPP (current international $)		World Bank
GDP growth (annual %)		World Bank
GDP per person employed (constant 2011 PPP $)		World Bank
New business density (new registrations per 1,000 people ages 15-64)	기업가정신	World Bank
Listed domestic companies, total		World Bank
ICT service exports (BoP, current US$)	기타	World Bank
Exports of goods and services (% of GDP)		World Bank
Imports of goods and services (% of GDP)		World Bank
ICT goods exports (% of total goods exports)		World Bank
High-technology exports (% of manufactured exports)		World Bank
Distance to frontier score (0=lowest performance to 100=frontier)		World Bank
Urban population (% of total population)	집적효과	World Bank

Data (inefficiency analysis) (2/2)

INDICATOR_NAME	Variable 구분	Source
Time required to start a business (days)		World Bank
CPIA business regulatory environment rating (1=low to 6=high)		World Bank
PMR: Restrictiveness of economy-wide product market regulation		OECD_Going to Growth
PMR: State control - Public ownership		OECD_Going to Growth
PMR State control - Involvement in business operation		OECD_Going to Growth
PMR: Complexity of regulatory procedures		OECD_Going to Growth
PMR: Administrative burdens on startups	Institutional Capital	OECD_Going to Growth
PMR: Regulatory protection of incumbents		OECD_Going to Growth
PMR: Barriers to FDI		OECD_Going to Growth
PMR: Tariff barriers		OECD_Going to Growth
PMR: Other barriers to trade and investment		OECD_Going to Growth
Mobile cellular subscriptions (per 100 people)		World Bank
Fixed broadband subscriptions (per 100 people)		World Bank
Individuals using the Internet (% of population)		World Bank
PISA: Influence of socio-eco and cultural background on student reading perf.	Labor	OECD_Going to Growth
Labor force, total		World Bank
Researchers in R&D (per million people)	R&D personnel	World Bank
Educational attainment - Upper secondary education (population aged 25-34)		OECD_Going to Growth
Educational attainment - Upper secondary education (population aged 45-54)		OECD_Going to Growth
Educational attainment - Tertiary education (population aged 25-34)		OECD_Going to Growth
Educational attainment - Tertiary education (population aged 45-54)	High educated Labor	OECD_Going to Growth
Graduation rates in tertiary education		OECD_Going to Growth
Labor force with advanced education (% of total working-age population with advanced education)		World Bank
Graduation rates in upper secondary education		OECD_Going to Growth
School enrollment, tertiary (% gross)		World Bank
Labor force, female (% of total labor force)		World Bank
Technical cooperation grants (BoP, current US$)		World Bank
Depth of credit information index (0=low to 8=high)	Social capital (대리지표)	World Bank
Compensation of employees (% of expense)		World Bank
CPIA transparency, accountability, and corruption in the public sector rating (1=low to 6=high)		World Bank

Literature review

Sustainable development in the knowledge society

Qualitative growth (UN, Sustainable Growth Goals (SDGs))

❖ is an economic activity that creates value without the input of material resources or environmental pollution.

❖ Science, technology and innovation (**STI**) play an important role in sustainable development.

> The UN emphasized strengthening of scientific research that invest in research and development and increase the number of researchers, in order to expand the proportion of medium and high-tech industries.
>
> (United Nations Conference on Sustainable Development, September 9, 2015)

Knowledge creation → Technology innovation → Economic growth

❖ The government can foster high-tech industries by building an innovation system based on organizational learning.

(Meeta Dasgupta, R.K. Gupta, 2009)

Technology and economic growth

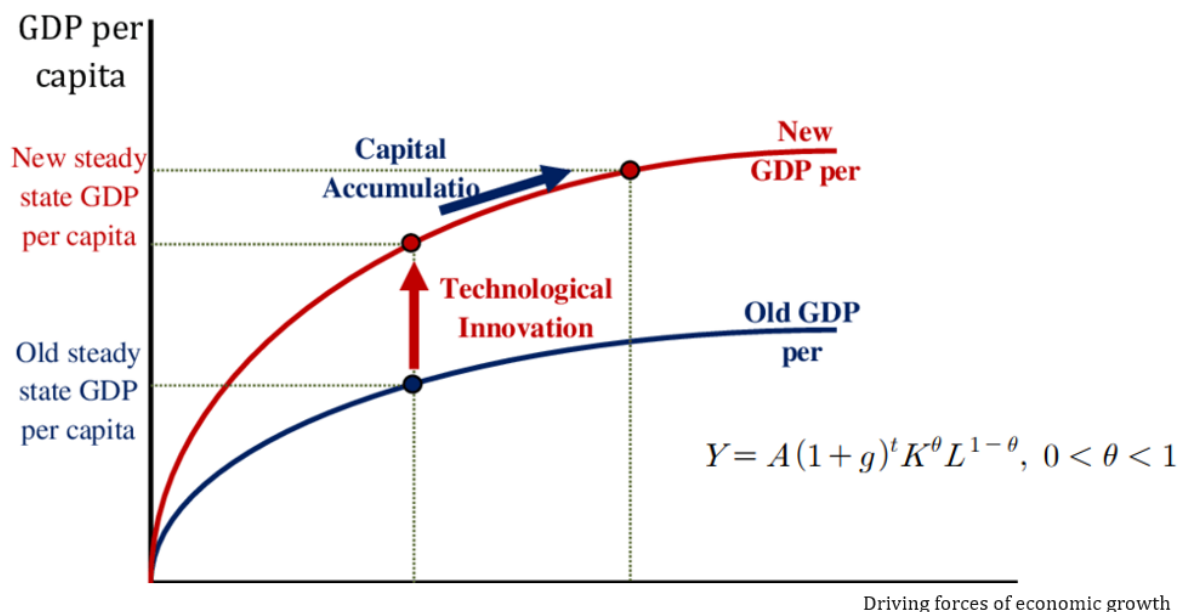### Technological development is the key to sustaining economic growth
- ❖ The law of diminishing returns to capital

Endougenous growth
- ❖ internal to the economic system
- ❖ Technological change is not random but determined by factors in the market system.
- ❖ The principle that marginal cost equals marginal revenue in profit maximization applies in the determination of the amount of knowledge investment firms would lie to make.
- ❖ Endogenous growth theory states thechnical change, including human capital, and other forms of knowledge-rich capital in capital stock.

- ❖ The enhancement of the human capital will lead to economic growth
- ❖ The improvements in productivity can be tied directly to faster innovation and more investments in human capital

Technological progress improves economic growth.
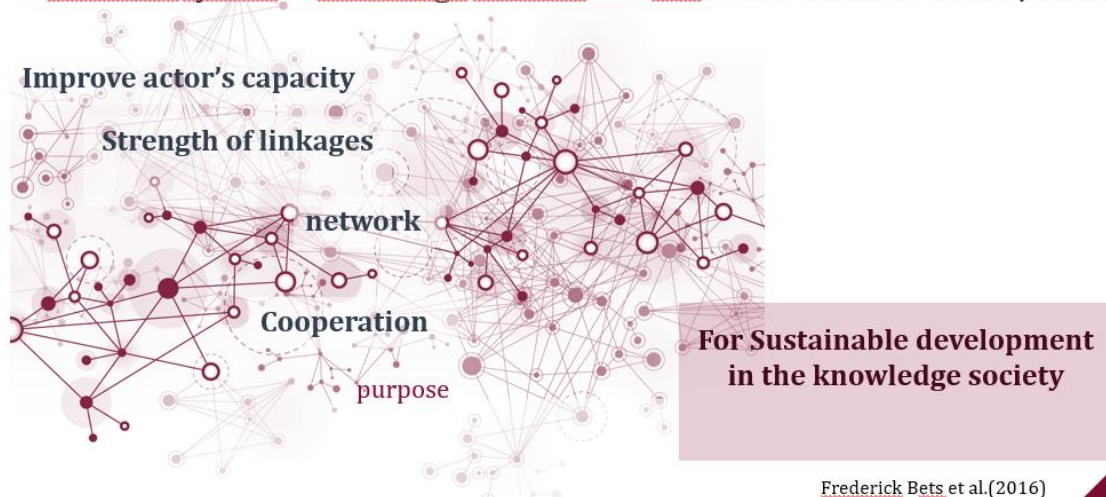
Technological progress increases marginal production of economic growth because it increases the constant value of the production function.

