

Special Issue of JOItmC on SOItmC 2017

2017, June 5th

- 1) Papers which were recommended at JOItmC special issue of SOItmC 2017 will be recommended at **Best Paper Award of SOItmC 2017** together in addition that those papers would be published at JOItmC.
- 2) All papers which were publish at JOItmC as SOItmC 2017 special issue papers, will be invited **at the book publishing of Springer Press** with the title **“Let us conquer the growth limits of capitalism by new combination between technology, and market or society”** as book chapters.

Subject Coverage

Suitable topics include but are not limited to:

Open Innovation
Business Model
Schumpeterian Economics
Complex economics

Important Dates and Importance notice

Finishing the applying of JOItmC special issue papers of SOItmC 2017: 30th October 2017

Shooting Method

Manuscripts should be submitted online at <https://jopeninnovation.springeropen.com/> by **registering** and **logging in to this website**.

Theme of special issue

[Let us conquer the growth limits of capitalism through new combination]

Editors and Notes

Manuscripts and all editorial correspondence should be addressed to:

editorial@jopeninnovation.com, www.jopeninnovation.com

Editor-in-Chief: JinHyo Joseph Yun, DGIST, Korea (E-mail: jhyun@dgist.ac.kr).

Please add Acknowledgement:

“This paper was received ‘best paper award’ at SOItmC 2017 conference”. (special issue papers)

“This paper was presented as keynote of SOItmC 2017, and supported the publishing fee by SOItmC, and DGIST”. (Keynote papers)

Invited Submissions to JOItmC (www.jopeninnovaiton.com)

The following selected research papers are invited to the special issue of SOItmC 2017 **with best paper award, and being invited at book chapters of Springer Press** by Editor-in Chief ; JinHyo Joseph Yun.

- ※ In addition to special issue paper list, keynote papers of SOItmC 2017 will be published as JOItmC special issue papers of SOItmC 2017.

Special Issue Paper List--Keynote Speakers (9 Papers)

No.	Paper Title
1	Taking Advantage of Emergence for Complex Innovation Eco-Systems
2	A Ground-up "Quaternary" Innovation Strategy for South Korea Using Entrepreneurial Ecosystem Platforms
3	Cluster policy: Insights from the German Leading Edge Cluster Competition
4	The Business Model Prism: Managing and Innovating Business Models of arts and cultural organizations
5	Benefits and Costs of Closed Innovation Strategy: -Analysis of Samsung's Galaxy Note 7 Explosion and Withdrawal Scandal-
6	Connecting corporations and communities: Towards a theory of social inclusive open innovation
7	Sustainable Development of Smart Cities: A Systematic Review of the Literature
8	Total Factor Productivity and the Features of Economic Growth: the Case of Lithuania and Latvia
9	Capitalism as a Complex, Adaptive System

Special Issue Paper List-Session (33 papers)

No.	Paper Title
1	E-Capital and Economic Evolution in European Metropolitan Areas
2	Innovative Japanese vending business in Russia (case of Dydo DRINCO Inc)
3	The social entrepreneurship concept as a subject of social innovation
4	Innovation of the Management Systems in Medium-Sized Enterprises – Problems and Solutions
5	Total Factor Productivity and the Features of Economic Growth: the Case of Lithuania and Latvia
6	Open innovation of industrial ecosystems – some Chinese cases
7	Organization, platform, & Business Ecosystem
8	Impacts of Meta-cognition on Innovative Behaviors: Focused on the Mediating Effects of Entrepreneurship
9	RECOMMENDING SUITABLE ALTERNATIVE PERFORMERS USING PROCESS MINING TECHNIQUES: TOWARDS SMART ORGANIZATIONS
10	Behavioral Model of Innovation Adoption: Comparing Chinese and U.S. College Students
11	Analysis of Technology and Market of Gangwon-Province , based on Korean Patent information
12	Benefits and Costs of Closed Innovation Strategy: -analysis of Samsung Note 7 Battery explosion
13	Alliance formation types, network positions, and firm performance in biopharmaceutical industry under open innovation paradigm

14	Comparing Validity of Risk Measures in Newsvendor Models
15	An empirical study on Taiwan enterprises' open innovation activities and their added value
16	An analysis on the relation between business keyword's trends and company's financial performance in Korea
17	Collaborative Workshops for Brand System Development
18	Finding Opportunities to Innovate 119 Emergency Medical Service by Design Thinking
19	The Effect of Hallyu on Tourism in Korea
20	Why uncertainty is unequal without government's precaution action? : the case of toxic humidifier disinfectant
21	Multilevel prognosis of logistics chains in case of uncertainty: information and statistical technologies implementation
22	Americanization in Lithuania as a driving force for globalization
23	Impacts of Potential Climate Change and Human Deforestation on Temperate Forest Carbon Pool in the Capital Area of South Korea
24	Entrepreneurship Education and Innovation performance: The moderating effect of Team-Based Learning on the Innovative personality in relation to Team Innovative Behavior and New Venture Idea
25	An Empirical Analysis for The Application Level of Chinese Internet Big Data Ecology: An Entropy Approach
26	Strategic Modelling for Improving Open Systems Innovations and International Supply Chain Collaborations in Multinational Enterprises
27	Agro-economic situation in the world and domestic markets of agricultural and food products in the CIS countries: Russia, Ukraine, Kazakhstan and Belarus
28	Circular business model for innovation within circular economy
29	Discovering innovative potential of people in Russia
30	Detention and Liberation, the Constant Slip Related to Naming and its Consciousness
31	A Study on the Interaction between Science & Technology and Society-Perspective of strong artificial intelligence –
32	Technology convergence, open innovation and dynamic economy
33	Blockchain Government

E-Capital and Economic Evolution in European Metropolitan Areas

Abstract

Purpose

E-capital, like other forms of capital, is likely to agglomerate in cities. Therefore, we investigate the level of e-capital in European metropolitan areas. Our interpretation of e-capital relies on the amount of tweets in Twitter. The most likely receiver of the tweet is the one who follow one's tweets, but also everyone interested in hashtags one use, can read the tweets. The most likely followers are users from the same region, but also users from anywhere interested in the same themes. Data mining from Twitter gains us access not only to intra-regional but also inter-regional ties, which Moreno (2013) concluded to be actually more important generating social capital and regional development.

We are interested in particular innovative networks forming social capital. Therefore, we will data mine tweets containing hashtags related to innovativeness. We used keywords from the earlier literature. These are 'innovation', 'startup', 'tech' and 'refugees welcome'. We will consider current topic in social media that is not location bound. For example, Brexit discussion in Twitter seemed to cluster heavily in Britain and Euro 2016 in France and participating countries. Therefore, we used hashtags from other continents that were discussed in Europe. All in all, hashtags that were mined from Twitter were '#innovation', '#startup', '#tech #refugeeswelcome'.

The amount of tweets presenting the level of e-capital of the metropolitan areas was compared to the level of economic development (GDP). The first interpretation discusses with the school of thought that considers the digitalization in the light of inequality and digital divide (e.g. Chen 2013 & 2014). The second step was to answer where the e-capital has clustered in Europe. We were also interested in whether e-capital clusters in the areas that have higher economic development and vice versa, thus inequality approach.

In summary, our research questions are:

- 1) Does region's level of e-capital correlate with regional development?
- 2) Geographies of e-capital and potential growth in Europe.
 - a) Where has e-capital clustered in Europe?
 - b) Which areas have managed to capitalize their e-capital?
 - c) Which metropolitan areas could grow their other forms of capital, i.e. human, social, cultural and further economic capital, by "jumping into" the e-capital conversation process?
 - d) Which metropolitan areas could grow their economy even greater if there were more e-capital?

Key Literature

Bourdieu (1986) defined social capital as social relationships that are directly usable in the short or long term. Later social capital has been described as "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam 2000: 19) and "that enable participants to act more effectively to pursue shared objectives" (Putnam 1995: 664). 'Better-connected' people have informational advantage as they gain timely access to high-quality and fine-grained information faster and earlier than 'less-connected' people (Burt 1992; Podolny 1993). People with more social capital receive more job information via informal social interactions (Granovetter 1973; Son 2013). The information advantage enabled by social capital can translate into higher compensation, faster promotion, and better ideas. Third, the literature on cultural capital shows that diverse network contacts require and facilitate a diverse repertoire of cultural knowledge (DiMaggio 1987; Erickson 1996).

There are several studies that can prove the correlation between social capital and regional development. One line of research has measured innovative networks that produce social capital and thus economic capital. Moreno (2013) investigated the spatial correlation between regional research networks and regional development in Europe. She concluded that collaborations with inventors outside the region, i.e. weak, distant ties are more important for innovation than networks within region (notice the same notion as Granovetter 1973). Moreno's suggested policy implication that interregional collaborations should receive greater attention than intra-regional linkages motivates us to investigate innovation flows in digital space. We believe that both intra-regional and inter-regional networks can be found the best in Twitter Social Network Site (SNS).

This leads us to a concept of digital social capital (Mandarano et al. 2010). Furthermore, Merisalo (2016) applies the concept of electronic capital. She redefines Hall's (2000) original definition of e-

capital, which related to college graduate workers use of business methods based on computers. Merisalo (2016) sees e-capital as a form of capital, which: "emerges from the possibilities, capabilities and willingness of individuals, organizations, and societies to invest in, utilize and reap benefits from digitalization and thus create added value". Further, all forms of capital are required, but also produced in the process of e-capital. This means that e-capital is likely to emerge in same locations than other forms of capital. On the other hand, regions "can gain access to other forms of capital by investing and utilizing digitalization, simply by jumping into the e-capital conversation process".

Design and approach

The measures of e-capital we got from SNS Twitter's API. First, we had to create an account to Twitter API. After that, we loaded TwitteR package for R software. Both of them are open source. We used code that brought us list of tweets containing certain hashtag from specific location from the period of last two weeks. For example, code for innovation tweets from Paris was following: `searchTwitter('innovation', n=30000, geocode='48.8566,2.3509,30mi')`

Where n=expected amount of tweets from last two weeks. The smaller the number, the faster the software mines the data. Therefore, for smaller metropolises we used n=1000 and if command brought us 1000 tweets, we raised the amount (process is slower the bigger the number). With the largest metropolises, it was necessary to use n=30000. Geocode is latitude and longitude of the location where the tweets are mined from. Coordinates have to be in four-digit form. Coordinates we got one by one from the website 'Find latitude and longitude' (2016). After the coordinates, the radius where the tweets are mined can be defined. Radius must be in miles. We consider that 30 miles' radius would be a grounded estimate size of a European metropolitan area. By changing the parameters to code, we mined the list of tweets city by city and marked the number of tweets into table of metropolitan areas, which had information of GDP per capita, employment rate and population from Eurostat database.

After collecting the amount of tweets in metropolitan areas defined by Eurostat, we calculated the amount of tweets per capita. Population of the metropolitan areas was from Eurostat. Then we made a regression analysis using amounts of tweets as predictors and GDP and employment rate as constant variables. With the coefficients of the analysis, we could answer on which hashtags correlate with economic indicators.

Both research questions can be answered with the means of regression analysis. First, where has e-capital clustered in Europe, is answered with predicted GDP scores of the analysis. Second, the

inequality in Europe could be answered with Moran I bivariate where the two variables are GDP and predicted GDP, i.e. e-capital. With Moran I bivariate, we found also areas that grow their economy even greater if they experienced higher e-capital level. Analysis was also made with open source software GeoDa. As Moran I bivariate finds spatial clusters of two variables, we took into consideration the four nearest neighboring metropolitan areas. We pay our focus on the clusters with statistical significance under 0.05.

There are limitations. First of all, tweets are only from two weeks' period. This makes single events or users possible to bias the results. While longer period of examination may have proved steadier results, this was the only option data was possible to collect from Twitter API. Another problem is the geographical area. Searching tweets within the 30 kilometers radius from the city center is an analytical restriction. For example, in coastal metropolitan areas, the area where the tweets are collected from is much smaller than in continental ones. Final problem comes from the used language: English spoken areas are overrepresented in the data. However, after considering the weaknesses of the model, we still think that our approach is the best possible way to collect the data. Advice was asked also from the peer users of TwitteR, for example from R-Help mailing list, to make sure this was the best method available. All this considered, we believe that even greater shortage of the analysis comes from the data from Eurostat. Comparing real time data from SNS to four years older information of economic development neglects for example the effect of recent growth in e-capital.

Findings

Results are discussed both with an approach of inequality and e-capital as an accelerator. We wanted to investigate which metropolitan areas have managed to capitalize their e-capital into economic capital and which not. Alternatively, areas that are performing better than the level of e-capital could succeed because, in addition to e-capital, other forms of capital have agglomerated in these areas. They are likely to grow their economy if only e-capital develops to same levels as other forms of capital in the area. Areas with low level of e-capital and lower GDP than expected, in turn, could grow their other forms of capital, i.e. human, social and cultural capital and further economic capital, by "jumping into" the e-capital conversation process. This could succeed possibly with public investments in digitalization, or in human capital, which is said to produce e-capital with the knowhow of people. Similarly, investing in other forms of capital could turn into electronic capital (Merisalo 2016).

Answer to the first research question is that e-capital correlates with regional development. Regression analysis where GDP per capita was predicted with the amount of tweets related to

innovations was highly significant (sig. <0.001). With used indicators, 17.7% (R-square) of regional development could be explained with the level of region's e-capital. When regression analysis was made with employment rate as constant variable, there were no significant correlation between e-capital and employment.

Second research question concerns the geographies of e-capital and potential growth in Europe. We answered this with predicted GDP scores from the regression analysis. Metropolitan areas with the highest level of e-capital locate in England, Belgium and the Netherlands. There is also evidence of larger clusters that follow the forms of the so called Blue Banana and Golden Banana. The Blue Banana starts from British Isles and continues in the continent in the valley of Rhine to southern Germany and Northern Italy. The Golden Banana, or the Sun Belt, lies in the coast of Mediterranean between cities of Valencia and Genoa. These areas are also the most populous areas in Europe.

Finding advances the conclusions of the correlation between social capital and economic capital to correlation between digital social capital and economic capital (Mandarano et al. 2010) and further the correlation between e-capital and regional economic wealth (Merisalo 2016). However, not all e-capital correlated with regional development. Tweets containing only word innovation per regions population predict economic development. Tweets containing words 'startup', 'tech', and 'refugees welcome', are not significant predicting region's GDP. Neither did absolute amount of tweets predict regional development.

Implications

Residual values can be interpreted in different ways. Higher GDP than predicted regarding to e-capital can result from several explanative factors. They could be seen as areas which have managed to capitalize their digitalization the best. Another interpretation is that these areas are wealthy in terms of other forms of capital (i.e. human capital, social capital and cultural capital) that has impacted their economic indicators. This interpretation is in line with earlier studies that have concluded that e-capital is likely to agglomerate in the same areas as the other forms of capital. Therefore, we examined where economic development is probably due to other forms of capital (i.e. areas with low level of e-capital but higher GDP than predicted). These areas could grow their economy if they invest in e-capital. Areas with high level of e-capital, but lower economic development than expected, are potential locations for e-capital growth. We categorized these (potential) growth areas into three categories:

- 1) Successful areas despite low e-capital
- 2) Unsuccessful areas despite high e-capital

3) Unsuccessful areas with low e-capital.

Group 1 "successful areas despite low e-capital" clusters in Southern Germany, Eastern France and Scandinavia. The second group formed with Moran bivariate method and named as "unsuccessful areas despite high e-capital", include only two cities (Warszawa and Leeds). A way of improving areas such as them could be considering public investments and procurements. The third group is the most problematic one.

Keywords: Social capital, Economic evolution, Metropolitan areas, Economic Growth, Quantitative analysis

“Innovative Japanese vending business in Russia (case of DyDo DRINCO Inc)”

Abstract

Russian vending market is still an emerging one. There are many difficulties and at the same time market is full of opportunities. Another evidence of growing opportunities in Russia is the limited penetration of vending machines in comparison to the number of potential clients. The Russian vending market attracts global players and DyDo DRINCO Inc. is the first Japanese vending company in Russia has started operations in Moscow in 2014, and established the wholly owned subsidiary DyDo DRINCO Rus, LLC. The main responsibilities of the company are marketing and distribution of beverages and vending machines. Jointly with Avalon Distribution, DyDo installs their own vending machines in business centers, shopping malls, metro, universities, gasoline stations. By the end of 2016 there are 550 vending machines installed in Moscow and assortment line contains 25 products.

The main aim of this research is to identify the uniqueness of the Japanese innovative vending business and its applicability on the emerging Russian vending market. The research is based on the case of DyDo as this company can be defined as an innovative company in the vending business as derives a significant portion of sales and profits from products/ solutions introduced recently. The company constantly creates new beverages to satisfy the changing customer's preferences. At the same time DyDo has unique techniques and business model to compete successfully in Russia.

Upon their introduction, vending machines created a new era of consumer choice and convenience and to be competitive in today's market companies have to rapidly adapt to survive. In case of DyDo we found at least ten strategic principles that are based on innovate approaches for the emerging vending business in Russia.

- Differentiation- there are many companies offering similar products and DyDo is able to offer choices clients cannot get elsewhere. DyDo is able to achieve it based on the substantive product line.
- Focus on quality- the main principle of DyDo is the highest quality of vending machines and beverages. Company uses natural ingredients and strictly controls production. The reputation is very important for the company.
- Reliable equipment- DyDo's vending machines can operate up to -35 C. In Russia only DyDo's vending machines can be installed outside and operate.
- Unique equipment- DyDo's vending machines in Russia can store and sell hot and cold beverages simultaneously.
- Ease of buying- DyDo's vending machines do not allow to see real products – only samples, and client have to press only one button and only once to get a certain product. This innovative simplicity allows to reduce a number of malfunctions which is also a part of the concept of quality.
- Supply chain technology and execution- Routeman is a specific system used by DyDo to serve vending machines and to implement sales.
- Adaptation- seasons and locations of vending machines have a significant influence on the assortment line of DyDo beverages. DyDo's vending machines have anti-vandal protect that is important for Russian market.
- Energy-safe standards- all DyDo vending machines are energy-saving machines.

- Stay in tune with what customers want- DyDo constantly monitor the market to meet clients needs and expectations.
- Vending is fun- DyDo turns the buying process into a game.

In Japan DyDo applies additional innovative technologies as touch screens, however in Russia they are not applicable due to a high level of vandalism.

The Japanese vending business in Russia is not well explored field and sources are quite limited. The main primary sources are interviews with top managers in Japan and Russia and DyDo DRINCO Corporate Reports. The article is based on descriptive and applied types of the research and demonstrates the importance of innovative approaches for Russian vending business.

Keywords: DyDo DRINCO Rus, innovative vending business, russian vending business .

The social entrepreneurship concept as a subject of social innovation

Abstract

Purpose/ Research Question: In the last years, in the international academic debate a discussion is evolving around a number of interconnected concepts which intrinsically include two apparently contradictory dimensions: social and economic. Among them, the most visible are the concepts of social entrepreneurship and social innovation which are often used as synonyms. The purpose of the research paper is to clarify the relation between the concepts of social innovation and social entrepreneurship.

Key Literature Reviews (About 3~5 papers): The research is based on the theoretical analysis of both the concepts using the works of Mulgan, 2007; Phills et al., 2008 Schöning, 2013.

Design/ Methodology/ Approach: In the research, the authors used the following methods: monographic method (to create a theoretical discussion and interpret research results on the social innovation and social entrepreneurship concepts, which are based on the findings of scientific literature); the methods of analysis and synthesis to separately explore elements of the problem and build interrelationships; the method of scientific induction – to create scientific assumptions and similarities based on separate elements; scientific deduction method – to logically systematize and explain empirical data. In scope of the research, the authors used scientific literature on social entrepreneurship and social innovation.

(Expected) Findings/Results: Social entrepreneurship and social innovation are interrelated, since social entrepreneurship often creates and promotes social innovation. Social innovation is a mechanism in actual innovation but a social entrepreneur is a driving force for social change.

Research limitations/ Implications: Social innovation and social entrepreneurship have several meanings, thus information related to these two subjects is widely dispersed in the scientific literature. Consequently, this research cannot be considered as an in-depth exploratory study. Another potential limitation was the subjectivity in the analysis of the social innovation and social entrepreneurship concepts.

Keywords: social innovation, social entrepreneurship, social change.

Acknowledgement

The research is conducted within the project 5.2.7. "Involvement of the society in social innovation for providing sustainable development of Latvia" as part of the National Research Program 5.2. "Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)".

Innovation of the Management Systems in Medium-Sized Enterprises – Problems and Solutions

Abstract

Purpose/ Research Question:

Small and medium-sized enterprises (SMEs) are the backbone economy. In Europe SMEs represents up to 99% of all businesses and provide two-thirds of the total private sector employment. In a private sector, large proportion of enterprises is owned by individuals or by families and at the same time managed by founders or owners. Despite of significance of the SME sector to economy, business literature as well as training programmes tend to use large companies and corporations as a best practice and management approach examples.

This paper review existing literature on management system development in small and medium enterprises and compare theoretical findings with several owner-managed medium-sized company cases from different European countries. Cases will be compared to find possible similarities and differences across different companies and different business environments. Purpose of this paper is to enlighten challenges SMEs are facing and possible solutions that will contribute to improving their management and sustainability.

Key Literature Reviews.

Literature review will include recent theoretical and empiric findings in the small and medium business area, with particular focus on management system development and owner-managed companies, as well as concepts of innovation and open innovation.

Management system, according to Kaplan and Norton (Kaplan & Norton, 2008) is the integrated set of processes and tools that a company uses to develop it strategy, translate into operational terms and monitor and improve effectiveness of both.

Literature still mainly focuses upon large organizations, and many questions on how management system can be developed in small and medium enterprises still remains unanswered. Empirical large-scale postal survey of owner-managed small and medium sized enterprises (SMEs) was conducted in the UK (Wang & Poutziouris, 2010) drawing evidence and exploring the association of small business managerial style and performance. It reveals that the managerial style of entrepreneurs is influenced by a series of demographic and situational factors. Moreover, according to this research, owner-managed businesses characterized by delegation of authority appear to achieve higher growth in sales and operationalize in a more professional way.

Implementation of the management system itself can be described as a process. Garengo and

Biazzo (Garengo & Biazzo, 2013) suggest the framework process for implementation of Integrated Management system (IMS) in SME. Their framework is based on changeover from the adoption of ISO quality standards to the implementation of an IMS.

For an owner-managed company, entrepreneurial behaviour of owner-manager is affected by their personal values and views. Jaouen & Lasch suggest a new typology of owner-managers (Jaouen & Lasch, 2013) exploring the extent to which the views of owner-managers regarding growth and lifestyle issues affect their entrepreneurial behaviour. Typology suggested consists of four owner-manager views associated with success, subsistence, hedonism and paternalism, and investigates the differences in the behaviours associated with these four profiles.

Open innovation has been defined as the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively (Chesbrough, 2006). Small and medium enterprises have limited internal resources and internal knowledge and shall use external knowledge; however, diversity in the SME sector is high. Chesbrough et.al ((Gassmann, Enkel, & Chesbrough, 2010)), identified several trends how open innovation develops. One of trend is that innovation goes from large companies to SMEs. Other trend is that industry is starting to professionalize the internal processes to manage open innovation more effectively and efficiently. Nevertheless, it is currently still more trial and error than a professionally managed process.

This research will analyze innovation in the management system of the small and medium enterprises linking both system and process aspects with the owner-manager personality traits.

Design/ Methodology/ Approach:

Research starts with a literature review using the state-of-the-art method to understand previous research on management system development in small and medium enterprises and owner-managed companies in particular. Then structured interviews with owners-managers of small-medium sized companies are conducted to identify underlying factors and particularities of management system is developed in case companies. This is followed by comparison of findings from literature review and case companies and drawing conclusions.

Expected Findings/Results:

This paper will enlighten challenges that SMEs are facing in context of current business environment and contribute to discussion on possible solutions that improve the SMEs management and sustainability.

Research limitations/ Implications:

This paper focuses on a Management system as a general set of tools and processes in a company, and not specifically on IT solutions used for enterprise resource planning (ERP systems), performance management or other management processes. Conclusions from field research are relevant to those particular medium-sized companies analyzed in this research, and

shall not be generalized without additional research and validation.

Keywords: Small and medium enterprises. Management system. Management processes. Owner-manager.

Literature

- Chesbrough, H. W. (2006). Open Business Models: How to Thrive in the New Innovation Landscape. *Research Technology Management*, 50, 256. http://doi.org/10.1111/j.1540-5885.2008.00309_1.x
- Garengo, P., & Biazzo, S. (2013). From ISO quality standards to an integrated management system: an implementation process in SME. *Total Quality Management & Business Excellence*, 24(3–4), 310. <http://doi.org/10.1080/14783363.2012.704282>
- Gassmann, O., Enkel, E., & Chesbrough, H. (2010). The future of open innovation. *R and D Management*, 40(3), 213–221. <http://doi.org/10.1111/j.1467-9310.2010.00605.x>
- Jaouen, A., & Lasch, F. (2013). A new typology of micro-firm owner-managers. *International Small Business Journal*, (November), 1–25. <http://doi.org/10.1177/0266242613498789>
- Kaplan, R. S., & Norton, D. P. (2008). Mastering the management system. *Harvard Business Review*, 86(1). <http://doi.org/617-783-7500>
- Wang, Y., & Poutziouris, P. (2010). LEADERSHIP STYLES, MANAGEMENT SYSTEMS AND GROWTH:: EMPIRICAL EVIDENCE FROM UK OWNER-MANAGED SMEs. *Journal of Enterprising Culture*, 18(3), 331–354. <http://doi.org/10.1142/S0218495810000604>

Total Factor Productivity and the Features of Economic Growth: the Case of Lithuania and Latvia

Abstract

The increase of competitiveness and productivity is the objective of improvement of every economic system. In this case, the economic development is closely related to the ability to retain competitive, the proper use of the available labour force and capital and to ensure the growth of the gross domestic product (or a company's turnover). Productivity is perceived as the ability to properly use the production factors to create value-added, implement innovations and to maintain the country's competitiveness. In the macroeconomic researches of different scholars (Solow, Saliola, Seker, Kathuria, Puharts etc.) special attention is given to the quantitative measurement of the various factors of development. These researches have shown that one of the more accurate methods of the productivity measurement is a calculation of total factor productivity. In the article, the total factor productivity is calculated by industry both in Lithuania and in Latvia. In this case, the proportion of the gross domestic product growth, which is explained by the labour and capital factors productivity growth, is emphasized. At the end of the article it is concluded, in what industries the growth of labour and capital are important in assessing the growth of the gross domestic product, in what industries the growth does not have an important influence and the most productive and less productive industries are distinguished.

Keywords: economic development, gross domestic product, productivity, total factor productivity.

Acknowledgements

The paper was supported by the project 5.2.2 «The Development of Innovation and Entrepreneurship in Latvia in Compliance with the Smart Specialization Strategy» within the National Research Program 5.2 «Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EK OSOC-L).

1. Kathuria, V.; Raj, R. S. N.; Sen, K. 2013. Productivity measurement in Indian manufacturing: a comparison of alternative methods, *Journal of Quantitative Economics* 11 (1/2): 148-179.
2. Puharts, A.; Kloks, P. 2015. Sources of TFP growth in the Baltic states: the frontier approach, *SSE Riga student research papers* 4 (169): 1-42.
3. Saliola, F.; Seker, M. 2011. Total factor productivity across the developing world, *Enterprise surveys country note series* 23: 1-8.

4. Solow, R. M. 1957. Technical change and the aggregate production function, *The review of Economics and Statistics* 39 (3): 312-320.

Open innovation of industrial ecosystems – some Chinese cases

Abstract

Purpose/ Research Question: The paper will argue why the evolution of industrial ecosystems can be considered as open innovation by taking some eco-industrial parks cases in China.

Key Literature Reviews (About 3~5 papers): Industrial ecosystems are complex engineering systems composed of many as well as different types of components and links. From dynamic perspective, open innovation contributes to the evolution of industrial ecosystems. We can find many innovation measures in the classical Kalundborg industrial ecosystems, such as waste exchanging, cascading usages and infrastructure sharing. All these innovation measures were incorporated into an open innovation system or cycle due to the openness of industrial development.

Design/ Methodology/ Approach: Case study and complex network method.

The first case is the Ningbo Economic and Technological Development Area (NETDA). Another case is the Yixing Environmental Industrial High-tech Park. After these case studies, we also uncover some structural complexity and functional complexity embodied in these industrial ecosystems by adopting complex network method. These agencies are described as nodes in networks, and relations as links, such as supply chain, competition and cooperation relations.

(Expected) Findings/Results:

The first case is the Ningbo Economic and Technological Development Area (NETDA). Since its establishment in 1985, NETDA has gradually formed into a comprehensive industrial base including petrochemicals, energy, steel, paper, automobile, ship and other six port industrial clusters. These heavy industries contribute to rapid economic growth, but also bring huge resource and environmental burdens. Since 2005, NETDA explored a sustainable development model according to circular economy principles and achieved remarkable results. In 2008, NETDA was awarded the title of the Best Practices of circular economy in Zhejiang Province. In 2013, NETDA listed as the pilot circular economy for the industrial parks. By uncovering the evolution of key industrial sectors and ecological infrastructures, we can observe the model of open innovation and also find the roles of technological improvement, market evolution and environmental governance.

Another case is the Yixing Environmental Industrial High-tech Park. After more than 30 years of development, Yixing has become the largest environmental industrial base in China, with more than 1,000 firms and industrial output of 3 billion dollars. Yixing also attracts more than 100 R&D agencies, including Tsinghua University, Nanjing University, Harbin University of Technology and others. Together with promotion centers, information centers and financial institutions, these agencies form an open innovation system, just like an ecosystem with highly woven relations.

Research limitations/ Implications: Through survey on enterprises, we got around 100 samples with information about supply chains, competition and cooperation relations. By defining the predation, competition and symbiosis relations between agencies, the Yixing environmental industry can be viewed as a network of ecological system. Then we use network analysis, one of the powerful method for complex systems, to uncover the centrality, the hierarchical features and the community structures.

