2019

국제지역학회 동계학술대회

뉴 노말 시대의 통상정책과 국제개발 협력

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장소 이화여자대학교 ECC관

사단법인 국제지역학회
The International Association of Area Studies

International Trade Openness, Resource Abundance and Economic Growth Nexus: A Panel Data Analysis of Resource-Intensive Countries

Samuel Bachunge
(Kyung Hee University)

International Trade Openness, Resource Abundance and Economic Growth Nexus: A Panel Data Analysis of Resource-Intensive Countries

Samuel Bachunge

Graduate School of Pan-Pacific International Studies

Kyung Hee University

Yongin, Republic of Korea

OUTLINE

I. THEORETICAL BACKGROUND

Trade and Economic Growth Theories	
Classical scholars	- Adam Smith (A. A) -Ricardian Model (C.A)
Neo-classical scholars	-Heckscher-Ohlin (H-O) (C.A) -Leontief's paradox -Stolper Samuelson (C.A) -Rybcynski theorem (C.A) -Paul Krugman: (NTT) -Solow's Exogeneous Growth model -Romer, Lucas, Weil, Mankwiw: Endogeneous Growth Model

Resource Abundance and Growth Interplay	
Raul Presbish Hans Singer D. Meier and D. Seers,	Export pessimism theories
Corden and Neary	-"Dutch disease" theory -TOT volatility Analysis
Sachs and Warner	-Resource Curse theory (paradox of plenty)

I. THEORETICAL BACKGROUND

Trade Openness and Economic Growth

- Findings from theoretical models and empirical studies have led to non-homogeneous or even non-convergent conclusions in the relationship between trade and growth.
- No definitive and unequivocal proof that trade openness always causes a country's economy to grow faster or always has a positive influence on a country's economic growth.

Resource Abundance and Economic Growth

- Resource-intensive countries tend to grow more slowly than resource-scarce countries.
- Natural resource abundance and economic growth link poses a conceptual puzzle and remains a paradox to date: Resource curse phenomenon or paradox of plenty.

II.RESEARCH DESIGN

A. Objective

- Given the controversy on international trade-economic growth nexus and natural resource abundance-economic growth nexus; this paper tests an economic growth model on 47 resource-intensive countries on the basis of the fundamental principle of comparative advantage.

B. Key Questions

- This research tries to identify what type of association exist between trade openness and economic growth, and between resource abundance and economic growth of resource-rich countries as a group after controlling for a certain number of factors and explains why.

II. RESEARCH DESIGN

C. Hypotheses

- Hypothesis 1: International trade openness and resource abundance could be the main determinants of resource-rich countries' economic growth.

- Hypothesis 2: Resource-abundance would not guarantee higher economic growth in resource-abundant countries. It will depend on the degree of trade openness, human capital (skilled, educated or trained workers, health conditions), macroeconomic stability, industrial development, institutional quality, and investments in infrastructures.

II.RESEARCH DESIGN

D. Contribution

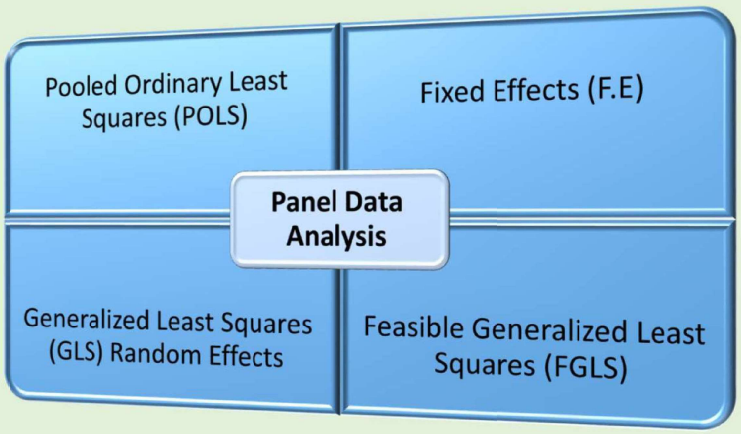
- Extension of previous methodologies by using the FGLS estimator, analyzing more recent data and examining whether the conclusion from existing studies are robust or fragile to the integration of more control variables;
- Gap filling by analyzing a particular setting of resource-rich countries;
- Lessons learnt for developing resource-intensive countries.

II. RESEARCH DESIGN

E. Methodology- Data- Variables- Estimation Methods-Equations

a. Data base	47 countries and 10,012 observations
b. Time period	Non-overlapping five-year intervals from 1987 to 2017

c. Estimation Methods:



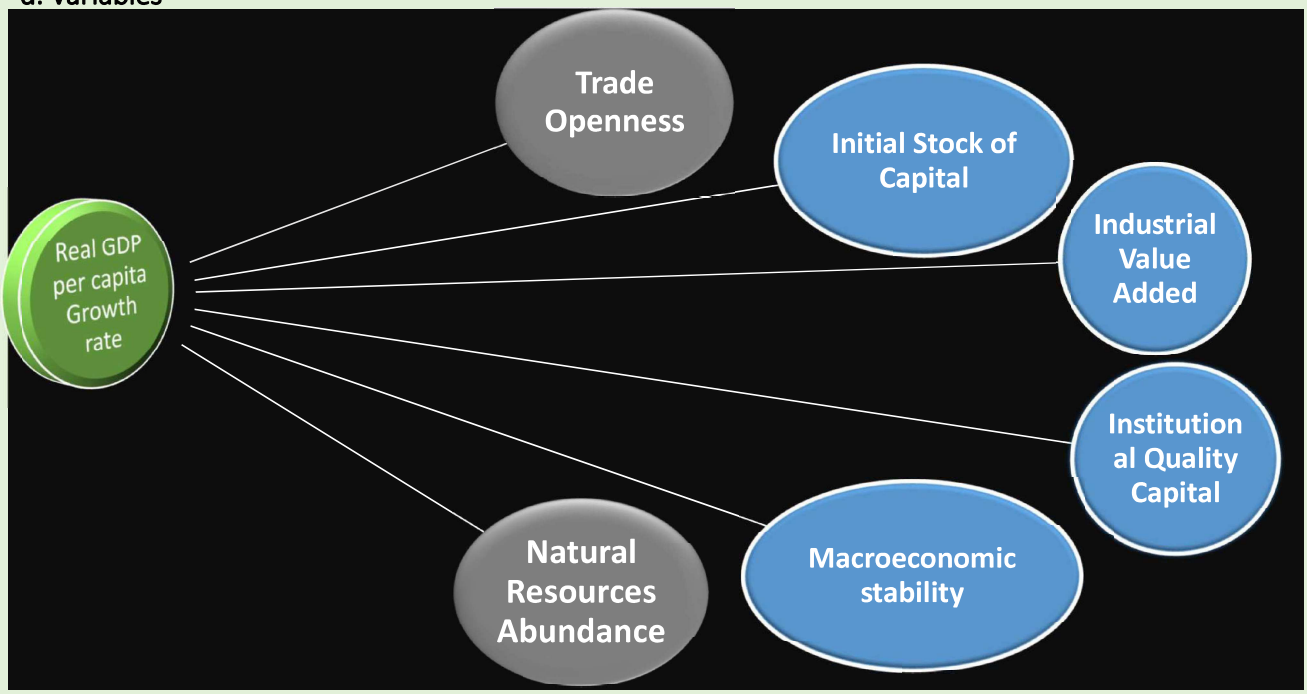
II. RESEARCH DESIGN

d. Variables

Variables	Notation	Definition	Source
Real GDP per capita Growth	GDPc	Annual growth rate of GDP per capita based on constant 2010 U.S. dollars. Real GDP per capita is gross domestic product adjusted for inflation, divided by midyear population..	World Bank (WDI)
Initial GDP per capita	$(GDPc)_{i,t-1}$	Initial real GDP per capita (initial stock of capital)	World Bank (WDI)
Trade Openness	TradOp	(Export+Import)/GDP	World Bank (WDI)
Trade Openness and Initial GDP per capita Interaction	$TraOp*(GDPc)_{i,t-1}$	(Export+Import)/ GDP and Initial GDP per capita	World Bank (WDI)
Natural Resources Abundance	ResAb	Total natural resources rents (% of GDP): the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents	World Bank (WDI)
Natural Resources Abundance and Institutional Quality Capital Interaction	ResAb*InstQual	Total natural resources rents (% of GDP) and Institutional Quality Capital	World Bank (WDI)
Human Capital	HumCap	Percentage of population aged 15 and over enrolled in secondary level education (regardless of completion status)	World Bank (WDI)
Physical Capital	GFCF	Gross Fixed Capital Formation (GFCF) (GFCF/GDP*100)	World Bank (WDI)
Institutional Quality Capital	InstQual	Index of Physical Property Rights, Intellectual Property Rights, and the Legal and Political Environment	Heritage Foundation
Industrial Value Added	Ind	Industry, value added (% of GDP) Industrial share of GDP that comprises value added in mining, manufacturing, construction, electricity and gaz	World Bank (WDI)
Macroeconomic stability	Infl	Inflation rate	World Bank and IMF