GDP per capita

New steady state GDP per capita

Old steady state GDP per capita

Capital Accumulatio

New GDP per

Technological Innovation

Old GDP per

$$Y = A(1+g)^t K^\theta L^{1-\theta},\ 0 < \theta < 1$$

Driving forces of economic growth

44

Main elements and linkages in National Innovation System (NIS)

❖ the **linkages amongst the actors** involved in the **innovation process** is key to improving **technology performance**. The innovative performance of a country depends to a large extent on how these actors relate to each other as elements of **collective system of knowledge creation and use**.... OECD "The National innovation system", 1997

Improve actor's capacity

Strength of linkages

network

Cooperation

purpose

For Sustainable development in the knowledge society

Frederick Bets et al.(2016)

National Innovation System (NIS)

### National innovation system has been defined as follows:

❖ .. the network of institutions in the public and private sectors whose activities and **interactions initiate, import, modify** and **diffuse new technologies.**(Freeman, 1995)

❖ .. the **elements** and **relationships** which interact in the production, diffusion and use of new, and **economically useful, knowledge** ... and are either located within or rooted inside the borders of a nation state. (Lundvall, 1992)

❖ ... a set of institutions whose **interactions** determine the **innovative performance** ... of national firms. (Nelson, 1993)

❖ .. the national institutions, their incentive structures and their competencies, that determine the rate and direction of **technological learning** (or the volume and composition of change generating activities) in a country. (Patel, P. and K. Pavitt, 1994)

❖ .. that set of distinct institutions which jointly and individually contribute to the **development** and **diffusion** of **new technologies** and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of **interconnected institutions** to create, store and transfer the knowledge, skills and artefacts which define new technologies. (Metcalfe, 1995)
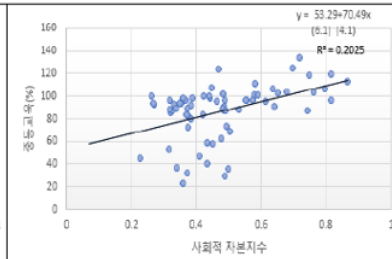
Social capital's impact

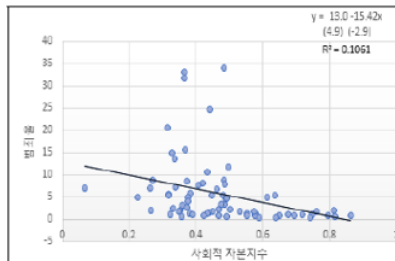## The higher a country's social capital index, the more positive it has in various areas.
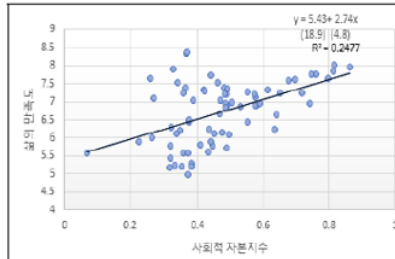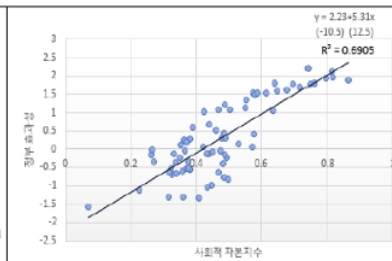

〈그림 5〉 사회적 자본 vs 삶의 만족도   〈그림 6〉 사회적 자본 vs 중등교육

〈그림 7〉 사회적 자본 vs 범죄율   〈그림 8〉 사회적 자본 vs 정부효과성

정갑영; 김동훈, 2019, "사회적 자본 지수의 계측", 한국경제포럼, vol12. 1,p.1-26

Regression Analysis Results

	gdpper~p	highte~s	ictgoo~s	techco~s	ictser~s	iprece~s	mktcap~c	_liste~m	rdexpe~e	compen~s	newbiz~y	deptho~o	starti~s	patent~s	mobile~t	broadb~t	indivi~t	export~p
gdppercapi~p	1																	
hightechex~s	0.0389	1																
ictgoodsex~s	0.0878*	0.5319*	1															
techcoopgr~s	-0.2295*	-0.0621*	-0.0688*	1														
ictservice~s	0.0554	0.1010*	0.0988*	-0.0731*	1													
ipreceipts	0.1003*	0.1332*	0.0913*	-0.0686*	0.8868*	1												
mktcapital~c	0.2083*	0.2309*	0.4361*	-0.0553	0.0850*	0.1081*	1											
_listedcom	-0.0553	0.1668*	0.1059*	-0.0903*	0.7305*	0.7667*	0.1148*	1										
rdexpendit~e	0.1568*	0.3895*	0.3081*	-0.0813*	0.2138*	0.2598*	0.1500*	0.2157*	1									
compensati~s	0.0353	0.038	0.0546	-0.0146	0.0099	-0.0439	-0.1023*	-0.0409	-0.0839*	1								
newbizdens~y	0.2565*	0.1256*	0.2495*	-0.1026*	0.002	-0.0121	0.3450*	-0.0554	0.1598*	0.0525	1							
depthofcre~o	0.2599*	0.0198	0.0674*	-0.1135*	0.1547*	0.1194*	0.0859*	0.021	0.1208*	-0.0044	0.2214*	1						
starticles	0.0284	0.1119*	0.1369*	-0.0710*	0.8430*	0.8299*	0.0756*	0.7323*	0.2658*	0.0051	-0.0085*	0.0883*	1					
patentappl~s	-0.0196	0.1936*	0.1673*	-0.0734*	0.7034*	0.7257*	0.0892*	0.8636*	0.2690*	-0.0284	-0.0693*	0.0616*	0.7314*	1				
mobilesubs~t	0.5455*	0.0845*	0.3461*	-0.2138*	0.1228*	0.0936*	0.2358*	-0.0302	0.3116*	0.1199*	0.4394*	0.4589*	0.1083*	0.0242	1			
broadbands~t	0.4272*	0.2148*	0.2995*	-0.2028*	0.1879*	0.1972*	0.2029*	0.0284	0.4488*	0.0016	0.4563*	0.5061*	0.1632*	0.0734*	0.7249*	1		
individual~t	0.5411*	0.2041*	0.3140*	-0.2345*	0.1655*	0.1755*	0.1909*	0.0157	0.4698*	0.0166	0.4489*	0.5149*	0.1508*	0.0688*	0.8494*	0.8798*	1	
exportsofgdp	0.3993*	0.2788*	0.4133*	-0.0824*	-0.0870*	-0.1154*	0.4421*	-0.1873*	0.0088	0.1344*	0.3540*	0.0736*	-0.1224*	-0.1796*	0.3233*	0.2205*	0.2415*	1
edu_tertiary	0.0343	0.1747*	0.1301*	0.0097	0.1566*	0.1583*	0.0887*	0.1246*	0.4227*	-0.0579	0.1976*	0.2337*	0.1389*	0.1044*	0.3199*	0.3813*	0.3577*	-0.0386
laborwitha~u	0.1392*	0.2303*	0.1501*	-0.1062*	0.1300*	0.1704*	0.1023*	0.0485	0.4155*	-0.0173	0.2369*	0.2103*	0.1135*	0.0166	0.3762*	0.4127*	0.4425*	0.0632*

Expected Conclusion

❖ Expanding R&D investment and upgrading the technology of the industry enable long-term growth.

❖ By maintaining the growth strategy and policy stance of simultaneously developing technology and material investment, the Korean economy will converge on the level of advanced countries.

❖ Korea needs to increase its social capital and advance its policies so that it can increase its economic growth.

❖ Quality of life will also improve when the proportion of high value-added industries increases.

❖ Social capital, high value-added industries, and high-education workforce emissions have high correlation.

8.

Evolution of open innovation by value-based network perspective: The case of Korean smart home industry

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Introduction

What is Smart Home Industry? (1/2)

Home Entertainment

Microsoft is releasing Xbox ONE, a home entertainment device with the concept of 'All-In-One', to enjoy various contents on one device.

Google will release Chromecast, which combines smartphones and TVs with a TV receiver

NTT DoCoMo's DoCoMo Smart Home, Japan's largest mobile operator, provides home entertainment services.

Home Data

Google (Android) Android home framework to bundle all the home appliances in the home with mobile OS Android

Home Automation

Supplied integrated home management system that enables users to control all situations at home through 'Digital Life' smart device of AT & T

Verizon Wireless is the first US mobile service provider to launch 'Home Monitoring and Control' services focusing on home monitoring, security checks, and energy control services.

Home Healthcare

MIT University developed technology related to various sensors, mobile support, health monitoring system, home automation system through Home Automation and Healthcare project

Korean Smart Home Industry

Samsung Electronics

Oriented smart home service that maximizes user convenience through integrated application of smart TV and smartphone, which is its main product.

LG Electronics

From 2013, LG signed an MOU with ABB, Bosch, and Cisco to develop 'Smart Home' technology and actively invest in 'Open Innovation' to foster next-generation smart home market.

KT, SKT, LG U+

In order to escape the stagnant business environment, we noticed the smart home business as a new revenue model.