Keywords: Open innovation; industrial ecosystems; complex network

Organization, Platform, & business Ecosystem

Agenda

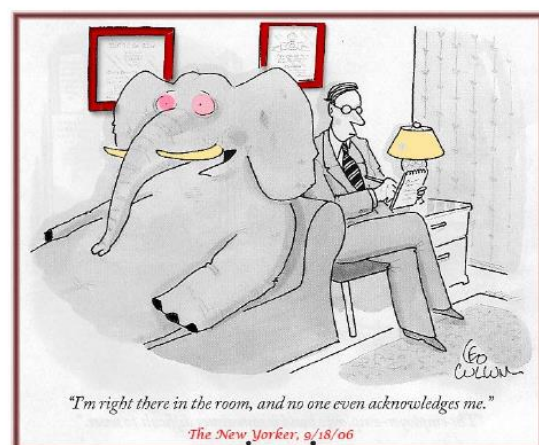
- Focus on Platform – an organizational lens
- Platform Ecosystem – a framework
- Key Characteristics and Perspectives – more than business model issues
- Policy Implications – new measures?
- New Challenges – new emerging species and typology

The Elephant in the Room

- Platform: is it a thing that we can ignore?
- If no, what is the first step that we should take?
- Why are we uncomfortable with platforms & ecosystems?

Traditional competition policy and regulation have been developed, targeting visible products &/or services. → sector-specific rules for framing the targets

Platform is invisible and manages process not product /service itself.

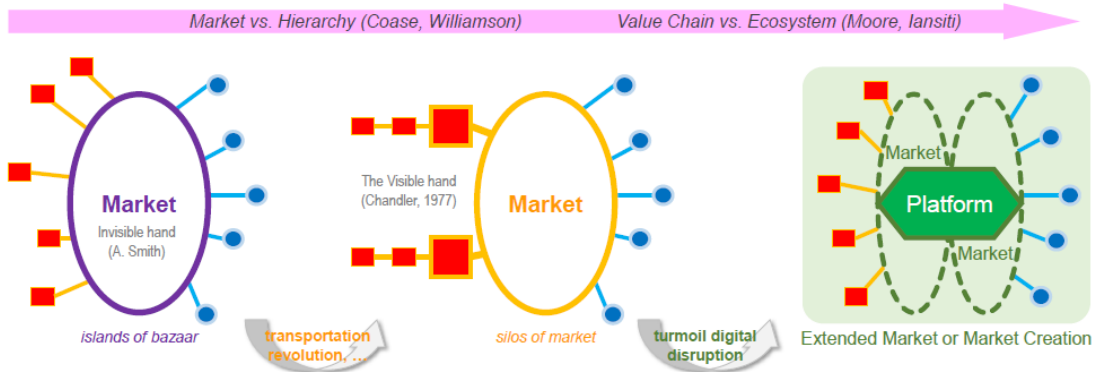


Grand Hypothesis of Mine

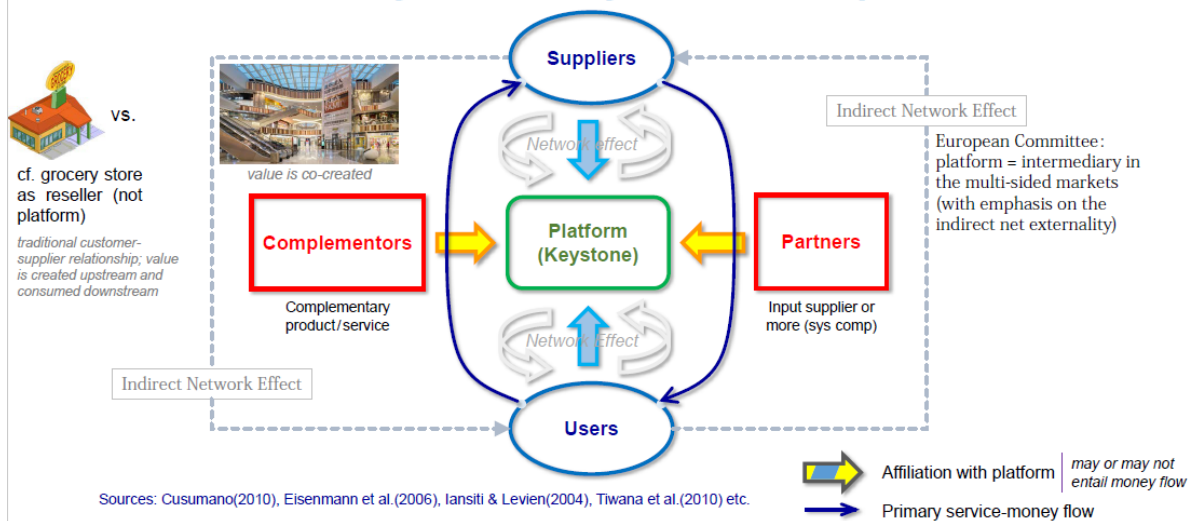
- Predicted on supply and demand
- Price controls trades (even clears some markets)

- Predicted on supply
- Quantities and firms are selected in their respective markets

- Supply and demand are unknown, but anyway created
- Some economy sections are selected or discarded



Platform Ecosystem: a Stylized, Conceptual Model



Key Characteristics of Platform Ecosystem

Resellers or VI Firms	Platform Ecosystems
<ul style="list-style-type: none"> • aggregate resources and offer value-added serv. by verifying quality for target products <ul style="list-style-type: none"> ✓ target segments • enjoy economies of scale for high demand products • take inventory risks and associated burden; but get greater control 	<ul style="list-style-type: none"> • may be too slow and not sufficiently convenient for either side <ul style="list-style-type: none"> ✓ costs of being affiliated • growth-oriented and more capital efficient • relatively more cost effective and less risky on various or long-tail demand

June 16, 2017

SOItmC & Riga 2017 Conference - Dohoon Kim

6

Key Characteristics Comparisons (continued)

Resellers or VI Firms	Platform Ecosystems
<ul style="list-style-type: none"> • focus on efficiency of internal operations – competing for dominance <ul style="list-style-type: none"> ✓ emphasis on internal capability ... resource-based view • Shareholders' value • Individual rationality and performance • Control and strategy 	<ul style="list-style-type: none"> • focus on mutual effectiveness and survival for the shared fate of their participants <ul style="list-style-type: none"> ✓ Iansiti and Levien (2004); Moore (2006) • Stakeholders' value • Collective rationality and performance • Governance and coordination

June 16, 2017

SOItmC & Riga 2017 Conference - Dohoon Kim

7

Viewpoint 1: Don't Kill the Golden Goose

- Regulating activities that may appear anti-competitive in the short-run; but those activities could be valuable to the ecosystem in the long-run
 - ✓ e.g.) incompatibility & entry barrier: Facebook's ban on data portability to Google+
- Platform is a keystone or a dominator or a landlord?



June 16, 2017

SOItmC & Riga 2017 Conference - Dohoon Kim

8

Viewpoint 2: Wolf in Sheepskin

- Most activities of keystones will be beneficial to their ecosystems and societies?
 - ✓ Actually, many keystones are in a (near) monopoly position
 - ✓ protecting rivals \neq promoting competition
- How regulations (or markets) will encourage platforms to be more beneficial to the society?





June 16, 2017

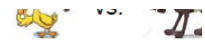
SOItmC & Riga 2017 Conference - Dohoon Kim

9

The Wisdom of Solomon Needed?

- Why judging  vs.  is so difficult?
- With traditional markets & firms, monopolization or dominance can be verified by proving two points: (1) market power and (2) exclusionary conduct
 - ✓ These are valid under the assumption of profit-maximizing actors →
 - ✓ The fact that a firm may possess market power does not by itself put it under a duty to help its rivals
- What if a platform does not pursue the profit? Instead, what if the platform just wants to maintain its (location, relation, and other soft, invisible) power in the ecosystem?

New Policy Measures



- How to exercise the power of leading position indirectly and in cooperation with its participants? – This could be good or bad or both...
- **Positive signs** – Iansiti & Levien (2004), Iansiti & Richards (2006) + more
- **Robustness**
 - ✓ survival rate of ecosystem participants
- **Productivity**
 - ✓ ROI; total factor productivity (need to be modified due to input char.); ...
- **Niche creation (diversity and innovation capability)**
 - ✓ availability of new funds for investment from platform or its VC partners



New Policy Measures (continued)

- Negative signs (in particular, inter-ecosystem competition)
- Investment in critical assets upon which participants depend
 - ✓ Basically, investment is a good thing
 - ✓ Idiosyncrasy could raise the hold-up issue
- Whether (and to what extent) to condone gateway (or adaptor)
 - ✓ provides room for alleviating platform's control power on its ecosystem
 - ✓ Compatibility through ex post introduction of gateway; multi-homing; ...
 - What is the real currency that consumers use to pay for free services?
 - Katz & Shapiro, AER, 1985 & JPE, 1986; Matutes & Regibeau, RJE, 1988; David & Bunn, IEP, 1988; Farrell & Saloner, JIE, 1992; ...

New Horizon and New Challenges

- “Why are there so many species? (and why they are so diverse?)” – C. Darwin (1859)
- “Why are there so many different kinds of organizations?” – Hannan and Freeman (1977)
- The same question applies to the platform ecosystems
- Perspective Change
 - ✓ structure – conduct – performance paradigm & adaptation → selection as a mode of organizational change and emphasis on dynamics
 - ✓ emphasis on architecture (more than structure) and governance – closer to a political system than to an economic system

New Species of Platform Ecosystem



Impacts of Meta-cognition on Innovative Behaviors: Focused on the Mediating Effects of Entrepreneurship

Abstract

Purpose/ Research Question:

The emergence of entrepreneurship is not generated suddenly, but is caused by solving the problems raised in one event or more. This stimulus can be realized through a systematic procedure to solve the problem. In other words, through this process, positive attitudes and attitudes toward solving problems can be said to be manifested in entrepreneurial spirit. Meta-cognition is utilized in the process of solving problems that stimulate the manifestation of entrepreneurship.

Key Literature Reviews:

Meta - cognition is an idea of thinking, a concept of perception of cognition, a function of understanding the cognitive process of an individual and planning, checking, and controlling the process of thinking and problem - solving. In this context, meta-cognition means planning what order to learn in order to solve the problem, effectively checking and evaluating what kind of information is connected to construct knowledge and how to achieve the goal. In conclusion, metacognition is a systematic plan for the performance of tasks as an activity and an accident that learners engage in while learning.

If the function of planning, checking, and controlling in the problem solving process is good, it will solve the problem without difficulty, but if it does not work properly, it will become difficult and frustrated and stressed by psychological pressure. In this case, the weakened meta - cognitive function is expected to increase the risk sensitivity of entrepreneurship and negatively affect innovation and initiative. In the end, the negative effects of entrepreneurship will act as a stimulus to weaken motivation in innovative behavior of individuals.

This study suggests resilience, about what factors may improve the initial metacognitive ability in the present study. Resilience is contributes to the speed and degree of recovery after being exposed to stress(Brooks, 2009), and it can be said that the resilience is a strong factor in positively converting the negative situation as a result of assimilation and control seen in the negative situation(Leipold & Greve, 2009). Even though the meta-cognitive ability is weakened, if

the resilience is well controlled, entrepreneurship will work more positively and it will lead to a more innovative behavior and positive effect on the individual as well as the organization.

Metacognition is actively and intentionally storing and retrieving the relationship of actor-information in its environment. Furthermore, it is the perception of self as strengthened self of self and development of memory as the application which applies all the intellectual means developed by the individual to the problem in memory(Flavell, 1985). Schoenfeld(1985) has emphasized three categories of Intellectual behavior, beliefs and intuition, control or self-regulation, and knowledge about thought processes.

In other words, he emphasized how accurately describe his thinking process and his managerial ability in solving problems in control or self-regulation. He said that one's resources, the process of one's interpretation, and one's mental state are objects to be controlled. In particular, beliefs and intuitions are subjective knowledge of the world acquired through living a cognitive life, so that belief and intuition act as important determinants of behavior as well as control and self-regulation.

In this respect, the relationship between metacognition and entrepreneurship can be defined as an algorithmic relationship. In other words, entrepreneurship can be seen as part of the mental, physical, and situational experience of humans manifested in the course of transforming a series of uncertain situations into certain situations. In particular, entrepreneurship in the spiritual aspect can be said to be an expression of individual 's beliefs and intuition.

According to previous studies, Metacognition is a learning strategy in the process of completing active and innovative behaviors such as self-directed learning. In order for an individual to have the ability to set and carry out learning goals, he or she needs a mechanism to plan, establish and control the learning objectives.

The voluntary plan in self-directed learning assumes that the metacognition should precede the individual's strategic behaviors in order to achieve self-learning by cognitive characteristics(Bae & Lee, 2010). These relationships suggest that metacognition can be an influential factor in entrepreneurial as well as innovative behavior, and that resilience is a moderating role in enhancing the static function of metacognition.

Design/ Methodology/ Approach:

This study will be test to find the relationship between meta-cognition, entrepreneurship and innovative behavior. First, we suggest that metacognition will be strong related to innovative behavior. Second, in order to make a stable relationship between meta-cognition and innovative behavior, entrepreneurship will be mediating role in a mutual relation. Third, Resilience will have

an impact to metacognition. Therefore, we tested to mediating effect of entrepreneurship and moderating effect of resilience how strongly to make connecting between meta-cognition and innovative behavior. We will use the AMOS and SPSS statistical program to verify the hypothesis.

(Expected) Findings/Results:

Metacognition will have a positive impact on innovative behavior.

Entrepreneurship will have a positive impact on innovation behavior.

Metacognition will have a positive impact on Entrepreneurship.

Resilience will have a moderating in the relationship between metacognition and entrepreneurship.

Entrepreneurship will play a mediator role in the relationship between metacognition and innovation behavior.

Research limitations/ Implications:

In the management aspect, we can confirm that metacognition and entrepreneurship are very important factors for the innovative behavior of the members.

The importance of metacognition can be confirmed as a factor in strengthening entrepreneurship.

It can be confirmed that resilience is an important factor in overcoming the negative situation.

In the pedagogical aspect, it can confirm the importance of entrepreneurship education and metacognition learning.

Keywords: Meta-cognition, Entrepreneurship, Resilience, Innovative Behavior.

**RECOMMENDING SUITABLE ALTERNATIVE PERFORMERS USING PROCESS
MINING TECHNIQUES:
TOWARDS SMART ORGANIZATIONS**

Abstract

A key capability of a smart organization is to flexibly and effectively react to unexpected events. A critical case of an unexpected event is sudden unavailability of process performers or increase of workload, which was not properly addressed by the existing dynamic resource allocation approaches. This paper proposes an approach to finding alternative performers from event logs. In particular, the degree of substitution between performers is assessed from the perspectives of task execution and transfer of work. Process mining and social network analysis (SNA) techniques are mainly used in the proposed approach. Using the proposed approach, suitable alternative process performers can be found rapidly to replace the original performers, enabling more dynamic and flexible resource allocation in case of exceptional situations. This approach is expected to contribute to redesigning organizations into more smart ones.

Keywords: smart organization, business process management, resource allocation, process mining, social network analysis

Behavioral Model of Innovation Adoption: Comparing Chinese and U.S. College Students

<Abstract>

The diffusion of innovation is a function of various factors including individual characteristics, organizational and institutional factors, and culture. Various research has explored how these factors are associated with the diffusion of innovation. However, little empirical research has discussed how creativity is associated with the diffusion of innovation. Further, little research has tested whether or not individuals with a higher level of creativity can be more or less related to the early adopters or later adopters. There are two possible arguments regarding this hypothesis. One is that individuals with a highly creative mind are more likely to be early adopters; the other is that individuals with a highly creative mind are less likely to be early adopters. Different culture has a different mechanism regarding a relationship between creativity and adoption behavior of innovation. These two competing hypotheses may vary from country to country. We, relying on a comparative college survey, compare how the hypotheses differ from Chinese and U.S. college students.

Keywords: Creativity, Diffusion of Innovation, Early Adopters, Later Adopters, Cultural Context

Analysis of Technology and Market of Gangwon-Province, based on Korean Patent Information

Abstract

Purpose/ Research Question: The purpose of this study is to analyze the industrial characteristics of Gangwon-province by analyzing the technology activity based on the patent analysis of Gangwon-province upbringing industry using the industry - patent linkage table.

Key Literature Reviews (About 3~5 papers):

1. JinHyo Joseph Yun, EuiSeob Jeong and JeongHo Yang, "Open innovation of knowledge cities", Journal of Open Innovation: Technology, Market, and Complexity 2015 1:16 Published on: 4 November 2015.
2. Hojin Lee, Sangyoon Cha and Heejun Park, "The effect of technology-exploration on product innovation: an analysis based on Korean manufacturing SMEs", International Journal of Quality Innovation 2016 2:1, Published on: 4 July 2016.
3. In-Sik Yun · Seok-Jin Kim · Eui-Seob Jeong, "Evaluation of Technology Activity, Innovation and Productivity using Korean Patent Information", Journal of information management v.42 no.2 ,pp. 151 - 165 , 2011.

Design/ Methodology/ Approach: Patent information is an innovation index of industry and science and technology activities and can be utilized as a tool to reflect the achievement of invention such as country, region, technology, company, and to measure the spread of technology and R&D performance. In the past, patent statistics related to technology used IPC (International Patent Classification) were used and various industrial and economic statistics were difficult to analyze by using KSIC (Korean standard industrial classification) It is possible to analyze in depth and effective patent information and industry related information by using the linkage table.

(Expected) Findings/Results: The core strategic industries of Gangwon Province are food manufacturing, medical materials and pharmaceuticals manufacturing, and medical equipment manufacturing. As of 2014, the index of technological activity of the food manufacturing industry is 4.70, that of medical materials and pharmaceuticals is 2.15, and that of medical devices is 3.44. Strategic industry in Gangwon province shows high degree of patent concentration.

Research limitations/ Implications: The KSIC code has a linkage with the patent in the major category and the middle class, and there is a limit to the patent analysis of the subdivision industry.

Keywords: analysis patent, industry - patent linkage, technology activity

Benefits and Costs of Closed Innovation Strategy:

-analysis of Samsung Note 7 Battery explosion"

Research Question and Research Scope

1)Research Question

Why did Samsung Galaxy note 7 explosion occur?

What are the causes of the scandal?

How should we understand the causes and processes of the scandal?

2)Research Method

First, Contents analysis : news papers 2016. 8. 26-11.16 keywords; Galaxy note 7 explosion

Korean newspapers and Financial times.

Second , Survey to newspaper reporters

Third, Intensive interviews

Literature Reviews and Research Framework

1) Literature Reviews

Now day, new economic pressures on innovation are occurring. Developing costs of new products are rising and product life cycles are being shorted. To offset the trends of rising development costs and shorter product life cycles, companies must experiment with creative ways to open their business models by using outside ideas and technologies in internal product development and by allowing inside intellectual property to be commercialized externally(Chesbrough 2007).

Though open approach to innovation allows the firm to discover combinations of products features that would be hard to envision under integration. However, when partners have divergent goals, open innovation restricts the firm's ability to establish the product's technological trajectory(Almirall and Casadesus-Masanell 2010). So, discovery and divergence are treated as benefits and costs of open innovation.

Open innovation concepts is relevant primarily to not 'high-technology' industries, with

examples that include Lucent, 3Com, IBM, Intel and Millenium Pharmaceuticals, but also organizations in industries outside 'high technology' that are early adopters of the concept(Chesbrough and Crowther 2006). According to Chesbrough and Crowther(2006), Key success factors of inbound open innovation includes several factors such as providing top-down direction and encouragement for open innovation practices, assigning business ownership and responsibility for success, building deep networks in relevant areas , and aligning metrics and incentives to encourage success whether in an open or closed environment.

Open innovation in risk laden activities such as corporate venture have the following advantages: (a) benefits form early involvement in new technologies or business opportunities; (b) delayed financial commitment; (c) early exits reducing the downward losses; and (d) delayed exit in case it spins off a venture(Vanhaverbeke, Van de Vrande et al. 2008). But according to Vanhaverbveke, de Vrande, and Chesbrough(2008), innovative firms have to learn new skills and routines to develop the full 'real option' potential of open innovation practices to come true of the benefits of open innovation.

In the process of transformation of consumer electronics, there are industrial dynamics of open innovation. We should not forget the important ant role for the innovative enhancement of consumer electronics of several other categories of firms that are mostly not associated with consumer electronics: small specialized suppliers of components and modules, broad-scoped electronic component providers, small providers of end-user products in the high-end markets, and the dedicated manufactures and assemblers of components and systems(Christensen, Olesen et al. 2005).

Which changes in a firm's organizational structure and management systems does the shift from Closed to Open Innovation? According to the adoption of Open Innovation by four Italian firms operating in mature, asset-intensive industries, the journey from Closed to Open Innovating involves four main dimensions of the firm's organization, i.e. inter-organizational networks, organizational structures, evaluation processes and knowledge management systems(Chiaroni, Chiesa et al. 2010).

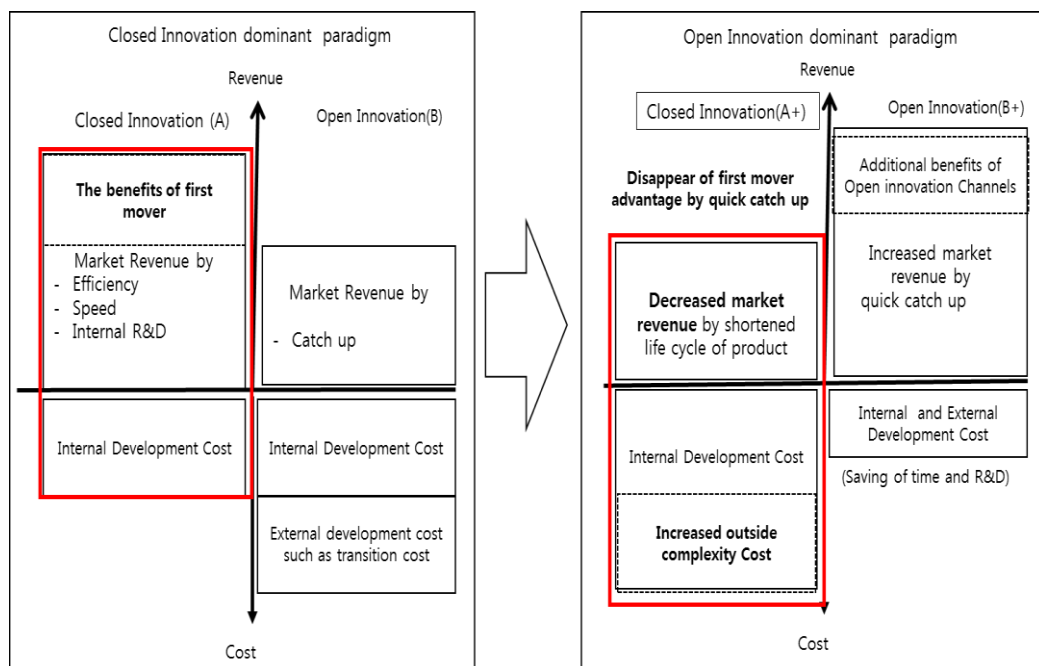
In the developmental changes in the semiconductor (DRAM technology), Samsung electronics followed a spiral process model of technological innovation. The spiral process includes 4 steps such as (a) Entrance of foreign companies into the Korean market and their refusal to transfer their technologies to Samsung initiating its indigenous technological innovation capabilities(ITCs), (b) Samsung stated technological innovation capabilities(TICs) by means of reversing the engineering of imported foreign technologies and transfer of technology, (C) it improved technological innovation(TI) by means of adaptive technological innovation strategy and finally (4) the capability to establish their own ITICs, to become one of the leading

companies in the world which challenges firms from advanced countries in the global market(Ali, Muhammad et al. 2011).

Innovation is a result of combinations such as dynamic combination between exploitation and exploration, open combination between absorption and distribution, vertical combination between upstream and downstream, functional combination between intensive and extensive, and multiple combination between synergic and sporadic(Hong 2012). In the innovation activities for CDMA digital phone development of Samsung, strong vertical combination gives Samsung competitive advantage over rivals according to Hong (2012).

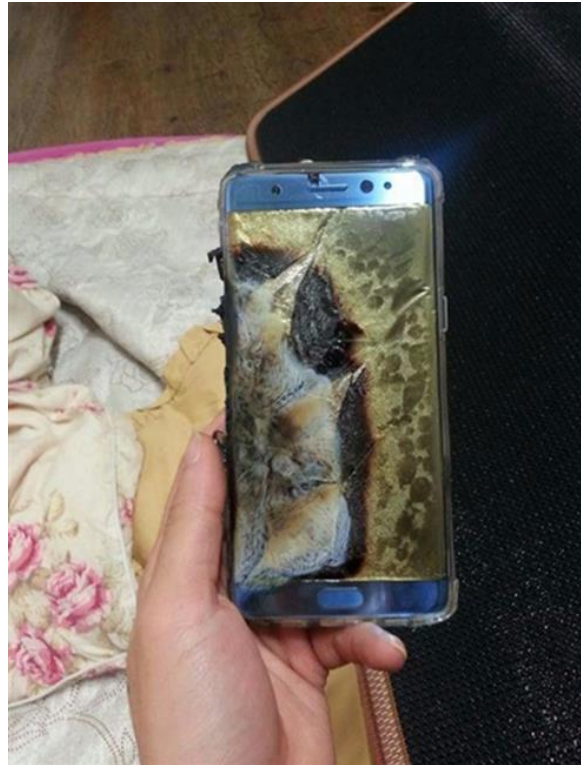
But in the case smartphone apples, opposite to Apple, the first mover of the platform has employed closed strategy for quality control of the platform and customer loyalty, Samsung has employed open the platform strategy "Openness," which is a free entry of participants, and "Sharing" of created value, are important along with the excellent platform environment(김나랑, 홍순구 et al.).

2) Research Framework

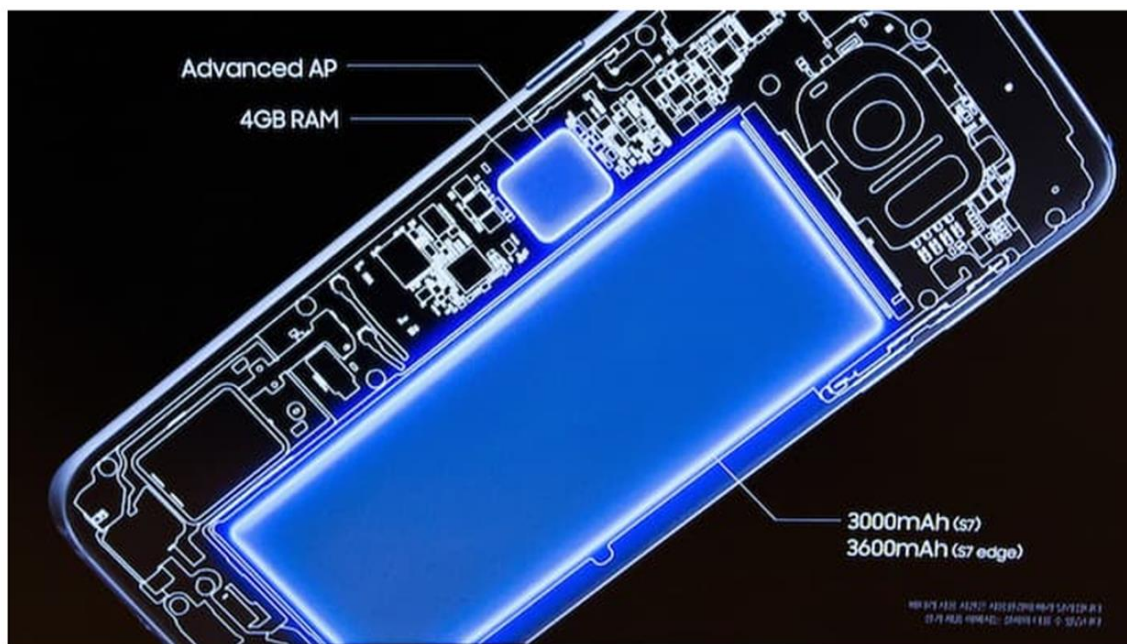


In advance analysis

1) explosion



2) Battery



The densely packed components of the Compaq Color Mate C7 seen here on a monitor at the



Model	Time	Battery Capacity
LG Electronics G5	6 Hour 31 minutes 49 seconds	2800mAh
Huawei P9	6 hour 51 minutes 43 seconds	3000mAh
Sony Experia X	7 hour 15 minutes 35 seconds	2620mAh
HTC 10	8 hour 3 seconds	3000mAh
Apple iPhone 6S	8 hour 13 minutes 57 seconds	1715mAh
Samsung Galaxy S 7 Edge	10 hour 30 minutes 14 seconds	3600mAh
Samsung Galaxy S 7	10 hour 59 minutes 11 seconds	3000mAh

Top suppliers of lithium-ion batteries

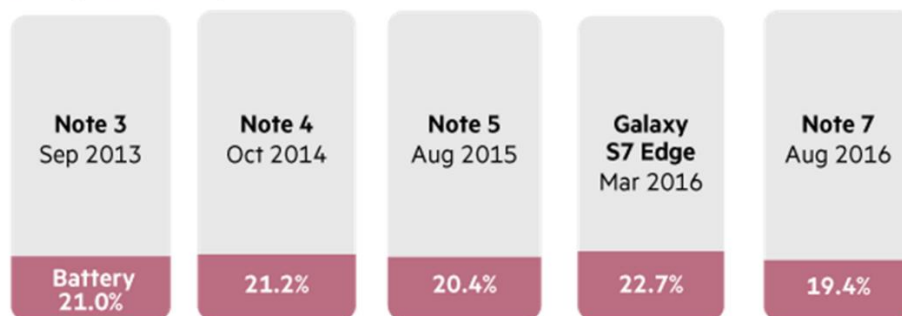
By market share, 2015 (%)



3) Samsung smart phone

Compact components: Samsung's batteries have become smaller

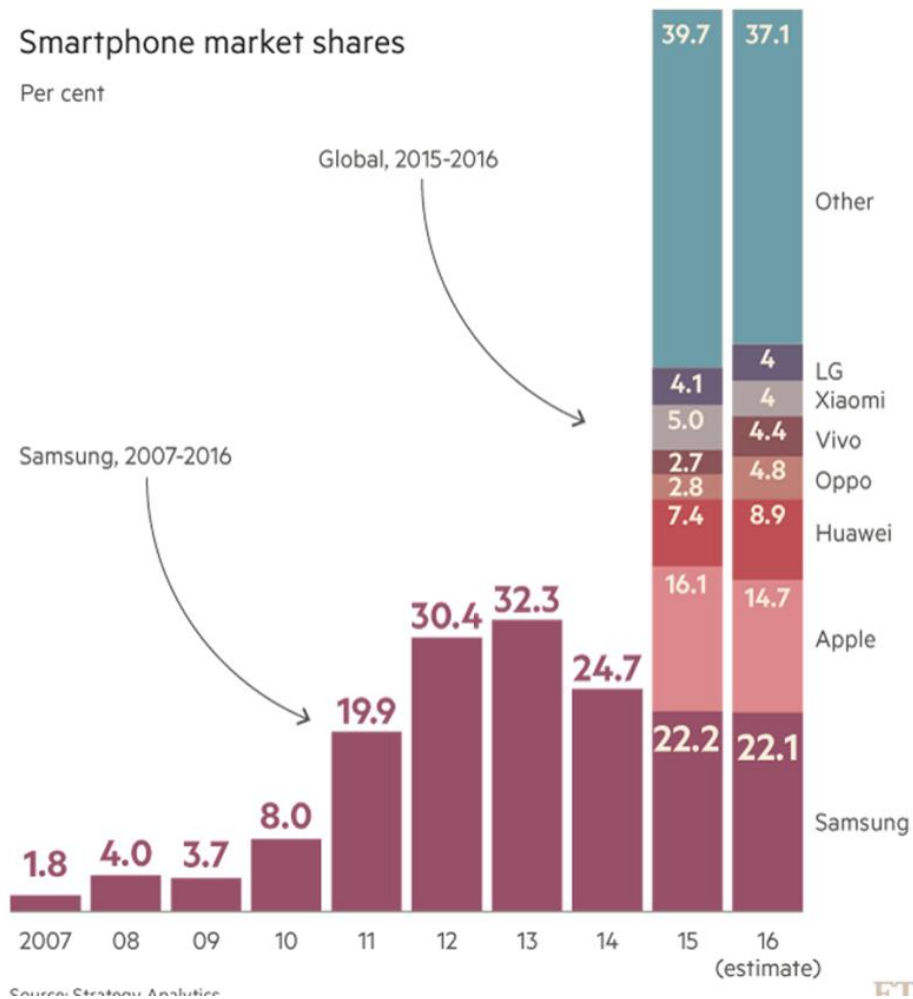
Battery size as % of phone



FT graphic Source: IHS Markit

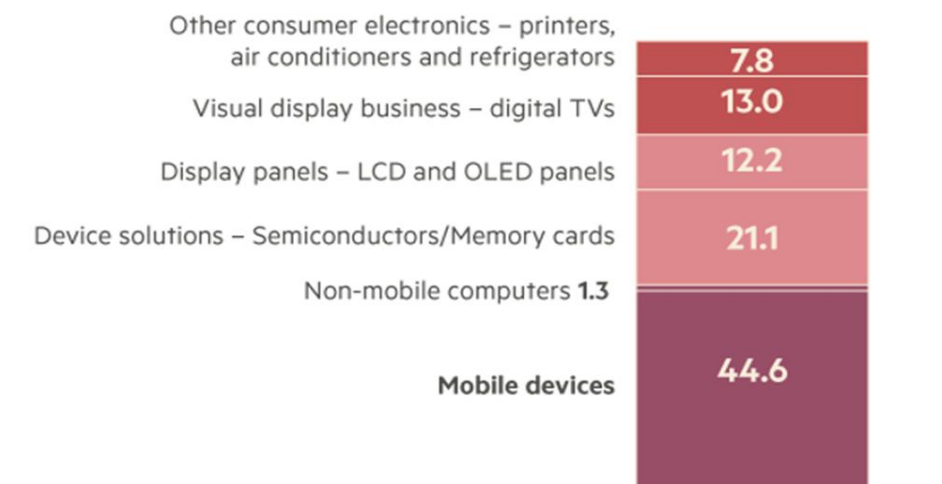
Smartphone market shares

Per cent



Samsung Electronics is heavily exposed to mobile

Sales as % of total, 2015



<Reference>

- Ali, M., et al. (2011). "A spiral process model of technological innovation in a developing country: The case of Samsung." African Journal of Business Management **5**(7): 2874.
- Almirall, E. and R. Casadesus-Masanell (2010). "Open versus closed innovation: A model of discovery and divergence." Academy of management review **35**(1): 27-47.
- Chesbrough, H. and A. K. Crowther (2006). "Beyond high tech: early adopters of open innovation in other industries." R&d Management **36**(3): 229-236.
- Chesbrough, H. W. (2007). "Why companies should have open business models." MIT Sloan management review **48**(2): 22.
- Chiaroni, D., et al. (2010). "Unravelling the process from Closed to Open Innovation: evidence from mature, asset-intensive industries." R&d Management **40**(3): 222-245.
- Christensen, J. F., et al. (2005). "The industrial dynamics of Open Innovation—Evidence from the transformation of consumer electronics." Research policy **34**(10): 1533-1549.
- Hong, Y. S. (2012). "Modes of combinative innovation: case of Samsung electronics." Asian Journal of Innovation and Policy **1**(2): 219-239.
- Vanhaverbeke, W., et al. (2008). "Understanding the advantages of open innovation practices in corporate venturing in terms of real options." Creativity and innovation management **17**(4): 251-258.