II. RESEARCH DESIGN

d. Variables



II. RESEARCH DESIGN

e. Equation

- $\Delta \ln(\mathrm{GDPc})_{it} = \boldsymbol{\beta_{0,i}} + \boldsymbol{\beta_{1,i}} \ln(\mathbf{GDPc})_{i,t-1} + \boldsymbol{\beta_{2,i}} \ln \boldsymbol{TraOp_{i,t}} + \boldsymbol{\beta_{3,i}} \ln \boldsymbol{ResAb_{i,t}} + \boldsymbol{\beta_{4,i}} \ln \boldsymbol{InstQual_{i,t}} + \boldsymbol{\beta_{5,i}} \boldsymbol{Infla_{i,t}} + \boldsymbol{\beta_{6,i}} \ln \boldsymbol{Indu_{i,t}} + \boldsymbol{\lambda i} + + \boldsymbol{\varepsilon_{it}}$

III. EMPIRICAL ANALYSIS

Trade Openness Index and Economic Growth Distribution across 47 countries, 1987-2017

Resource Rent Index and Economic Growth Distribution across 47 countries, 1987-2017

III. EMPIRICAL ANALYSIS

B . Regressions and Findings Discussion

Regressions (POLS, FE, RE and FGLS) Results

	(F.E)	(R.E GLS)	(FGLS)
	lnGDPc_it	lnGDPc_it	lnGDPc_it
$ln\ (GDPc)_{i,t-1}$	0.0787***	0.0784***	0.07769***
	(0.0177)	(0.0646)	(0.0112)
$ln\ TraOp$	0.006231***	0.006971***	0.08751***
	(0.0457)	(0.0450)	(0.0423)
ln $ResAb$	-0.16129*	-0.15132*	-0.22179*
	(0.0633)	(0.0625)	(0.0516)
ln $InstQual$	0.0408	0.0399	0.06656
	(0.152)	(0.151)	(0.0134)
$ln\ Indu$	0.210***	0.237***	0.58729**
	(0.00500)	(0.00490)	(0.00456)
$ln\ Infla$	-0.0504***	-0.0500*	-0.02275**
	(0.00732)	(0.00733)	(0.00161)
N	725	725	725
R^2	0.337	0.393	0.584

IV. CONCLUDING REMARKS

Major Findings	Recommendations for resource-intensive developing countries
On average, Increase in trade shares and industrial value added are associated with possible higher growth rates	1. Policies that favor openness to international trade and mostly imports of intermediate and capital goods to support industrial development.

IV. CONCLUDING REMARKS

Major Findings	Recommendations for resource-intensive developing countries
On average higher exports of natural resources or increase in resources rents are associated with lower annual growth rates of real GDP per capita Most of energy and mineral natural resources are exhaustible, pose real challenges with regard to revenue management or some risks such as the "Dutch disease" and civil wars, among others	2. Building up diversified and resilient economies by developing a growth path outside the resource sector both in the level and composition of non-resource exports. 3. Engaging in industrial development (construction of mining and mineral industries in petroleum refining, copper; cobalt transformation or steel making) to create backward and forward linkages.

IV. CONCLUDING REMARKS

Major Findings	Recommendations for resource-intensive developing countries
Higher exports of natural resources or increase in resources rents are associated with lower annual growth rates of GDP per capita Most of energy and minerals natural resources are exhaustible, pose real challenges with regard to revenue management or some risks such as the "Dutch disease" and civil wars, among others	4. Efficient use of strategies and reforms to enhance the quality of economic management, transparency, accountability and political governance, such as the Extractive Industries Transparency Initiative (EITI) 5. Constitution of a sovereign wealth fund and adhesion to the International Forum of Sovereign Wealth Funds (IFSWF) in order to pursue multiple objectives, for example, short-term and long-term macroeconomic stabilization, resource curse mitigation, revenue volatility minimization, "Dutch disease" prevention

IV. CONCLUDING REMARKS

Major Findings	Recommendations for resource-intensive developing countries
Higher exports of natural resources or increase in resources rents are associated with lower annual growth rates of GDP per capita	6. Use of legal regulations to require multinational firms exploiting natural resources to closely work with some domestic firms in order to transmit them technologies and know-how, and lift their capability and potential to compete in international markets over time.
Most of energy and minerals natural resources are exhaustible, pose real challenges with regard to revenue management or some risks such as the "Dutch disease" and civil wars, among others	7. Policies oriented toward economic development and inclusive growth to address poverty issue and narrow wealth inequalities, both issues are major source of frustration and civil wars in resource-abundant countries.

Thank you

Impact of Technology Transfer Channels on Economic Growth of the Kyrgyz Republic

Zhamilia Arnakunova
(Kyung Hee University)

Thesis for the Degree of Master of Art in Industry and Trade Policy

Impact of Technology Transfer Channels on Economic Growth of the Kyrgyz Republic

Prepared by
Zhamilia ARNAKUNOVA
Supervised by
Professor Jun Yeup KIM

Graduate School of Pan-Pacific International Studies
Kyung Hee University
Yongin, Republic of Korea
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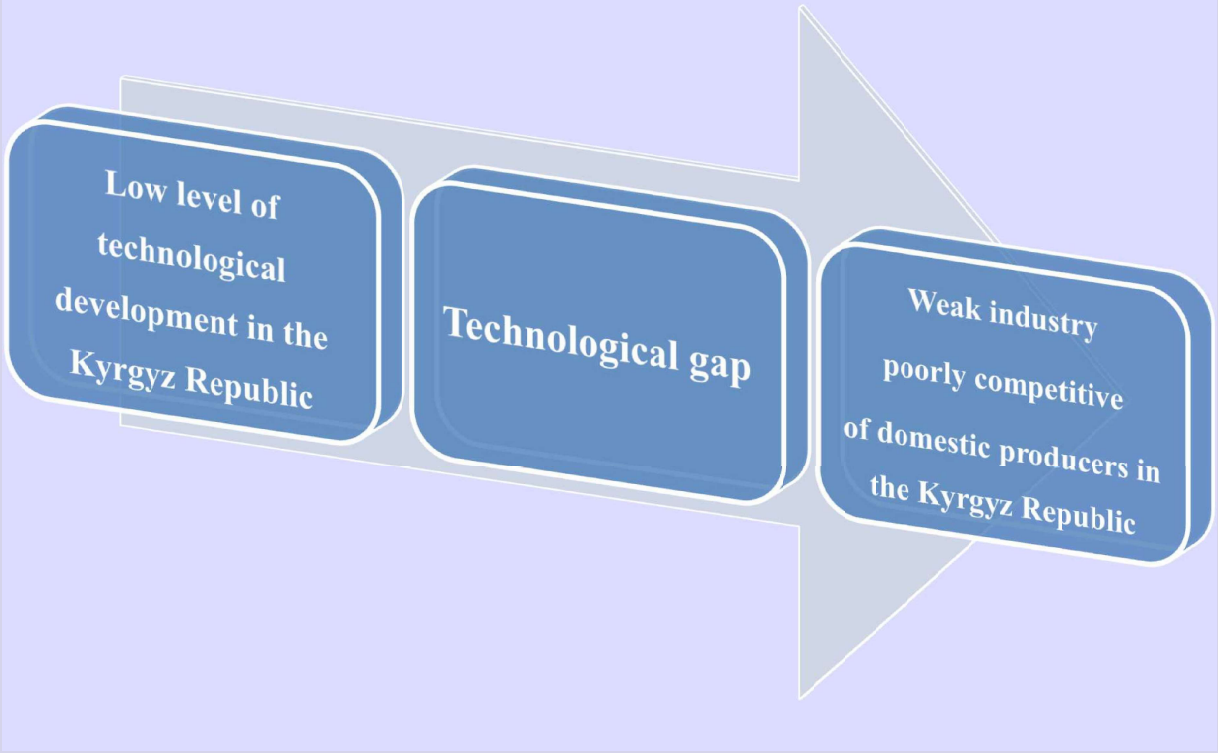
Content

Motivation

Why ITT channels in the Kyrgyz Republic?



Conceptual Framework

- Crispolti and Marconi (2005)
- Ben and Wei (2011)
- Ghazouani and Teraoui (2014)
- Osano and Koine (2016)
- Awosusi and Awolusi (2014)
- Fotros and Ahmadvand (2017)

Contribution

Academic gaps	Contribution
Limited literature on the topic "Impact of ITT channels in the Kyrgyz Republic"	❑ Fill the gap in the empirical literature on the study of this topic ❑ The first research work on this object of study in the Kyrgyz Republic ❑ Recommendations for the effective integration of imported technologies in the economy of the Kyrgyz Republic
Examine impact of ITT channels through FDI and import t on the economic growth of the Kyrgyz Republic using **multiple regression analysis and correlation analysis**	**Highlight empirically:** 1. The main channel of ITT in the Kyrgyz Republic 2. Impact of ITT channels on economic growth of the Kyrgyz Republic

Methodology

- ➢ Model: Ordinary Least Squares
- ➢ Secondary Quantitative Analysis
- ➢ Data period: 1993-2017

✓ Multiple Regression Analysis

$$\boldsymbol{lnY = \alpha + \beta_1 lnFDI + \beta_2 lnIMP + \varepsilon}$$

(multicollinearity; heteroscedasticity; normality)

✓ Correlation of two variables (Gross Industrial Product and Import)

✓ Measurement for technology transfer

- $Integration\ of\ Technology\ Index = \frac{growth\ of GIP}{growth\ of\ IMT}$
- $Imported\ \ Technology\ as\ \%\ of\ \ GIP = \frac{Machinery\&\ Equipment * Value\ of\ MI}{GIP * Value\ of\ GDP} * 100$