Since 2010, KT has been promoting 'Educational Robots (Kibot 1,2)', 'Smart Home Phone HD' and 'Smart Home Pad' as its three major smart home businesses.

SKT has entered the home network market through SK Telecom's home network business (D.Home) since 2007.

LG U + has built U + ACN (AP Centric Network) based on home WiFi AP for home network system since 2010.

Development Strategy of Korean Smart Home Industry

Korean smart home industry is developing into home entertainment and information appliances, while overseas smart home industry is developing into various parts.

Especially, in the home data and healthcare sector, the development level of Korean smart home industry is insufficient compared to overseas.

In the case of the home data industry, the problem of standardization of data codes of various electronic devices necessitates consensus and support for national and important companies due to the complexity of their interests.

The healthcare industry also needs R&D in support of the convergence of IT, BT and medical services with more national support.

Background and Theory

<div style="background:#1f7fc0; text-align:center">Innovation System</div>

- Innovation takes place through technology and information flowing through mutual exchanges between innovation actors such as business and government universities.
- First advocated by Ludwall (1985)
- Related research
    - NIS: *Freeman(1987), Ludwall (1992), Nelson (1993)*
    - SIS: *Breschi & Malerba (1996), Marlerba (2004)*
    - RIS: *Cooke et al. (1997)*
- Metcafe (1978): Set the subject of innovation as enterprise, government, and consumer
- Pavitt(1988): Set the subject of innovation as corporations, universities, and governments
- Freeman(1982): Advised on the importance of university in innovation

> Limitation of Previous Research:
> - Collaboration is limited to mutual relations among innovation actors in the innovation system.
> - As the subject of innovation, focusing on companies and government universities, the role of users is restricted to consumers.

Background and Theory

<div style="background:#1f7fc0; text-align:center">Open Innovation</div>

- The management strategy that enhances efficiency by utilizing external technologies and knowledge from universities, other companies, and research institutes in research, development, and commercialization (Chesbrough, 2003; Feams et al., 2005; Enkel et al.,2009)
- Related research
    - Types of cooperating partners (business, university, government, user)
        - *Belderbos et al. (2004)*
    - Level of cooperating partners (top, bottom, same industry)
        - *Tomlinson (2010), Arranz and Arroyabe (2008)*
    - Types of networks (technical cooperation, M & A, Joint R & D etc.)
        - *Chesbrough (2003), Chesbrough (2006), Gwynne (2007)*
    - Network quality (duration, contract type, strength)
        - *Nieto and Santamaria (2007)*
    - Network Diversity (number of networks)
        - *Nieto and Santamaria (2007), Faems et al. (2005)*
    - Network directionality (internal, external)
        - *Lichtenthaler and Ernst (2009)*

User Innovation

The theory explaining the important role of users in the market

Noting the leading and voluntary impact of users on the creation of new values of products and services

Von Hipel(1998), Shah & Tripsas (2007), Oliverira & von Hippel (2009)

Related research

Changes in user roles

Shah (2000), Franke and von Hippel (2003),   Tietz et al. (2005) , Raasch et al. (2008), Oliveira and von Hippel (2009)

Causes of user innovation

Tomlinson (2010), Arranz and Arroyabe (2008)

Analysis of user innovation activity by large scale data

Bogers (2009), de Jong and von Hippel (2009), Lhuillery and Bogers   (2006), Chatterji and Fabrizio (2008)
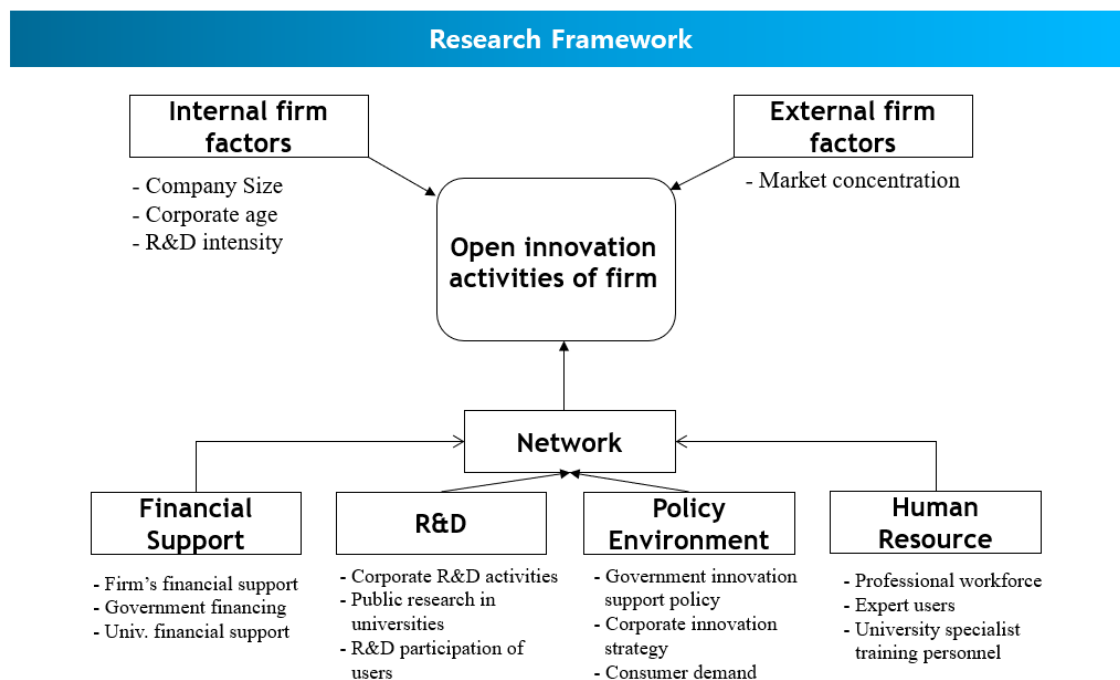
Background and Theory

Innovation value according to subjects in smart home industry		
Innovation subject	Value	Related Research
Gevernment	Supporting Policy	Metcalfe (1982) Malerba (2004)
	Financial aid to Private Firm	Freeman (1982) Pavitt (1988)
	Financial aid to Public Research	Freeman (1982) Smilor (1987) Pavitt (1988) Malerba (2004)
Firm	Technology Development	Metcalfe (1978) Pavitt (1988) Lettl (2007) Nambisan (2002)
	Capital Support	Cooper (1976) Freeman(1982) Malerba (2004)
	Researcher and Labor	Pavitt (1988)
	Innovation Strategy	Pavitt (1988)
University	Public Research	Pavitt (1988)
	Trained experts	Mowey & Rosenberg (1991)
User	R&D participation	Lettl (2007) Von Hippel (1988) Riggs & von Hippel (1994)
	Expert users	Von Hipple (1988) Lettl (2007) Riggs & von Hippel (1994)
	Shaping market demand	Metcalfe (1978) Malerba (2004)
Collaboration	Creating links among actors	Pavitt (1988) Chesbrough (2003)
	Network Activity	Chesbrough (2003) Enkel et.al (2009)
	Creating link with firm and government	Pavitt (1988)

Background and Theory

Value based innovation system in smart home industry		
Component	**Value**	**Subject**
Financial Support	Capital Support	Firm
	Financial aid to Private Firm	Government
	Financial aid to Public Research	Government
R&D	Technology Development	Firm
	Public Research	University
	R&D participation	User
Collaboration Activity	Creating links among actors	Government
	Network Activity	Firm
	Creating link with firm and government	University
Policy Environment	Supporting Policy	Government
	Innovation Strategy	Firm
	Shaping market demand	User
Human Resource	Researcher and Labor	Firm
	Expert users	User
	Trained experts	University

Background and Theory

Research Framework

Internal firm factors
- Company Size
- Corporate age
- R&D intensity

External firm factors
- Market concentration

Open innovation activities of firm

Network

Financial Support
- Firm's financial support
- Government financing
- Univ. financial support

R&D
- Corporate R&D activities
- Public research in universities
- R&D participation of users

Policy Environment
- Government innovation support policy
- Corporate innovation strategy
- Consumer demand

Human Resource
- Professional workforce
- Expert users
- University specialist training personnel

Methodology

○ Data: Firm Survey Data in Korean Smart Home Industry
  ○ 400 companies survey
  ○ 208 companies responded

Model 1: Logistic Regression

New product innovation$_i$, Product improvement$_i$ = exp (a1*Age + a2*Size + a3*RD + a4*HHU + a5*FIN_F + a6*FIN_G + a7* FIN_UNI + a8*R&D_F + a9*R&D_UNI + a10*R&D_U + a11*POL_G + a12*POL_U + a13*POL_F + a14*HUM_F + a15* HUM _UNI + a16*HUM _U + u$_i$) , where u$_i$ is the error term.