Alliance formation types, network positions, and firm performance in biopharmaceutical industry under open innovation paradigm

ABSTRACT

The purpose of this study is to understand the influence of network positions and formation types in strategic alliance on firm performance. We used panel data including the information of strategic alliance and financial performance in 937 biopharmaceutical firms from 1984 to 2010. In this study, we examined not only the main effects of the network positions and formation types, but also the interaction effects between them on firm performance. The empirical results suggest that network position in alliances does not lead to sales performance directly and more inter-industry alliances and intra-industry alliances have a negative effect on firm performance in biotechnology segment and pharmaceutical segment, respectively. However, the estimation results of the interaction term between network positions and alliance formation types show that the alliance formation types moderate the effect of network position on sales performance. Moreover, those effects are opposite depending on the segment. The reverse impact between pharmaceutical and biotechnology segments offers notable implications to policy makers and managers when they locate firms in alliance network.

Keywords: alliance formation type, biopharmaceutical industry, network position, panel regression, strategic alliance

1. Introduction

To sustain their competitive advantages, firms obtain resources and capabilities by acquiring knowledge of other firms through strategic alliances. Especially in R&D-intensive industry such as biopharmaceutical industry, knowledge transfers through strategic alliances develop firms' competences. For example, biopharmaceutical firms have carried out strategic alliances to acquire

specialized technologies to enhance internal capacity and expand their pipeline portfolios (Nicholson et al., 2003). Moreover, partnerships between them are important because biotechnology firms have specialized knowledge regarding novel approach to drug development while pharmaceuticals have capitals, labors, and know-hows to commercialize that knowledge.

Previous studies analyzed alliance structure and formation, especially from the network perspective (Barley et al, 1992; Walker et al., 1997). They enable us to understand evolution of biopharmaceutical industry structure by exploring the dynamics of alliance networks (Gay and Dousset, 2005, Roijakkers and Hagedoorn, 2006). Furthermore, some studies have examined the effect of alliance on firm performance, which shows controversial results: positive or negative effects (Lerner et al., 2003; Nicholson et al., 2003; Shan et al., 1994; Stuart et al., 2007).

Therefore, we need an additional factor on the relationship between strategic alliance and firm performance. Although some studies have considered firm's network position (Guan and Zhao, 2013; Powell, 1996), they have ignored alliance formation types and not compared the alliance networks of pharmaceutical and biotechnology firms even though their purposes are different. Consequently, our understanding of the effects of strategic alliance on biopharmaceutical firm's performance is still limited.

To fill this gap, we examine alliance formation types, i.e. intra-industry and inter-industry alliances. Findings show not only the main effects of the network positions and attributes, but also the interaction effects between them on firm performance. In addition, we compare pharmaceutical and biotechnology segments to identify how different their determinants affecting firm performance are.

The research questions and hypotheses are as follows:

Question 1: How do the network positions of biopharmaceutical firms in strategic alliance affect firm performance?

H1a. The central position of firms in alliance network are positively related to their financial performance.

H1b. The peripheral position of firms in alliance network are positively related to their

financial performance.

Question 2: How do the alliance formation types affect firm performance?

H2a. Inter-industry alliances are positively related to its financial performance.

H2b. Intra-industry alliances are positively related to its financial performance.

Question 3: Do the alliance formation types moderate the effect of network position on firm performance?

H3a. When firm has more inter-industry alliances, the central or peripheral position of firms affects more positively their financial performance.

H3b. When firm has more intra-industry alliances, the central or peripheral position of firms affects more positively their financial performance.

The remainder of this paper is organized as follows. The following section present data and methodology. Section 3 discusses the empirical results, followed by conclusion in section 4.

2. Data and methodology

For empirical analysis, we combined two types of datasets on 982 biopharmaceutical firms (543 pharmaceutical and 439 biotechnology companies). First, we collected the strategic alliance data of biopharmaceutical firms from the Thomson Reuters' SDC Platinum database. This database has been widely used due to its usefulness to investigate firms' alliance activities. Consequently, we collected 3,154 strategic alliances, and calculated each firm's centralities through network analysis using Pajek, a well-recognized network analysis software. Second, we used Compustat database and annual reports to obtain firms' financial and accounting information, respectively. Finally, combining these datasets, we obtained the panel data of 10,210 observations including the information of firms' alliances and performance from 1984 to 2010.

To compare the determinants between pharmaceutical and biotechnology firms, we divided the firms into two segments by the standard industrial classification code: pharmaceuticals (2834) and biotechnologies (2836). Table 1 shows composition of the total observations and change in portion

of each segment by year.

[Insert Table 1 here]

Then, we select variables to analyze in this study. First, a dependent variable is sales as a proxy of corporate performance. Second, independent variables are firms’ centralities. We use degree (central position) and betweenness (peripheral position) centralities that define different location characteristics and roles in network. To obtain the value of firms’ centralities, we employed the Pajek program for the social network analysis. Another independent variable is alliance formation type. We counted the number of inter- and intra-industry alliances each firm had. Third, control variables include firm size, R&D expense, and marketing expense. For the empirical analysis, we used the panel model as follow:

$$Y = \alpha + \beta_1 \text{ Degree Centrality} + \beta_2 \text{ Betweenness Centrality} + \beta_3 \text{ Inter-industry alliances} + \beta_4 \text{ Intra-industry alliances} + \text{Control variables} + \varepsilon$$

where Y is the firm performance as a dependent variable, α is the estimated parameter and ε is the error term. And the descriptive statistics and correlation coefficients of the variables are shown in Table 2.

[Insert Table 2 here]

3. Empirical Results

We estimate the coefficients for all firms and for each segment using fixed effect panel regression (Table 3). The findings show that firm size and marketing expenses exert a positive influence on sales, whereas the effect of R&D expense is insignificant.

[Insert Table 3 here]

The estimation results reveal that the main effects of centralities are insignificant in both segments. This implies that firms' central and mediating positions in alliance network are not related directly to sales. In addition, the coefficients for inter-industry alliance in biotechnology segment and intra-industry alliance in pharmaceutical segment are negative and significant. That is, the more alliance biotechnology firms make within industry or the more alliance pharmaceutical firms make across industries, the less sales outcome the firms achieve.

The estimation results of the interaction terms between the centralities and alliance formation types provide an intriguing argument. As they have more inter-industry alliances, biotechnology firms located in central position achieve higher sales performance ($\beta=56.60, p<0.01$), while those located in mediating position achieve lower one ($\beta=-0.153, p<0.01$). However, those interaction effects for pharmaceutical segments are insignificant. In case of intra-industry alliance, as they have more intra-industry alliances, pharmaceutical firms located in central position achieve higher sales performance ($\beta=27.90, p<0.01$), while those located in peripheral position achieve lower sales performance ($\beta=-0.0734, p<0.01$). However, those interaction effects for biotechnology segments are insignificant. Therefore, it can be argued that the effect of network position on firm performance depends on alliance formation type. Furthermore, the results that degree centrality shows a positive effect, whereas betweenness centrality shows a negative impact on sales in both segments suggest that central firms are dependent in alliance network, whereas peripheral firms are relatively detached. This is because core-periphery structure may result in preferential attachment.

4. Conclusions

This study examines the moderating effect of alliance formation types on the relationship between network position and firm performance using large samples of biopharmaceutical firms. The empirical results suggest that network position in alliances does not lead to sales performance directly in both pharmaceutical and biotechnology segments. Also, it shows that more inter-industry alliances and intra-industry alliances have a negative effect on firm performance in biotechnology segment and pharmaceutical segment, respectively. However, the estimation results of the

interaction term between network positions and alliance formation types show that the alliance formation types moderate the effect of network position on sales performance. Moreover, those effects are opposite depending on the segment.

The reverse impact between pharmaceutical and biotechnology segments offers notable implications to policy makers and managers when they locate firms in alliance network. For example, when a biotechnology firm has many inter-industry alliances, locating in central position rather than peripheral position in alliance network will produce higher revenue, and when a pharmaceutical firm has many intra-industry alliances, the central position rather than peripheral position will also produce higher sales performance.

References

- Barley, S.R., Freeman, F., Hybles, R.C., 1992. Strategic alliances in commercial biotechnology. In: Nohria, N., Eccles, R.G. (Eds.), *Networks and Organizations: Structure, Form, and Action*. Harvard Business School Press, Boston, MA, 311-347
- Gay, B. and Dousset, B., 2005. Innovation and network structural dynamics: Study of the alliance network of a major sector of the biotechnology industry, *Research Policy*, 34, 1457-1475
- Guan, J., Zhao, Q., 2013. The impact of university-industry collaboration networks on innovation in nanobiopharmaceuticals. *Technological Forecasting and Social Change*, 80(7), 1271-1286
- Lerner, J., Shane, H., Tsai, A., 2003. Do equity financing cycles matter? Evidence from biotechnology alliances, *Journal of Financial Economics*, 67(3), 411-446
- Nicholson, S., Danzon, P.M., Jeffrey McCullough, 2003. Biotech-pharmaceutical alliances as a signal of asset and firm quality. *Journal of Business*, 78(4), 1433-1464
- Powell, W.W., 1996. Inter-organizational collaboration in the biotechnology industry. *Journal of Institutional and Theoretical Economics*, 120(1), 197-215
- Roijakkers, N., Hagedoorn, J., 2006. Inter-firm R&D partnering in pharmaceutical biotechnology since 1975: Trends, patterns, and networks
- Shan, W., Walker, G. and Kogut, B., 1994. Inter-firm cooperation and startup innovation in the

biotechnology industry, *Strategic Management Journal*, 15(5), 387–394

Stuart, T., Ozdemir, S., Ding, W., 2007. Vertical alliance networks: The case of university-biotechnology-pharmaceutical alliance chains, *Research Policy*, 36, 477-498

Walker, G., Kogut, B., and Shan, W. J., 1997. Social capital, structural holes and the formation of an industry network. *Organization Science*, 8, 109-125

Table 1. Observations

Year	Total	Pharmaceutical	%	Biotechnology	%
1985	140	100	71.4	40	28.6
1986	155	111	71.6	44	28.4
1987	167	114	68.3	53	31.7
1988	184	124	67.4	60	32.6
1989	194	132	68.0	62	32.0
1990	226	157	69.5	69	30.5
1991	254	166	65.4	88	34.6
1992	287	183	63.8	104	36.2
1993	318	198	62.3	120	37.7
1994	338	207	61.2	131	38.8
1995	377	220	58.4	157	41.6
1996	399	229	57.4	170	42.6
1997	411	233	56.7	178	43.3
1998	455	262	57.6	193	42.4
1999	483	279	57.8	204	42.2
2000	485	279	57.5	206	42.5
2001	505	287	56.8	218	43.2
2002	540	302	55.9	238	44.1
2003	551	308	55.9	243	44.1
2004	562	307	54.6	255	45.4
2005	569	299	52.5	270	47.5
2006	573	307	53.6	266	46.4
2007	563	304	54.0	259	46.0
2008	514	267	51.9	247	48.1
2009	498	260	52.2	238	47.8
2010	462	231	50.0	231	50.0
Total	10,210	5,866	57.5	4,344	42.5

Total 982 firms = 543 pharmaceutical firms + 439 biotechnology firms

Table 2. Descriptive statistics and correlation

Variable	Mean	Stdev	Min	Max	1	2	3	4	5	6
1 Sales	888.269	4419.86	0	67791	1.0000					
2 Degree	0.195	0.87	0	24	0.2099*	1.0000				
3 Betweenness	19.512	248.47	0	10280	0.0731*	0.6706*	1.0000			
4 InterL2	0.075	0.43	0	12	0.1453*	0.3538*	0.1725*	1.0000		
5 IntraL2	0.163	0.70	0	12	0.2584*	0.4515*	0.2532*	0.5142*	1.0000	
6 Firmsize	2.748	12.05	0	122.2	0.9192*	0.3109*	0.1405*	0.2203*	0.3435*	1.0000
7 Advexp	19.155	162.33	0	4000	0.6451*	0.1680*	0.0420*	0.1010*	0.1871*	0.5994*
8 R&Dexp	2970.626	2411.35	1	7448	0.1319*	0.0632*	0.0301*	0.0293*	0.0695*	0.1373*

* $p \leq 0.05$

Table 3. Results from the panel data analysis

	All	Pharmaceutical	Biotechnology
Degree centrality	-16.60 (14.77)	-24.17 (23.86)	-4.676 (4.348)
Betweenness centrality	-0.00817 (0.0421)	-0.0256 (0.0734)	-0.00312 (0.0130)
Inter-industry alliance (time-lag 2)	15.62 (22.69)	28.97 (36.12)	-28.51*** (6.990)
Intra-industry alliance (time-lag 2)	-55.43*** (14.48)	-73.01*** (22.48)	1.091 (4.731)
Degree centrality x Inter-industry alliance (time-lag 2)	-3.832 (9.150)	-8.817 (12.65)	56.60*** (6.209)
Betweenness centrality x Inter-industry alliance (time-lag 2)	0.0207 (0.0299)	0.0345 (0.0408)	-0.153*** (0.0345)
Degree centrality x Intra-industry alliance (time-lag 2)	24.73*** (5.220)	27.90*** (7.234)	-13.61 (4.241)
Betweenness centrality x Intra-industry alliance (time-lag 2)	-0.0727*** (0.0132)	-0.0734*** (0.0183)	0.00864 (0.0186)
Firm size	111.4*** (4.696)	110.8*** (6.185)	152.2*** (4.598)
Marketing expenses	4.945*** (0.187)	4.974*** (0.243)	19.26*** (1.234)
R&D expenses	-0.000284 (0.00471)	-0.000687 (0.00834)	-0.000247 (0.00113)
Constant	1381.5*** (8.760)	2115.4*** (14.86)	411.2*** (2.181)
Adj. R ²	0.126	0.130	0.332
Observations	6,857	4,019	2,838

Standard errors in parentheses.

* $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$

Comparing Validity of Risk Measures in Newsvendor Models

Abstract

Purpose/Research Question: The multi-product newsvendor model, initiated by Arrow, Harris and Marschak (1951), is a well-known classical stochastic inventory replenishment problem in supply chain management literature. In this model, there exist multiple perishable products with random demand in a single-selling season. Then a newsvendor should decide his optimal ordering quantity for each product in this single-period model before demand realization. Because the product demand is only given as a probability distribution, the objective function is represented as a random outcome. If the newsvendor orders too much for any product, all the leftover items are sold at a discounted price; if the newsvendor orders too little, it will lose sales opportunity.

Then, it is important to select quality risk measures to analyze newsvendor problems under risk. To find such risk measures in newsvendor problems, we review various risk measures of risk-averse inventory models and existing articles in inventory management literature.

Key Literature Reviews (About 3~5 papers): The original model by Arrow et al. (1951) maximizes the expected value of profits without resource constraints and demand substitution. Then the multi-product model is decomposable into multiple single-product models in each product and has a simple analytical closed-form optimal solution for each product. This solution is known as a fractile, described with overage and underage profits, of the arbitrary (cumulative) demand distribution function. Thus, it can characterize the optimal solution effectively with underage and overage profits as well as its solvability as a closed-form solution. Owing to its simple solution with trade-off analysis between underage and overage profits, it has many applications in industries such as overbooking problems or facility capacity problems.

To overcome drawbacks of risk-neutral models, risk-averse models have been studied in literature. In risk-averse models, inventory managers consider the variability of the outcome as well as its expected value. That is, under risk aversion, a risk-averse inventory manager may prefer more stable outcome even if the outcome is worse on average. Schweitzer and Cachon (2000) conducted two empirical experiments to show risk preferences of inventory managers. By the experiments, they showed that inventory managers may be risk-averse for short life-cycle or high-value products. Therefore, risk aversion can capture the decision making of inventory managers at a different angle from risk neutrality and both of them are consistent with rational decision makers. Because risk aversion significantly aspects the optimal choices of inventory managers, it is a very interesting and important factor to analyze the optimal choices of inventory managers. Risk aversion has a very good fit especially to conservative decision makers. Some good examples are energy, environment, sustainability industries and so on.

Design/Methodology/Approach: This paper aims to extend the series of previous works, Choi and Ruszczyński (2008), Choi, Ruszczyński and Zhao (2011) and Choi and Ruszczyński (2011). In

those three papers, we conducted our extensive literature review for various risk measures used in the inventory management literature and categorized the risk measures into four typical approaches – expected utility functions, stochastic dominance, chance constraints and mean-risk models. Then we selected coherent measures of risk as quality risk measures in Choi and Ruszczyński (2008) and Choi, Ruszczyński and Zhao (2011) and an exponential utility function in Choi and Ruszczyński (2011), respectively.

(Expected) Findings/Results: We provide an axiomatic reasoning and framework to evaluate validity of each risk measure in newsvendor problems - consistency to the four axioms in coherent risk measures. In this framework, the underlying assumptions and managerial insights to the newsvendor problems are studied for each risk measure. Consequently, exponential utility function and coherent measures of risk are selected as two plausible risk measures to analyze multi-product risk-averse newsvendor models. We believe that there is an important extension that can be addressed in this axiomatic framework. In this paper, we discuss meaning and implications of the four axioms in coherent risk measures in newsvendor models.

Research limitations/Implications: A multi-period model can be a possible extension for the model. For a multi-period case, dynamic version of coherent risk measures were also analyzed in the literature (refer to Riedel (2004), Kusuoka and Morimoto (2004), Cheridito, Delbaen and Kupper (2006) and Ruszczyński and Shapiro (2006b)). Then, this axiomatic approach can be a good starting point of constructing another axiomatic framework to compare the validity of various risk measures for a multi-period case.

Keywords: (multi-product) newsvendor problem, risk aversion, coherent measures of risk, (exponential) utility function.

An empirical study on Taiwan enterprises' open innovation activities and their added value

Abstract

With an era of razor-thin profit margins that Taiwan's industries have allegedly been through, this paper aims to comprehensively examine the relationship between Taiwan enterprises' added value and their open innovation activities. In doing so, an econometric model based on the panel data constructed¹ is employed and an innovation survey with revision of Oslo Manual framework is conducted to analyze the nature of Taiwan enterprises' innovative activities and the underlying factors for added values. The econometric model shows that Taiwan's industry has experienced decline in value-added ratio, particularly in information technology (IT) industries. In addition, the survey shows that the main components of firms' innovative activities are in-house R&D, acquisition of embodied technologies, and product designs. Major obstacles to the implementation of innovation activities are mainly due to the lack of skilled manpower and the excessively high cost of innovation.

Keywords: value-added, innovation activities, open innovation

3) Purpose/ Research Question

The achievement of Taiwan's economic development has been paved on its flexible manufacturing capacities to adjust promptly and swiftly in the changing global business environment. For example, information technology (IT) sector was highly beneficial to the business model through using contract manufacturing for major international corporations, such as Original Equipment Manufacturer (OEM) orders. However, the volume of added value of Taiwan industry has been allegedly deteriorating due to the meager marginal profits derived from constant slashing of costs (Chen and Liu, 2005; Kung and Lee, 2004). Moreover, while competing with products from developing countries, the commonly seen "razor-thin profit" situation became worse. Therefore, this turns out to be a vital issue in terms of how to progress toward the high value added development and innovation-based industrial growth to ensure Taiwan's future development.

A large number of literatures have addressed growing sources of industrial added value and economic growth (Romer, 1986; Porter, 1990). So far Innovation has been regarded as an important source mainly because of its promotion to technological change, which enables economic growth probable (Nelson et al. 1982; Metcalfe, 1995); however, the relationship between innovation and the growth of value added

¹ Data analyzed in this paper were collected by two research projects "The Evaluation and Analysis of National Innovation System and Competitiveness in Taiwan (In Chinese)" and "The Analysis of the determinants on Enterprise innovation activities and added value" sponsored by Department of Industrial Technology, Ministry of Economic Affairs, R.O.C.(95-EC-17-B-31-R2-0736). The views expressed herein are the authors' own.

(VA) has not been fully explored. Therefore, this study intends to the expanding literature on the linkage between industrial added value and innovation by providing evidence on the components and characteristics of industrial added value of Taiwan enterprises.

Since the estimation of how much added values have been created in the innovation process is inadequate because of the complex process of commercialization process, an identical specification of the model and an identical method are required to explain heterogeneity of added value in the process of innovation. It must be noted that this study does not attempt to estimate the causal effect of innovation investment on the added value of innovation output or the causal effect on firm performance. Instead, we explore the underlying factors of added value behind Taiwan enterprises' open innovation activities by developing an econometric model and complement this with the survey carried out in Taiwan by the Taiwan Institute of Economic Research (TIER).

4) Literature related to the measurement of added value and innovation

a) The measurement of industrial added value

The continuous debate over the sources of long-term economic growth has shed light on the role of innovation. In neo-classical economics there is a subsequent and strong research commitment on investigating the influences of specialization and division of labor on economic growth since Adam Smith (1776). From neoclassic point of view, the process of endogenous economic growth shall converge to a final state of equilibrium. The considerable explanatory power in new-classical economic model is based on the conditional convergence due to the assumption that the economic world is a mechanistic perspective which implies determinism and predictability (Castellacci et al., 2005).

The role of technological progress is recognized by neo-economists as an exogenous factor in the long term equilibrium growth. Neo-economists emphasize the importance of real capital accumulation, saving rate, population growth and technological progress as exogenous factors that influence the growth of economics (Solow, 1956; Swan, 1956). However, with the predictive characteristics of conditional convergence, the problem of technological exogeneity remains. Therefore, in an attempt of resolving the problem, new growth theories endogenize technical progress as the driving force, thus modifying the production function. Romer (1986) facilitates a competitive equilibrium model of long-run growth as primarily driven by endogenous technological change and the accumulation of knowledge which have increased marginal productivity. In his modeling framework, long-run growth is primarily driven by the accumulation of knowledge, which accumulated by devoting resources to research through forward-looking profit-maximizing agents.

With this framework, Romer (1987) further specifies the model by introducing R&D theory and imperfect competition into the growth model. By assuming that a production function requires an imperfectly substitutable and intermediate input developed by an R&D sector, economic growth would be mainly driven by such factors as saving willingness, production function (subject to the impacts of taxation or other government policies), R&D costs, and economy of scale. As for the role of technological progress, Romer (1990) argues that, as the major driving force of economic growth, technological progress would be benefited from intentional R&D activities, which would require inputs of human capital and other intermediate products. The availability of which input factor therefore would affect technological progress. Similarly, both studies of Grossman & Helpman (1991) and Aghion & Howitt (1992) confirm that technological progress affect the quality improvement of intermediate and final products, particularly the role of technological transfers from the leading countries to the developing ones.

However, a major problem in neo-classic equilibrium frameworks is their conceptual formalization. The existence of price and/or quantity is based on the adjustment mechanisms within deterministic closed-systems when mathematical models are available for dealing with (Dow, 2000). In this case, with the deficiency of continual technological progress is assumed to be exogenous, the prediction for the growth under the concept of equilibrium in deterministic closed-systems would come to an end. Therefore a lot of interests and insights have been attracted by the Schumpeterian theory in the study of economic growth which focuses on the central role of innovation for the process of economic development.

To correct this deficiency of neo-classic equilibrium frameworks, the economic analysis of evolutionary growth has been based on an open-system approach (non-deterministic) and more evolutionary micro foundations (Dosi, et al., 1988). Evolutionary economics conceive the economy as a never ending and ever changing process, and emphasizes that "growth is an evolutionary process". The innovative behavior of a firm with different technologies and organizational character interrelate under a set of investment decision scheme linked to "selection environment" of the persistent disequilibrium (Dosi, et al., 1988). According to

Schumpeter (1942), innovation and selection are the two main forces of growth and the competitive environment within which firms operate is dynamic. This in turn will affect firms' innovative behavior due to the fact that the decisions of innovative entrepreneurs on investment and innovation are selective ones. In short, evolutionary theory intends to model the firm as having certain capabilities, decision rules and selection sets. Thus, the core concern of evolutionary theory is related to the dynamic process that firm behavior

patterns and market outcomes are jointly determined over time. From the point of view of evolutionists, more explicitly foci highlight the micro foundations of innovation by addressing firm-level decisions to invest in product or process innovations. The main contributions of above literatures are identification of the role of innovation and technological progress in economic growth. Consequently, while evolutionary economics focus on the micro foundations of firm-level innovation, which will be investigated by survey method in this paper, innovation also can bring significant productivity gains (added value) to upgrade the competitiveness of a nation from neo-economics' viewpoint.

5) Design/ Methodology/ Approach:

a) Econometric analysis of added value

High added value is not only created by the utilization of new technology into new products, but also can be made from various dimensions, such as employment and depreciation. In general, value added is defined as sales less the cost of bought-in materials, components and services (DTI value added scoreboard)². However, this definition cannot be used to standardize the estimates of value added when some countries do not publish sufficient information in terms of bought-in materials. Since the limitation of audited company annual reports in Taiwan, a firm's nominal value-added is calculated by the summation of its gross profit, employee salary, and capital depreciation cost.

In terms of R&D activities, the enhancement of R&D not only can enlarge the scale of production due to the technological improvement, but also enlarge the value or price of products due to improved quality. In addition, branding efforts can enhance products' relative prices even when other tangible inputs being equal. Therefore, the analytical focus of this report is placed on measuring the contribution of R&D and branding activities.

Investigating the contribution of innovation to the growth of added value is a challenging task due the fact that innovation involves much broader and diverse activities than R&D. All entrepreneurial actions leading to the increased value-added can be perceived as innovation activities. In this regard, except for pure capacity duplication through expansion of labor and capital inputs, value of innovation is defined as the increased value-added resulting from innovation activities. Moreover, we attempt to overcome this limitation by conducting an innovation survey when R&D expenditure is not able to present the realities of firms' innovation activities. These quantities are extracted from an annual report of Taiwan is shown in Table 1 of the analysis

Table 1 Regression Variables, Definitions, and Data Sources

	Variable	Variable/Proxy Definition	Data Source
Y	Nominal Value Added	Total of gross profit, employee salary, and depreciation cost	Listed Firms' annual financial reports
R	Process and product innovation	R&D expenditure	
L	Labor Input	Employees' salary	
K	Capital Stock	Property depreciation cost	
M	Branding and Marketing Input	Marketing expenditure	

Source: Collected by the authors.