Variable selections

S/N	Variable	Author	Data source
Multiple Regression Analysis			
1	Gross Domestic Product	Crispolti and Marconi 2005; Acharya and Keller 2007; Ghazouani and Teraoui 2014; Ben and Wei 2011; Awosusi and Awolusi 2014; Fotros and Ahmadvand (2017); Adeel Abid, Parveen and Iqbal (2018)	World Bank, National Statistic Committee of the Kyrgyz Republic, National Bank of the Kyrgyz Republic.
2	Foreign Direct investment		
3	Merchandise Import		
Correlations between GIP and MIT as a Percentage of GIP			
1	**Gross Industrial Product** (total output of manufacturing, industry, construction)	Jafarieh (2001)	World Bank, National Statistic Committee of the Kyrgyz Republic, National Bank of the Kyrgyz Republic.
2	**Import of technology** (manufacturing imports, ICT goods import, computer and communication imports)		

Major Findings

LnGDP	Coef.	Std.err	t	P>t	[95% Conf.	Interval]
LnFDI	**.0087062**	.0384016	0.23	**0.823**	**-**.0709338	.0883462
LnIMP	**.6184939**	.0643867	9.61	**0.000**	.484964	.7520239
_cons	8.605505	.8953578	9.61	0.000	6.748646	10.46236

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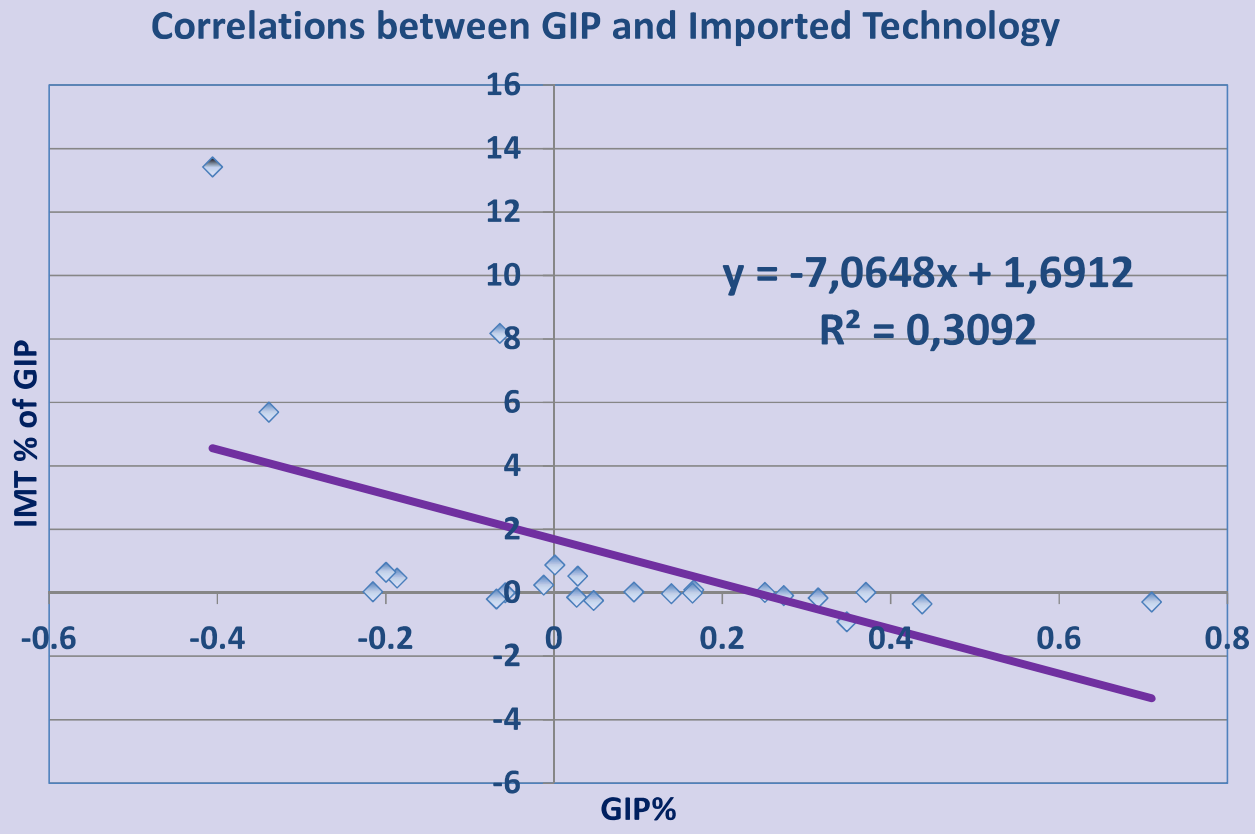

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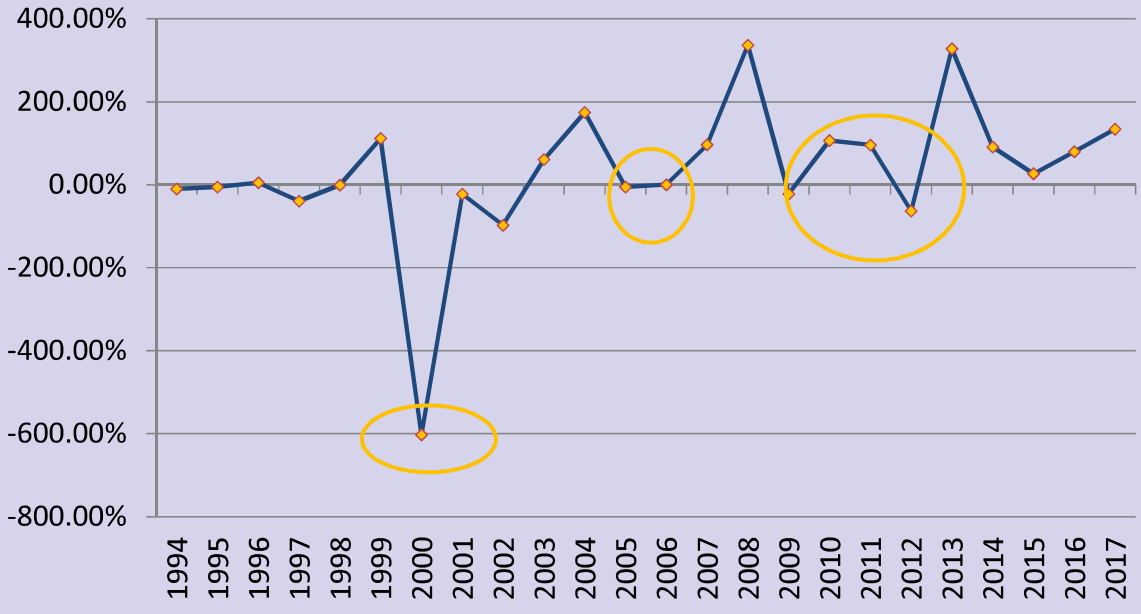

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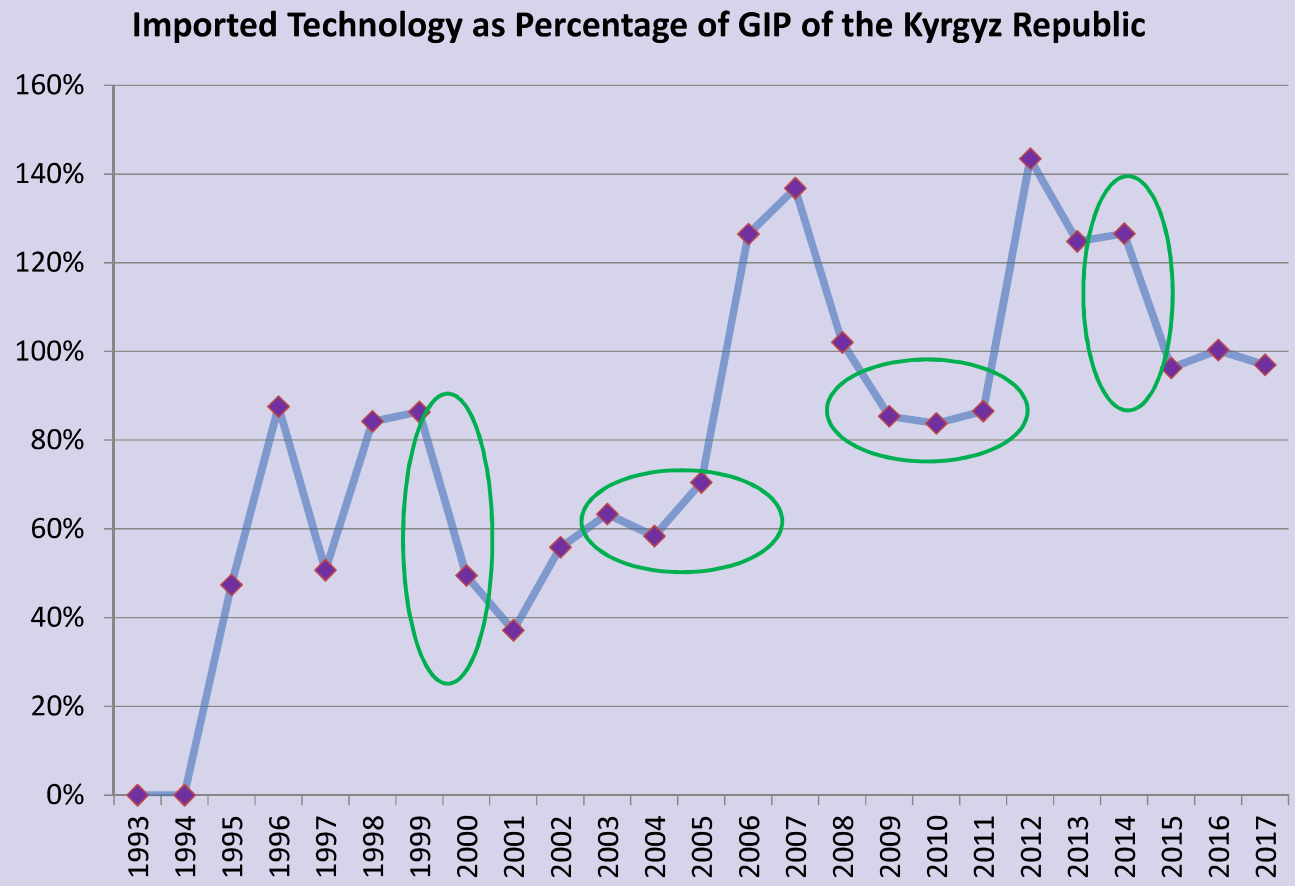