Model 2: Negative Binomial Regression

Number of Patents$_i$ = exp (a1*Age + a2*Size + a3*RD + a4*HHU + a5*FIN_F + a6*FIN_G + a7* FIN_UNI + a8*R&D_F + a9*R&D_UNI + a10*R&D_U + a11*POL_G + a12*POL_U + a13*POL_F + a14*HUM_F + a15* HUM _UNI + a16*HUM _U + u$_i$) , where u$_i$ is the error term.

Methodology

Categories	Variables	Descriptions	Researches
Dependent variables	[NEW]	Noticeably distinct from existing products	EU Commission (2003) Lev (2001)
	[IMPROV]	Noticeably different from existing products	EU Commission (2003) Lev (2001)
	[PATENT]	Number of patent enrolled	Galende & Fuente (2003) Griliches (1990)
Explanatory variables	[FIN_VAL]	Number of network with financial values	Kortum and Lerner(2000) Wallsten(2000)
	[FIN_F]	Participation in network with firm's financial support value	Kortum and Lerner(2000)
	[FIN_G]	Participation in government's financial support value	Tripsas et al.(1995) Wallsten(2000)
	[FIN_UNI]	Participation in university's financial support value	Schartinger et al. (2002)
	[R&D_VAL]	Number of network with R&D values	Okamuro (2005) Santoro & Chakrabarti(2002
	[R&D_F]	Participation in network with firm's R&D value	Rosenfeld(1996), Okamuro (2004)
	[R&D_UNI]	Participation in university's R&D values	Tether(2002)NSB(1993)Schartinger et al. (2002)
	[R&D_U]	Participation in university's R&D values	Von Hippel(2005), Lilien et al. (2002), Rosenberg (1982)
	[POL_VAL]	Number of network with policy environment values	Feldman and Kelley(2006)
	[POL_G]	Participation in government's policy environment values	Beugelsdijk & Cornet(2002) Souitaris(2002) Branstetter & Sakakibara(1998)
	[POL_U]	Participation in user's policy environment values	Narver and Slater(1990) Han et al.(1998) Von Hippel(1988)
	[POL_F]	Participation in network with firm's policy environment values	Vanhaverbecke et al. (2008) Enkel &Gassmann(2010)
	[HUM_VAL]	Number of network with human resource values	Shaw(1994) Zucker and Darby(2001)
	[HUM_F]	Participation in network with firm's human resource values	Perkmann(2007)
	[HUM_U]	Participation in user's human resource values	McQuail(1987) Frey et al.(2000) Salomo et al.(2003)
	[HUM_UNI]	Participation in university's human resource values	Stuart et al.(2007) Zucker et al.(1998) Zucker et al.(2002)
Control variables	[AGE]	Age of firm	Klepper (1996) Cohen et al. (1987)
	[SIZE]	Revenue of firm	Pavitt (1984) Lichenthanler (2008)
	[R&D]	The ratio of R&D investment to the firm's total expenditure	Brown & Svenson (1998)
	[HHI]	Market concentration ratio	Levin et al. (1985) Han & Manry (2004)

Results and Discussion

Statistical Descriptions

<Model1>

Variable	Observe	Mean	Std.Dev.	VIF	Min	Max
1. AGE	189	12.15	6.23	1.40	2	43
2. SIZE	189	3.65	.87	1.86	2	5
3. R&D	189	3.12	.82	1.30	0	5
4. HHI	189	2703.6	1769.2	1.19	188	7647
5. FIN_VAL	189	1.22	1.05	2.58	0	3
6. R&D_VAL	189	1.29	1.19	2.83	0	3
7. POL_VAL	189	1.47	1.16	2.54	0	3
8. HUM_VAL	189	1.08	1.05	1.87	0	3

<Model 2>

Variable	Observe	Mean	Std.Dev.	VIF	Min	Max
1. AGE	189	12.15	6.23	1.56	2	43
2. SIZE	189	3.65	.87	1.98	2	5
3. R&D	189	3.12	.82	1.36	0	5
4. HHI	189	2703.6	1769.2	1.29	188	7647
5. FIN_F	189	.58	.49	1.97	0	1
6. FIN_G	189	.46	.50	2.05	0	1
7. FIN_UNI	189	.17	.38	1.97	0	1
8. R&D_F	189	.47	.50	2.27	0	1
9. R&D_UNI	189	.29	.45	2.17	0	1
10. R&D_U	189	.52	2.73	2.55	0	1
11. POL_G	189	.46	.49	2.26	0	1
12. POL_U	189	.529	.50	1.54	0	1
13. POL_F	189	.48	.50	1.67	0	1
14. HUM_F	189	.32	.46	1.76	0	1
15. HUM_U	189	.50	.50	1.56	0	1
16. HUM_UNI	189	.25	.43	1.64	0	1

Results and Discussion

	New product innovation				Product improvement				Number of patents			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Network var.												
FIN_VAL	1.1389**	0.028			.05415	0.881			.2364	0.267		
R&D_VAL	1.1558**	0.049			-.0187	0.960			1.0640***	0.000		
POL_VAL	.0897	0.859			.8184**	0.025			.5642*	0.066		
HUM_VAL	.9970**	0.015			-.2945	0.376			.0068	0.972		
FIN_F			5.1271**	0.022			-.8412	0.334			.2514	0.657
FIN_G			-.7444	0.626			1.0074	0.248			-.0014	0.998
FIN_UNI			-.4905	0.828			.7328	0.520			.4488	0.267
R&D_F			2.4316	0.114			-.0462	0.953			2.0263***	0.007
R&D_UNI			.6375	0.730			-.7594	0.453			.9203*	0.075
R&D_U			5.1140**	0.042			2.2972	0.034			-.1403	0.848
POL_G			.3317	0.814			-1.0621	0.324			-.3497	0.626
POL_U			-.1.984	0.339			2.0551***	0.006			.8049	0.158
POL_F			.5562	0.656			.3942	0.586			1.4958*	0.060
HUM_F			1.4011	0.354			-2.158*	0.060			.9039**	0.037
HUM_U			3.5043**	0.044			1.2782*	0.070			-.1855	0.706
HUM_UNI			3.5256*	0.075			-.5514	0.569			.1093	0.793
Control var.												
AGE	-.0024	0.975	-.2360	0.247	.1289**	0.044	.1617**	0.032	-.0320	0.382	-.0143	0.688
SIZE	-1.229**	0.027	-1.8668	0.116	.9903**	0.011	.8585*	0.098	.0378	0.896	.4744	0.110
HHI	-.0005	0.168	-.0012**	0.039	.0003*	0.096	.0003	0.181	.00003	0.847	.0001	0.328
R&D	.5456	0.275	1.3707	0.112	-.4407	0.246	-.4975	0.287	.8519***	0.000	.8433**	0.017

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Results and Discussion

New Product Innovation

The dependent variable is considered as a new product innovation, the network (FIN_VAL) with financial support value, the network with R&D value (R&D_VAL) and the network with human value (HUM_VAL), and it has a positive effect on new product development innovation.

On the other hand, the policy environment variables (POL_VAL) and other control variables (firm age, R&D intensity, market concentration) did not show a statistically significant relationship with new product innovation.

Moving on to analyze this in more detail, the four value networks can be classified into three categories. We have seen how each factor affects new product innovation. The results show that FIN_F, R&D_U, HUM_U and HUM_UNI have a positive effect on the network and the remaining value networks do not have a significant relationship with new product innovation.

Product Improvement

POL_VAL has a positive effect on product improvement innovation.

However, it does not have a significant effect on networks with other values such as FIN_VAL, R&D_VAL, and HUM_VAL.

The user's policy environment value (POL_U) and manpower value (HUM_U) both have positive effects on product improvement innovation.

However, there is a negative relationship with the company's workforce value in the case of R&D_F.

Also the results showed that the other values had no significant effect.

Patent

The results of Model 1 show that the network with R&D value (R&D_VAL), as well as new product innovation, positively influences innovations in terms of patents.

If companies increase the number of networks with R&D value, the probability of patent registration is higher. By contrast, the remaining networks, FIN_VAL, HUM_VAL, and POL_VAL, did not have a statistically significant effect.

A positive effect was observed in terms of the university's financial support network (FIN_UNI), corporate R&D (R&D_F), and corporate human resource value (HUM_F).

Conclusion

This study found that the value of different open innovations influenced new product

innovation, product improvement, and number of patents as innovations.

For new product innovation, it is helpful to build networks for financial support, R&D, and human resources.

On the other hand, it is more important to establish a government policy network for product improvement.

For number of patents, it is necessary to establish R & D and government policy network.