To sum up, these panel data are extracted and calculated from Taiwan Economic Journal Data Bank which is based on the database of Taiwan Stock Exchange Corporation. Annual financial reports for 1109 listed manufacturing companies and 66 service companies were collected to obtain the required data for analyzing the impact on entrepreneurial value-added of R&D expenditure, employees' salary, capital, branding and marketing investment, after excluding those with incomplete data sets and market-channel firms.

² Value added is calculated from a company's accounts as following formulation: Value added= Operating Profit+ Employee costs+ Depreciation+ Amortization.

It must be noted that the estimates of value added are expressed in various measures and in the ratio form³. To avoid the effect of size of market and industrial scale, the indicators are divided by net sales for the purpose of statistical analysis.

b) Innovation survey

Since innovation activities take place in all parts of the economy, we take all industries into consideration. The target population for innovation surveys is involved with listed corporation from all industries so that the results can be grossed up and comparisons can be made. In the case of sample surveys, the sample frames should correspond as closely as possible to the target population. We collect data on listed corporations, which R&D budget are over 10 million NTD or sales are over 30 billion without R&D spending record. In order to ensure a satisfactory response rate, we keep the questionnaire as compact as possible; and clearly formulate questions as well as instructions; and express the formal definitions in an appropriate and meaningful arrangement to all industries' respondents. To sum up, total 1200 corporations were selected and 120

questionnaires were received (response rate is 10.25%). Corporations from ICT industries accounts for 40%, both machinery and chemical industries account for 21%, service industry accounts for 11%, and householder industry accounts for 7 % respectively.

6)(Expected) Findings/Results:

This section intends to analyze the effect of innovations on industrial value-added in Taiwan. In doing so, we develop multi-variable regression model and analyze data from the annual financial reports of the listed companies in Taiwan’s stock exchange market to investigate entrepreneurial activities of value creation.

a) A simple model

Since the impact of innovations could be reflected in the quantitative increase of production as we reviewed literature in section 2, this section intends to investigate the industrial value-added of innovations measured by the real output level as well as in the qualitative improvement. In doing so, Kung and Lee (2004) theoretical model is adopted to develop a regression analysis. In order to further conduct the statistic inference, the econometric model is derived as follows from the above theoretical model:

$$\ln Y = \alpha_0 + \alpha_1 \ln R + \alpha_2 \ln L + \alpha_3 \ln K + \alpha_4 \ln M + e$$

$$\ln(VA) = c + a* \ln(L) +b* \ln(K) + d* \ln(RD) + e* \ln(M)$$

where α_0 depicts the intercept of the regression, and R 、 L 、 K 、 M represent respectively the R&D input, labor input, fixed capital stock, marketing and branding input, and error term. Note that given the cross-sectional data of year 2004 and 2005, every firm would face the identical economic cyclical impact, thus excluded from the empirical analysis. Also note that the cross-sectional data of two year period is assumed to render of no difference in using relative prices or nominal prices for our empirical study (Kung and Lee, 2004).

For the dependent variable Y , the nominal value-added data of listed companies in the Taiwan stock exchange market is used.⁴ For the independent variables, listed companies’ R&D expenditure data in their annual financial reports is used for the R&D input variable R ; the employees’ salary in a listed company is for the labor input variable L ; the figure of property depreciation in a listed company is for the fixed capital variable K ; for the variable of branding and marketing input, branding is determined by the listed company’s marketing expenditure in its annual financial report.

b) Empirical result

This section intends to demonstrate the empirical results from econometric model. The industrial

c) 3 value added efficiency P2 (%)

d) Total value added Employee cost Depreciation

⁴A firm's nominal value-added is calculated by the summation of its gross profit, employee salary, and capital depreciation cost.

sectors are classified by the standard industrial classification system of the Republic of China⁵ (Revision 8, 2006). To begin with, regarding to the discussion of each input component, the impact of R&D expenditure on firm's value-added performance is positive and significant (significant level of 5%), except for optical instruments and service industries. Secondly, capital effect is not significant in chemical, information and communication, and service industries.

Thirdly, regarding to the component of labors, employees' salary on firms' value-added performance is positive in most of the industries except metal-machinery, semiconductor and information and communication. Moreover, the elasticity coefficients of transportation and storage and optical instrument industries are among the highest, reaching 3.45 and 2.175, respectively. This may infer that the highest benefit of the employees salary on the creation of added value. Finally, the impact of marketing and branding is not significant in metal-machinery and service industries.

To sum up, the result shows that the impact of R&D investment is beneficial for firms' value-added performance in most of industries except in service industries, though the respective extent varied. For overall ICT industries, the elasticity coefficient is 0.862, meaning that per dollar of R&D investment may generate 0.862 in added-value due to the resulted technological improvement. Particularly, the coefficient in information and comm. industry is 3.1, which implies that R&D investment should bring them the greater added-value than that of other industries. In terms of branding and marketing, our result shows that only metal-machinery and semiconductor industries do not have significant effect on firms' added-value performance. This infers that these two industries produce intermediate goods; branding and marketing may not contribute much on their value-added. On the other hand, the coefficients in branding/marketing and employees categories are positive and significant in most of the cases; it implies that the innovation investment in 'soft' infrastructure within companies should not be overlooked.

Table 4 Regression Findings of Impact on Industrial Value-Added

Industry	n	Intercept	Branding & Marketing	Fixed Capital	Employees	R&D Expenditure
ICT	494	0.128*	1.081*	0.714*	0.65*	0.862*
Chemical industries	87	0.126*	0.611*	---	1.262*	1.122*
Household industries	53	0.075*	0.692*	1.512*	1.167*	1.236*
Metal-machinery industry	81	0.111*	---	1.277*	---	2.925*
Computer & peripherals and	117	0.07*	0.094*	1.032*	1.469*	1.163*
Optical instruments	47	0.108*	1.863*	0.681*	2.679*	---
Semiconductor manufacturing	66	0.182*	---	0.38*	---	0.694*
Information and Comm.	38	0.042*	1.432*	---	---	3.1*
Biotechnology	33	0.182*	0.509*	---	1.157*	0.859*
All service sector	63	0.181*	---	---	1.828*	---
Wholesale and Retail	16	---	---	---	1.981*	---
Transportation and Storage	14	---	---	---	3.45*	---

Note: (1) * significant level of 5%

e) The dynamics and evolution of innovation activities

In this subsection, we inquire about what kind of innovation activities Taiwanese enterprises mainly focus during three different periods, namely, before 2002, 2003-2005, and 2006-2010. According to table 2, before 2002 Taiwanese enterprises ranked production/supply/operation technique improvement, equipment use and operation method learning, and short-term new product development as top priorities; however, in 2003-2005, the priorities of innovation activities evolved into medium term product/production

⁵ please see <http://www.dgbas.gov.tw/public/Attachment/791216474871.xls> for detail process research and development, specifically, near 40% of enterprises were expecting to invest in developing next generation product and production processes.

When we asked Taiwanese enterprises to project their next 5-years (2006-2010) innovation activity priorities, the focuses of their innovation shifted towards developing long term frontier/basic science research

for next generation products and services, establishing business model and building brands (also see table 2).

Table 2 Top 5 priorities of innovation activities over different periods

Period	Examples of innovation	%
Before 2002 (include 2002)	1) Carry on improvement on existing technique	21.24
	2) Short-term R&D (one year) on innovation and prototyping	21.14
	3) Accumulate related skill and technique for production/supply/delivering	20.35
	4) Learning operating procedure of new equipment	19.91
	5) Integrate production/supply/deliver technology and engineering support	17.92
Year 2003-2005	1) Carry on improvement on existing technique	38.94
	2) Research on mid-term product and production process	38.18
	3) Develop mid-term product and production process	37.73
	4) Short-term R&D (one year) on innovation and prototyping	34.09
	5) Developing frontier/basic science research (next generation product and service)	32.27
Year 2006-2010	1) Developing frontier/basic science research (next generation product and service)	39.77
	2) Establishing new distribution or delivering method /new business model	34.73
	3) Research on mid-term product and production process	34.32
	4) Establish own brand	34.07
	5) Develop mid-term product and production process	33.64

Note: This question contains 10 options with duplicate selection frame

The impact of innovation activities on enterprises

Inspecting from intellectual capital point of view, the impacts of innovation activities on enterprises can reflect upon the gains on the following four aspects: process capital, relationship capital, human capital, technology innovation capital. The accumulation of above tangible and intangible assets aggregates to the final outcomes in generate competitive advantage and value creation.

According to the survey, the impact of innovation investment and activities on enterprises has been visible. On the average, innovation activities have positive contribution to all four aspects, while slightly higher impact on the process capital and technology innovation capital aspects can be observed. As to the impact on generate competitive advantage and value creation, increasing profitability and market shares are the highest while the impact on “increasing loyalty income” is the lowest.

Table 3 Impact of innovation activities on enterprises

The scope of Effect	Items	Average Score (0-4) *
Process capital		
	Improving product and service quality	2.65
	Improving production or service providing flexibility	2.62
	Increasing production or service providing capacity	2.50
	Increasing product or service speed of delivery	2.40
	Reducing labor cost of per unit output	2.36
	Reducing production lead time	2.32
	Reducing operation cost on service providing	2.29
	Reducing cost of product design	2.29
	Reducing consumption on material and energy	2.24
	Improving information technology capabilities	2.22
Relationship		
	Increases abilities in accordance to the different customer demand	2.55
	Reducing response time to customer demand	2.45
	Developing the better customer relations	2.41
	Improving enterprise internal knowledge sharing and transmission	2.26
	Improving communication and the interaction between the dependence	2.24
	Increasing knowledge sharing and the transmission with between	2.23
Human capital	Establishing capability to develop key component, material and mass production technologies	2.37
	Enhancing human resources learning capability	2.40
	Increases the structural density of high-level human resources	2.34
	Promoting human resources professional skill	2.30
Technology innovation capital		

Generate competitive advantage and value creation	
Increasing profitability	2.62
Increasing market share	2.62
Raising shares of new product and service to total sales value	2.45
Establishment new spin-off enterprises	2.26
Increasing loyalty income	2.03

Note: Score (0-4) are measured by five likert-type ordinal categories, that is, 0=less important and 4=most important.

To sum up, firstly, production innovation and product designs are the main components of firms' innovative activities. Overall these innovation activities are commonly intramural. Secondly, factors influencing firms' innovation activities are analyzed through the importance of value activities on firms' decisions to innovate. In general, technology development, application research and mass production test are the top three targets assigned to Taiwanese enterprises' value activities. Thirdly, major impediments for enterprise to take on innovation are lack of high quality manpower and insufficient internal innovation capability. In addition, Taiwanese enterprises also take the economic factors, such as high innovation cost and excessive risk, and the uncertainty of market demand, into consideration with respect to whether prolong or withdraw from the innovation activities.

7) Conclusion

This paper examined the value-added performance and Taiwanese enterprises' innovation activities from both econometric analysis of added value and innovation survey. We identified major challenges to the growth of industrial added value, and discussed trends and characteristics of Taiwanese enterprises' innovation activities that may affect its future development. The findings have led to some general conclusions about the theoretical and policy implications of Taiwan's experience.

Firstly, the previous analyses of Taiwan's industrial added value reveal several factors that contribute to economic development. These factors consist of two categories. The first category includes factors such as the capital and labors. The second category refers to the Taiwan enterprise innovation activities such as branding & marketing, process & product innovation. When we consider value creation as a crucial factor in knowledge based economy, the empirical evidence shows that the growth of Taiwan's industrial added value depends on scale expansion more than innovation activities. These observations could be inferred as a warning sign with regard to the long-term growth on added value, and a need for readjustment in policy actions to encourage innovation.

Secondly, survey results show that, in Taiwan, most of enterprises managed to create their value mainly through expanding factors of production, and some also go through company self-financed innovation activities, such as in-house R&D and acquisition of embodied technologies. However, the devotion of product and process innovation is generally larger than that of branding and marketing. In addition, innovation investment appears to be one of high risk methods for uplifting of entrepreneurial value-added performance in the survey. Thus, the results raise an issue related to the negative side of Taiwan's development, especially related to the decline of added value of Taiwan IT related industries, which is also echoed by econometric evidence.

Thirdly, in addition to the past development experience and lessons, the challenge of decline industrial added values should not be overlooked. Given the econometric framework of added value we have analyzed and some superficial insight in innovation survey, this leads to the needs for the reform in the allocation of financial resources that provide stronger 'incentive mechanism' to simulate the relationship between technological advancement and industrial development in order to upgrade Taiwan enterprises' innovation activities. For example, government increase monetary rewards of outstanding or good research in industrial technology, including encouraging more active interaction between academics and industry, experts exchange, or the formation of R&D alliances among groups of small- and medium-sized enterprises, particularly those in previously different industries. Therefore, the technology capabilities of Taiwan enterprise can be upgraded through a wide range of policy actions.

The limitation of research should be noted that the report has been separated into two parts of empirical works. Since the survey can provide complementary evidence to the added value model as well as a variety of information in terms of enterprise innovation activities, the study may not fulfill academic rigor in some methodological coherence. From this perspective, what have been reported are some preliminary observations. We hope that these issues can be debated and qualified. Since the empirical studies are more adequate for understanding the current situation where there is a growing need for both strengthening the policy effort for innovation and value creation, the implications of the combined evidence on theoretical development should be interpreted with caution.

Reference

Aghion, Philippe and Peter Howitt (1992). "A Model of Growth through Creative Destruction", *Econometrica*, 60, 2 (March), 323-351.

Chen, S.-H. and Liu M.-C. (2005) "The investigation of the high tech, the high value added proposition", International Conference on 2005 Industrial Technology innovation: New Value Creation Era, Aug25-26, Taipei (In Chinese).

Dow, S. C. (2000) "Prospects for the Progress of Heterodox Economics", *Journal of the History of Economic Thought*, 22, 157-70.

Lin, X.-W. and Lin, H. Y. (2006) "The Evaluation and Analysis of National Innovation System and Competitiveness in Taiwan". Research project funding by Department of Industrial Technology, Ministry of Economic Affairs, R.O.C.(In Chinese)

Lin, X.-W. and Yan, J. H. (2006) "The Analysis of the determinants on Enterprise innovation activities and added value". Research project funding by Department of Industrial Technology, Ministry of Economic Affairs, R.O.C.(In Chinese)

Kung, M.-H. and Lee H.-P. (2004) "Creating the Value of Entrepreneurial Innovations" International Conference on 2004 industrial Technology Innovation: Growth Engines of the Innovation-driven Economy, August 19-20, Taipei.

Castellacci, F., Grodal, S., Mendonca, S., Wibe, M. (2005) "Advances and Challenges in Innovation Studies" *Journal of Economic Issues*, Vol. 39, 2005

Dosi, G., Freeman, C., Nelson, R., Silverberg, G. and Soete, L. (eds.) (1988) *Technical Change and Economic Theory*. London: Pinter Publishers.

Grossman, G. M. and Helpman, E. (1991) *Innovation and Growth in the Global Economy*, Cambridge MA, MIT Press.

Metcalf, J.S. (1995) "The Economic Foundations of Technology Policy", in Stoneman, P. (ed.), *Handbook of the Economics of Innovation and Technological Change*, Oxford, Oxford University Press. Nelson, R. R. and Sidney, G. W. (1982). *An Evolutionary Theory of Economic Change*. Cambridge: Harvard University Press.

OECD (2005) *Oslo Manual: Guidelines for collecting and interpreting innovation data* (3th edition), Paris, OECD Publishing.

Porter, M. E. (1990). *The competitive advantage of Nations*. Free Press.

Romer, Paul M.(1986) "Increasing Returns and Long-Run Growth", *Journal of Political Economy*, 94, 5(October), 1002-1037.

Romer, Paul M.(1987) "Growth Based on Increasing Returns Due to Specialization," *American Economic Review*, 77, 2(May), 56-62.

Solow, R. M. (1956) "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, 70, 1 (February), 65-94.

Swan, T. W. (1956) "Economic Growth and Capital Accumulation", *Economic Record*, 32 (November), 334-361.

Schumpeter, J. A. (1942) *Capitalism, Socialism, and Democracy*. New York: Harper and Brothers.

Statistics data

Directorate General of Budget Accounting and Statistics, Executive Yuan, R.O.C.: <http://www.dgbas.gov.tw/>
Department of Statistics, Ministry of Economic Affairs, R.O.C.:
<http://2k3dmz2.moea.gov.tw/gnweb/default.aspx>

Council for economic planning and development, Ministry of Economic Affairs, R.O.C.
<http://www.cepd.gov.tw/encontent/m1.aspx?sNo=0001453&key=&ex=%20&ic=&cd=>
Taiwan Economic Journal Data Bank, Taiwan Economic Journal Co. Ltd.:
<http://www.tej.com.tw/webtej/index.htm>.

An analysis on the relation between business keyword's trends and company's financial performance in Korea

Abstract

Purpose/ Research Question: In this research, we aim to analyze the influence of the change of business keyword of major Korean enterprises on the financial performance by utilizing Korean corporate annual report. Also, supplementarily, we try to see changes in business trends by main industry through keyword change.

Key Literature Reviews (About 3~5 papers): Feng L. used the Naive Bayesian Machine Learning Approach to analyze the future looking sentences of the management diagnostic analysis (MD&A) of the American 10-K, Annual report and 10-Q, Quarterly report. Feng L. used the Naive Bayesian learning algorithm rather than the dictionary based approach to analyze the future looking sentences of the business diagnosis. Specifically, he first classified 30,000 sentences of randomly selected future looking sentences into two dimensions. In other words, he classified them as positive and negative tone. He use this classified data as training data of the Naive Bayesian algorithm. According to n-fold cross-validity experiment (n changes from 3 to 50), this algorithm is 67% for tone (positive / negative / neutral) and content (12 categories) and 63% success rate. In the actual analysis, he analyzed the 13 million future looking sentences in the 140,000 reports in the data of 1994-2007. As a result of analysis, the company with good current performance, small stock issue, small scale, lower market to book value ratio (MTB), low yield fluctuation, low Fog index of business diagnosis analysis, or longer history tends to show a positive tone on its future looking sentences. In the conclusion, this paper incorporates the following contents. The tone of the future looking sentence is expressed as a function of current results, issuance, company size, MTB ratio, change in profitability, Fog index of business management diagnosis, and corporate age. The tone of the future looking sentence shows the correlation between the future outcome and quantity and shows the explanatory power to other variables. Meanwhile, despite the continued efforts of the Securities and Exchange Commission, there was no systematic change on the informativeness of management diagnosis analysis. In other words, he criticized that detailed information was not provided. When managers warn about future performance in business diagnosis analysis, they also point out that there is less possibility that investors will incorrectly evaluate the issuance of shares. Meanwhile, when he measures the tone of the sentence by dictionary based method in the management diagnosis analysis, he found that it does not show the positive correlation between the tone and the future performance. However, if the Bayesian method is used, the tone positively correlates with the future performance and supposed to be strongly related to the future gain even when there is a limit of measuring the tone in the dictionary based method. Looking at these results, he argues that the dictionary-based approach can not be suitable for analyzing the tone of the company's documents.

Jihwan L. et. al analyzed the business model of the company by text mining the annual report. They

used vector space model of keyword extracted from the nonstructural texts of the annual report. A general text mining process for vector space model is as follows: First is the process to establish the CORPUS. it is collect the documents to analyze with.; The second is the process of dividing sentences into individual words, which is called tokenization.; The third is called stop-word removal, deleting unnecessary words for analysis.; The fourth is stemming, extracting only the root word. The last is to create a term-document matrix. The value of the cell on the term-document matrix indicates the frequency of occurrence of the term in the documents. The methodology of the research consists of the business model concept extraction and the business model evolution analysis. The business model concept extraction was implemented using PERL language. First, the process of establishing CORPUS is as follows. As a result of reviewing ITEM 1 and ITEM 7 in the 10-K report, only the ITEM 1 is used in the analysis because the depth of ITEM 7 differs for each company. They collected the entire 10-K filings from the EDGAR online database automatically using PERL's crawling module (LWP::UserAgent, WWW::Mechanize). However, in order to extract only the necessary items, some techniques were utilized. Since the collected reports are in HTML format, they deleted unnecessary tags. Finally, the regular expression matcher was used to extract only item 1. After creating CORPUS, the next step is the sentence filtering stage. For this, they developed a word index to select only sentences related to the business model. That is, they selected the sentence containing 'we', 'our', 'us', 'registrant', 'strategy', or 'company' in the subject or 'allow', 'enable', 'sell', 'help' in the verb in the introduction sentence. The next step is to extract key-words from the selected sentences and extract only nouns using the "Lingua::EN::Tager" module. Meanwhile, this study omitted the stemming process to clarify the meaning and did not consider multi-word phrases. The final step is the process of creating a keyword vector. Second methodology of this research, the business model evolution analysis, is a process of analyzing the temporal change of key-words. The methodology provides a business model evolution map. The methodology generates the temporal keyword matrix which shows how often the keyword occurs in the related year. The next process is to calculate TF-IDF. The next stage is to measure the growth degree of the key-words using the temporal change of TF-IDF. This process uses the linear regression analysis and the result of the analysis takes the form of $Y = a + bX$, where b is the slope and can be used as the growth degree of the key-word. If b is positive, this means that the keyword is emerging. The last step is to put the individual key-words into a business model evolution map.

Xin Y. Q. et. al has developed an SVM-based forecasting model for the 10-year annual report for 30 enterprises. The research analyzed the company's past report and can possibly support the automatic prediction on the future financial performance. Three experts on financial accounting assisted the research. The analysis utilized the 1990–2003 Annual Report for 30 companies in three industries. In particular, in this research, the keyword vectors and the financial information are used for development of the models. This research used the return on equity (ROE) of financial information, and classified the financial performance of a company into Positive, Neutral, Negative based on the change ratio of ROE. As a result, this study argued that it showed the possibility of being used to predict the future short-term performance of the text classifier of the annual report.

Design/ Methodology/ Approach: We apply text mining techniques to business contents in annual report of Korean company and construct keyword–document vector. We use the keyword-document

vector, ROE, capital investment, or other financial information in the analysis. The machine learning method or statistical analysis method is also used to analyze the relation between keyword's trends and corporate performance. We also look at the changes in key words by industry.

(Expected) Findings/Results: Company with many changes in keywords, much facility investment, or much research and development investment is expected to show high performance. However, it seems that characteristics will exist for each industry. We also expect to analyze changes in business trends by industry. If the experiment is successful, the relationship between keyword change and firm performance can be derived.

Keywords: Corporate annual report, text mining, financial performance, key word's trends

Collaborative Workshops for Brand System Development

Abstract

Purpose/ Research Question: This study was carried out with the view that the collaborative workshop with clients would be a desirable method to develop a proper brand system.

1. How can client and agency collaborate for brand system development?
2. How can agency expand its role for clients?
3. What is the collaborative workshop process?
4. What are the effects of the collaborative workshops?

Key Literature Reviews:

The development of brand systems is commonly left to external agencies. However, brand development is about creating a distinctive personality. The internal voice of the company should be taken as an important factor and reflected in the result. Collaboration between a brand agency and a client company is an indispensable element in the development of a successful brand system.

The recent emphasis on networked business models reflects that single companies cannot possibly master all the significant resources needed in R&D, production, and marketing.(Brigitte Gay, 2014). The need for a new approach for firms to deal with the increasing OI phenomenon in the form of strategies, business models, user innovation, collective intelligence, and crowdsourcing, is on the rise(JinHyo Joseph Yun*, DongKyu Won and Kyungbae Park, 2016).

Client companies make a RFP(Request for Proposal) and brief which includes the background and context of their brand and objective of a project. They also use meetings, calls and emails for interaction, but it is not enough to fully derive inner issue and thoughts from client companies. More efficient and creative collaboration methods should be sought.

With this challenge, this study was conducted to suggest a collaborative workshop of agencies and clients. The 'Collaborative Workshop' is combination of 'collaborative; and 'workshop'. Collaborative workshops are the process in which client and multidisciplinary experts gather together and collaborate to form ideas and discuss to solve challenges. It is aimed at revealing the inner thoughts of clients on their brand and deeply understanding the situation of a brand. It also derives the results with various directions. The effects of workshop are well known through previous research. According to John Kolko, the effects of the workshop can be revealed through dialogue rather than tied up with formal procedures, and participants can freely think about new ideas because they can discard concerns about the outcome. This study utilized the workshop method to

develop more effective collaborative branding. It is expected to improve the brand development process.

The new brand development process was demonstrated through the process of a brand system development process of "Museum San", a museum in South Korea.

Design/ Methodology/ Approach:

As for the research, a methodology used is as follows: first, understand the research necessity by considering the characteristics of brand system development process and the change of collaborative work paradigm. Second, the brand development and collaborative workshop have been defined through literature review. Third, grounds have been prepared to validate the research, by analyzing and doing case study of SAP, a system service company. They carry out a collaborative workshop with clients to draw creative problem solving methods. The effect of collaborative workshop will be examined through a case study of how SAP utilizes the Design Thinking Workshop to collaborate with their clients. Fourth, the process and methods of collaborative workshop was customized and designed based on the contents of brand system and brainstorming. Fifth, the new brand development process was demonstrated through the process of a brand system development process of "Museum San", an art museum in South Korea. In order to prove the effectiveness of the collaborative workshop, this research analyzed the client's feedback to the workshop and changes in the number of the museum blog visitors after brand renewal.

(Expected) Findings/Results:

The process of the cooperative workshop is as follows. The workshop usually takes place in groups of several teams. In the team formation, client and agency including brand strategists, the specialists, and the designers is made in one team. A group leader or facilitator in agency should encourage clients to naturally express their opinions. The process of the workshop and its method of proceeding are as follows: understanding the overall context and background of the project, raising questions, developing ideas, presenting and sharing, and summarizing.

In this collaborative workshop, it is easy for the participants to draw out the key concepts of the brand. Participants collage keywords and images together and communicate with them, and draw ideas from various and appropriate perspectives within a short time of several hours. From the perspective of the agency, it can be used as an opportunity to find consensus with the client before reporting on the result, so it is more likely to produce high-quality results from the client, and it is easy to persuade them with appropriate results.

Through this collaborative workshop, agencies can present value to clients more than products or services they have already provided. SAP is a software company, but works with clients based on

design thinking and workshops to expand the client's creative possibilities. This new way of collaborating with SAP will create a powerful and lasting partnership(<https://designthinkingwithsap.com>). The work carried out by the Design and Co-Innovation Center (DCC) at SAP demonstrates how Design Thinking can be an effective problem-solving method regardless of the nature or size of a business. Clients come from various industries across the globe, including the food and beverage, agriculture, oil, biotech, news, and retail industries. To co-innovate with clients effectively, the DCC breaks down the complexity of Design Thinking into concise workshop experiences, also known as "DT Workshops."(<https://experience.sap.com>)

Agencies expand their role from providing clients with products, services, and tasks that they request to creating new value. There are cases in which client is expanded to recognize their internal identity or induce creativity for innovation.

A Collaborative Workshop for the 'Museum San' Project

This collaborative workshop was conducted on the development of a museum brand in South Korea. The museum, which was designed by Ando Tadao, had a unique surrounding environment located on the mountain. Prior to the development of a full-fledged brand system, museum staff and a branding agency including designers, brand strategists, and namists gathered together to conduct the workshop at the museum.

The client's idea on the collaborative workshop was taken into consideration to develop a new brand system of the museum. First, represent the distinctive environment of the museum being on the mountain. Second, express a tranquil atmosphere. Third, illustrate an image of oriental sensitivity rather than a Western one. These played a crucial role in helping to produce a result that had an oriental touch and mysterious emotions.

The effectiveness of brand development through collaborative workshops was verified through client feedback on the workshop and comparison of the numbers of visitors before and after the brand renewal. Clients said that they were able to communicate more smoothly through collaborative workshops, and inside people had the opportunity to think deeply about the project. The concept, mountains and reflection extracted from the workshop was used for their cultural and educational events such as an art camp called Mountain, Light, Art, and Emotion and a meditation experience event.

Research limitations/ Implications:

The effectiveness of the collaborative workshop with clients can be summarized as follows. First, the collaborative workshop is a method in which, the whole brand development process of definition

and expression is done to get solutions in a short period of time. Second, the collaborative workshops provide brand strategists and designers a deep understanding of the brand, including the context in which the brand should be positioned. Third, in the collaborative workshop, experts from various fields such as brand strategists, verbal branding experts, and designers participate not only in the clients but also in the clients.

The collaborative workshops proposed in this study can be used in areas where all innovative ideas are needed, but not necessarily in all processes. It is surely a good method for branding to naturally draw out the inner thoughts of the brand owners and to discover the possibility of the brand. Therefore, it will be helpful in the field of brand development. The proposed workshop process and techniques should be tailored to the situation and in a variety of ways. In a follow-up study, a quantitative survey of the effects of cooperative workshops will be conducted. With this workshop model, the total brand development process and method should be improved according to the needs of the times.

Keywords: Collaborative Workshops, Role of Agency, Brand System Development Tool

Finding Opportunities to Innovate 119 Emergency Medical Service by Design Thinking

Abstract

Purpose/ Research Question: Entering into experience economy, industrial design begins to emphasize on product experience which is umbrella concept including various design issues of usability, visual attractiveness, functions and other characteristics. With the change of design point, public service, as intangible product, became one of the design area. This study aims to find chances to improve 119 Emergency Medical Service (EMS), one of the basic public services, through analyzing service experience of stake holders by a qualitative approach based on design thinking.

- 1) What is the whole flow and sequence of 119 EMS?
- 2) Who are stakeholders relating to 119 EMS?
- 3) Who can be the most critical player in terms of stake holder map?
- 4) What is a possible direction to improve quality of 119 EMS?

Key Literature Reviews:

In many cases, 119 EMS were thought as having 2 stages, pre-hospital and hospital stage, or 3 stages, arriving on site, transporting and handing over patients. Concerning EMS, despite decreasing numbers of trauma mortality rate and pre-hospital mortality rate, in preventable trauma mortality rate, there were no differences for the past 10 years from 1991 to 2011 (Kang et al., 2013). It indicates that there are possibly other factors independent of medical treatment qualities provided by hospitals and one of the factors is a way to offer emergency medical service. When considering 119 EMS mainly involved with the pre-hospital stage of EMS, according to the 2010 service satisfaction survey, positive response rate of 74.8% ('very satisfied' 31% and 'satisfied' 43.8%) tells that there was only a small increment of 1.2% from the 73.6% of 2009. Respondents with 'being unsatisfied and very unsatisfied' pointed out 'late arrival of the first service' 29.4%, 'old and faulty facilities' 23.5%, 'poor attitude of rescuers' 23.4%, and 'inappropriate treatment of rescuers' 17.6% as their reasons (National Emergency Medical Center, 2011). This result shows that arrival time of the first service is considered as even more critical to service receivers including victims. More related with 'late arrival of the first service', the success rates of less-than-5-minutes arrival time of the first service are as follows; Seoul, 83.4%; major

cities average, 59.8%; rural area average, 44.1% ; national average, 52% (National Emergency Medical Center, 2013). It shows the tendency of polarization in service quality between urban and rural areas.