Conclusion and Recommendation

Major Finding	Recommendations
Import is the main channel of technology transfer in Kyrgyz Republic (Crispolti and Marconi 2005; Osano and Koine 2016; Fotros and Ahmadvand 2017)	▪ To diversify FDI structure in the economy of the Kyrgyz Republic (Awosusi and Awolusi 2014) ▪ To invest in the R&D (Awosusi and Awolusi 2014) ▪ To develop a policy for the cooperation of national R&D, universities and firms
FDI, as a ITT channel, is associated positively, but does not influence significantly on economic growth (Shahbaz and Rahman 2012; Awosusi and Awolusi 2014; Hunjra et.al. 2014; Ghazouani and Teraoui 2014)	
Weak correlation between the imports of technology and GIP (Jafarieh 2001)	• To increase the level of the technological management at firm level for the effective integration of foreign technologies ▪ To import technologies by technological level of firms . (Ben and Wei 2011; Lai, Wang, and Zhu 2009) ▪ To develop internal R & D policy (Ghazouani and Teraoui 2014)


"THANK
YOU"

Effects of Product Certification on Importer Trade Across Borders: The Case Study of the Philippines

Michelle Esteban
(Kyung Hee University)

Effects of Product Certification on Importer Trade Across Borders: The Case Study of the Philippines

Michelle Esteban
Kyung Hee University

November 30, 2019

Outline

Introduction
Review of Related Literature
Methodology
Results
Conclusion & Recommendations

Introduction

Product Selection: Electrical and Electronics

ISO	certificates in manufacturing	64%
ASEAN	exports share (2012-2017)	43%- 67%
	export value (2019)	56.7%
PHL	growth rate (2019)	45%

Effects of product certification on importers trading across borders?

Ease of Doing Business: Trading Across Borders

- common parameters with product certification
- time, cost and documentary requirements

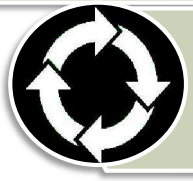
(Miller 1998)

1970 regulatory compliance → **1980** self certification for identity → **1990** globalization "trade weapon"

voluntary → mandatory

conformance evaluation

ASEAN harmonization to minimize TBT, safeguard



different schemes process

Conceptual Framework

Government[9]
+ developed countries
o+ implementation
o+ institution

Importers?
Developing country?
Time, cost, docs.?

Exporters[8]
+ standards
+ requirements
+ export growth
+ market share

Producers[7]
+ organization
+ technology
o+ perception
+ education
o- investment in innovation
+ cost
+ standards
+ corruption
± innovation efficiency
+ export performance

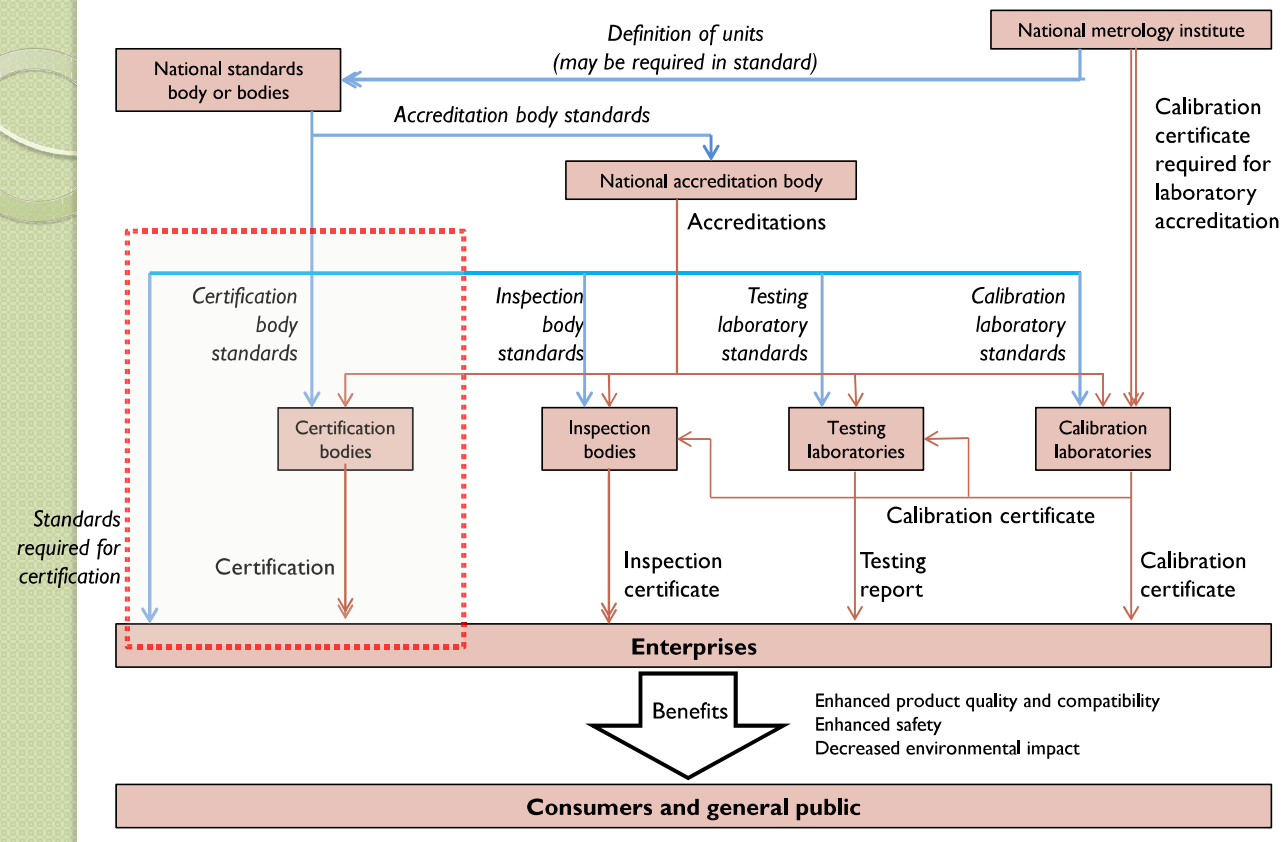
Certification

Consumers [6]
+ choice
+ status
+ education
o+ information
o advertising

Market Sellers [6]
+ price
± innovation
+ standards
- trade barriers
+ decreased cost
+ economic growth
+ requirements