The total value of each entity has a different effect on the innovation performance (New product innovation, Product improvement, Number of patents) rather than the influence of network objects such as corporations, governments, universities and users on the innovation performance.

9.

System Analysis and modeling of the collaborative governance in post-disaster reconstruction

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Abstract

Reconstruction practice after a disaster is a series of activities, including infrastructural, psychological, demographic, economic, cultural and political reconstruction. Due to complexity of reconstruction operations and interdependency among facilities and other elements, traditional approaches are limited in their ability to analyze multiple interdependent processes operating simultaneously. In this regard, simulation approaches partially overcome the empirical problem of data availability, especially in emergent post-event situation, because of its some advantages including the ability to precisely track the behavioral steps and feedback process leading to the outcomes of interest (Harrison et al., 2007).

This study developed a system dynamics (SD) simulation model to analyze the dynamic features of overall recovery efforts while considering collaborative governance in post-disaster reconstruction from a holistic perspective. Our research focuses both on reconstruction work progress and the collaborative governance among different participants. Three fundamental questions are tackled in this article:

1. How can a system dynamics approach help understand the dynamics of collaborative governance in post-disaster reconstruction?
2. What are the interactions and feedback loops among factors (e.g. outcomes and performance drivers) affecting the collaborative governance in post-disaster reconstruction?
3. How to intervene these interactions and feedback loops in order to obtain sustainable post-disaster reconstruction?

There have been many research efforts to analyze and improve the disaster manage

ment. For example, Won et al. (2015) introduced the concept and characteristics of n atech disaster (natural hazards triggered technological disaster) and to explore the poli cy issues in complex disaster management in Korea using bow-tie model and ABM (Agent-based model). Researches focus on the reconstruction process include resource supply chain management (Orabi et al., 2010; Freeman et al., 2014), reconstruction m anagement (Opdyke et al., 2018), and collaboration (Yi & Tu, 2018). Despite their co ntributions toward reducing the negative impacts of interrupted functions, one key to i mplementing a better reconstruction practice within limited time and resources is to u nderstand how reconstruction systems can change over time according to the collabora tion among multi-stakeholders from a holistic perspective. There are multiple difficulti es in addressing this concern. First, there lacks comprehensive understanding (at the macro level) of complex and multiple collaboration among multiple stakeholders. Seco nd, there lacks understanding about dynamic changes of collaborative governance in th e overall recovery system. Third, there also lacks a strategic point of view that can b e helpful in capturing the effects of collaborative governance in diverse reconstruction practice.

To accomplish the research object, system analysis and SD Modelling are used. Firstly, the system analysis of collaborative governance in post-disaster reconstruction is conducted from three aspects: the availability of resources, the allocation of resources and the long-term outcomes of collaborative governance in post-disaster reconstruction.
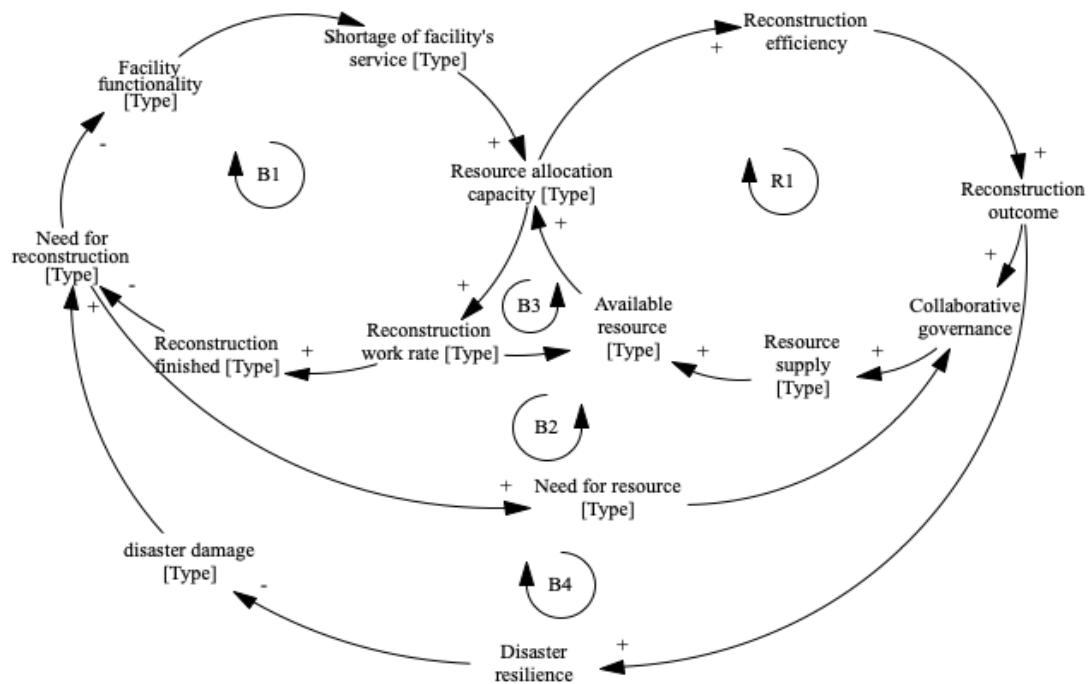
Figure 1 General Causal loop diagrams: Post-disaster reconstruction and collaborative govern ance (Adapted from Hwang et al., 2014)

Table 1 Variable classification based on types of infrastructures
(Adapted from Hwang et al., 2014)

Variable [type]	Reconstruction type	Function
Variable [G]	General infrastructure (e.g., residential and commercial building)	Residential and commercial service
Variable [C]	Critical infrastructure (e.g., school, hospital, power communication, ...)	Public service
Variable [I]	Industrial infrastructure (e.g., industry, agriculture, tourism. ...)	Industrial and economic service
Variable [T]	Transportation infrastructure (e.g., roadway, railroad, ...)	Transportation service

As shown in Figure 1 and Table 1, a disaster event generates considerable need for reconstruction of the system. As for the types of facilities/infrastructures within the region, they can be categorized into four types (i.e., subdimensions) into the "Type" dimension of an array variables according to their functions (Shoji & Toyota, 2009). When many facilities are damaged, and consequently, many projects simultaneously require restoration resources, resource problems can be more severe. Thus, the more established the collaboration system, the more opportunities for an exchange of the resources and information required in post-disaster reconstruction, and recovery facilitation ("B1" loop in Figure 1). From another point of view, a lack of resources for post-disaster housing reconstruction significantly limits the prospects for successful recovery ("R1" loop in Figure 1).

Secondly, a detailed stock-and-flow diagram (see Figure 2) was constructed based on the casual loop diagram and DPM diagram, and equations and parameters were entered for all variables. Verification has been carried out on both the "structure" and the "behavior" of the model. The simulation result shows the trends of living standard, economy development level, government credibility and citizen satisfactory increase in S-shaped growth curve. These social-economic performance indicators grow mild at the start of post-disaster reconstruction, while they jump in the middle of reconstruction and rise to one, which mean that the whole potential of collaborative governance is now being exploited. Variations of corporate image and social identity experience logarithmic. These simulation results state that the corporate image of profit organizations and social identity of non-profit organizations often grow faster in the early stage of reconstruction. They could achieve a higher return for their participation. Thus, it will be of interest to encourage profit and non-profit organizations to participate in the post-disaster reconstruction practice as soon as possible. The results of policy analysis ill