Design/ Methodology/ Approach:

To achieve the research purpose, this study adopted interview with 119 rescuers, and mainly observation of rescuers activities in 119 EMS. More specifically, research and analysis methods were as follows; first, to get insight concerning service experience of service users and providers, 8 users and 11 rescuers of 119 EMS were interviewed. Second, for 2 days, the whole rescue activities from receiving calls to handing over patients to hospitals were observed accompanying contextual inquiry on site. All interviews and observation were executed with prior, or instant consents of interviewees and service providers, or service users respectively. Third, based on service experience of the users and providers, stakeholders were identified and their interaction between service processes were defined.

(Expected) Findings/Results:

Integrating experience remembered by 119 EMS rescuers, and patients (guardians), the 119 EMS briefly consists of 3 stages, pre-hospital stage, hospital stage, and post-hospital stage and it is possibly segmentalized into arrival on site, transports, in-hospital, and homing. In the whole process of 119 EMS, stakeholders seems to be classified with four groups, service users (patient/victims, and guardians), executors (EMS field agents), and supporters (headquarters personnel, advisory medical doctors, hospitals, and policemen) and partners (neighbors). It is possibly said that among the stakeholders, the most critical players are the EMS field agents creating interaction with all other stakeholders and performing and having responsibilities of the first treatment. However, the problem is that their abilities vary individually. Although EMS field agents are senior or junior emergency medical technicians (EMTs), because junior EMTs are able to handle only limited tasks in state of emergency where various immediate health-related-risks occur, supportive measures compensating the defect should be considered.

Research limitations/ Implications:

Although this study tries to have deep understanding 119 EMS through a qualitative approach, provided a large scaled survey is adopted, further research would take more strong reliabilities and validities. In addition, because this study was more focused on analyzing stake holders' experience, it could not provide various solutions to problems found. Therefore, in following studies, creating solutions with solid evidence is needed in order to improve quality of 119EMS.

Keywords: Emergency Medical Service, Stakeholders, Service Experience

The Effect of Hallyu on Tourism in Korea

Abstract

The purposes of the study are to estimate inbound tourism demand and to analyze the effect of the Korean Wave and Economic indicators on it. For these purposes, we examined the influence of Korean Wave, GDP, CPI and exchange rate on inbound tourism demand for foreign tourists from the USA, China, Japan and Hong Kong to Korea. In order to measure the Korean wave, the export amount of Hallyu related contents exported to each of the four countries is used. GDP means the GDP of each of the four countries. However, the CPI and the exchange rate are relative to Korea. Panel data on tourism demand, Korean Wave, and Economic indicators from 1997 to 2014 are collected for analysis. Through the various tests for panel analysis model selection, the best fit model proved to be a random effect model. As a result, Korean Wave, GDP, and exchange rate have a statistically significant impact on tourism demand. Therefore, it can be seen that the Korean Wave is one of the important factors for attracting foreign tourists to Korea in four countries. Also, the results show that overseas tourism increases when the economic income of the country is high and the exchange rate is favorable. However, CPI does not appear to have a statistically significant impact on tourism demand. This indicates that tourists are not overly concerned about the cost of the travel country when planning a trip.

Keywords: Hallyu(Korean Wave), Tourism Demand, Panel Data Analysis.

1. Introduction

Korean Wave is a term originally used by Chinese media in 1999. It refers to the phenomenon that young people in China are enthusiastic about Korean popular culture such as Korean dramas and popular songs. It is also defined as the phenomenon that Korean pop culture is spreading overseas or Korean pop culture is gaining popularity in global market (Korea Culture Tourism Research Institute, 2011). Recently, the Korean Wave is led by music such as K-pop, and visual media represented by drama and broadcasting. Due to the influence of the Korean Wave, interest in Korea has increased, and the number of foreigners who have visited Korea has been increasing. The number of foreign tourists visiting Korea has increased nearly fourfold from 3 million in 1998 to 11.8 million in the beginning of the Korean Wave. As of 1998, Asian visitors accounted for 71.3% of the total number of foreign tourists visiting Korea, up from 83.5% Asia, which is the center of the region. The number of Chinese tourists visiting Korea accounted for 43.14% of the total foreign tourists and 51.64% among Asian tourists in 2014 from the share of 4.96% in 1998, the year of liberalization of entry into Korea. China's overseas tourism demand growth rate, which is at the center of the Korean Wave, is growing at an annual average rate of 12.3% thanks to rapid economic growth. Hallyu tourism has contributed greatly to the expansion of the number of Chinese tourists, so systematic research on this issue is very important for the development of tourism demand in the Chinese market which is an infinite potential market. Despite Japan's earthquake that hit Japan in March 2011, 3,289,000 people, or 8.8% more than in 2010, came to Korea (33.6% of total outbound travelers), followed by China with the largest number of tourists (Korea Tourism Organization, 2012). Therefore, the Japanese market for Hallyu tourism is very important for Korea's tourism demand development and improvement direction. In addition, since Hong Kong is a place of East-West meeting leading the Asian tourism, financial and cultural industries with high purchasing income of the people, the success of the Korean Wave in Hong Kong is expected to have a great influence on other Central Asian countries (Kim Sung Sup, 20008). Therefore, systematic research is important. Some studies point out that the trend of increasing number of tourists visiting Korea and the increase of the proportion of Asian tourists are attributed to the Korean Wave (Jung-min, 2012; However, it is hard to find any research that tried to predict tourist demand and forecast tourism income by using quantitative indicators about the fact that Korean Wave is the cause. Therefore, the purpose of this study is to investigate the influence of Korean Wave and

macroeconomic indicators on inbound tourism demand for foreign tourists from the USA, China, Japan and Hong Kong to Korea.

2. Methodology

2.1. Data collection and Operational Definition of Variables

panel data for 18 years from 1997 to 2014.

Dependent variable: Inbound Tourism Demand.

Explanatory variables: Hallyu(Korean wave), GDP, CPI and currency exchange rates. 4 Variables.

[Table 1] Operational Definition of Variables

Variables	Unit	Describe Variables	Reference
Inbound Tourism	People	Number of travelers to Korea from USA, China, Japan and Hong Kong by year	Bank of Korea
Hallyu(Korean wave)	US \$	Amount of Hallyu contents exported to USA, China, Japan, Hong Kong (by year)	Korea Creative Content Agency
GDP	US \$	Each country's (USA, China, Japan, Hong Kong) GDP by year	World Bank
Customer Price Index	Num, (2010=100)	Each country's (USA, China, Japan, Hong Kong) relative CPI to Korea (by year)	World Bank
Exchange Rate	KRW(\)	Korean Won exchange rates for each country (Average rate by year)	Bank of Korea

2.2. Hypothesis

- Effect of Hallyu(Korean wave) on Tourism Demand

H1 : Hallyu(Korean Wave) has a positive effect on tourism demand for Korea

- Effect of Economic indicators on Tourism Demand

GDP refers to the nation's economic levels. Economic growth lead to national income growing and improvement in people's quality of life. In other words, a rise in national income has influence on the number of inbound tourists.

H2 : GDP has a positive effect on tourism demand for Korea

Cost travel is the main explanatory variable as a determinant of international tourism demand. And the CPI is most widely used proxy variable for cost. The following hypothesis is generated with the assumption that the CPI has an influence on the number of inbound tourists.

H3 : CPI(compared to Korean CPI) has positive effect on tourism demand for Korea.

Exchange rate means the value of one country's currency in relation to another currency. The lower the exchange rate of the country you are traveling to, the less the financial burden of travelers. Thus, the following hypothesis is proposed.

H4 : Exchange Rate(Korean Won Currency) has a positive effect on tourism demand for Korea

2.3 Measures

In this study, panel data and STATA 13 program are used to was used for panel data analysis. The mathematical model of the estimates for inbound tourism demand is as follows.

$$Inbound_{it} = \alpha + \beta_1 Hallyu_{it} + \beta_2 GDP_{it} + \beta_3 CPI_{it} + \beta_4 Exchange\ Rate_{it} + \varepsilon_{it} \quad [1]$$

(i = USA, China, Japan and Hong Kong; t =1997, ..., 2014)

The dependent variable of [1] is the number of tourists visiting Kore from each country i of USA, China, Japan, and Hong Kong at time t . The explanatory variable, $Hallyu_{it}$, means the amount of Korean Wave content exported to the country of i at time t . In addition, GDP_{it} is the gross domestic product of i at time t , and CPI_{it} is Korea 's CPI relative to i ' s CPI at time t . And $Exchange\ Rate_{it}$ means the exchange rate of country i against the Korean won at time t . α is the intercept, which means the individual characteristics of each individual country. And ε_{it} means the error term.

3. Results

3.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Inbound	72	1,209,112	1,238,776	96,650	6,126,865
Hallyu	72	4,502,178.36	3.96e+07	1,662,277	174,554,033
GDP	72	6.41e+12	5.59e+12	1.57e+11	1.80e+13
CPI	72	1.104262	0.1468298	0.9291508	1.5621
FX	72	625.9186	493.9769	114.74	1413.14

3.2. Selection of best fit Model

To select the best fit model among Pooled Ordinary Least Square Model(POLS), Fixed Effect Model and Random Effect Model, the F-statistic tests, the Breusch-Pagan LM test, and the Hausman test are performed. As a result, the best fit model is identified as the random effect model.

3.3. Hypothesis Test

Hypothesis Test Result

Variable	Hypothese	Coef.	z	P> z	
Hallyu	H1	0.006693	3.64	0.000***	Adopt
GDP	H2	2.79e-07	14.61	0.000***	Adopt
CPI	H3	-613347.8	-1.37	0.172	Reject
FX	H4	1396.011	3.03	0.002***	Adopt

4. Conclusion

In this study, the effects of the Korean Wave and Economic indicators on inbound tourism demand on Korea is analyzed. For these, we examined the influence of Korean Wave, GDP, CPI and exchange rate on inbound tourism demand for foreign tourists from the USA, China, Japan and Hong Kong to Korea. Panel data on tourism demand, Korean Wave, and Economic indicators from 1997 to 2014 are collected for analysis. Through the various tests for panel analysis model selection, the best fit model proved to be a random effect model. As a result, Korean Wave, GDP, and exchange rate have a statistically significant impact on tourism demand. Therefore, it can be seen that the Korean Wave is one of the important factors for attracting foreign tourists to Korea in four countries. Also, the results show that overseas tourism increases when the economic income of the country is high and the exchange rate is favorable. However, CPI does not appear to have a statistically significant impact on tourism demand. This indicates that tourists are not overly concerned about the cost of the travel country when planning a trip.

Why uncertainty is unequal without government's precaution action? : the case of toxic humidifier disinfectant

Since 2001, the humidifier sterilizer had been regarded as an innovative and health-promoting product for babies and pregnant women and extensively sold until 2011 in South Korea. However, mysterious deaths due to serious lung diseases have been reported and the prosecutor finally started the investigation in April 2016. According to a civic group, 266 people are thought to be dead due to the disinfectant and about 1,600 people are still suffering from lung diseases. While the media and citizens are condemning companies which sold the product, it seems that the role of the government has been less scrutinized. In this context, this article aims at critically discussing the role of the government in dealing with the possible risk of the humidifier disinfectant. We pay attention to the unequal nature of uncertainty and risk, which significantly constraints individuals' rationality. Some could be in the state of nescience whereas others could be aware of the risk, i.e. either 'probabilities known' or probabilities unknown'.

We will review the incident of the poisonous disinfectant from 1996 when the core chemical, PHMG, inside the disinfectant was first developed by a local company, and question why the government has failed to stop such a high number of deaths. In so doing, we will conduct and analyze in-depth interviews with key informants and examine relevant documents from the government, civic groups, and newspapers. In the end, we will argue that the uncertainty is highly unequal without the precaution action by the government, and it is essential for the government to introduce the precaution principle for public health related policies.

Multilevel prognosis of logistics chains in case of uncertainty: information and statistical technologies implementation

Abstract

Purpose/ Research Question: Effective, strategic, current and operational management of modern logistics systems requires continuous monitoring and forecasting of their condition in many parameters. Especially these questions are critical in justifying the need for modernization or technical re-equipment of the enterprise, when the issue for the evaluation of its technical and economic potential is relevant.

It can be concluded that there is the need to study the issues of formation of scientifically-based logistics solutions. Moreover, by analogy with the systems theory in engineering, it comes to research of the effectiveness of these decisions in conditions of limited, incomplete and often inaccurate information. In general, the management of the logistics process is based on the adopted corporate policies and involves the coordination of related solutions in various areas (scientific, technical, economic, marketing, sales, etc.). The difficulty of solving this problem is the complexity of combining all these elements to achieve the long-run objective that is to optimize the logistics process in view of the strategic objectives of the organization.

A decision on the need to modernize the logistics system must be taken in a timely manner and formed with prior, current and forecast information based on adaptability concept with predominant use of «efficiency-cost» criterion. Adaptability means the implement of the conversion process of all currently available useful information to make effective solutions and ensure the functioning of a competitive logistics system.

The review and analysis of the methodological problems of the choice and decision-making theory in the management of the logistics process have identified the need to take into consideration the level of uncertainty. The development of these issues should be carried out on the basis of information and statistical methods and models of decision-making, taking into account the uncertainty and risks, with the construction of the adaptive forecasting models. Current advances do not allow solving these problems quite effectively. Since the methods of scientific, technical and economic analysis have specific features of their application, for example, for a multi-dimensional prediction parameter logistic systems, therefore there is a need for the information-statistical approach.

Key Literature Reviews:

1. Arefyev I, Klawdiev A. Prognozowanie informacyjne stanu systemu transportowego. Z.N. Politechniki zapiskij, N 75. Transport. Gliwice. 2012. s. 5-8

2. Arefyev I.B., Volovik A.A., Klavdiev A.A. Method of assessment of the river craft technical condition on the basis of the microstatistics. Scientific journals. Maritime University of Szczecin, 2014, № 37, pp. 5-10.

3. D. Garanin, D. Pervuhin, V. Shpenst. Bases of Stochastic Similarity of Difficult Systems. Applied methods of statistical analysis. Novosibirsk, 2015. pp. 343-350

Design/ Methodology/ Approach:

The proposed approach enables the integration of previously developed procedures for statistical analysis of data, and implemented in the form of program information processing technologies (Statgraphics, SPSS, Statistica, etc.) with methods of decision-making support on the basis of maximum uncertainty principle. In this case, a multi-dimensional prediction of the logistic system parameters can be represented in the form of branched algorithm, which is based on well-known methods of different types of analysis such as correlation, time series, factorial and mathematical analysis.

(Expected) Findings/Results:

At the same time increase of the objectivity and validity of the results is ensured not only by the implementation of the consistency principles, but also by the introduction of a comprehensive verification of the forecast results of the procedure. Automation of this kind of algorithms allows to improve decision support system and thereby contribute to the adequate and efficient management of logistics systems.

Keywords: logistics chains, uncertainty, supply chains.

Americanization in Lithuania as a driving force for globalization

Abstract

PURPOSE. The purpose of the article is to analyze Americanization patterns in Lithuania by exploring socio-economic and cultural factors and to determine the impact of Americanization on the level of globalization of the country.

DESCRIPTION OF THE PROBLEM

Although there are very few studies, Americanization has been the object of research since the 19th century (Lauret 2013). America since at least the end of the 19th century has exported certain products, techniques, fashions, investment, and art, as well as people. Huebner (1906) and Butler (1920) described Americanization as the process of immigrants' integration into the society, assimilation and transformation into Americans. Due to the expansion of American corporations to Europe at that time, some of the European researchers saw Americanization as a threat to their customs and cultural values (Bonin, de Goery 2009). Americanization refers to cultural transfer (Kuisel 2010). Belgian economists Maes and Buyst (2005) claimed that Americanization, as internalization, is neither entirely satisfactory nor entirely avoidable. Later, Americanization was defined as the form of modernization (Tipps 1973) and a specific type of globalization (Craig et al. 2008). Maes and Buyst (2005) found some signs of Americanization in interwar Belgium and associated it with migration to U.S. in the 1920s. The evidence of Americanization can be found even in interwar Lithuania as worldwide acknowledged brands, such as Ford Motors, Wrigley, Chevrolet, Chrysler, Gillette and others, were well known at that time (Minkevičius 2015). WWII and the Soviet annexation suspended the process of Americanization as internationalization for fifty years. After the collapse of the Soviet Union, Lithuania joined the free market system, started privatization process, and reestablished a business relationship with American corporations, which dominated during the interwar period. From the 1990s the expansion and penetration of American corporations into the Lithuanian market, in the forms of foreign direct investment (FDI) and international trade, made a remarkable impact on the economic growth. Even more, these significant changes went beyond the economic impacts. The movement of goods, capital, information and labor across the borders has transformed social and cultural habits. Recent study (Pekarskiene, Susniene 2011)

showed that all Baltic States have reached a high globalization level. In the meantime, Lithuania faced emigration and brain drain problems. The level of emigration has been increasing since the 1990s. Thus, it might be assumed that emigration and brain drain are the consequences of globalization. The further research will focus on emigration related decision-making and the choice of a country for emigration. Particular emphasis will be drawn on the factors determining emigration to the U.S. and immigrant's abilities to adapt to the American culture.

METHODOLOGY/APPROACH. The research employs both qualitative and quantitative methods by using primary and secondary data. Further descriptive statistics, correlation regression, and factor analysis will be applied.

Primary data was collected by carrying out the survey. Secondary data was drawn from the World Bank and Statistics Lithuania

OUTCOMES.

The obtained and analyzed information on the spread of foreign capital, culture and their impact on social and cultural life in the host country which results in emigration and brain drain problems. On the other hand, the research allows us to examining the behavior of Lithuanians and their abilities to accept new culture and social life on the basis of own wealth.

The project comprises three scientific areas: sociology, economics and mathematics. It is unique as it extends to the theory of globalization and synthesizes both understandings of Americanization: immigrants' integration into society and assimilation, as well as Americanization as the form of internalization.

ORIGINALITY/ ADDED VALUE

It is an interdisciplinary research, which covers three scientific areas: sociology, economics and mathematics.

It is unique as it extends to the theory of globalization and synthesizes both understandings of Americanization: cultural assimilation and Americanization as the form of internationalization.

Keywords: emigration, brain drain, globalization, immigrants, Americanization.

REFERENCES:

Bonin, H.; de Goey, F. 2009. American Firms in Europe– Strategy, Identity, Perception and

Performance. Geneve: Librairie Droz

Craig, S. C.; Douglas, S. P.; Bennett, A. 2008. Contextual and cultural factors underlying Americanization, *International Marketing Review* 26(1): 90–109.

Huebner, G. G. 1906. The Americanization of the immigrant, *Annals of the American Academy of Political and Social Science* 27 (May): 191–213.

Lauret, M. 2013. When is an immigrant's autobiography not an immigrant autobiography? the Americanization of Edward Bok, *MELUS* 38(3): 7–24.

Maes, I.; Buyst, E. 2005. Migration and Americanization: the special case of Belgian economic, *Euro. J. History of Economic Thought* 12(1): 73–88.

Minkevičius, R. 2015. Tarpukario Lietuvos reklama [Advertising in Interwar Lithuania]. Vilnius: BALTO print.

Pekarskiene, I.; Susniene, R. 2011. An assessment of the level of Globalization in the Baltic States, *Inzinerine Ekonomika-Engineering Economics* 22(1): 58–68

Impacts of Potential Climate Change and Human Deforestation on Temperate Forest Carbon Pool in the Capital Area of South Korea

Abstract

This study estimates the impact of potential climate change and human interference (anthropogenic deforestation) on the temperate forest carbon pool change in the capital area of South Korea, using a dynamic global vegetation model (DGVM). Also, the characteristic of forest carbon pool change was simulated based on a biogeochemical module. The change of atmospheric carbon dioxide (CO₂) concentration is deeply related with the change of forest carbon pool which is estimated with those of net primary productivity (NPP) and soil carbon storage (SCS). The NPP and SCS were estimated at 2.02-7.43 tC ha⁻¹ yr⁻¹ and 34.55-84.81 tC ha⁻¹, respectively, during 1971-2000. The SCS showed a significant decreasing tendency under the condition of increasing air temperature and precipitation in near future (2021-2050) and far future (2071-2100) which were simulated by a future-climate scenario data without any human interference. Besides, it is estimated that the temporal change of NPP indicates only a little decrease, which is a little influenced by potential climate change.

In the effect of potential climate change plus human interference, the decrease rate of NPP and SCS were simulated at 17-33% and 21-46%, respectively, during 2000-2100. Furthermore, the effect of potential human interference contributes to 83-93% and 61-54% of the decrease rate of NPP and SCS, respectively. The decline of forest carbon pool simulated in this study can play a positive role in the increasing atmospheric carbon dioxide. Consequently, the effect of potential human interference can further accelerate the decline of temperate forest carbon pool. For the effective reduction of carbon dioxide emission in urbanizing areas, it would be more effective to control human interference. Consequently, this study suggests that the reforestation corresponding to deforestation rate should be at least maintained with long term monitoring- and modeling-related studies against climate change problems.

Keywords: climate change, dynamic global vegetation model, human interference, net primary productivity, soil carbon storage

INTRODUCTION

The emission rate of greenhouse gases (GHG) by human interference is increasing since the industrial revolution (Marland et al. 1999; IPCC 2001). In addition, it is clear that the global warming is a main environmental concern because there is a strong possibility that the increasing global surface air temperature is attributed to the increase of greenhouse gases in the latter half of the twentieth century (Marland et al. 1999). Even though the global surface air temperature increased with 0.74°C during the past 100 years, the global

warming is accelerated up to 1.3°C per 100 years for the recent 50 years (IPCC 2007).

In the potential adverse effect of global warming on ecosystems, there is a possibility that approximately 10-40% of animals and plants face the extinction when the global surface air temperature increases up to about 1.5-2.5°C and human interference occurs (Thomas et al. 2004; IPCC 2007; Carpenter et al. 2008). Carbon dioxide (CO₂) is a main greenhouse gases contributing approximately 50% to climate change (Rodhe 1990). Generally there are two kinds of strategies in the reduction of CO₂; one is the carbon source control and another is the enhancement of carbon sequestration in forest areas. Most of reduction methods focused on the carbon source control, which occurs from energy uses and industrial processes. However, there is a growing concern in the enhancement of carbon sequestration in forest areas since forest areas were counted to the carbon sequestration in Kyoto protocol. The carbon assimilation in forest areas plays an important role in not only carbon sequestration but also landscape, recreation space and terrestrial ecosystem conservation (Korea Forest Service 2009).

In this research, the variation of temperate forest carbon pool in the capital areas of South Korea is estimated with long-term simulation of Soil Carbon Storage (SCS) and Net Primary Productivity (NPP) under the condition of potential climate change and anthropogenic deforestation using a dynamic global vegetation model which includes a biogeochemical concept. Also, this research suggests a strategy as an effective enhancement of carbon sequestration in forest areas where human interference is expected.

MATERIALS AND METHODS

Study site

The study was carried out in temperate forest areas in the capital area of South Korea located in the middle of Korea peninsula and consists of Seoul Metropolitan City, Incheon City and Gyeonggi Province Fig. (1). The study area is covered with 565,024 ha forest (about 50% of the total area) which ranges within latitudinal range of 36°89'~38°29' and longitudinal range of 124°59'~127°85'. This area is the most urbanized area with approximately 23 million populations (about half of national population) in South Korea, in which human interference is strongly expected. Annual air temperature varies from 11°C to 13°C and annual mean precipitation is approximately 1,100 mm in this study area.

In this study, 4 study points (A, B, C and D) were selected to analyze locational distinction and to compare our simulation data to other study data; A point (37°45'25.37"N, 127°9'11.62"E) is KoFlux DK-site where a permanent flux tower where was installed in the Kwangneung Natural Forest (Kim et al. 2007; Lim et al. 2003), B point (37°47'1"N, 127°10'37"E) adjacent to A is located in the Korea Practice Research Center, C point (37°23'45"N, 127°5'1"E) is in the Kumto Mountain inside of Pangyo housing development area recently constructed, and D point (37°25'2"N, 127°3'22"E) is adjacent to C located in the Chunggye Mountain Fig. (1).

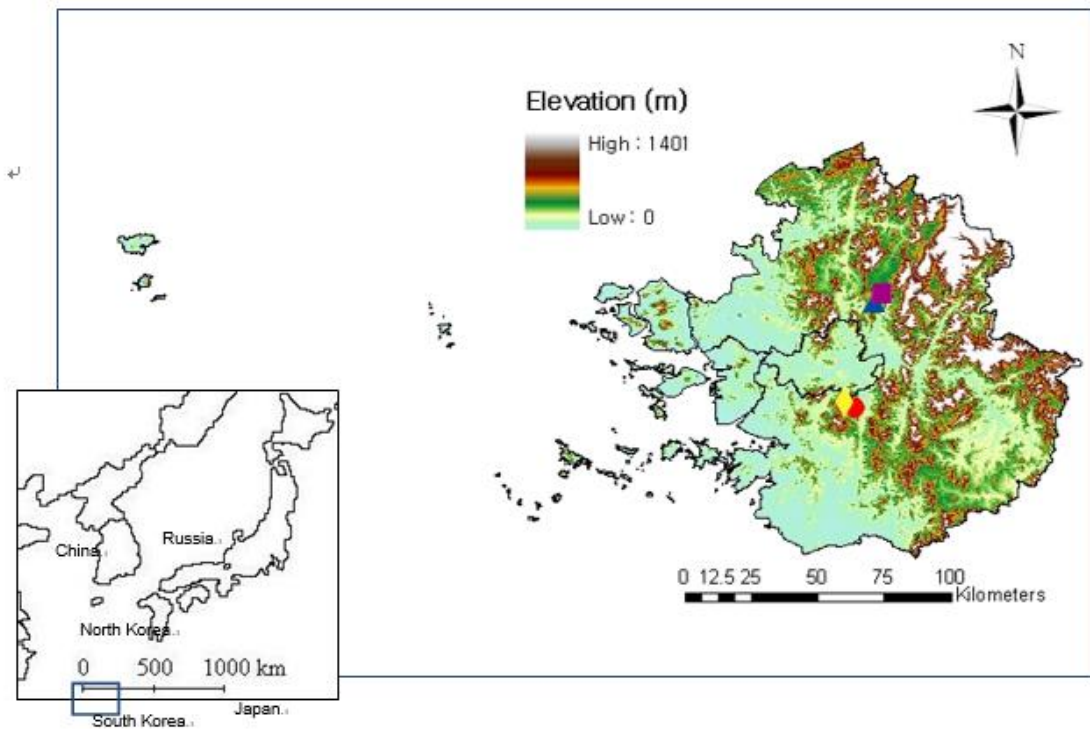


Fig. (1). Study Area : The Capital Area of South Korea. (▲ A, ■ B, ● C, ◆ D : selected points)

Dynamic global vegetation model (DGVM)

MAPSS-CENTURY (MC1) model as a new dynamic global vegetation model was used in this study, which was made to estimate the impacts of global climate change on forest ecosystem structure and function at a wide spatial range from landscape (50m) to global scales (Bachelet et al. 2001). In addition, the MC1 model can simulate the cycling of carbon, nitrogen, water, and the change of vegetation under the condition of climate change using the combination of biogeological MAPSS model and biogeochemical CENTURY model (Parton et al. 1994; Neilson 1995; Bachelet et al. 2001).

The main functions of MC1 are to (1) predict life-forms (*e.g.*, coniferous and deciduous-evergreen tree and grass species) and their biomass in different vegetation classes using a climatologic rule base, (2) simulate the dynamic of carbon, nutrient and water in aboveground and belowground ecosystems through plant production, soil organic matter decomposition and nutrient cycling (Bachelet et al. 2001; Lenihan et al. 2008). In California in the United States, there was a case study that the change of vegetation distribution, carbon dynamic and fire disturbance was simulated with local and continental scales under the condition of climate change using MC1 model (Lenihan et al. 2008).

Data handling

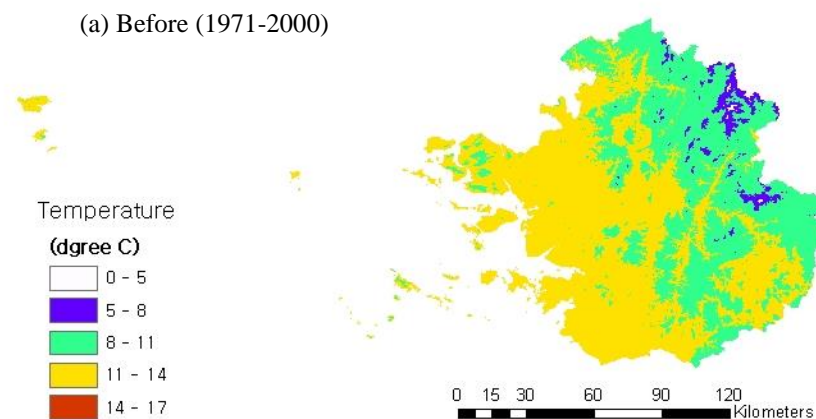
The spatial resolution of simulation used in this study was on 0.005° (approximately 500 m) and all input data were raster dataset with 49,046 pixels, which were divided by the historical period of 30 years (1971-

2000), near future (2021-2050) and far future (2071-2100). The past climate data were observed by Korea Meteorological Administration (KMA) and future predicted climate data were originated from Korea National Institute of Meteorological Research, with A1B scenario presented by IPCC.

Three categories of input data were used in the MC1 model; 1) geographic data such as elevation, 2) soil data such as soil bulk density, soil texture and rock fraction, and 3) climatic data such as monthly mean, maximum and minimum air temperature, monthly mean cumulative precipitation, humidity, wind speed and solar radiation.

The data of air temperature and precipitation were calibrated at the sea level which considered the effect of elevation of measuring point and the height of measuring equipment. The IDSW (Inverse distance squared weighting) method was applied to the calibrated climatic data except air temperature (Lee et al. 2007). The calibrated air temperature data were interpolated into the spherical semi-variogram kriging as a spatial statistic method (Park et al. 2008). The other data were rescaled to fit on 0.005° spatial resolution. All input data were prepared by Arc/Info 9.3 (Geographic Information System by ESRI).