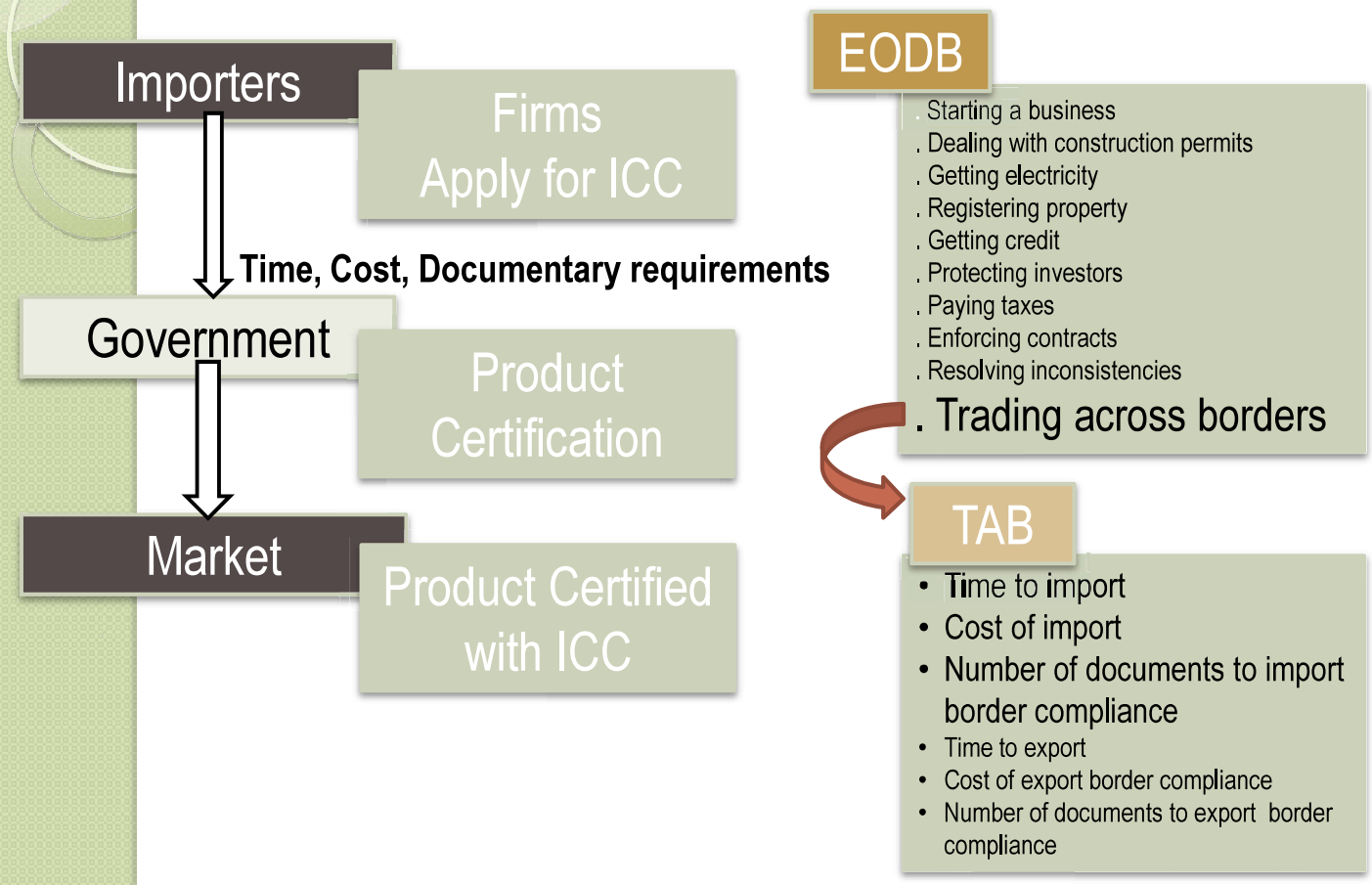
Sources:
[6](Blind et. al. 2015, Dimara and Skuras 2001, Giovanetti and Cleto 2018, Houde 2018, Latouche and Chevassus-Lozza 2015, Jang et.al. 2014, Lee and Shin 2013, Plummer 2011, and Stevens et.al. 1998);etc.
[7](Fentisov 2007, Marde 2015), regulatory institution (Berliner and Prakash 2014, Panuov 2016, Rodriguez-Arnaldo and Martinez-Lorente 2014, and Spasojevic-Brkic, et.al. 2015) ;etc.
[8](Panuov 2016, Pekovic and Rolland 2016, Spasojevic-Brkic et. al. 2015, Sun and Ouyang 2014); etc.
[9](Paunov 2016, Rodriguez-Arnaldo, and Martinez-Lorente 2014) etc.

Figure 1. Schematic Representation of National Quality Infrastructure



Note: Figure 1. Schematic Representation in National Quality Infrastructure as described by author consist of many other stakeholders
Source: Guasch, et.al 2007

Standards and definitions
Conformity assessment process

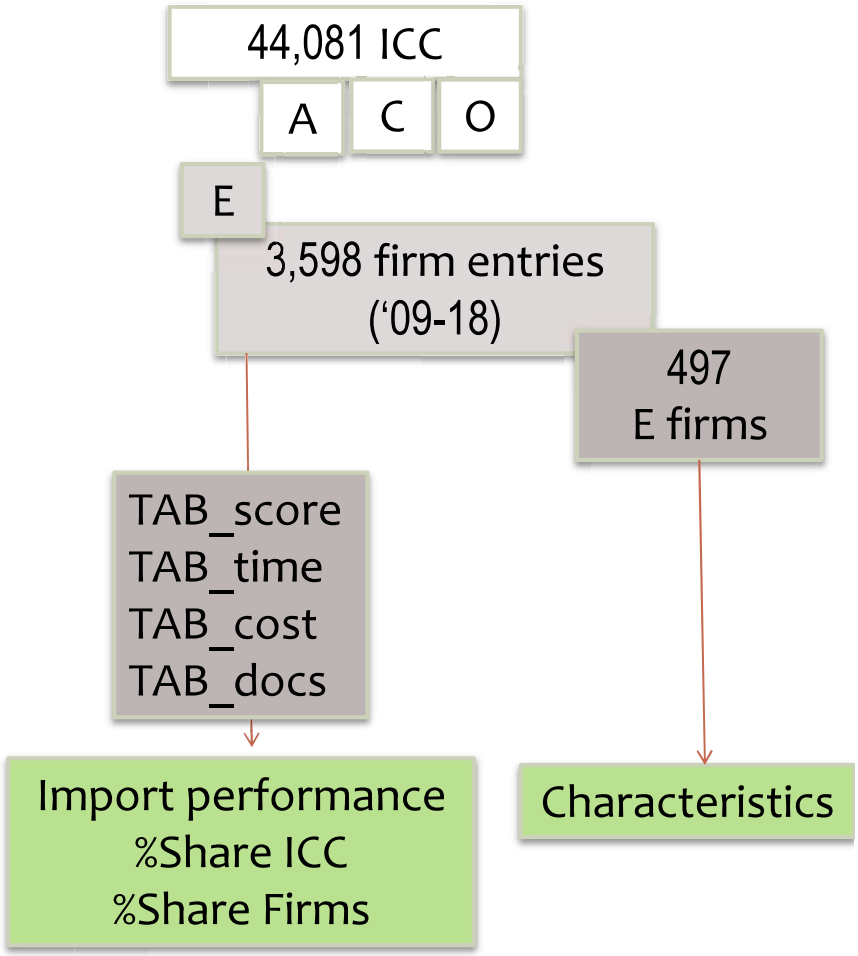


Methodology

Certification type:
mandatory, ICC
(batch certification)

Sources:
World Bank, DTI,
PSA, ASEAN

Analysis:
semi-structured survey,
interview
time series analysis
Pearson's correlation
bivariate regression



Major Findings

Table 3.2 Number of Firms Data Entries per Year (2009 – 2018)

Year	N_f	A	%	C	%	E	%	O	%
2009	259	48	*19*	94	*36*	97	*37*	20	*8*
2010	155	149	*96*	93	*60*	129	*83*	10	*6*
2011	326	307	*94*	219	*67*	272	*83*	25	*8*
2012	326	304	*93*	184	*56*	268	*82*	47	*14*
2013	330	299	*91*	177	*54*	260	*79*	66	*20*
2014	313	282	*90*	164	*52*	240	*77*	42	*13*
2015	503	469	*93*	330	*66*	416	*83*	11	*2*
2016	485	449	*93*	246	*51*	373	*77*	35	*7*
2017	511	478	*94*	257	*50*	392	*77*	7	*1*
2018*	390	360	*92*	169	*43*	291	*75*	35	*9*

Note: *Only January to June of 2018 has an available data based on publicly available source. One firm count per year, if same firm appears on second year, another count for that firm is tabulated to calculate % distribution of firms on per year basis.
Source: (BPS 2019)

Table 3.1 Number of ICC Data Entries per Year (2009 – 2018)

Year	N_i	A	%	C	%	E	%	O	%
2009	2416	596	25	950	39	805	33	65	3
2010	962	155	16	312	32	472	49	23	2
2011	~~4254~~	~~590~~	~~14~~	~~1642~~	~~39~~	~~1614~~	38	408	10
2012	4193	435	10	1566	37	1878	45	314	7
2013	4321	453	10	1671	39	1686	39	511	12
2014	~~4385~~	~~582~~	~~13~~	~~1893~~	~~43~~	~~1588~~	36	322	7
2015	~~6761~~	~~1515~~	~~22~~	~~1813~~	~~27~~	~~3035~~	45	398	6
2016	~~6493~~	~~1481~~	~~23~~	~~697~~	~~11~~	~~3942~~	61	373	6
2017	6498	569	9	877	13	3753	58	1299	20
2018*	~~3797~~	~~735~~	~~19~~	~~507~~	~~13~~	~~2085~~	55	470	12