ustrate that a higher government fund policy reduces the effect of collaborative gover
nance in a long term. Government credibility has a significant positive effect on the
corporate image of profit organizations and social identity of non-profit organizations
comparing with other polices.
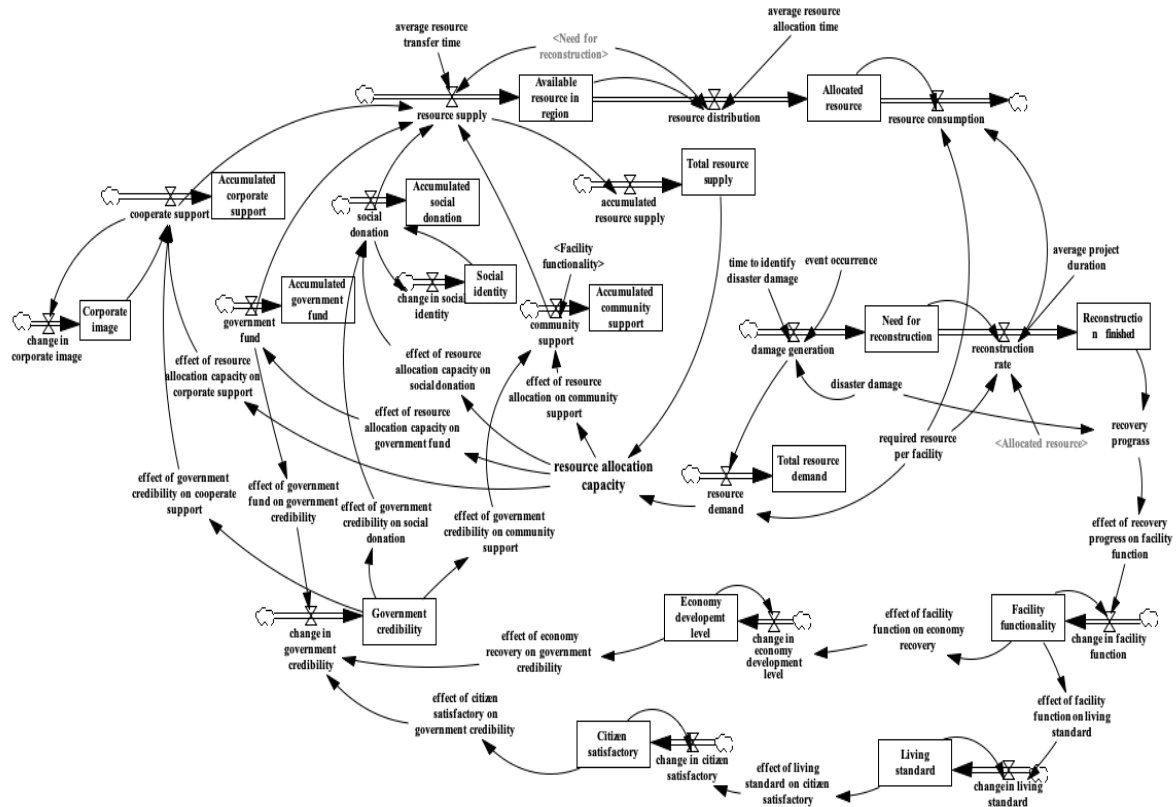
Figure 2 The stock and flow diagram model: Post-disaster reconstruction and collaborative governance

Policy implications and lessons learned from policy analysis can support in providi
ng specific guidelines for future post-disaster reconstruction, such as over-reliance on
government support should be reduced, improvement of government credibility should
be emphasized, resource supply should be allocated reasonably and the enhancement o
f community's resistance should be taken into consideration in post-disaster reconstruct
ion. The analysis results and discussions accumulate knowledge of dynamic and compl
ex collaborative governance in reconstruction practice with understandable model struct
ures in causal loop diagrams. Further research is necessary to develop more applied k
nowledge on this general model and its effectiveness in supporting collaborative gover
nance in post-disaster reconstruction.

Keywords: Collaborative governance, post-disaster reconstruction, system dynamic model
ling, dynamic performance management

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10.

A Study on the Performance of the Supply Chain Participant and the Moderating Effect of Open Innovation Activities

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Ⅰ. Introduction

With the globalization of enterprise activities, the framework of cooperation in the production and sales activities of manufacturing companies is becoming more important, and these activities can be described as those of the supply chain

Companies participating in the supply chain may experience increased uncertainty over the participation activities of the supply chain depending on their location and degree of partnership within the supply chain. .

These situations may be taken more seriously, especially for small and medium-sized manufacturing entities. Small and medium-sized manufacturing companies will have no choice but to focus on management activities for continued survival, and one of the external drivers required for such survival will be to seek viability through open innovation activities.

Through this study, we intend to empirically research and analyze the role of innovation in terms of sustainability of small and medium manufacturing companies.

Ⅱ. Theoretical background

1. SCM Network

Kapasuwan (2004) explains that an inter-enterprise network is a group that utilizes all possible relationships to obtain diverse resources such as consulting, finance, and market assurance, and that its network activities can reduce uncertainty in its activities, provide flexibility, and enable access and communication of resources and information that the entity does not have.

Street & Cameron (2007) explained that sharing of resources, information, and knowledge flows between entities can be viewed as a link between organizations that can have a significant impact on corporate performance and that has the potential to provide tangible and intangible benefits, such as new experiences, knowledge and resources that individual firms do not acquire.

Rickne (2001) referred to connections between organizations that could have a significant impact on corporate performance by sharing the flow of resources, information and knowledge between entities. Therefore, the view that the network will have a positive effect on business performance can be explained by various theories.

Doney et al (1997) studied the properties of trust in the buyer-seller relationship. They also found that the vendor's trust in the supplier entity and its salesperson affects the predicted future interactions between the supplier and the purchaser

McMullan and Long (1987) stated that if the education level of the CEO is high, the company's strategic implementation and execution are excellent, but its adaptability is low in uncertainty situation.

Lindgaard (2019) stated that young people have more up-to-date educational opportunities than older people, making them more aware of the importance of recent technologies and innovative techniques, and more successful with bold drive and implementation.

2. Resource accessibility

Sean (2006) presented access to information and resources as the most representative effectiveness that private network connectivity can provide in his studies of networks described as social capital. It also demonstrated empirically that an entity can benefit from creating and spreading information by networking with other entities (Tsai & Ghoshal, 1998; Yli-Renko, Autio & Mapienza, 2001).₩The network noted that its members not only increased access to information, but also improved the

quality of information, relevance of content and timeliness (Adler & Kwon, 2002).

Hypothesis 1: SCM network will positively affect the resource accessibility.

Hypothesis 2: SCM network confidence will positively affect the resource accessibility

Hypothesis 3: Absorption ablity will positively affect the resource accessibility

Hypothesis 4: CEO education level will positively affect the resource accessibility

Hypothesis 5: Firm size will positively affect the resource accessibility

Lane, Koka & Pathak (2006) argued that absorption has a positive effect on innovation and corporate performance as knowledge performance such as general knowledge, scientific knowledge, technical knowledge and organizational knowledge are generated along with business performance such as products and services and patents. Mowery, Oxley, and & Silverman (1996) demonstrated that the higher the absorption capacity, the higher the innovation of the entity, and explained why.

Lane, Salk, and Lyles (2001) found that knowledge learned from the parent company and the use of knowledge from outside the parent company had a positive effect on the performance of the international joint venture.

Hypothesis 6 resource accessibility will positively affect the operation performance

3. Open Innovation

Cesbrough et al. (2006) defined open innovation as a deliberate inflow and outflow of knowledge to make internal innovation and expand the market for external use of innovation.

From the perspective of resource-based theory, an open approach to innovation can be overcome by the wide use of manufacturing facilities, distribution panels, and customer base by utilizing other companies' resource networks.

Acquiring skills or resources from outside partners enables the acquisition of information about the activities of competitors in the same industry. Open innovation can also help businesses mitigate
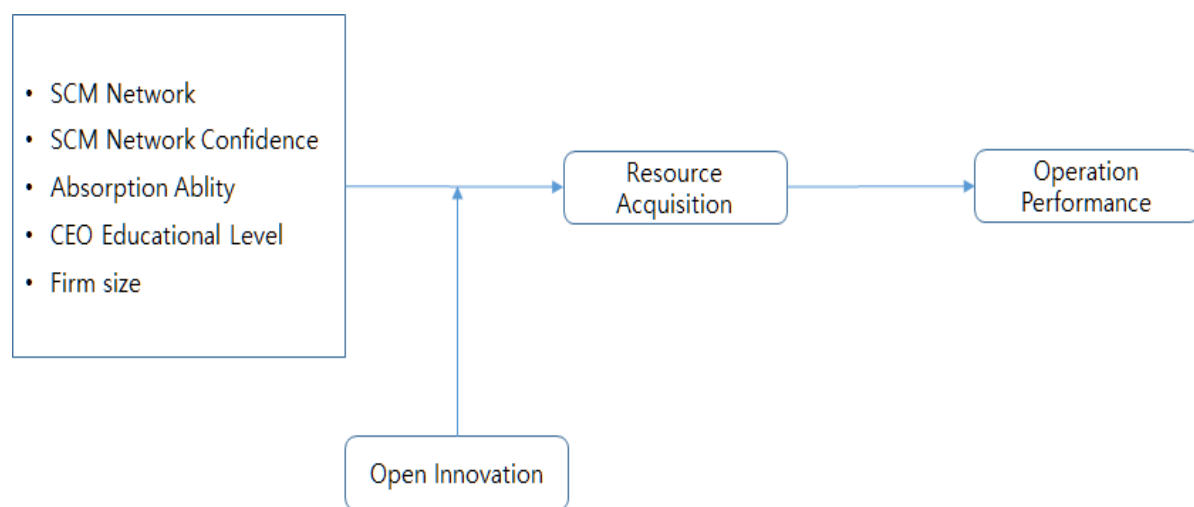
the uncertainty associated with innovation.