Fig. (2) and (3) showed the regional distribution of monthly mean air temperature and monthly mean cumulative precipitation in historical period (1971-2000), near future (2021-2050), and far future (2071-2100), respectively. It was simulated that the mean air temperature and precipitation in the study area would increase by 1.4°C and 10 mm in near future and 4°C and 24 mm in far future, which was based on A1B scenario presented by IPCC Fig. (4). In addition, Figure 4 showed the change of climatic conditions in the selected four sites and capital area in this study.



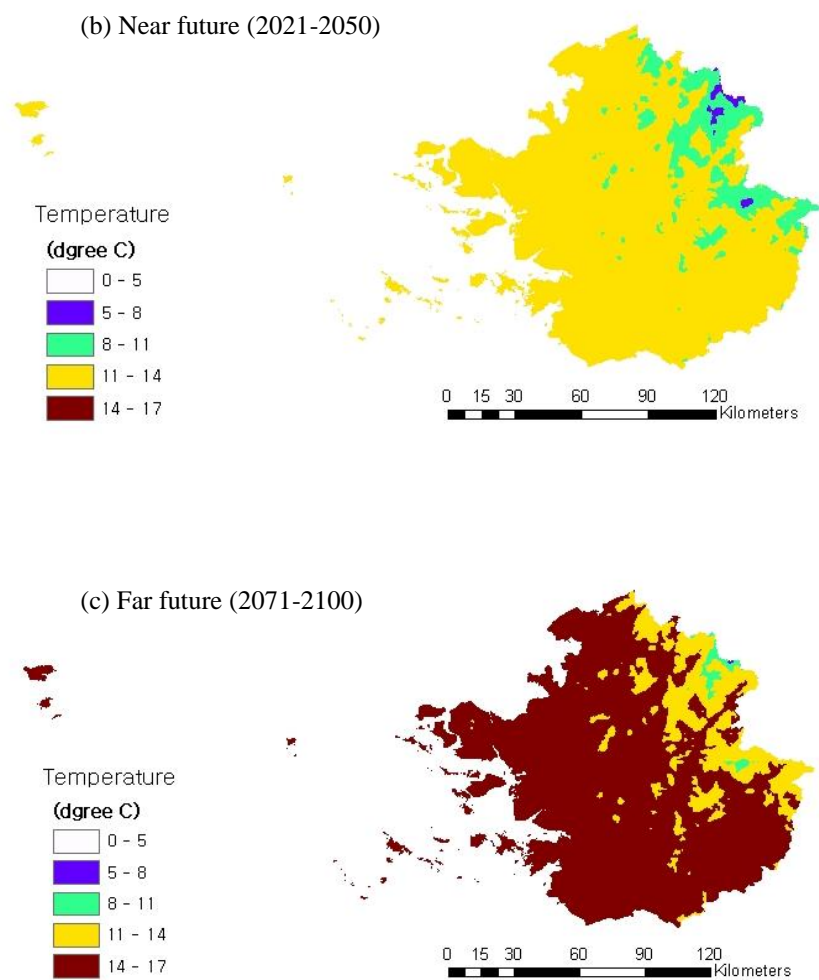
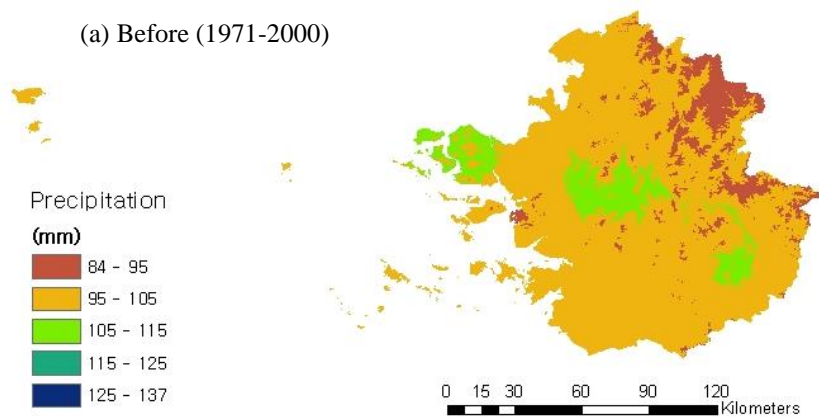


Fig. (2). Distribution of Mean Air Temperature in Capital Area.



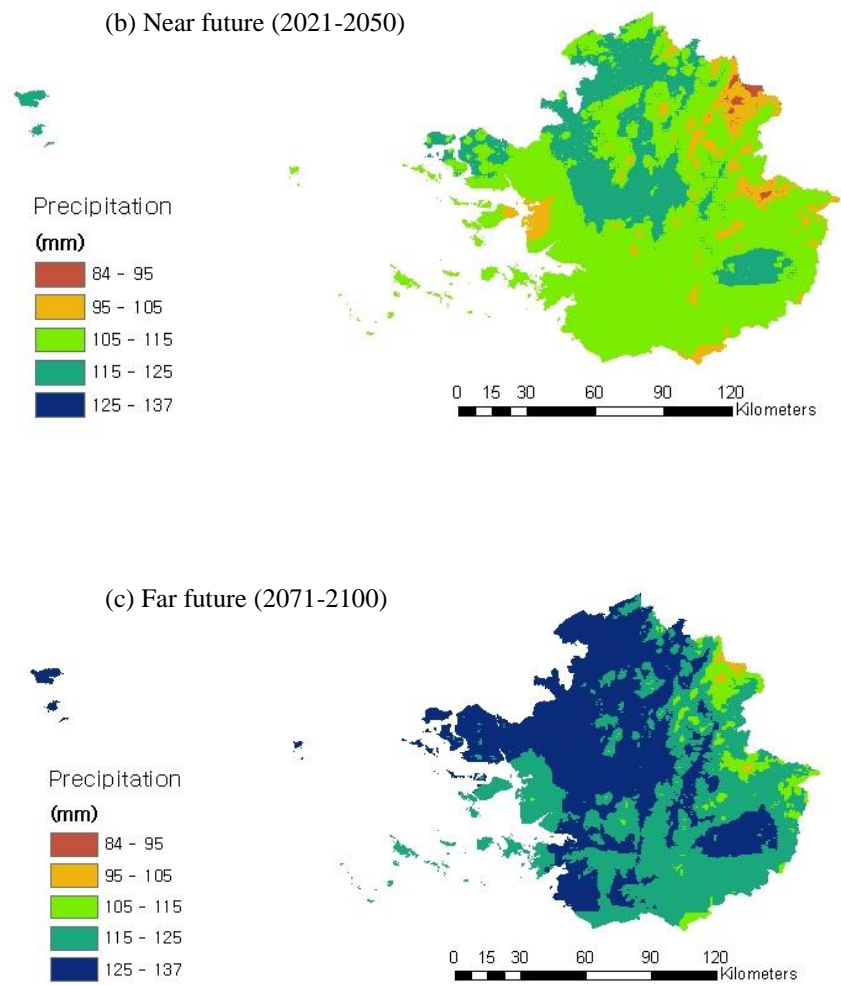


Fig. (3). Distribution of Monthly Mean Accumulative Precipitation in Capital Area.

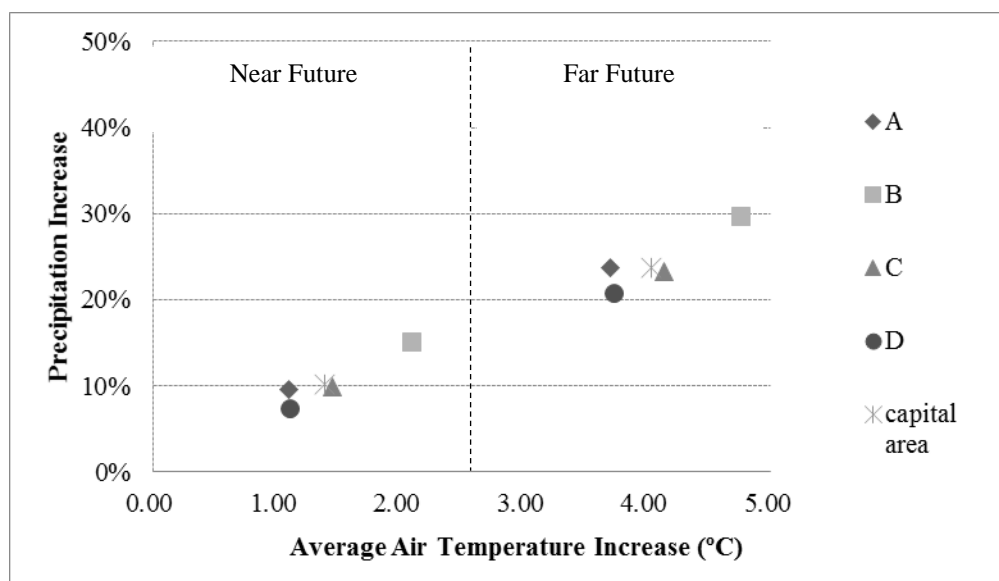


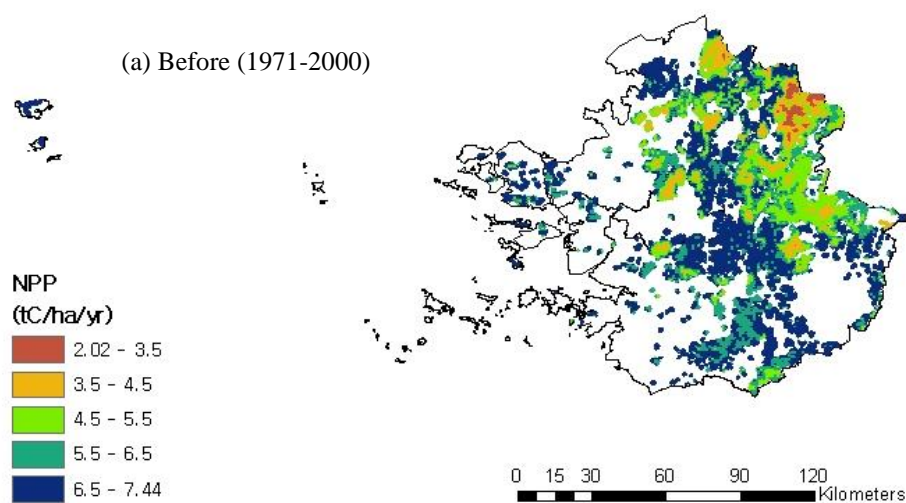
Fig. (4). Change of Future Air Temperature and Precipitation Relative to Historical Period (1971-2000) Predicted by Korea National Institute of Meteorological Research with A1B Scenario Presented by IPCC. (Near future: 2021-2050, Far future: 2071-2100).

The NPP and SCS results in this study were extracted by current forest area after simulated with potential vegetation distribution and carbon dynamics which were based on the climatic change and soil conditions. Human interference (anthropogenic deforestation) data cannot be applied to the MC1 model simulation because the input data is required much more in detail. However, the forest areas in the capital area of South Korea have been reducing by 1,940 ha (average during 2003-2009) per year because of forest land use changes to fields, ranches, housing, factories, roads and golf courses (Forestry Statistical Yearbook 2004-2010). Moreover, the damaged area because of forest fire was about 16.4 ha (average during 2003-2009) per year (Forestry Statistical Yearbook 2004-2010). In this study, the change of NPP and SCS by the human interference was estimated with the decrease rate of forest areas (Forestry Statistical Yearbook 2004-2010) and the simulated NPP and SCS results by MC1 model under the condition of climate change.

RESULTS AND DISCUSSION

Net primary productivity change by potential climate change

The simulated NPP are ranged from 2.02 to 7.43 tC ha⁻¹ yr⁻¹ under the historical period of 1971-2000; the average is 6.02 tC ha⁻¹ yr⁻¹ Fig. (5). In the near future simulation, NPP varies from 2.32 to 7.63 tC ha⁻¹ yr⁻¹ under the condition of potential climate change during 2021-2050; the average is 5.85 tC ha⁻¹ yr⁻¹, which decreases by 3% compared with that of 1971-2000. In the far future simulation, NPP shows from 2.89 to 7.67 tC ha⁻¹ yr⁻¹ under the condition of potential climate change during 2071-2100; the average is 5.88 tC ha⁻¹ yr⁻¹, which decreases by 2% compared with that of 1971-2000.



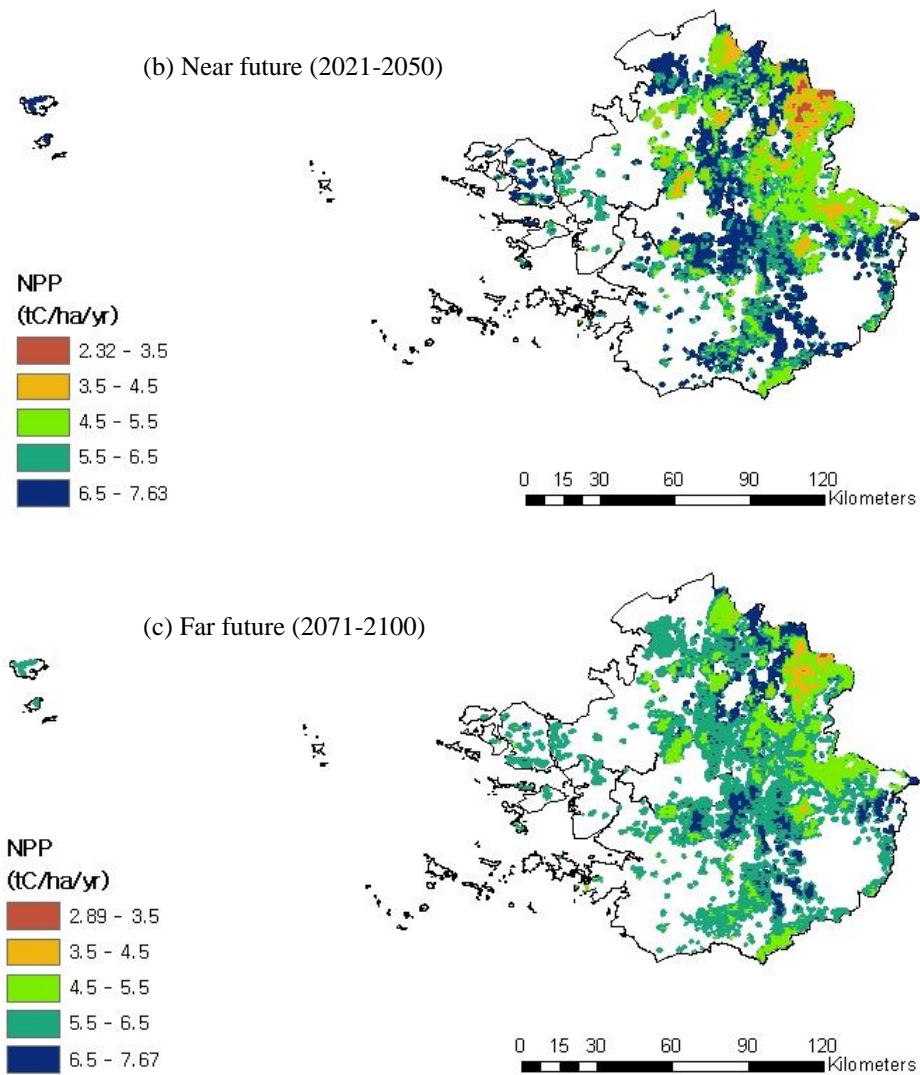


Fig. (5). The Simulation Results of Net Primary Productivity (NPP) in Capital Area.

In the selected 4 simulation points, the NPP of A, B and C points indicates a decreasing tendency but not D point in near future (2021-2050) relative to past (1971-2000) Fig. (6). In the far future simulation, the NPP of A and D points increase but those of B and C points decrease. Although the NPP of C point decreases by 48%, that of D point near to the C point increases by 29%, which are located in near urbanizing area or not, respectively. In the comparison of other simulated data, the simulated NPP of temperate forest in A point during 1971-2000 was $6.67 \text{ tC ha}^{-1} \text{ yr}^{-1}$, which is approximately 10% higher than $6.04 \text{ tC ha}^{-1} \text{ yr}^{-1}$ of NPP simulated at the same point by a Lund-Potsdam-Jena Module of Community Land Model 3.5-DGVM from Lim et al. (2010). In addition, our simulation data is similar to $6.69 \text{ tC ha}^{-1} \text{ yr}^{-1}$ of NPP simulated by a TEM model of Melillo et al. (1993) in temperate mixed forest.

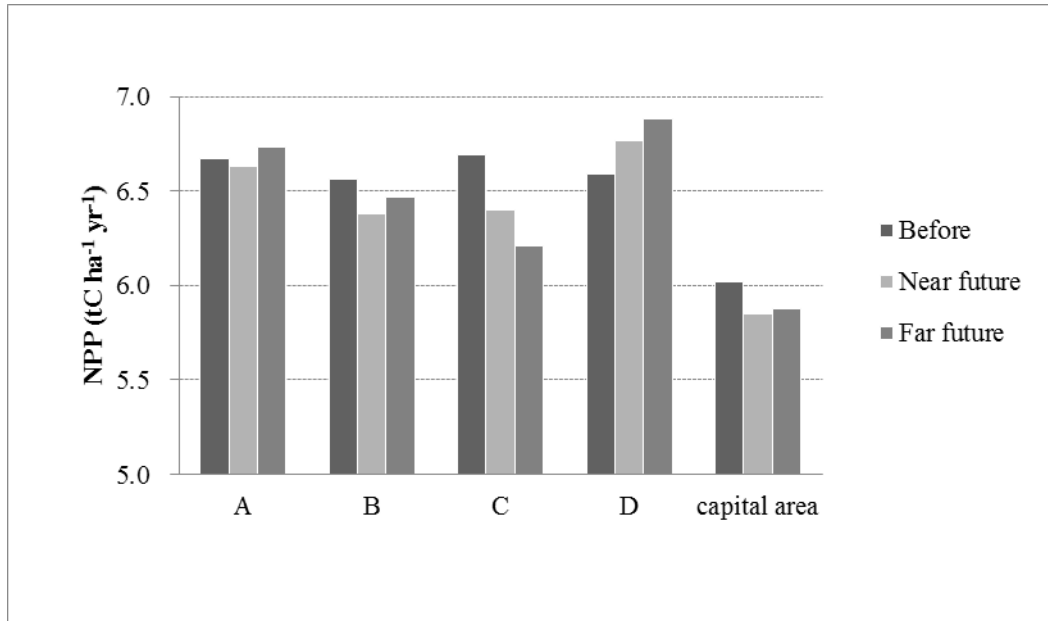


Fig. (6). The Results of Net Primary Productivity (NPP) in Selected Points and Capital Area.
(Before: 1971-2000, Near future: 2021-2050, Far future: 2071-2100)

In this study, the change rate of future NPP simulated is described with GIS Fig. (7). In the near future simulation, forest areas where NPP decreases are more than NPP-increased forest areas, which range from 0 to 14%. In the far future simulation, the NPP is regionally fluctuated with the increase by 93% (especially northern areas) and decrease by 24%. The forest areas where NPP decreases are mainly coastal areas or relatively low elevation forest areas. On the other hand, the relatively high elevation forest areas above 150 m indicate 4.62% increasing rate of NPP comparing far future (2071-2100) and past (1971-2000). With regard to the result, in high elevation forest areas above 200 m, the NPP increases by respective 1-3% and 6-14% during 1999-2030 and 1999-2090 which Peng et al. (2009) simulated with a climate scenario of temperature and precipitation increases and a TRIPLEX model in the northeastern China.

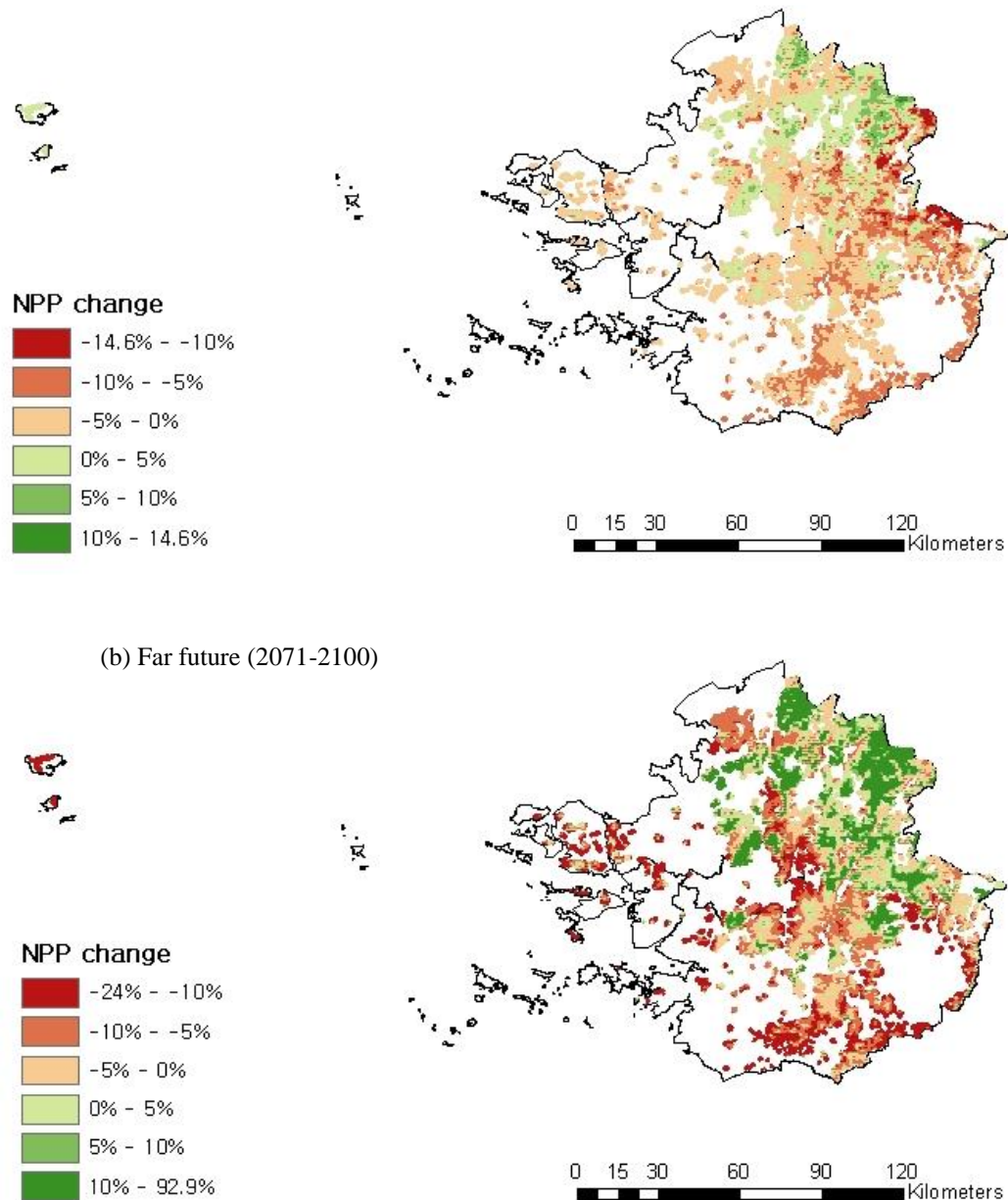


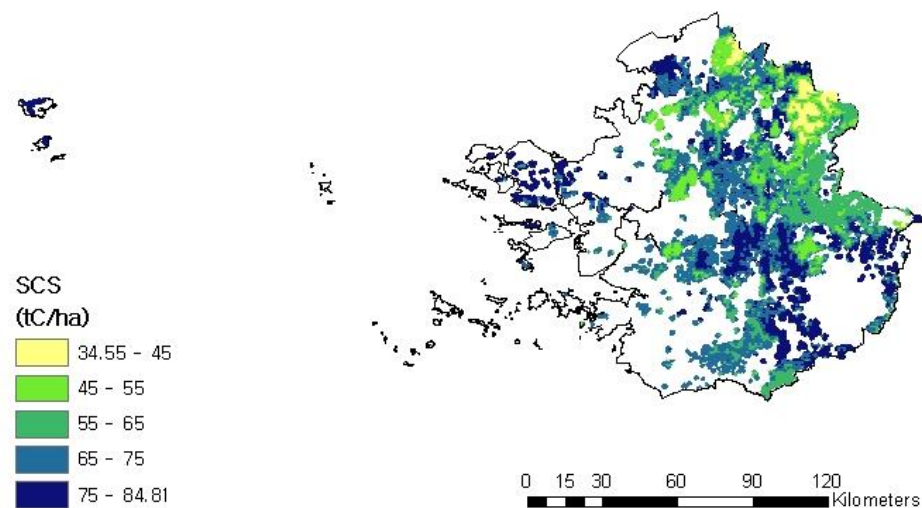
Fig. (7). Distribution of Net Primary Productivity (NPP) Change in Capital Area Relative to the Historical Period (1971-2000).

Even though the long-term simulation result of NPP is only small decrease tendency of 2-3% under the condition of potential climate change during 2000-2100, quantitatively it would be not negligible because NPP can be accumulated annually.

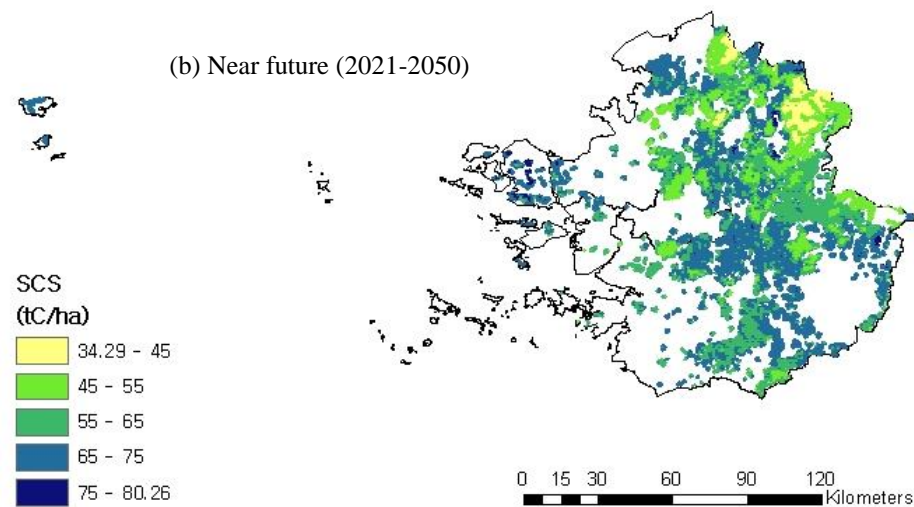
Soil carbon storage change by potential climate change

The simulated SCS varied from 34.55 to 84.81 tC ha⁻¹ under historical period of 1971-2000; the average

is 66.84 tC ha⁻¹ Fig. (8). In the future simulation, the SCS decreases in most of forest areas, which is described with GIS Fig. (9). In the near future simulation, SCS ranges from 34.29 to 80.26 tC ha⁻¹ under the condition of potential climate change during 2021-2050; the average is 61.37 tC ha⁻¹, which decreases by 8% compared with that of 1971-2000. In the far future simulation, SCS indicates from 35.39 to 76.34 tC ha⁻¹ under the condition of potential climate change during 2071-2100; the average is 52.81 tC ha⁻¹, which decreases by 21% compared with that of 1971-2000.



(b) Near future (2021-2050)



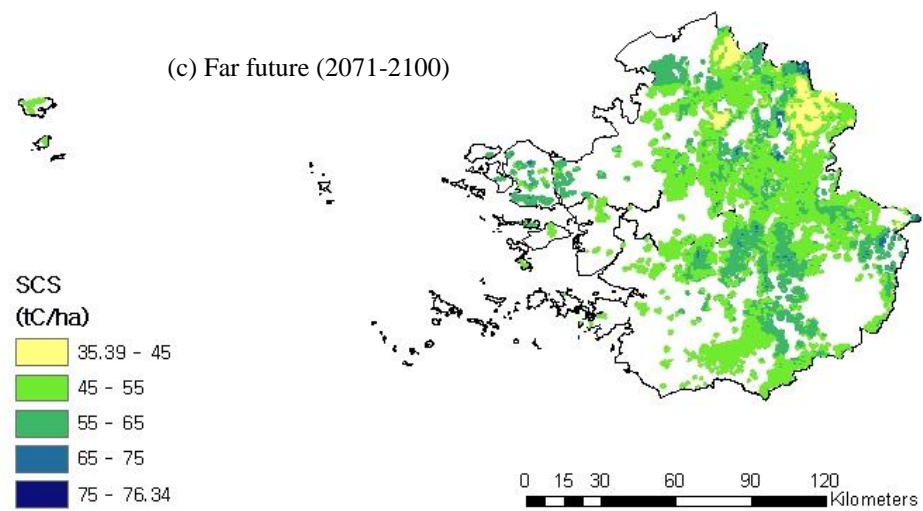
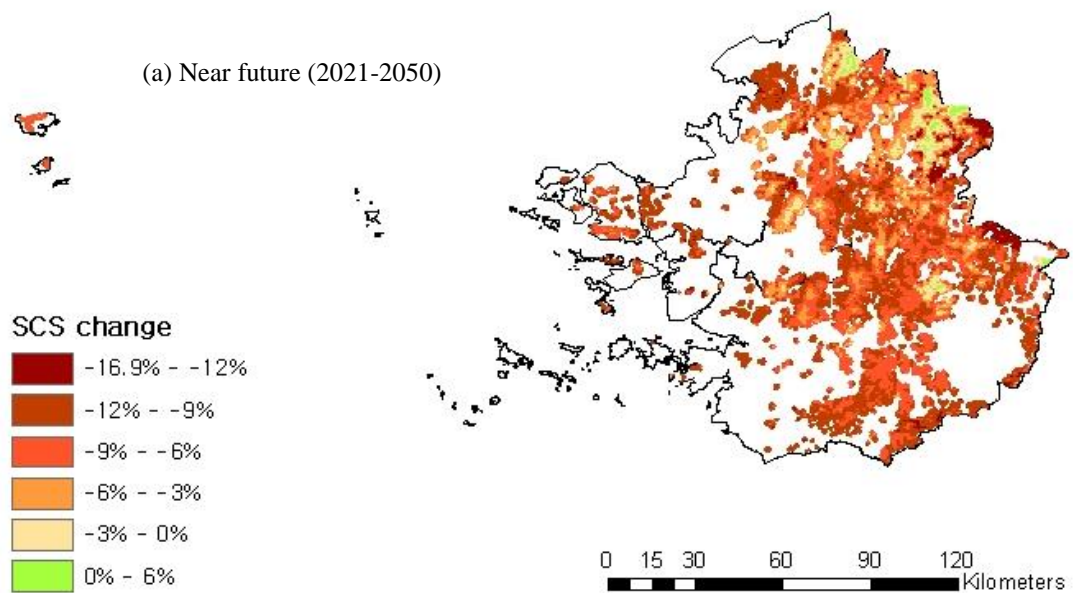


Fig. (8). The Simulation Results of Soil Carbon Storage (SCS) in Capital Area.