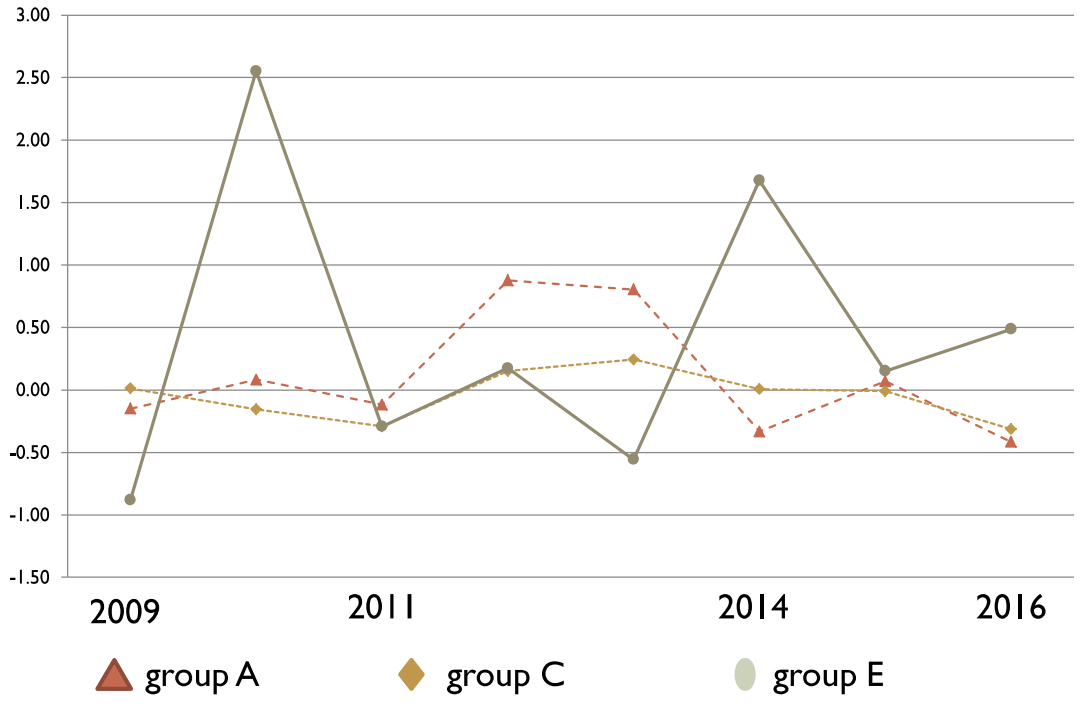
Note: *Only January to June of 2018 has available data based on publicly available source. Number of ICC per year represents % share of ICC imports, N_i. A,C and E mostly follow BPS groupings while group O also includes LPG, monobloc chairs, lighter, fire extinguisher, brake fluid, helmet and visors. The certificate of exemptions ware not accounted.
Source: (BPS 2019)

Correlations and Regression Matrix Analysis

Table E.1 Correlations and Regression Results of Product Groups

Variables Dependent:	Para-meter	TAB_score X (09-18)	TAB_score (10-15)	Tab_time (09-18)	Tab_time (10-15)	Tab_cost (09-18)	Tab_cost (10-15)	Tab_docs X (09-18)	Tab_docs (10-15)
EODB_score (2010-2015)	P	X	0.514	X	-0.308	X	0.438	X	-0.515
	S	X	0.297	X	0.552	X	0.386	X	0.296
TAB_score	P	N/A		0.576	-0.961	0.323	-0.864	X	- 0.927**
	S			0.082	0.002	0.362	0.026	X	0.008
	R^2	N/A		0.331	0.924	0.104	0.747	X	0.859
	Std.E			2.499	0.465	2.892	0.003	X	0.008
E: % N_1	P	-0.756*	-0.821*	-0.760*	0.803	-0.636	0.822*	X	0.687
	S	0.011	0.045	0.011	0.054	0.066	0.045	X	0.139
	R^2	0.074	0.727	0.067	0.645	0.140	0.675	X	0.459
	Std.E	14.077	4.178	14.131	3.370	13.564	3.225	X	4.159
% N_4	P	0.272	-0.631	-0.259	0.513	0.375	0 .885*	X	0.350
	S	0.447	0.179	0.470	0.298	0.286	0.19	X	0.496
	R^2	0.074	0.399	0.067	0.263	0.140	0.783	X	0.123
	Std.E	14.077	2.222	14.131	0.459	13.564	1.335	X	2.683
A: % N_1	P	-0.401	-0.485	0.149	0.612	0.363	0.720	X	0.200
	S	0.251	0.329	0.680	0.196	0.303	0.107	X	0.704
% N_4	P	0.134	-0.871	-0.417	0.727	-0.528	0.889*	X	0.726
	S	0.712	0.024	0.230	0.102	0.117	0.018	X	0.102
C: % N_1	P	0.875**	0.646	0.796	-0.860*	0.582	-0.729	X	-0.356
	S	0.002	0.166	0.006	0.028	0.077	0.101	X	0.489
% N_4	P	0.527	-0.348	0.238	-0.324	0.183	0.733	X	0.065
	S	0.117	0.452	0.509	0.531	0.613	0.097	X	0.903

Figure 4.2.1 (N_2) New firms rate (growth rate) applying for ICC (2009 – 2018)



Firm Characteristics Group E

Number of years	Shifts (S)	With gap (G)	Both (B)	Fixed (F)
7 to 10	8	6	2	Importing 41
	0	0	0	Not importing 4
5 to 6	8	1	2	4
	1	3	0	11
3 to 4	11	4	2	41
	2	0	1	10
1 to 2	5	2	3	Importing 96
	7	10	1	Not importing 210
Count	43	26	11	417

Interview Results

Cost

Depends on import value
Depends on type
Cheaper electrical imports
Low labor cost

Documents

Docs. requirements varies
Certification type varies

Time

Time varies on type
Faster on-line application

Other observations

10+ yrs. importer
Import frequency depends on season
Lacks information
Promotes competitiveness

Conclusion

	Possible Implications
(++) Cost of importation $\%N_i$ (6 & 10yrs period) $\%N_f$ (10 yrs period) **(-) Time** of importation $\%N_i$ (10 yrs period) **Import and exit behavior** firms 1-2 yrs and fixed product import 7-10 yrs **Flexible technical regulation**	• Incentives in frequent importation (competitiveness) • High demand, technological advancement (innovation) • Company certification strategies (efficiency) • Short period import substitution effect • Import surge (TBT) • Regulation have varied effects to products and importers (choice)

Conclusion con'd…

(o) Documents Other observations were found statistically insignificant.	• policy review on mandatory and optional document requirements
(-)TAB_score (6 & 10yrs period)	• reduced cost and time may ease up and increase import of product but does not necessarily increase importers

(++) stong positive; (-) moderately negative; (o) not significant

Recommendation

Further research on the following:

- The effects of increase in number of **certification bodies** versus **import or export performance** and compared with other countries.
- The impact of **promotion** versus firm performance.
- ICC on **importers of other industry**
- Comparative analysis on **other certification types**
- Certification and **development of standards** in other countries
- The effects of **technological advancement**
- The level of **technical training** in the system of certification and impact on the quality of service of CABs

THANK YOU!

The Impact of Product Certification on Operational and Business Performance in Small Medium Enterprises

Mohammad Addi Fanhas
(Kyung Hee University)

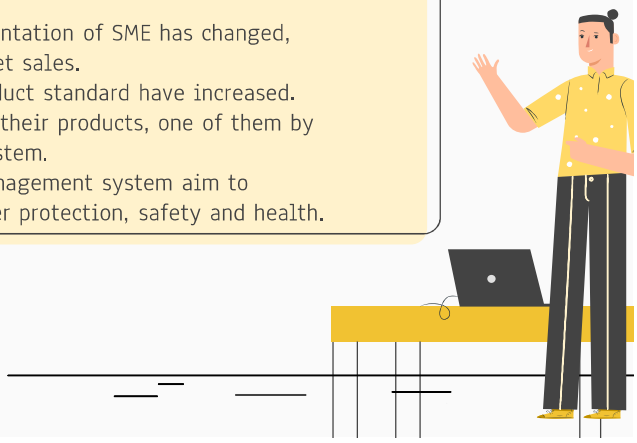
The Impact of Product Certification on Operational and Business Performance in Small Medium Enterprises – A Case Study of Indonesia