Hypothesis 6 Open innovation will moderate affect the relationship between the SCM network, SCM network trust, absorption capacity and resource accessibility.

Ⅲ. Empirical analysis of research

1. Conceptual Research Model

2. Subject of research

As a research method using a survey, we will focus on small and medium-sized manufacturing companies in Daegu and Kyungsangbukdo.

3. Methods of research

In order to examine the validity and reliability of the variable measures, exploratory factor analysis and reliability were measured using SPSS 23.0. For hypothesis testing and path analysis, use   Smart PLS analysis. The analysis of the adjustment effects is also performed using Smart PLS.

1) SCM Network

In this study, to define the supply chain network as the level of mutual cooperation between the

companies within the supply chain and measure using four questionnaires. The development of the questionaires by Heikkila(2002), Johnstonetal.(2002,2004), Jap(1999), Heideetal.(1990), Myht& Speckman(2005).

2) SCM Network Confidence

SCM Network Confidence define The inter-company needs of the supply chain will to strive to satisfy and the degree to which one believes in achieving profit. Measuring four questionnaires. The development of the questionnaires Kumaretal.,(1996), JordanLewis(1999)

3) Absorption Ability

Absorption capacity was defined conceptually to the extent that it could be converted to enhance the capacity of the organization by internalizing that knowledge to obtain outside knowledge and actually utilized for product development. Items used in the preceding studies for measurement of three sub-dimensions of absorbed capacity were composed of search capacity, conversion capability and utilization capacity.(Gebauer, Worch, and Truffer, 2012; Tzokas et al., 2015) Measuring 8 questionnaires.

4) Control Variable

Third-party variables that may affect the results of this study were considered as control variables. The size of the enterprise and the stage of business growth were considered as the control variables. The entity's size was measured by the number of employees of the sample company. And he used the management's academic background as a control variable.

5) Resource Accessesbility

In this study, resource accessibility was defined as a degree of usability of tangible resources that affected the firm's competitiveness and the questionnaires used in Liden(2001), Spreitzer(1996) Sandefurandaumann(1998) research were used. Measuring 6 questionnaires.

6) Operation Performance

The performance of an entity's operations was measured in this study as non-financial performance perceived by management. Non-financial indicators are indicators of qualitative relevance that cannot be measured with financial settlement data and are primarily dependent on management's

subjective judgment measured by 6 questionnaires.

IV. Conclusion and discussion

1. Results of the study

Today's global business environment is very dynamic, uncertain, and business complexity is gradually increasing, so supply chain management depends on how companies participating in the supply chain utilize the resources and capabilities they have.

OI activities are primarily a process of acquiring outside knowledge and promoting knowledge inflow and outflow, so the suitability of the entity's capabilities should be considered.

Absorption capacity affects performance by processing new external knowledge and communicating the necessary knowledge to innovative activities. While acquisition and assimilation of the capacity to absorb is the activity of discovering and analyzing relevant external information, deformation and utilization are the activity of combining external knowledge with internal knowledge to connect to competitive advantage.

As for the directionality of the adjustment effect of open innovation variables, the results of the preceding studies show antagonistic adjustment of two-way rather than effectiveness in one direction, so it is believed that the direction of the adjustment effect between groups with high levels of open innovation and those with low levels of innovation will differ.

2. Limitations and Suggestions

Although researchers have made many efforts to minimize bias in the study, this study has some

limitations. If sample data were collected from more diverse companies due to problems with

research data, I think it would have been more helpful in generalizing the results of the research.

Although the moderating effect of open innovation may vary from industry to industry, this study did not specifically distinguish between industries. Therefore, it may be different from the results of a study of companies in a wider range of industries. And Absorption capacity variables consist of four subparameters, but in this study only two subparameters were used.

In this era of global business environment, we hope that cross-border research, divided by industry, will help us interpret research results more.

Finally, it may be considered to analyze the data between companies in a time series to see if there is a difference in performance and how it relates to external environmental variables.

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11.

Green Credit Policy and Corporate Debt Financing

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Abstract

Purpose/ Research Question: With the guidance of national policies and social needs, going green has become the development strategy and goal of more and more Chinese listed companies. Guided by this goal, the China Banking Regulatory Commission issued the "Green Credit Guidelines" in 2012, which clarified the standards and principles of green credit in the banking industry. The green credit policy actually requires financial institutions such as banks to incorporate environmental risks into their credit decisions, reduce credit support for projects with high environmental risks, and increase credit support for projects that meet the concept of sustainable development. At the level of listed companies, listed companies in heavy polluting industries with high environmental risks are vulnerable to the green credit policy, while listed companies in industries such as renewable energy may be further easing financing constraints due to the green credit policy. Therefore, we focus on the impact of the green credit policy on debt financing of listed companies in the heavily polluting industries and renewable energy industry, and attempt to empirically test the implementation of the green credit policy.

Key Literature Reviews (About 3~5 papers): Before the implementation of the "Green Credit Guidelines", some scholars have paid attention to the green credit policy implemented by China at the national and provincial levels (Zhang et al., 2011). With the improvement of the green credit policy in recent years, scholars have gradually begun to pay attention to the implementation effect of the green credit policy at the enterprise level. Zhou et al. (2018) focus on the impact of carbon risk on debt financing in high-carbon companies and explored the moderation effect of media

attention; Change et al. (2019) investigate the influences of credit policy and financial constraints on tangible and research & development (R&D) investment of companies in renewable energy industries. He et al. (2019) find that green financial development has a negative impact on renewable energy companies' access to bank loans and inhibits investment efficiency; Luo et al. (2019) find that the quality of environmental information disclosure of heavily polluting listed companies has significantly reduced the cost of debt financing. Through literature review, we find that existing research only focuses on the impact of the green credit policy on listed companies in a particular industry, and lacks a study to examine the effectiveness of policy implementation from a more comprehensive perspective. Therefore, we choose to study the impact of the green credit policy on the listed companies in industries which are positively and negatively affected, and comprehensively examine the effect of policy implementation.

Design/ Methodology/ Approach: Considering that the regulatory requirements issued by the regulatory authorities are exogenous and unpredictable for listed companies, we can construct quasi-natural experiments based on the promulgation of the ''Green Credit Guidelines'', and divide the experimental and control groups according to time and industry. The listed companies in the industries affected by the policy are the experimental group samples, and the remaining listed companies are the control group samples. We have established a difference-in-differences model to examine the different impacts of green credit policy implementation on debt financing (including the size, duration and cost of debt financing) of listed companies in the heavily polluting industries and renewable energy industry, thus providing empirical evidence for green credit policies to eliminate backward production capacity and promote green transformation. On this basis, we further examined the impact of the nature of the company's controlling shareholders, the quality of corporate environmental information disclosure, regional environmental regulations and regional financial development on the implementation of green credit.

(Expected) Findings/Results: Through empirical tests, we expect to find that after the implementation of the green credit policy, the debt financing scale of listed companies in heavily polluting industries has dropped significantly, the debt financing period has become significantly shorter, and the debt financing cost has risen significantly, indicating that the green credit policy has inhibited the listing of heavily polluting industries. While the debt financing scale of the listed companies in the renewable energy industry has risen significantly, the period has become significantly longer, and the cost has dropped significantly, indicating that the green credit policy has promoted the debt financing of listed companies in the renewable energy industry. In further analysis, we also expect to find out the impact of the nature of controlling shareholders, the quality of environmental information disclosure, regional environmental regulations and regional financial development on the effectiveness of policy implementation. We expect research findings to support

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that green credit policy plays a positive role in guiding listed companies to go green through the redistribution of debt financing.

Research limitations/ Implications: First, considering the availability of data and referring to existing research, we divided the experimental group and the control group according to the industry. The sample has not been classified according to the environmental risks at the listed company level, which may have a certain impact on the evaluation of policy effects. Second, we only considered the impact of policy implementation on the debt financing of listed companies, and did not involve the impact on other behaviors of listed companies, such as investment behavior. Third, we have not continued to explore the impact of the implementation of green credit policies on the performance of listed companies, such as the efficiency or competitiveness of listed companies.

Keywords: green credit policy; debt financing; heavily polluting industries; renewable energy industry

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12.

The Dark Sides of Digitalization: Social Media Addiction

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Abstract

Purpose/ Research Question:
The social media platform such as Facebook, Twitter, YouTube, Instagram, WhatsApp and WeChat enable its users to create the profile and share the content within their network and their friend's network through posting, sharing and tagging. However, due to the unlimited use of social media by the people there are several factors such as constantly checking the notification, scrolling down the wall, continuously updating the status and stories leading to the social media addiction. Social media addiction is considered as one of the most common issues faced by everyone as an individual, working within organization and society and there no certain age group restriction to open an account.