(b) Far future (2071-2100)

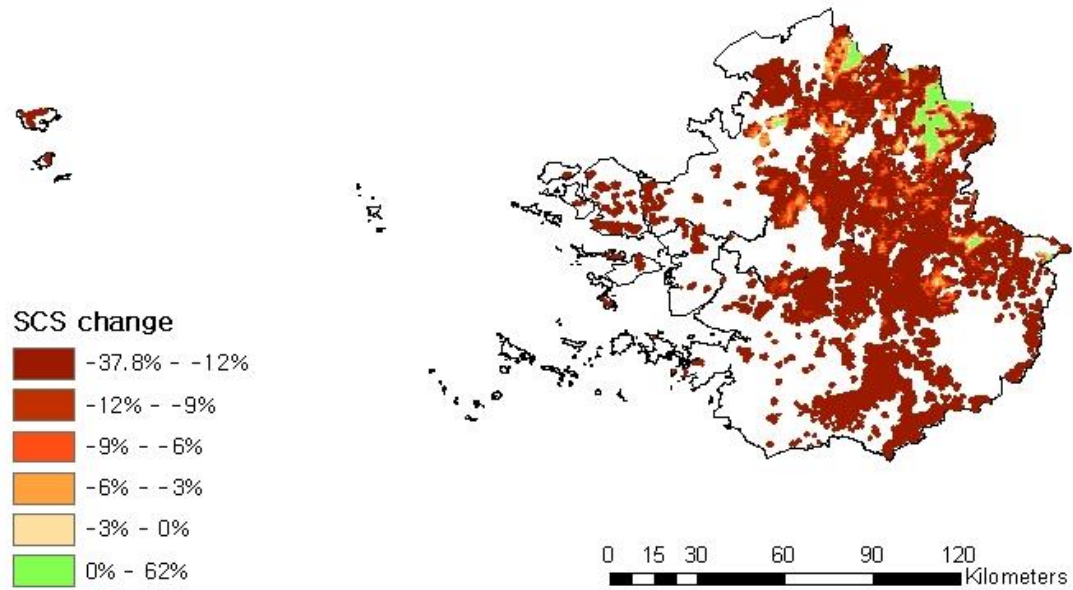


Fig. (9). Distribution of Soil Carbon Storage (SCS) Change in Capital Area Relative to the Historical Period (1971-2000).

In the selected 4 simulation points, the SCS of A, B, C and D points shows a decreasing tendency during 2000-2100, which decreases by 3.58-7.29% and 13.17-18.52% in near future and far future, respectively Fig. (10). The variation is presumably derived from the distinction of soil and climate. In the comparison of other simulated data, the simulated SCS of temperate forest A point during 1971-2000 is 77.57 tC ha^{-1} , which is approximately 5% higher than 73.8 tC ha^{-1} of SCS simulated at the same point by a Lund-Potsdam-Jena Module of Community Land Model 3.5-DGVM from Lim et al. (2010).

Even though Davidson and Janssens (2006) reviewed that a consensus has not yet emerged on the temperature sensitivity of soil carbon decomposition, in the decrease of SCS by the climate change, many researchers have reported that the SCS decreases with the climate change (Bonan and Van Cleve 1992; Trumbore et al. 1996; Melillo et al. 2002; Neff and Hooper 2002; Peng et al. 2009; Pan et al. 2010).

Therefore, according to the long-term simulation result, SCS would be a main factor in the decline of temperate forest carbon pool, which decrease continuously and largely by 21% during 2000-2100 (quantitatively 14.03 tC ha^{-1}).

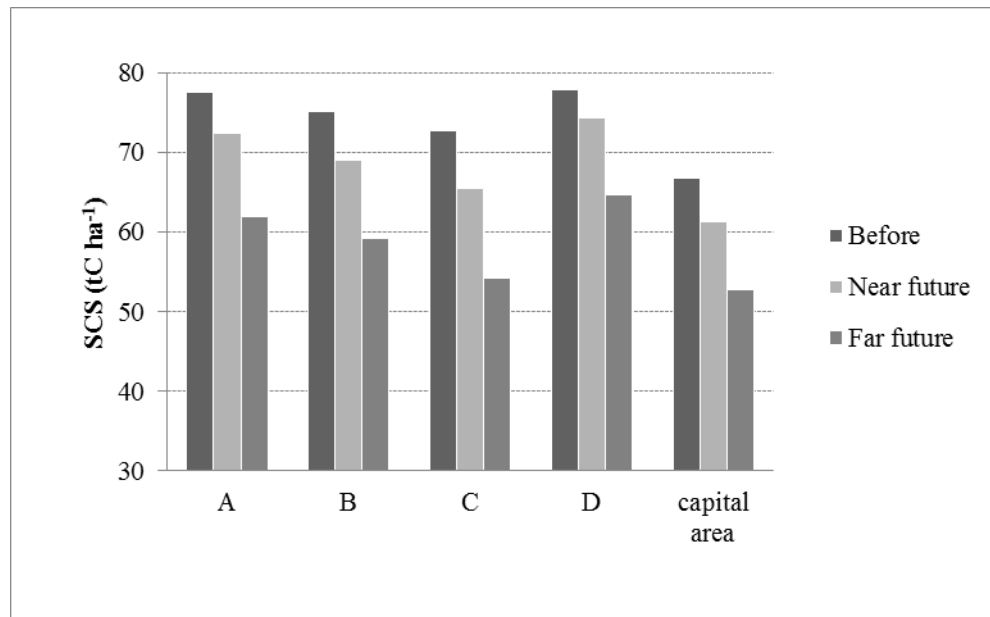


Fig. (10). The Results of Soil Carbon Storage (SCS) in Selected Points and Capital Area. (Before: 1971-2000, Near future: 2021-2050, Far future: 2071-2100).

Impact of human interference on temperate forest carbon pool

This study tried to estimate how potential climate change and human interference have an influence on the change of forest carbon pool because there is not only the effect by potential climate change but also that by human interference on the change of forest carbon pool.

In the simulation results, the NPP and SCS showed small and large decreasing tendencies, respectively. However, the NPP and SCS are simulated with a significant decrease under the condition of potential climate change and human interference in the future simulation. Assuming that the forest areas decrease with current decrease rate in the future, it is simulated that the NPP and SCS decrease by 2,836 TgC yr⁻¹ (17% ↓) - 2,276 TgC yr⁻¹ (33% ↓) and 29,753 TgC (21% ↓) - 20,437 TgC (46% ↓), respectively, in temperate forest areas in the capital area of South Korea (Table 1). In addition, the effect of human interference contributes 83-93% and 61-54% to the NPP and SCS, respectively, during 2000-2100 (Table 2).

Table 1. Calculations of forest carbon pool considering human interference.

		Before(2000)	Near future(2050)	Far future(2100)
Without Human interference*	NPP (TgC yr ⁻¹)	3,401	3,305	3,322
	SCS (TgC)	37,766	34,676	29,839
Considering Human Interference**	NPP (TgC yr ⁻¹)	3,401	2,836	2,276
	SCS (TgC)	37,766	29,753	20,437

* Original simulation data were multiplied by 565,024 ha of forest region in capital area from 2009 Land Cover Map by Korea

**Forest land use change (1,940 ha/yr) and fire damage area (16.4 ha/yr) from Forestry Statistical Yearbook (2004-2010) by Korea Forest Service were considered of human interference

Table 2. Contribution of potential anthropogenic deforestation and climate change to forest carbon pool.

Decline of NPP	Contribution of climate change (%)	Contribution of human activity (%)
Near future(2050)	17	83
Far future(2100)	7	93
Decline of SCS	Contribution of climate change (%)	Contribution of human activity (%)
Near future(2050)	39	61
Far future(2100)	46	54

The decrease of forest carbon pool will result in a positive feedback to climate change, which is caused by the decrease of NPP and SCS. Consequently, if the forest areas decrease with the current level by human interference, it would further accelerate the climate change. It is desirable for a continuous forest management to be performed with some interest and support by international and domestic levels, because a decline of carbon sequestration capacity in forest can be improved by forest area managements, fire managements and fertilizer uses and soil amendments (Lal 2005). In addition, it is necessary to consider such NPP and SCS simulation data when the national and local land planning are established, because forest is an important and effective carbon sink.

For the effective reduction of carbon dioxide emission in temperate forest areas, above all it would be effective to control anthropogenic deforestation. Consequently, this study suggests that it is necessary to reforest extra areas corresponding to deforestation rate if there are some unavoidable plans. It is concluded that potential human interference (anthropogenic deforestation) has more influence on the decline of temperate forest carbon pool than potential climate change in the capital area where human interference is expected with national and local land planning.

ACKNOWLEDGEMENTS

The authors wish to thank Prof. W. K. Lee from Korea University. Financial supports come from

This work was supported by the National Research Foundation of Korea(NRF) grant funded by the

Korea government(MSIP) (2009-0083527).

REFERENCES

- Bachelet, D, Lenihan, JM, Daly, C, Neilson, RP, Ojima, DS & Parton, WJ (2001) MC1: A Dynamic Vegetation Model for Estimation the Distribution of Vegetation and Associated Ecosystem Fluxes of Carbon, Nutrients, and Water. Technical Documentation version 1.0. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-508.
http://www.fs.fed.us/pnw/pubs/pnw_gtr508.pdf. Accessed 10 January 2011.
- Bonan, GB & Van, CK (1992) Soil temperature, nitrogen mineralization, and carbon source-sink relationships in boreal forests. *Can J For Res*, 22, 629-639
- Carpenter, KE, Abrar, M, Aeby, G, Aronson, RB, et al (2008) One-third of reef-building corals face elevated extinction risk from climate change and local impacts. *Science*, 321, 560-563
- Davidson, EA & Janssens, IA (2006) Temperature sensitivity of soil carbon decomposition and feedbacks to climate change. *Nature*, 440, 165-173
- Kim, J, Kang, MS, Kang, SK, Kang, HS, Ku, JW & Kim, RH, et al (2007) CarboKorea: Development of Carbon Cycle Monitoring and Assessment Technology by Integrating KoFlux Footprint, MODIS/IKONOS Satellite Image and Ecohydrology Modeling, Korea Ministry of Environment.
- Intergovernmental Panel on Climate Change (2001) IPCC Third Assessment Report: Climate Change (TAR): The Scientific Basis. http://www.grida.no/climate/ipcc_tar/wg1/pdf/TAR-01.pdf. Accessed 10 January 2011.
- Intergovernmental Panel on Climate Change (2007) IPCC Fourth Assessment Report: Climate Change (AR4): Synthesis Report. http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf. Accessed 10 January 2011.
- Korea Forest Service (2009) Climate change & Forest. <http://carbon.forest.go.kr/foahome/user.tdf>. Accessed 10 January 2011 (in Korean).
- Korea Forest Service (2004-2010) Forestry Statistical Yearbook.
http://www.forest.go.kr/foahome/user.tdf?a=common.HtmlApp&c=1001&page=/html/kor/information/stat/stat_030_010.html&mc=WWW_INFORMATION_STAT_040. Accessed 10 January 2011 (in Korean).
- Lal R (2005) Forest soils and carbon sequestration. *For Ecol Manage*, 220, 242-258.
- Lee, M, Lee, WK, Song, CC, Lee, JH, Choi, HA & Kim, TM (2007) Spatio-temporal change prediction and variability of temperature and precipitation. *Korea Journal of GIS Assc*, 15, 267-278.
- Lenihan, JM, Bachelet, D, Neilson, RP & Drapek, R (2008) Response of vegetation distribution, ecosystem productivity, and fire to climate change scenarios for California. *Climate Change*, 87, S215-S230

- Lim, JH, Shin, JH, Jin, GZ, Chun, JH & Oh, JS (2003) Forest Stand Structure, Site Characteristics and Carbon Budget of the Kwangneung Natural Forest in Korea. *Korean Journal of Agri For Meteo*, 5, 101-109.
- Lim, HJ, Lee, YH & Kwon, H (2010) Evaluation of Community Land Model version 3.5-Dynamic Global Vegetaion Model over Deciduous Forest in Gwangneung, Korea. *Korean Journal of Agricultural and For Meteo*, 12, 95-106.
- Marland, G, Andres, RG, Boden, TA, Johnson, C & Brenkert, A (1999) Global, regional and national CO₂ emission estimates from fossil fuel burning, cement production and gas flaring (pp 1751–1996). Report NDP-030. Carbon Dioxide Information Analysis Center, Oakridge National Laboratory, Oakridge, TN, USA.
- Melillo, JM, McGuire, AD, Kicklighter, DW, Moore, III, B, Vorosmarty, CJ & Schloss, AL (1993) Global climate change and terrestrial net primary production. *Nature*, 363, 234-240.
- Melillo, JM, Steudler, PA, Aber, JD, Newkirk, K, Lux, H, Bowles, FP, Catricala, C, Magill, A, Ahrens, T & Morrisseau, S (2002) Soil warming and carbon-cycle feedbacks to the climate system. *Science*, 298, 2173-2176.
- Neff, JC & Hooper, DU (2002) Vegetation and climate controls on potential CO₂, DOC and DON production in northern latitude soils. *Global Change Biol*, 8, 872-884.
- Neilson, RP (1995) A model for predicting continental scale vegetation distribution and water balance. *Ecol Appl*, 5, 362-385.
- Pan, Z, Andrade, D, Segal, M, Wimberley, J, McKinney, N & Takle, E (2010) Uncertainty in future soil carbon trends at a central U.S. site under an ensemble of GCM scenario climates. *Ecol Model*, 221, 876-881.
- Park, NW & Jang, DH (2008) Mapping of temperature and rainfall using DEM and multivariate kriging. *Kor Geogra Soc*, 43, 1002-1015.
- Parton, W.J, Schimel, DS, Ojima, DS & Cole, CV (1994) A general study model for soil organic matter dynamics, sensitivity to litter chemistry, texture, and management. In: Quantitative modeling of soil forming processes (pp 147-167). Special Publication 39. Soil Science Society of America (SSSA).
- Peng, C, Zhou, X, Zhou, S, Wang, X & Zhu, B (2009) Quantifying the response of forest carbon balance to future climate change in Northeastern China: Model validation and prediction. *Global Plan Change*, 66, 179-184.
- Rodhe, H (1990) A comparison of the contributions of various gases the greenhouse effect. *Science*, 248, 1217-1219.
- Thomas, CD, Cameron, A, Green, RE, Bakkenes, M, Beaumont, LJ, Collingham, YC, Erasmus, BFN, Siqueira, MF, Grainger, A, Hannah, L, Hughes, L, Huntley, B, Jaarsveld, AS, Midgley, GF, Miles, L, Ortega-Huerta, MA, Townsend Peterson, A, Phillips, OL & Williams, SE (2004) Extinction risk from climate change. *Nature*, 427, 145-148.

Trumbore, SE, Chadwick, OA & Amundson, R (1996) Rapid exchange between soil carbon and atmospheric carbon dioxide driven by Temperature Change. *Science*, 272, 393-396.

No.24

**Entrepreneurship Education and Innovation performance:
The moderating effect of Team_Based Learning on the Innovative personality
in relation to Team Innovative Behavior and New Venture Idea**

1. Background & Purpose

Innovation defines the creative outcome at the organization level as a successful execution (Ancona & Caldwell, 1987), and innovation has to do with the production or adoption of useful idea and idea implementation (Kanter, 1988; Van de Ven, 1986).

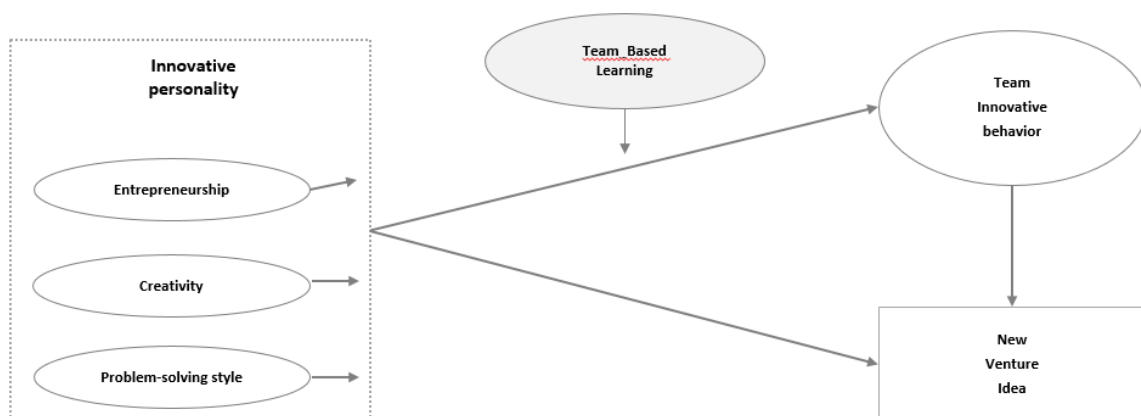
Kanter (1988) has proven that people with innovative tendencies have sought sponsorship of ideas and attempted to build coalitions of supporters for their realization. This innovative tendency is seen as an innovation activity through education. And Scott & Bruce (1994) integrated a number of streams of research on the antecedents of innovation to develop and test a model of individual innovative behavior.

In addition, according to the previous research (Kaufmann & Tödtling, 2001), it is proved that the team innovation behavior is more effective than the individual innovation behavior, and that the new opportunity creation effect is higher than the individual innovation behavior, and that the TBL can increase the innovation effect through the new problem solving effect through mutual experience and knowledge sharing and interaction. Also the Team-Based Learning approach (Michaelson, 2002) is a specific technique that facilitates this process.

However, there is little research on whether the tendency of individual innovation influence on the development of venture idea, whether it is manifested as team innovation behavior through TBL, or leads to new business idea.

This study will test the effects of innovative personality- creativity, entrepreneurship, and problem-solving styles- tendencies on the emergence of team innovation behavior and new venture ideas by TBL, reports a specific experience of using TBL in a first step of business unit for innovation, and calls for wider adoption of TBL in entrepreneurship teaching considering each of these elements

Conceptual model and hypothesised relationships



Theoretical and hypotheses

2.1 Innovative personality and Team innovative behavior

Personality is a set of stable characteristics that determine the commonalities and

differences(Hellriegel, Slocum & Woodman, 1995)

Innovative personality is a change-oriented tendency to adopt and introduce new ideas without being tied to existing methods(Woodman et al.,1993).

Scott & Bruce(1994) & Kirton(1976) addressed problem-solving style on innovative personality and Woodman et al(1993) and Hellriegel&Slocum(1995) showed creativity on innovative personality, and entrepreneurship is known to be an important element of innovation(Hellriegel&Slocum, 1995), and Innovative personality will have influence on innovation behavior because they have self - efficacy and self – determination(Collins & Porras, 1994)

Therefore, to replicate and confirm early results linking innovative personality with Team innovative behavior,
we suggest:

Hypothesis 1a : The degree to which an individual's Entrepreneurship is positively related to Team Innovative behavior

Hypothesis 1b : The degree to which an individual's Entrepreneurship is positively related to New venture idea

Hypothesis 1a : The degree to which an individual's Creativity is positively related to Team Innovative behavior

Hypothesis 2b : The degree to which an individual's Creativity is positively related to New venture idea

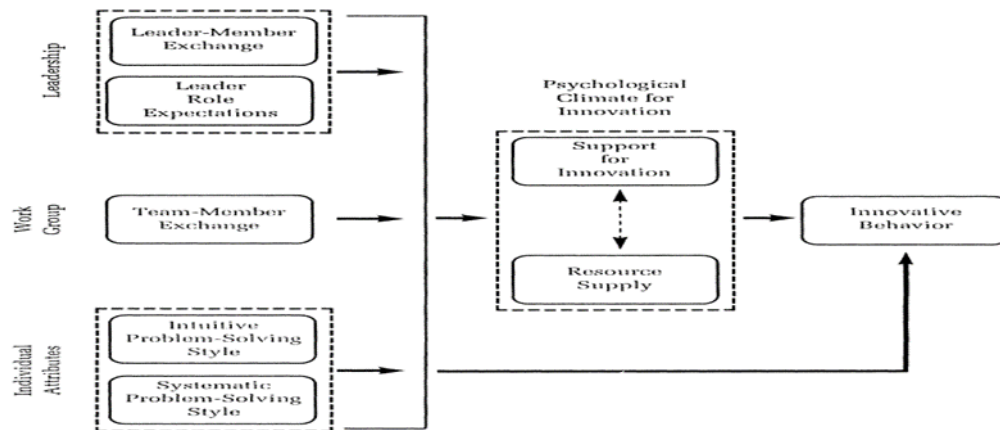
Hypothesis 3a : The degree to which an individual's Problem-solving style is positively related to Team Innovative behavior

Hypothesis 3c : The degree to which an individual's Problem-solving style is positively related to New venture idea

Team innovative behavior and Team Based Learning

Innovation is the process of action in which a new idea is created or introduced internally to the adopted sub-organizational unit, and it is implemented and utilized within the group over time. The root of innovation is the idea, and the subject that develops, Because it is a person (VandeVen, 1986), research into motivating or enabling an individual's or group's innovation behavior is important.

Scott& Bruce determined innovative behavior. The study provides evidence that innovative behavior is related to the individual attributes.



Team innovation behavior means team members' idea creation and sharing activities to promote team performance improvement(West and Farr,1 989). Teams are the core of organizational innovation, and these team processes are a key factor in innovation development (Taggar, 2002). The difference between the innovation behavior at the individual level and the innovation behavior at the team level is that the innovation behavior at the individual level is to recognize the problem at the individual level and act to change it. At the team level, There is a difference in the recognition of shared change among team members and in the level of individual-level innovation behavior in that cooperative efforts of team members are required to carry out change.

Kanter (1988) has proven that people with innovative tendencies have sought sponsorship of ideas and attempted to build coalitions of supporters for their realization. This innovative tendency is seen as an innovation activity through education.

Team learning is increasingly viewed as a decisive factor in organizational ability to create economic value for organizational stakeholders(Thompson, 1995). And TBL is provided opportunities to show their thoughts and criticisms freely and the team members can think twice about the dominant logic that they have taken for granted(Prahalad & Bettis, 1986). Therefore, we can show a high innovation tendency to present a new and improved direction.

Accordingly:

Hypothesis 4a : TBL will moderate the relationship between individual's Entrepreneurship and to Team Innovative behavior

Hypothesis 4b: TBL will moderate the relationship between individual's Creativity and to Team Innovative behavior

Hypothesis 4c : TBL will moderate the relationship between an individual's Problem-solving style and to Team Innovative behavior

2.3. Team innovative behavior and New venture idea

New Venture Ideas (NVI) are imaginary combinations of product/service offerings; potential markets or users, and means of bringing these offerings into existence (Per Davidsson, 2015)

From the viewpoint of a potential entrepreneur like a university student, entrepreneurship starts with an idea. This process continues with a range of practices including attractiveness and feasibility of an idea, gathering information to minimize value-related uncertainty and possibility and perhaps the main idea's conformity ratio in terms of newly discovered needs (Hayton and Cholakova, 2012).

Earlier we proposed that the program as a whole increases the students' innovative behavior and innovative performance is new venture idea. Since firstly it is logical to assume that the TBL's effect is due to the benefits that students derive from it we pose the following hypotheses:

Hypothesis 5 : Team Innovative behavior is positively related to New venture idea

3.

3.1. Sample

Students (more than 200) of entrepreneurship-related lessons in which founding ideas are included in the curriculum in Korea

3.2. Measures

a. Research Method : Survey Analysis

b. Questionnaire implementation period: December 2016

c. Composition of questionnaire contents innovative personality(Entrepreneurship, Creativity, Problem solving style) Team's innovative behavior: Self evaluation of team activity

- New venture idea: self-evaluation of business idea

d. Questionnaire scale: 5-point Likert scale(1= not at all; 5= strong)

e. Control variables: Team size, major field

f. Analysis method: Multiple regression analysis including reliability and validation

Factor	#Item	Operational Definition	
Innovative personality	24	A change-oriented propensity to seeks to adopt and introduce new ideas beyond existing methods - Creativity - Entrepreneurship(Risk-taking, Progressive, Innovation) - Problem-solving Style	Rogers and Shoemaker (1971, p.27) <u>Hellriegel</u> , Slocum & Woodman(1995) Hughes, M. & Morgan, R.E. (2007)
Team Innovative behavior	7	she or he generates new (novel or adopted) ideas and solutions, works to promote and build support for team, and produces an applicable prototype or model for the use and benefit of the organization or parts within it.	Scott & Bruce(1994) Thompson(1965) <u>Kanter</u> (1988)
New venture idea	7	New Venture Ideas (NVI) are imaginary combinations of product/service offerings; potential markets or users, and means of bringing these offerings into existence.	Per Davidsson(2015) <u>Amason et al.</u> (2006)

4.Expected result

The effectiveness of Team Based Learning is expected to be proven in the entrepreneurial education.

Individuals' innovative attributes (Entrepreneurship, Creativity, and Problem-Solving Style) are expected to influence team's innovative behavior and founding ideas.

We will be able to see which factors have a greater impact.

Implication for practice

This study will test the effects of innovative personality- creativity, Entrepreneurship , and problem-solving styles- tendencies on the emergence of team innovation behavior and new venture ideas by TBL, reports a specific experience of using TBL in an first step of business unit for innovation, and calls for wider adoption of TBL in entrepreneurship teaching considering each of these elements

Also, this study will provided a course such as " New venture idea creation by team" in Entrepreneurship Education programs for undergraduate and graduate students. In this course, new methods and structures for finding new venture ideas

Offering such courses at graduate levels (Junior levels) as an advanced course is another good option that policy-makers, higher education managers and employers would take it into consideration.

No.25

An Empirical Analysis for The Application Level of Chinese Internet Big Data Ecology: An Entropy Approach

Abstract: With a Chinese 13th Five-Year plan putting forward the National Big Data Strategy, almost all levels have been developing rapidly in the Internet Big Data Ecosystem(IBDE). The paper attempts to make an extensive definition of Internet Big Data, its ecology. An assessment of Big Data value is also provided based on a managerial point of view. An essential part of the big data ecosystem, the "application layer" directly facing to the public users, resulting in the so-called big data feedback effect from the user side to reach the end of the enterprise and the government. Based on CNNIC reports, an entropy analysis of the statistical data is trying to explain the evolution characteristics of application layer structure in IBDE during the process of its development, and thus reflecting the structure of public users' preference evolution. The paper found that the newborn cluster in the application layer structure contributes to the increment of the entropy through the analysis of Shannon entropy with concatenated substitution method, although the newborn cluster cause the rising of the degree of disorder. However, that the current stage on the left side of an inverted "U" type structure is perfectly aligning with National Internet Big Data innovation strategy and with the development of Innovation Economy Strategy, Public Innovation & Entrepreneurship Strategy, is of vital importance in dialectically and

rationality viewing the geographical increase of the system entropy. The government should be encouraged to promote the Internet Big Data industry innovation, to pay attention to the construction of the fundamental level of the ecological system, to pay attention to the alteration of consumer demand level, by means of policy coordination. The appropriate performance assessment to commercial organizations innovation, and positive effects on industrial ecosystem caused by government information disclosure, and guarding against and preventing the abuse of open government information by commerce and individual as well.

Purpose/research question: The paper attempts to define the nature and scope of Big Data from the characteristics that currently widely recognized; to make a quantitative description of the value of Big Data; to describe and summarize the application layer of big data ecosystem; to analyze and identify the pattern of structure evolution of the IBDE (Internet Big Data Ecosystem) with an entropy approach; to reflect the structure of public users' preference evolution; to provide suggestions and solutions to the development of China Internet Big Data ecology in a sustainable way.

[research question] The entropy structure and evolution of the IBDE application layer; the inverted "U" curve of the entropy and its incompleteness; the cause of the inverted "U" curve and the meaning behind it; the solution to a sustainable growth of IBDE.

Key literature review(3-5 papers): China has been starting its implementation of innovation strategy, which boosts productive forces and overall national strength. The core feature of innovation version 3.0 paradigms is innovation ecosystem(LI Wan, CHANG Jing, WANG Min—jie, ZHU Xue—yan, JIN Ai—min, 2014). The concept of innovation ecosystem is based on former studies and comes from the concept of ecology of the nature, which reflects the agglomeration amongst innovative subjects, a relationship transcending the market relationship(Wu Jin-xi, 2014). Paying close attentions to "interdependence between the subjects" emphasized by innovation systems theory and "the subjects' interaction with the environment" emphasized by ecology, it establishes that a "Core—Periphery" fame to contain the components of innovation ecosystem, which reveals the connotations, structure and behavior that innovation ecosystem on different levels contained and the cross—level interactions(ZHAO Fang, ZENG Guo-ping, 2014). Online platform creates online markets that are capable of providing user feedback and iterative innovation. Open online platform means entrepreneurial space for applications which constitute a symbiotic entrepreneurial community around the platform. The revolution of Entrepreneurial Ecosystem occurs primarily on line, while it has been changing the related entities offline simultaneously(Zhao Fuzeng, Wang Shengguang, 2015). The Obama administration announced \$200 million in Big Data research and development initiative, with the aim to advance state-of-the-art technologies, expand the workforce, strength the national security(White House, 2012). Advancements in big data analysis offer cost-effective opportunities to improve decision-making in critical development areas such as health care, employment, economic productivity, crime, security, and natural disaster and resource management (Martin Hilbert, 2016). In statistical mechanics, entropy is a measure of the number of ways in which a system may be arranged, often taken to be a measure of "disorder" (the higher the entropy, the higher the disorder) (Sethna, James P., 2006). Systems tend to progress in the direction of increasing entropy(Simon, Donald A. McQuarrie; John D., 1997). The information entropy, a status function that can be used to describe the complexity and chaos of any system that consists of many factors(Geng Haiqing, 2004). Method of concatenated substitution is an important method to make factor analysis(Wang qi, Zhang Yafen, 2001). Environmental harmony, value-added in value proposition, sensitive to the new ideas plays a vital role in creative and innovative ecology system(Wu Jin-xi, 2014).