Supervised by : Prof. Jun Yeup Kim
Prepared by : Mohammad Addi Fanhas

CONTENTS

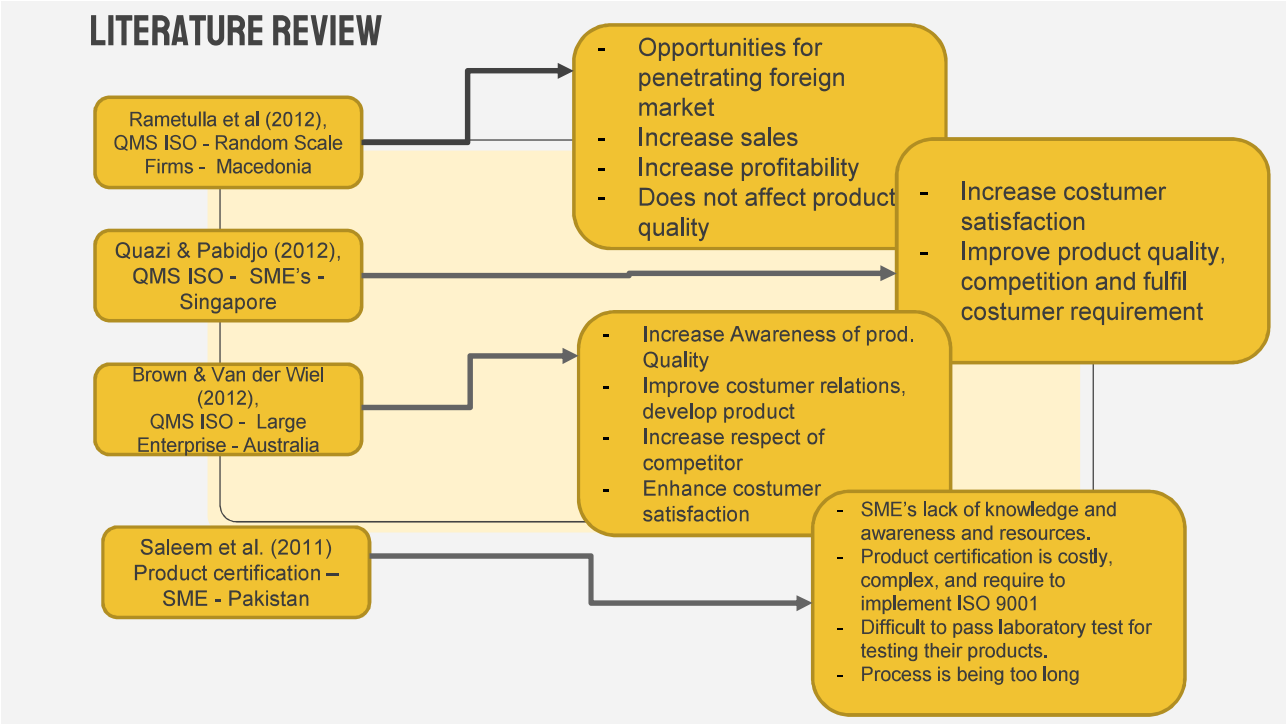
INTRODUCTION

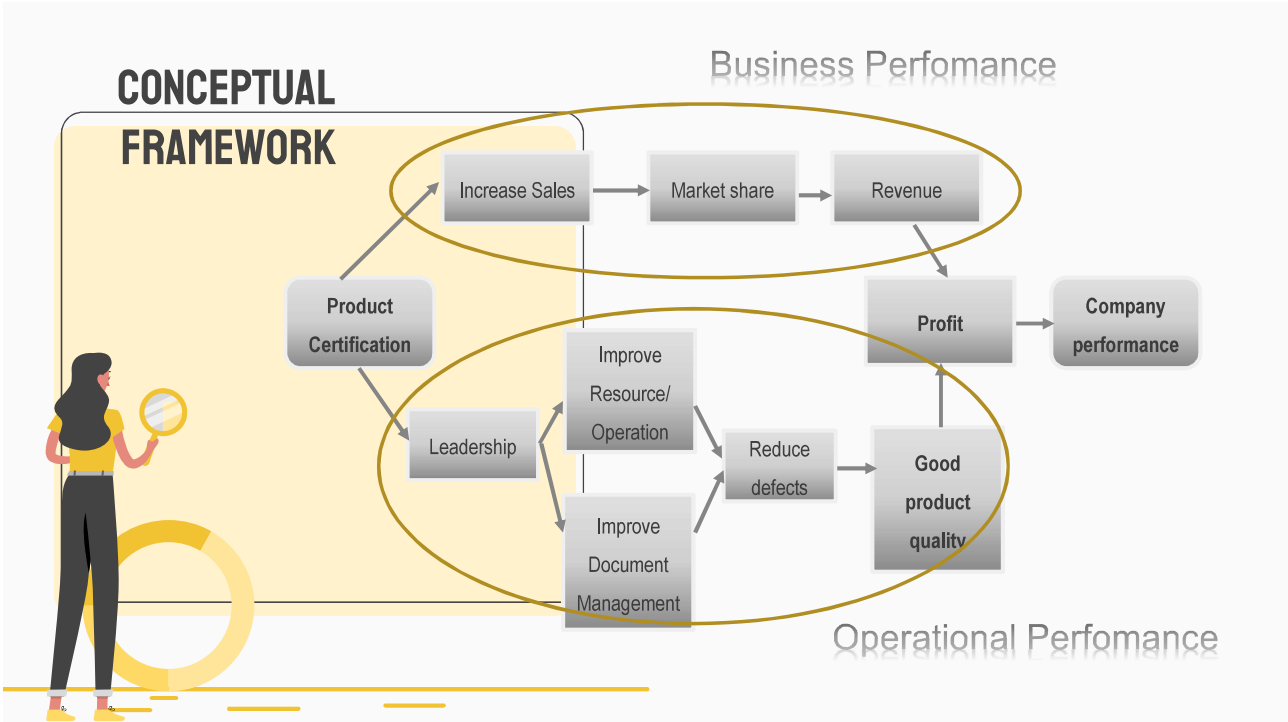
- SME's Plays an essential role in driving the growth of Indonesian Economy
- 97% of employee, 60% of GDP, 98% of total firms.
- After 2008, government interest to develop SME's in Indonesia -> Ministry of Small Medium Enterprise
- In globalization era, the success orientation of SME has changed, from domestic sales to foreign market sales.
- Consumer needs for high quality product standard have increased.
- SMEs need to improve the quality of their products, one of them by improving the management of its system.
- Product certification and Quality management system aim to support economic activities, consumer protection, safety and health.



PRODUCT CERTIFICATION IN INDONESIA (SNI)

- **Product standard certification** or **product qualification** is the process of certifying that a certain product has passed **performance tests** and quality assurance tests, and meets qualification criteria stipulated in contracts, regulations, or specifications (typically called "certification schemes" in the product certification industry).
- Basically applied voluntary, will be mandatory In the context of public interest, security, safety environment and national economic development.
- Mostly type 5 of product certification, QMS+Quality product testing.
- Most of SME's implement product certification because its mandatory.


LITERATURE REVIEW
Rametulla et al (2012), QMS ISO - Random Scale Firms - Macedonia
Quazi & Pabidjo (2012), QMS ISO - SME's - Singapore
Brown & Van der Wiel (2012), QMS ISO - Large Enterprise - Australia
Saleem et al. (2011) Product certification – SME - Pakistan
- Opportunities for penetrating foreign market
- Increase sales
- Increase profitability
- Does not affect product quality
- Increase costumer satisfaction
- Improve product quality, competition and fulfil costumer requirement
- Increase Awareness of prod. Quality
- Improve costumer relations, develop product
- Increase respect of competitor
- Enhance costumer satisfaction
- SME's lack of knowledge and awareness and resources.
- Product certification is costly, complex, and require to implement ISO 9001
- Difficult to pass laboratory test for testing their products.
- Process is being too long


CONCEPTUAL FRAMEWORK
Business Perfomance
Increase Sales
Market share
Revenue
Product Certification
Profit
Company performance
Leadership
Improve Resource/ Operation
Improve Document Management
Reduce defects
Good product quality
Operational Perfomance

RESEARCH OBJECTIVE

1. Does SMEs SNI certified companies get better improvement in their operational and business performance after implementing product certification?

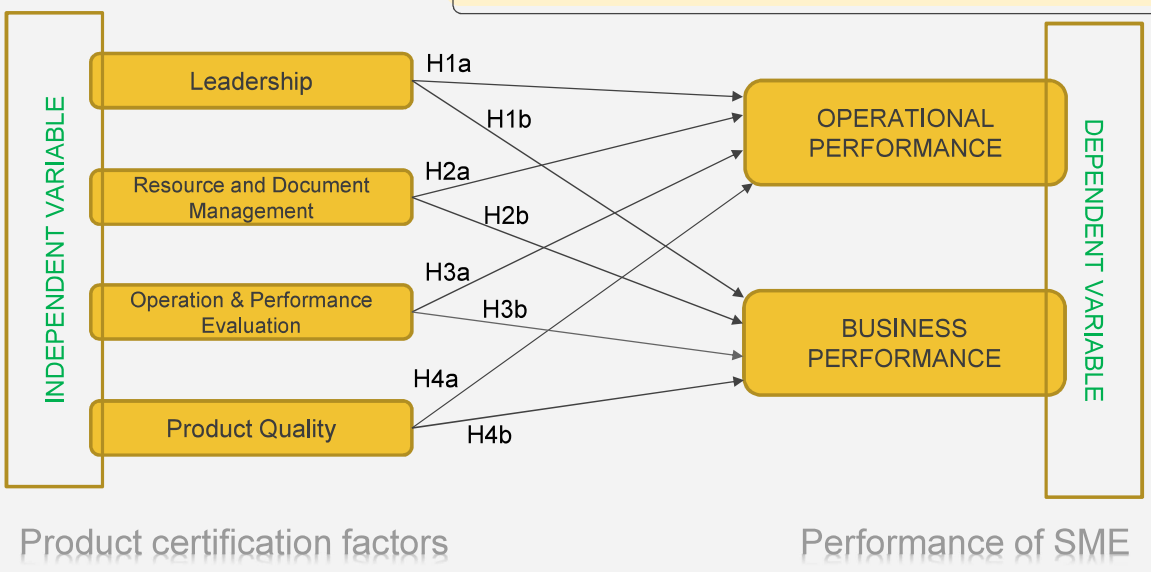
2. What are the significant factors for SMEs to improve their performance?

3. is SME's in Indonesia (with all its limitations) able to implement product certification and quality management systems and how to encourage them?

METHODOLOGY

- SURVEY INSTRUMENT (5 POINT LIKERT SCALE), 36 ITEM OF STATEMENTS
- 200 SMES RESPONDENT (53 VALID RESPONSES) – MINISTRY OF INDUSTRY DATA
- 6 REGION OF INDONESIA
- 6 CLASS OF PRODUCT
- VALIDITY AND REALIBILITY TEST – TO REDUCE MEASUREMENT ERROR
- CORRELATION, FACTOR ANALYSIS AND LINEAR REGRESSION

RESEARCH MODEL AND HYPOTHESIS



VALIDITY TEST

I. CONTENT VALIDITY

- ✓ there is an agreement between the researcher and respondent that the subject covered all aspects of the measured variable
- ✓ the four factors used as variables are part of the determinants of ISO 9001: 2015 (QMS-Requirements) and the company's obligation to fulfil SNI product certification requirements.