The growth of digitalization is boosted in the past few eras and social media platform is a source of connectivity between individuals, society and organisation. However, there are unveiled dark sides of digitalization at all the levels. Therefore, the project aims to focus on various processes and consequences of these dark sides, especially in social media use. The primary goal of the project is to focus on the reasons and factors behind the dark sides of social media use. With heavy literature review and statistical analysis, this project will deliver a structure with potential factors behind these dark sides and various recommendations to rectify them.

Literature Review

Most authors and researchers have focused on how social media addiction is related to various aspect of human life. It was revealed from the literature that factors such as age, relationships, Personality, Self-esteem, Online Social Networking Addiction, SNS, Undergraduate students, addiction and Procrastination are taken into consideration and various statistical analyses are performed to find the co-relationship between the factors. According to the survey reported by (Smith & Anderson) in US Facebook and YouTube were the most common social platform used by the adult and Instagram and Snapchat for the age group between 18 to 24 years old. It was observed from the literature that the average age group affected by social media between 16-88 years, but the different age groups have different effects of social media in terms of different factors. There were various methods used to perform the survey for data collection which was questionnaires, online surveys, etc.

Design/ Methodology/ Approach:

With heavy literature review and statistical analysis this project will deliver a structure with potential factors behind this dark sides and various recommendation to rectify them. The rigorous literature review will be conducted to answer the research questions on "what are the factors of social media addiction and its effect on individual, organization and society?"

(Expected) Findings/Results:

This research will help to identify the various factors of social media addiction and its effects to an individual, organization and society Moreover, a conceptual framework of social media addiction will be shown the key factors and its drivers, process and consequences.

It was observed from the literature that the average age group affected by social media between 16-88 years, but the different age groups has different effects of the social media in terms of different factors. Thus, age was one of the common factors.

Personality and self-esteem are also another factors of social media addiction, and there were various methods used to perform the survey for data collection which were questionnaires, online surveys, etc.

Research limitations/ Implications: Contents

Keywords: social media, dark side, negative effect. Literature review.

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13.

Knowledge sharing and technology commercialization with a focus on R&D support policy

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Abstract: The study tries to investigate the factors affecting the technology transfer and commercialization by using the research outputs of universities and public research institute with government-funded R&D on the project-level. In particular, we examine the characteristics of technology transfer of universities and public research organizations by technological field. In order for that, we utilize knowledge production function regression model. The big data set collected by National Science and Technology Information Service is used and we conduct four hypotheses. Based on findings, applied types of R&D is positively relevant to technology transfer and commercialization (TTC). Interestingly, with respect to technology life cycle, early stages of technology life cycle are more effective TTC than mature stage. In case of R&D collaboration research types, foreign partnership has a positive impact on TTC. Findings highlight practical policy regarding TTC that when choosing the research projects supported by government, the possibility of knowledge sharing in terms of open innovation should be considered at first.

Keywords: government-funded R&D; technology transfer and commercialization; commercialization of knowledge; characteristics of technology transfer by technological field

14.

The Comparative Start-up Studies on the Blockchain-based Sharing Economy Model between Korea and China

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Abstract

As the global consumption paradigm shifts from ownership to sharing, shared-economic business models like Airbnb and Uber are growing on a global scale. The shared economy has emerged as a next-generation business model that fuses various sectors in the global market (Kim Ki-yeon, 2014). Academic interest has also continued to grow, with various studies on the shared economy business model under way. In particular, the importance of the discussion is emphasized in that it has completely changed the trading behavior(Sundarajan, 2016). However, the inequality of distribution and monopoly patterns in which existing shared economic models account for user-generated values, data and profits by intermediary platforms create negative externalities (Rober Rich, 2015) and this ultimately leads to a decline in confidence. In other words, the existing shared economy business model is turning into an economic structure for platform operators, not participants.

Thus, blockchain technology is proposed as a new alternative to overcome the limitations of existing shared economy models and provide new possibilities. Along with the shared economy, the blockchain technology is drawing attention as an innovative technology along with the era of the fourth industrial revolution. While blockchain is recognized for its ripple power as the underlying technology and develops into a business model in various areas, there are lack of theoretical

researches on the blockchain-based shared economy business model.

Thus, this study analyzed the innovation cases of four global companies with blockchain-based shared economy business models by applying the four research frameworks of customer value propositions, revenue mechanisms, core resources and core processes based on business model component theory. The main purpose of this study is to derive the characteristics of an existing blockchain-based business model through multi-case studies.

According to the results, the innovation value of the blockchain-based shared economy business model was identified, and the core processes of the business model in question reaffirmed the importance of building governance for the sustainability of the network ecosystem. In addition, traditional community used negative methods to guide the appropriate behaviors. However, in this study, both positive and negative methods were used that guided appropriate behaviors of the participants. This new model could be presented as an alternative model.

The results of this study are significant that basic academic, practical, and policy data were provided. The results lead to a drastic change in the existing shared-economic trading system and present a new alternative to complement the problem. And discussions on blockchain-based shared economy business models, which were discussed only in practice, extend to academic areas.

Keywords: Blockchain, Sharing Economy, Business model, Innovation, Blockchain based Sharing Economy

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15.

The Effects of Incentive Policies on R&D Performances

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Purpose of the Study

When royalties were incurred by utilizing the R & D results of the national research grant, the Korean government reclaimed a portion of the royalties. Since 2008, however, the policy has been changed so that royalty income for research and development by universities and government-funded research institutes is not returned by the government. Therefore, the basis for the higher amount than before was set as an incentive for the researcher's achievement. To date, however, it is not known whether these policy changes actually affect researchers' R & D performance. Therefore, this study will examine whether the increased incentives lead to the improvement of the actual research results by inspiring researchers' motivation. The results of this study can be used as important source for policy makers who want to improve the nation's research capacity and performance.

Methodology

This study is based on data accumulated since 2007 using K2Base DB provided by KISTEP. In order to see the difference in performance before and after research and development royalty national repatriation policy changes for universities and government-funded research institutes, we set up private firms' research institutes with no benefit of policy change as a control group and use the difference-in-difference method. Through literature studies, we will try to verify the consistency and implication of this study based on the results of previous research on the effects of incentives on individual or organizational performance.

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<p style="text-align:center">**16.**</p>

The Effect of the Elderly's Digital Usage Level on Life Satisfaction: evidence from panel data

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Abstract

Purpose/ Research Question: In a digital society, using online-based digital skills are important factors influencing the individual life satisfaction. Besides, along with the transition to a super-aged society as aging becomes prevalent, it is needed to pay attention to the life satisfaction and emotional stability of the elderly. Hence, this research aims to analyze the effects of digital usage on the individual life satisfaction for middle-old aged persons who are not familiar with a digital environment.

Key Literature Reviews: Digital usage may refer to using a variety of digital services for certain purposes. Such utilization of digital information includes a process to collect data via various paths, select information needed, and at the same time, process and deliver it for reuse. (Kim et al.,2007). In particular, for the elderly, their online-based digital usage activities may be described as a device for maintaining mental health through social networking which relieves loneliness and makes a life rich and abundant(Karavidas,M et al. 2008; Ali Haydar et al. 2012).

Design/ Methodology/ Approach: As for the research methodology, first-differenced fixed effect panel analysis was conducted. Based on two-year panel data for 2013 and 2017, the study tried to complement limitations of cross-sectional data analysis on a level of changes of digital usage and life satisfaction for the middle and old aged more than 45.

(Expected) Findings/Results: Analytic findings showed that diversified digital usage by the entire subjects had significantly positive (+) effects on the individual satisfaction, relational satisfaction and collective satisfaction. Furthermore, a level of social usage had a significant effect on the collective satisfaction. Particularly, an analysis limited to the elderly aged 60 or more revealed the diversity of digital usage had significant effects on the individual/relational satisfaction but had no significantly positive (+) effect on the collective satisfaction. Moreover, contrary to the analytic results for the

entire subjects, a level of productive online activities had a significantly positive (+) effect on the collective satisfaction for the aged more than 60. Monthly income, a socioeconomic variable, had significantly positive (+) effects on the increased life satisfaction for both middle and old aged subjects.

Research limitations/ Implications: This study has significance in that it analyzed the effects of digital online activities on the life satisfaction of the middle and old aged in today's digital and super-aged societies. In general, since the diversity of digital services usage has a positive (+) effect on the increased life satisfaction of the middle and old aged, UI, UX designs and functions should be implemented in order for them to use a new digital service easily. Furthermore, to enhance their collective satisfaction, it is needed to raise social usage capacity for digital services including SNS. However, for the aged more than 60, productive usage rather than social usage had a significant effect on the increased collective satisfaction so it is required to prepare opportunities for them to enhance individual presence and contribution to a community.