Design/methodology/approach: Shannon's Entropy approach is introduced into information theory, which is used to measure the degree of uncertainty of a random event (Shannon, 1948). In information theory, entropy is the measure of the amount of information that is missing before reception and is sometimes referred to as Shannon entropy (Balian, Roger, 2004). Albert Einstein once described entropy as the first law of the entire universe. Although the concept of entropy was originally a thermodynamic construct, it has been adapted in other fields of study, including information theory, psychodynamics,

thermos-economics/ecological economics, and evolution (Brooks, Daniel, R.; Wiley, E.O., 1988). The concept of entropy can be described qualitatively as a measure of energy dispersal at a specific temperature (Lambert, Frank L, 2009). Resource and neoclassical economics focus primarily on the efficient allocation of resources, and less on two other fundamental economic problems which are central to ecological economics: distribution (equity) and the scale of the economy relative to the ecosystems upon which it is reliant (Daly, H. and Farley, J. , 2004). Ecological Economics also makes a clear distinction between growth (quantitative increase in economic output) and development (qualitative improvement of the quality of life) while arguing that neoclassical economics confuses the two. The simple definition that sustainability is something that improves "the quality of human life while living within the carrying capacity of supporting eco-systems"(Gland, 1991). The "Circles of Sustainability" method of the UN and Metropolis Association described four components "economics", "ecology", "politics" and "culture" as the main idea of sustainable development(United Nations, 1992). By applying the four components into ecology system of China Internet Big Data, the suggestions come from the idea within. To quantitatively identify each contribution factor, a concatenated substitution method is used.

Findings/results: The mapping of public demand into the cyber world that interacts and clusters with the commercial organizations to match resources, is an important external performance of the structure evolution of the Internet Big Data industry.

The rising entropy of the ecology shows an inverted "U" curve with incompleteness, which probably means an initial phased result. In a dialectical view, keeping the ecology system entropy increasing may be a better choice in that newborn clusters contribute to the innovation and sustainable growth within the open coordinative environment. Government should be able to maintain an infrastructure suitable for upper layer ecology system, develop an appropriate performance assessment system, guard against the probable abuse of government open information and data.

Research limitations/implications: The paper attempts to analyze and explain the pattern of entropy evolution of China Internet Big Data Ecology system's application layer and the cause of its entropy increment. The ecology system of Internet Big Data industry is not quite clear due to its rapid development, since every physical object carries information that may be collected and calculated, which makes the boundary of Big Data remain open. All things are data/information, such as "all things are numbers" by Pythagoras(C. M. Bowra, 1957), in a mathematical and philosophy view point. However, not everything's information and data can be collected and calculated due to technology limitations and cost-benefit analysis(Jules Dupuit, 1848) in a utilitarian perspective. The traditional concatenated substitution or interlocking substitution method does not consider that different order of the components brings slightly different impacts of each component's number result. A modified approach using calculus can amend the problem but not be covered in the paper. The consumers layer that above the application layer is not included in the paper which requires a profound knowledge of Maslow and Alderfer theory in psychology.

Keywords (more than three): Big Data, ecology, entropy, evolution, application layer, factor analysis, concatenated substitution

References:

- [1] LI Wan, CHANG Jing, WANG Min—jie,ZHU Xue—yan, JIN Ai—min, Innovation 3.0 and innovation ecosystem [J]. Study in Science of Science, 2014, 32: 1761-1770.
- [2] Wu Jin-xi, The connotation, characteristics and implications of innovation ecosystem [J]. Study in Science of Science. 2014,32: 41-51.
- [3] ZHAO Fang, ZENG Guo-ping, Innovation system under multiple perspective. [J]. Study of Science of Science. 2014, 32:1781-1796.
- [4] Zhao Fuzeng, Wang Shengguang. Entrepreneurial Ecosystem in the Ubiquitous Internet [J]. Journal of Chinese Academy of Sciences, 2015, 4: 549-558
- [5] White House. OBAMA ADMINISTRATION UNVEILS "BIG DATA" INITIATIVE. [EB/OL].

<https://www.whitehouse.gov/blog/2012/03/29/big-data-big-deal>

- [6] Hilbert, M.. Big data for development: A review of promises and challenges. Development Policy Review, 2016, 34(1), 135-174.
- [7] Sethna, James P. (2006). Statistical mechanics : entropy, order parameters, and complexity. [M] Oxford University Press. p. 78.
- [8] Simon, Donald A. McQuarrie; John D. (1997). Physical chemistry : a molecular approach (Rev. ed.).[M] Sausalito, Calif.: Univ. Science Books. p. 817.
- [9] Geng Haiqing, GU Shu-zhong, GUO Dong-mei, Analysis on evolution of household energy consumption structure based on information entropy. [J]. 2004, 19,2, p257-262.
- [10] Wang qi, Zhang Yafen, Mathematical Model of the method of concatenated substitution. [J] Journal of Jilin Province Economic Management Cadre College. 2001, 15, 2, p40-41.
- [11] Nature. Big Data. [EB/OL]. <http://www.nature.com/news/specials/bigdata/index.html>
- [12] Viktor Mayer-Schönberger, Kenneth Cukier . Big Data: A Revolution That Will Transform How We Live, Work and Think [M] . Hodder Export
- [13] BAO Ji-gang, Information Entropy Economics,[M]. 2013. Economics and Science Press :p20

No.26

Strategic Modelling for Improving Open Systems Innovations and International Supply Chain Collaborations in Multinational Enterprises

No.27

**Agro-economic situation in the world and domestic markets of
agricultural and food products in the CIS countries: Russia, Ukraine,**

The Commonwealth of Independent States is one of the global intergovernmental regional economic unions, the development of which overlaps with the major global trends - globalization and regionalization. At present, the CIS faces the problem of finding a niche for itself in the context of changing configuration of the modern world, increasing competitiveness of the national economies, and transforming the Commonwealth into a regional economic union able to play a significant role in the global economy. The Commonwealth of Independent States has significant resource capacity. It covers 16.4 % of the world territory with approximately 4.4 % of the world population. The CIS owns about 20 % of world oil reserves, 40 % of natural gas, 25 % coal, 10 % of electricity

production, 25 % of the world forest resources, almost 11% of the world renewable water resources and 13 % of all arable land. Transportation and communication systems of the CIS states are playing an increasing role in global transport channels. Significant capacity is a sufficient basis to increase production, ensure economic stability and improve the livelihood in the CIS states.

During 1992-1995, the volume of agricultural production in the CIS countries was decreasing by 7.5 % annually, during 1996-2000 - by 1.4 %. Subsequently, there was an increase of agricultural production. During 2001-2005, the average annual growth rate of agricultural production amounted to 3.8 % in the Commonwealth, and during 2006-2010, it reached 1.9 %. For twenty years the total area of arable land in the CIS decreased by 14 %. The number of cattle over the years has decreased by 52 %, including 42% of cows, pigs - by 51 %, sheep and goats - by 41 %. Cattle and poultry for slaughter (slaughter weight) produced during this period decreased by 27 %, milk – by 28%, eggs - by 5%.

There have been positive trends in the development of agriculture in the CIS countries during the last ten years. The sown area of grain and legume crops expanded by 12%. In 2012, the Commonwealth milled more than 157 million tons of grain, which is 18 % more than in 2000, sunflower (grain) – by 1.7 times more. The harvest of vegetables increased by 44 %, sugar beet - by 36 %, fruits and berries - by 24%, while the gross harvest of potatoes declined by 11 %.

In 2001-2013 the situation with livestock (pigs, sheep and goats) as well as a poultry production has been improved, which allowed the CIS increase the production of livestock and poultry for slaughter (slaughter weight) by 1.7 and the gross eggs production by 1.5 times. At the same time, the number of cattle has been reduced (January 1, 2013 compared with January 1, 2001 - 10%), including cows (16%). The increase in production of milk over the last 10 years in the Commonwealth increased by 11% due to the improved productivity of cows. In current conditions, Russia gains a particular importance for the prospects of dynamic development of economic relations with the CIS countries, determining largely its geo-strategic position in the post-Soviet and Eurasian region, as well as at global level. Russia is a major investor in the economy of the Republic of Belarus. The maximum complete realization of mutual export opportunities of Russia and Belarus is directly related to the prospect of modernization of the Belarusian industrial sector and the active participation of Russian capital in the privatization of Belarusian enterprises. Its share in the economy of Belarus is about 80%.

Crop production. In October 2012, the Russian Federation had prices for feed grain higher on 169.8-256.3 %, bread wheat price - 88.2, barley – 79.5, oats - 112.6 % (Table 6) compared with the Republic of Belarus (at the exchange rate of the National Bank of Belarus). Whereas Ukraine grain prices were much higher (on 5.7-294.1 %) than in the Republic of Belarus. Kazakhstan grain prices were higher than in the Republic of Belarus (on 202.7-259.3 %).

Livestock products. In October, the purchase prices for cattle in slaughter weight (average and lower than average fatness), pigs (II and III category), as well as for milk production in the Russian Federation were higher than in Belarus: 29.3-50.5: 24.5-36.1 and 32.4 %, respectively (at the rate of National Bank of the

Republic of Belarus). In Kazakhstan, the purchase prices for milk were higher than in Belarus by 60.9 %, and in Ukraine - by 6.9 %.

Retail prices. In October, Russian retail prices (at the rate of National Bank of the Republic of Belarus) for beef, pork and milk were higher on 31.4-44.2 % than in the Republic of Belarus, for potato and vegetables – 42.8-138.0; bread - 36.6; cheese - 20.4; sugar - 8.7; eggs - 5.7 %. In Ukraine, in comparison with the Republic of Belarus, milk was more expensive by 15.1 %, beef - 19.2%, pork - 19.2 % (data for 2012). Ukrainian sunflower oil was cheaper by 9.5 %, rice - 37.6 %, poultry meat - 14.9%; sugar – 16%, cabbage - 2.4%; rye-wheat bread - 15.9 %. In October, in Kazakhstan, milk was cheaper than in Belarus by 3.3 %, cabbage - by 15.2 %. It is to be recalled that in September in Kazakhstan milk was more expensive by 6.8 %, cabbage - by 17.7 %. Retail price growth was registered for the following products: beef - 11.9 %, potatoes - 128.8%; butter - 22.1%; sugar - 36.6%; sunflower oil was more expensive (by 6.8 %) in Belarus.

Despite the economic downturn in '90s and the subsequent global financial and economic crisis, there is a revival of growth in the economy of the CIS countries. Moreover, in spite of the successes achieved in the agricultural sector in recent years, economy is still under the strong influence of external factors, and the CIS countries still lag behind the leading producers of agricultural commodities. The key factors hindering the development and efficiency of domestic agriculture and livestock are the organizational and technological factors, including the lack of material and technical resources and production base. Positive returns of agro-industrial potential of the CIS countries can be achieved by a rational combination of strategies in sectorial and territorial development under optimal proportions of agro-industrial complex development, and with involvement of investment projects and state target programs on development of agricultural production and processing, and enhancement of sustainability of rural areas. Subsequently, the above mentioned countries have great opportunities and potential, not only to develop agriculture and livestock production but also to enhance the export capacity, which will contribute to a real economic growth and increase their impact on the development of the world economic system.

No. 28

Circular business model for innovation within circular economy

1. Introduction

Circular business models may obtain a greater competitive edge in the years to come because they create more value from each unit of resource than the traditional linear production and consumption model. It is needless to say that innovation is related to the firm growth. Innovation and environment and economics are closely inter-related. However, most innovation studies pay little attention to the innovation and environment. Circular economy is an industrial ecology that is restorative or regenerative by intention and design.

These day, a range of factors (i.e., population growth, resource scarcity, climate change) impacts and an array of regulations addressing issues from toxic substances to zero-waste initiatives — are placing pressure on companies to move away from an industrialized make-use-dispose economic model to a more circular strategy. It replaces the end-of-life concept with restoration, renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models. The concept of circular economy (CE) was introduced by Pearce and Turner (1990). They outline the theories within and between economics of natural resources and their interactions and implications for the concept of how economics works. According to the definition of circular economy by World Economic Forum (2014), a circular economy is an industrial system that is restorative or regenerative by intention and design. Originally, environmental and resource economics is concerned with the allocation, distribution and use of environmental resources. The authors assert on environment both as an input and as a receiver of waste. They elaborate that ignoring the importance of environment means ignoring the economy as this is a linear or open-ended system without an in-built system for recycling.

Enterprises produce the productions through the use of the resources, and sell the products to a consumer, who then disposes it when it no longer gives a value its purpose. Those behaviors is called as liner systems. More than 150 year, industrial pattern have been used a one-way or linear model of production and consumption in which goods are manufactured from raw material, sold, used and then disposed as waste. This linear systems reach its limits (World economic forum, 2014). A circular economy has benefits that are operational as well as strategic, on both a micro- and macroeconomic level. This is an opportunity, with huge potential for innovation, job

creation and economic growth (World economic forum, 2014).

Many enterprises also realized that this linear system steadily can increase their risks. And, enterprises will change the industrial mechanism, such as production methods and marketing strategy.

Rapid environmental deterioration around the world has led to the development of policies for reducing the negative impacts of production and consumption on the environment. A number of countries have introduced acts and laws for establishing the recycling principle of a circular economy. Germany is the forerunner in this as it started implementing CE in 1996. This was accompanied by the enactment of the law 'Closed Substance Cycle and Waste Management Act'. The law provides a framework for implementing closed cycle waste management and ensures environmentally compatible waste disposal and assimilative waste capacity. Another example of an attempt to start implementing CE is in Japan. The Government of Japan has developed a comprehensive legal framework for the country's move towards a recycling-based society (METI, 2004; Morioka et al., 2005). 'The Basic Law for Establishing a Recycling-Based Society', which came into force in 2002 provides quantitative targets for recycling and long-term dematerialization of Japanese society (Van Berkel et al., 2009).

In order to fulfill aims, firstly, this study will be a review of the rapidly growing literature on CE covering its concept and current practices as also assessing its implementation. Secondly, current CE practices are introduced and the standards for the assessment of its development and performance are discussed. Thirdly, based on an analysis of literature, business model will be suggested and challenges in an entrepreneurial perspective are analysed. Finally, the review provides a conclusion to CE's development and makes some policy suggestions for future improvements,

adaptations and further development as part of an entrepreneurial and innovative national level development strategy.

2. Circular economy

The circular economy becomes more widely understood and commonplace in business. Almost unanimously, survey respondents felt they clearly understood the concept, while more than half could provide examples of the circular economy in play. It also considers low demand and consumption, low emissions and high materials, water and energy use efficiency in production and maximizes uses of renewable resources as core characteristics. Reduction refers to minimizing inputs of primary energy and raw materials which can be achieved through improvements in production efficiency. Reuse suggests using byproducts and waste from one stage of the production in another stage. This includes the use of products to their maximum use capacity.

3. Benefit of circular economy

Eliminating waste from the industrial chain by reusing materials to the maximum extent possible promises production cost savings and less resource dependence. However, this report argues that the benefits of a circular economy are not merely operational but strategic, not just for industry but also for customers, and serve as sources of both efficiency and innovation.

Importantly, any increase in materials productivity is likely to have a positive impact on economic development beyond the effects of circularity on specific sectors.

Circularity as a ‘rethinking device’ has proved to be a powerful new frame, capable of sparking creative solutions and stimulating innovation.

The aspiration to replace one-way products with goods that are ‘circular by design’ and create reverse logistics networks and other systems to support the circular economy is a powerful spur to new ideas. Adopting more circular business models would bring significant benefits, including improved innovation across the economy [Figure 7]. It is already proving a vibrant terrain for entrepreneurs who target the benefits of an economy that operates with higher rates of technological development; improved materials, labour, and energy efficiency, and more profit opportunities for resource-productive companies.

The effects of a more circular industrial model on the structure and vitality of labour markets still needs to be explored. It seems likely that the effects will depend on the way these labour markets will be organized and regulated, and yet: there are signs that a circular economy might bring greater local employment, especially in entry-level and semi-skilled jobs, which would address a serious issue facing the economies of developed countries

The aspiration to replace one-way products with goods that are ‘circular by design’ and create reverse logistics networks and other systems to support the circular economy is a powerful spur to new ideas. Adopting more circular business models would bring significant benefits, including improved innovation across the economy. It is already proving a vibrant terrain for entrepreneurs who target the benefits of an economy that operates with higher rates of technological development; improved materials, labour, and energy efficiency, and more profit opportunities for resource-productive companies.

Economies will benefit from substantial net material savings, mitigation of volatility and supply risks, drivers for innovation and job creation, improved land productivity

and soil health, and long-term resilience of the economy.

4. Business model

Recently, some scholars have devoted a growing amount of attention to business model innovation (Teece, 2010; Najmaei, 2013). A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers (Teece, 2010). In short, a business model could be defined as the manner in which an enterprise creates and delivers value to customers, and then converts the payments that are received into profit (Björkdahl, 2009; Chesbrough, 2007; Zott and Amitt, 2010; Zott et al., 2011). No consensus exists yet regarding the definition, structure, and evolution of a business model. The manner in which firms create and capture value is a popular research topic. Each firm has its own business model, but no generally-accepted definition of the term ‘business model’ has yet emerged. Prior studies regarding business models fail to reach a consensus to define their components. The interest in business models is relatively recent, and Boudreau (2010) noted that early work to identify business models focused on capturing the revenue stream of web-based firms. No matter the sector, there are criteria that enable one to determine whether or not one has designed a good business model. Business models yield value propositions that are compelling to customers, achieve advantages in terms of the cost risk structures, and enable significant value to be captured by the business.

At the most rudimentary level, business models are defined in terms of a firm’s economic model (Morris et al., 2005). The business model concerns the logic of how

profit is generated by the firm. Steward and Zhao (2000) assert that the business model is a statement of how a firm will both make money and sustain its profit stream over time. Furthermore, the business model can be defined as an architectural configuration of the firm's survival. Slywotsky (1996) noted that a business model consists of the totality of how a company selects its customers, defines and differentiates its offerings, defines the task it will perform itself and those it will outsource, configures its resources, goes to market, creates utility for customers, and captures profits. A business model is related to a number of other managerial concepts, and it captures the key components of a business plan. The business model components consist of price, product, distribution, organizational characteristics, and market strategy (Horowitz, 1996; Timmers, 1998; Dubosson-Torbay et al., 2001; Hamel, 2001). What do we know about a business model? Prior studies are referenced in this study to define the business model of a company as a simplified representation of its business logic. Namely, a novel business model is crucial to maximize profits.

5. Methodology and conclusion

The goal of this study is to find business model innovation in the circular economy. To fulfill the goal, we search for numerous case studies including literature reviews. Fieldwork and field interviews were carried out to obtain raw data. When the targets were selected for the intensive interviews, a purposive sampling question was adopted in order to identify interviewees, including their individual characteristics. This method is particularly effective and appropriate for this type of qualitative research (Punch 1998). Before contacting the individuals in person, it was necessary to scrutinize the details of data released by secondary sources, such as turnover, brief history, and

CEO's creed and former achievements. In particular, the information released by newspaper was thoroughly examined before having an interview and academic journals and periodicals were also analyzed. In this paper, we also pursue the comparative study also. Innovative business models, especially changing from ownership to performance-based payment models, are instrumental in translating products designed for reuse into attractive value propositions. Sustainable development depends on private sector innovation. SMEs play a pivotal role in charting sustainable development paths both as drivers of innovation and because they are embedded in global supply chains which increasingly must meet sustainable development criteria.

Reference

- Abolhosseini, S. and A. Heshmati (2014). The Main Support Mechanisms to Finance Renewable Energy Development. *Renewable and Sustainable Energy Reviews* 40, 876-885.
- Allwood, J.M. (2014). Squaring the circular economy: The role of recycling within a hierarchy of material management strategies. *Handbook of Recycling*. Chapter 30, 445-477.
- Altvater, E. (2009). World Economy, the Financial Crisis, and Ecological Sustainability – a Trilemma. *Capitalism Nature Socialism* 10(4), 37-68.
- Pearce, D.W. and R.K. Turner (1990). Economics of natural resources and environment. Harvester Wheatsheaf, John Hopkins University

Discovering innovative potential of people in Russia

Abstract

There is one question, which the Russians often asks in response to the prominent achievements of Russian science, technology and innovation, demonstrated by Russian TV channels: «If we are so smart, why are we so poor?» Being the rhetorical one, the question reflects the very essence of the Russian innovation development. This is exclusion of people of Russia from innovation development of the state, from goals of innovation development, placed by the government, and from the results of innovative activity of the stakeholders of formal innovation system of Russia.

There are plenty of research papers and monographs devoted to innovation development of Russia. There are a few institutions, which work on this theme. National Research University Higher School of Economics (Gokhberg L., Kuznetsova T., Zaichenko, S., Meissner D.) and the Russian Presidential Academy of National Economy and Public Administration (Leonard C., Mau V.) are the most visible in terms of number of publications and expertise they provide for state bodies and agencies of innovation development in Russia. They stay mostly within innovation system framework (see Freeman 1987; Lundvall 1992, 2010; Nelson 1993) and investigate innovation system, innovation policy and economic development of Russia based on the evolutionist approach. Most of the publications cover the issues of innovation system configuration and transition from state planning system to effective national innovation system, but with government, industry and academia as main stakeholders. Theme of social inclusion in innovation development of Russia also appears in research focus of Russian scholars, but reflects general gap in its exploration at academic and expert levels. For example, Gokhberg et.al (2016) provides cases of 15 Russian universities and their impact on inclusive innovation in Russia. But understanding social inclusion is narrowed there to inclusion of disabled people in education process, or providing public awareness on science activity. It means all measures are mostly duplicated in these universities and have low impact on local society and society in general in terms of their real everyday problems and needs. Tomsk is a good example of this situation. Tomsk is a town in Siberia with 500,000 population and six universities, three of which are the platforms for promotion of 'social inclusion' through 'social innovation ideas' of students and young scholars. For all the years of this activity there were implemented not a single innovative solution for improving life of local society, as, for example, slippery surfaces of the town (it leads to around 4,000 injuries of Tomsk habitants for 3-4 months of winter yearly), or physical accessibility of most campuses of Tomsk universities for immobile people, etc. Society

and its real needs is a matter of nominal interest of innovation policy of the state. As soon as the state is all-pervasive and dominant actor of Russian innovation system, academia and industry perform activity for providing social inclusion in the same nominal way.

Main objective of this paper is mapping society in national innovation system of Russia, to identify its specifics and role in innovation development of the country, and perspectives of becoming innovative society.

Paper contains multi-dimensional analyses of inventive activity of Russian society from historical, cultural and political perspective. It identifies the segments of society (social groups and 'places' of innovative activity of people), which perform innovative activity nowadays in Russia, and provides insights on the prospects and limitations of innovative potential of Russian society.

References

Gokhberg, L., Poliakova, V., Zaichenko, S., Suslov, A. (2016) Universities as actors of inclusive development in Russia. In: *Rising Inequalities and Innovation for Inclusive Development: Challenges for Universities and Innovation Policies* (eds. C. Brundenius, B. Göransson, J. de Mello), Springer.

Freeman, C. (1987). *Technology Policy and Economic Performance: Lessons from Japan*. London, Pinter.

Lundvall, B. A°. (2010). *National systems of innovation towards a theory of innovation and interactive learning*, Anthem Press.

Lundvall, B. A. and B. Johnson (1994). "The Learning Economy." *Journal of Industry Studies* 1(2): 23-42.

Nelson, R. R. (1993). *National innovation systems: a comparative analysis*, Oxford University Press, USA.

Keywords: innovation by grassroots, innovative society, Russia.

Detention and Liberation, the Constant Slip

Related to Naming and its Consciousness,

Abstract

The human 'naming' consciousness has always existed for 'calling', and the semantics of naming is always a discourse based on the consciousness of 'social man'. Through language, humans recognize and communicate each other's existence, and move toward meaningful existence. However, because the language constantly slips, the signifier and the signified do not always coincide. In this sense, the meaning of human language can be said to be shared for the reproduction of meaning. The reason is that language is to express some thoughts but the use of language is not so permanent. Human language cannot avoid concepts but there is no concept in the crying sound of a bay bird.

Early on, Chuang-tzu said, "If there is anything, the thing does become 'that' and the thing does become 'this,' too." Explaining his mention, the meaning of 'that' is not revealed from its situation itself, but as you get any knowledge by 'this,' it can lead us to know 'that.' So, as he added that "'that' comes out of 'this' and 'this' too comes from 'that,'" this statement means that 'this and that' can be said to have come together. For example, if there is life, there is death, and if there is death, there is life. If there are things possible, there are things impossible, and if there are things impossible, there are things possible. When something is wrong, there is wrongness because there is rightness, and when something is right, there is rightness because there is wrongness.

In addition, along with Hui Shi, ancient Chinese philosopher in the Warring States Period, Gongsun Long representing the School of Names among schools of Chinese philosophy said that "if there is anything, it always points something." Gongsun also hinted that human perception is made not through things themselves but through and with the concepts of directing at them. When he discussed on his famous statement "the white horse is not a horse," he stands on the same contextual line. He makes it clear that two different kinds of concepts indicating color and shape are strictly in separation. There are not only white horses but also black horses and yellow horses, and the black horses and yellow horses are not included in white horses. Therefore, he claims that the 'white horse' can be only a 'white horse' and it is never a 'horse'. In other words, because there is a gap, wider or narrower, between the concepts of 'white horse' and 'horse,' it cannot be stated that 'the white horse is a horse.' Also, according to his view, if 'a horse' means something when various colors are subtracted from colored

horses, one of 'white horses' is of white hue added to uncolored horses. Therefore, it can be claimed that the white horse is only a white horse and not a horse. In other words, the general concept 'horse' and the particular concept 'white horse' cannot be equated.

Long Gongsun's 'White Horse dialogue 'the white horse is not a horse' is a figurative expression to emphasize that the relationship between concepts and objects is strictly classified on the bases of their different standards and layers. And this is not an expression of mere a sophistry, but also this has been a representation of political ethics that the name cannot be confused with the reality and that right politics can be realized by correcting the relationship between the two. Moreover, from a hybrid point of view, we can look at this related subject; that is, as "the positive as the concept referring color" and "the positive as the concept of the form" melted together, the term 'white horse' came into being.

Keywords: Hybrid, Chuang-tzu, Hui Shi, Gongsun Long, White horse dialogue

Acknowledgement: This work was supported by the DGIST R&D Program of the Ministry of Education, Science and Technology of Korea (17-IT-01, 17-FA-07).

A Study on the Interaction between Science & Technology and Society

- Perspective of strong artificial intelligence –

Abstract

It is a general view that science and technology and society are inseparable. However, how technology and society are influencing each other has been constantly controversial and has not been adequately discussed in more realistic and concrete cases (such as the viewpoint of artificial intelligence). This is because the artificial intelligence has had a considerable impact on our society in recent years. Until then, artificial intelligence technology was a weak artificial intelligence. This has become a concern for everyone, as artificial intelligence (AI) technology is mentioned as one of the key technologies that will lead the fourth industrial revolution.

It is time to think about what kind of influence science/technology/society will have and how we should look at artificial intelligence. The European Parliament has already acknowledged the legal status of the AI in order to prevent such problems beforehand. However, the academic community's efforts are far beyond that of the interest. Recent papers are mainly about simply predicting positive and negative changes in artificial intelligence (AI) technology. In this paper, we try to distinguish the viewpoints of interaction between science and technology and society, viewpoints of artificial intelligence through the analysis of previous researches, and propose a viewpoint to look at artificial intelligence. Through this, we will be able to draw the stage of artificial intelligence in future society.

Keywords: Artificial intelligence (AI), Fourth industrial revolution, Science and technology,

Acknowledgement: This work was supported by the DGIST R&D Program of the Ministry of Education, Science and Technology of Korea (17-IT-01, 17-FA-07).

Technology Convergence, Open Innovation and Dynamic Economy

Abstract

Purpose/ Research Question: What are main issues to overcome current low economic growth over the world?

Design/ Methodology/ Approach: Openness, Convergence, Creation of new market demand through new emerging technologies (IoT, Big data, AI etc.) maybe open to solve low economic growth. When they link to network, law of increasing return will come true.

(Expected) Findings/Results: As main issue of the 4th industrial revolution touched in the 2016 WEF are closely related, enlargement of Open innovation and Convergence will lead to new dynamic economy and sustainable development.

Research limitations/ Implications: To solve low economic growth encountered in the developed economies, three words such as open innovation, convergence and dynamic economy are the key engine.

Keywords: Openness, Convergence, Creation of new market demand

Blockchain Government

Abstract

Purpose/ Research Question:

Today, over than hundred blockchain projects aiming to innovate the government system are being conducted in more than thirty countries. What make the countries to jump into the blockchain projects? What's the relationship between government and blockchain?

Key Literature Reviews (About 3~5 papers):

- 1) Don Tapscott·Alex Tapscott, 《Blockchain Revolution》, Penguin Random House UK, 2016,
- 2) Mark Walfort, 《Distributed Ledger Technology: beyond block chain》, A report by the UK Government Chief Scientific Adviser, 2015
- 3) Julie Maupin, "The G20 Countries Should Engage with Blockchain Technologies to Build an Inclusive, Transparent, and Accountable Digital Economy for All", <2017 G20 Summit>, March 25, 2017

Design/ Methodology/ Approach:

First, I reviewed the projects led by governments globally.

Second, I introduced theoretical resources which can explain the inner factors of the relationship between blockchain and government.

Third, I clarify the essence of the characteristics of government that adopt blockchain technology.

(Expected) Findings/Results:

The reason governments around the world are going to embrace blockchain technology is because blockchain is a technology directly related to the social organization. Unlike other technology, there lies the consensus mechanism in the core of blockchain. Traditionally consensus is not belongs to machine but to mankind, however blockchain works on consensus algorithm with human intervention. And once the consensus made, it cannot be modified or forged. Following Laurence Lessig who suggested the proposition 'Code is law', I suggest that blockchain makes 'absolute law' that cannot be violated. This characteristic of blockchain makes it possible to implement social technology that can replace exiting social apparatus including bureaucracy. In addition there are close resemblances between blockchain and bureaucracy. First, both of them are defined by the rules and execute pre-determined rules. Second, both of them works as information processing machine of the society. Third, both of them work as trust machine of the society. So I think it is possible to replace bureaucracy with blockchain system and moreover it is unavoidable. In conclusion, I suggest 5 principles that should be adhered

when we replace bureaucracy with blockchain system. 1) Introducing Blockchain statute law. 2) Transparent disclosure of data and source code, 3) Implementing autonomous executing administration 4) Building a governance system based on direct democracy. 5) Making Distributed Autonomous Government (DAG).

Research limitations/ Implications:

The discourses of blockchain today is somewhat contained technical perspective, but this article reveal the social and political aspect of blockchain technology, so this article is expected to help not only understanding the blockchain technology but also to guide how we can harness the potential of blockchain technology to innovate the government and society.

Keywords:

Blockchain, Government, Smart Contracts, bureaucracy, Blockchain statute law, Distributed Autonomous Government