2. CONSTRUCT VALIDITY

Independent Variable	Item	Factors Loading
Leadership	LD1	0.790
	LD2	0.840
	LD3	0,771
	LD4	0.646
	LD5	0.847
Resource and Documented Information	DI1	0.809
	DI2	0.723
	DI3	0.621
	DI4	0.733
	RU1	0.752
	RU2	0,753
	RU3	0.805
	RU4	0.671
	RU5	0.943
	RU6	0.781
	RU7	0.840
Operation and Performance Evaluation	OP1	0.821
	OP2	0.699
	OP3	0.778
	OP4	0.932
	OP5	0.905
	OP6	0.715
	PE1	0.840
	PE2	0.732
	PE3	0.758
	PE4	0,743
Product Quality	PQ1	0.965
	PQ2	0.950
	PQ3	0.745
	PQ4	0.888

3. CRITERION VALIDITY

	LD	RDI	OPPE	PQ	OPF	BPF
Leadership	1					
Resource & Documented Inf.	0.491**	1				
Operation & Performance Eval.	0.452**	0.643**	1			
Product Quality	0,225	0.487**	0.388**	1		
Operational Performance	0.409**	0.606**	0.620**	0.518**	1	
Business Performance	0,138	0.424*	0.522**	0.709*	0.513**	1

RELIABILITY TEST

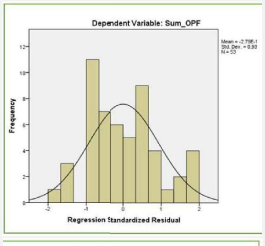
Variable	Reliability Cronbach (α)
Leadership	0,899
Resource and Documented Information	0.810
Operation and Performance Evaluation	0.899
Product Quality	0,876
Operational Performance	0,960
Business Performance	0,946

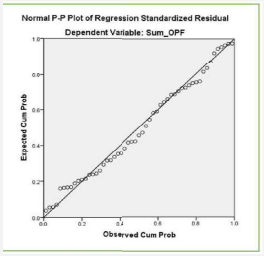
Source: Calculated by the author using SPSS 24

Correlation coefficient (α)	Reliability Criteria
0,90 < r ≤ 1,00	Excellent
0,80 < r ≤ 0,90	Good
0,60 < r ≤ 0,80	Fair (acceptable)
0,50 < r ≤ 0,60	Poor
0,00 < r ≤ 0,60	Very Poor

MODEL ASSUMPTION

I. NORMALITY TEST





2. HETEROSCEDASTICITY TEST

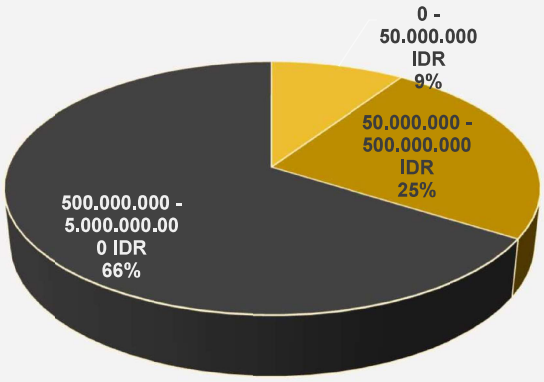
Factors	Remarks	Residual
Residual	Correlation Coefficient	1.000
	Sig. (2-tailed)	.
Sum LD	Correlation	.032
	Sig. (2-tailed)	.823
Sum DI	Correlation	-.023
	Sig. (2-tailed)	.869
Sum RU	Correlation	.004
	Sig. (2-tailed)	.976
Sum OP	Correlation	-.068
	Sig. (2 tailed)	.628
Sum PE	Correlation	-.052
	Sig. (2-tailed)	.709
Sum PQ	Correlation	-.017
	Sig. (2-tailed)	.904

3. LINEARITY TEST

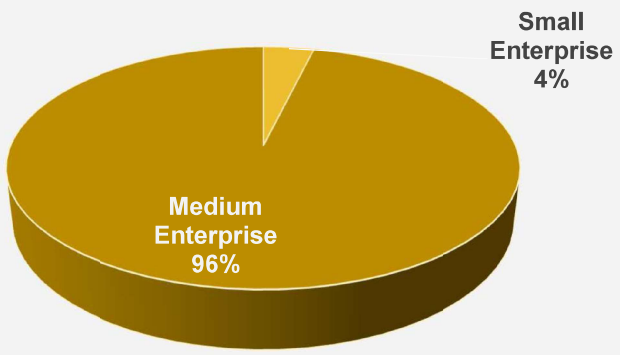
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Total Mean * Sum OPF	Between Groups	(Combined)	1.516	4	.379	21.464	.000
		Linearity	1.446	1	1.446	81.921	.000
		Deviation from Linearity	.069	3	.023	1.311	.282
	Within Groups		.847	48	.018		
	Total		2.363	52			

RESULT - DEMOGRAPHY OF RESPONDENT

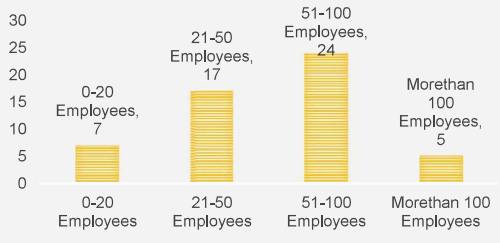


Assets of SME's



Scale of SME's

RESULT - DEMOGRAPHY OF RESPONDENT



Number of Employees

	Region						Total
	Jakarta	West Java	Banten	Central Java	Yogyakarta	East Java	
Food and Beverage	1	7	2	2	1	1	14 (26%)
Electronics	1	3	0	0	0	0	4 (7%)
Home Appliance	1	1	3	0	0	3	8 (15%)
Chemicals Products	2	4	2	2	0	2	12 (23%)
Steel Products	3	4	2	2	0	3	14 (26%)
others	0	0	0	1	0	0	1 (2%)
Total	8 (15%)	19 (36%)	9 (17%)	7 (13%)	1 (2%)	9 (17%)	53

Source: Author's classification based on the survey

Regions and class of products

RESULT-CORRELATION ANALYSIS

PROD. CERTIFICATION VS OPERATIONAL PERFORMANCE

Product Certification Factors	Correlation	P-Value
Overall SNI Product Certification Implementation	0,782**	0,0001
Leadership	0.409**	0,0024
Resource & Documented Information	0.606**	0,0002
Operation & Performance Evaluation	0.620**	0,0000
Product Quality	0.518**	0,0001

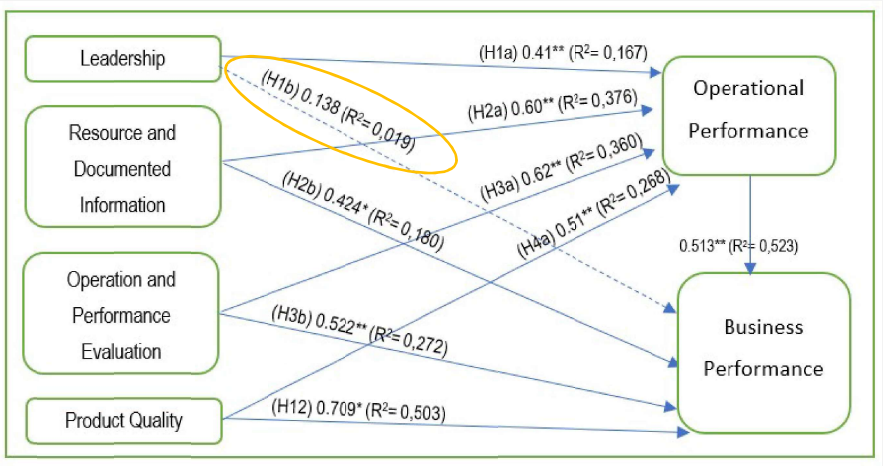
Note: ** Significant at p<0,01, 2-tailed
Source: Calculated by the author using SPSS 24

PROD. CERTIFICATION VS BUSINESS PERFORMANCE

Product Certification Factors	Correlation	P-Value
Overall SNI Product Certification Implementation	0,578**	0,000
Leadership	0,138	0,326
Resource & Documented Information	0.422**	0.002
Operation & Performance Evaluation	0.522*	0.001
Product Quality	0.709*	0,000

Note: *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
Source: Calculated by the author using SPSS 24

RESULT - HYPOTHESIS TESTING



Note: Values in the figure are summed regression coefficients with the z-statistic in parenthesis. Significant levels: $*p < 0.05$, $**p < 0.01$. ___ Supported, and _ _ _ not supported. The dependent variable is one of organizational performance. Independent variables were constructed by five-point Likert scale.

CONCLUSIONS AND IMPLICATIONS

1. From this study, it was found that SME's in Indonesia has statistically been able to implement product certification and quality management systems as include in it.
2. Factors such as leadership, documented information, resource utilization, operations, performance evaluation and product quality have a significant positive impact relationship on operational performance.
3. This study underlines the importance of commitment and involvement of top management in carrying out the quality management system.
4. Interestingly, the leadership factor does not have a significant impact on SME's business performance. This may have something to do with the type of leadership adopted by most SMEs in Indonesia which tend to be transactional.

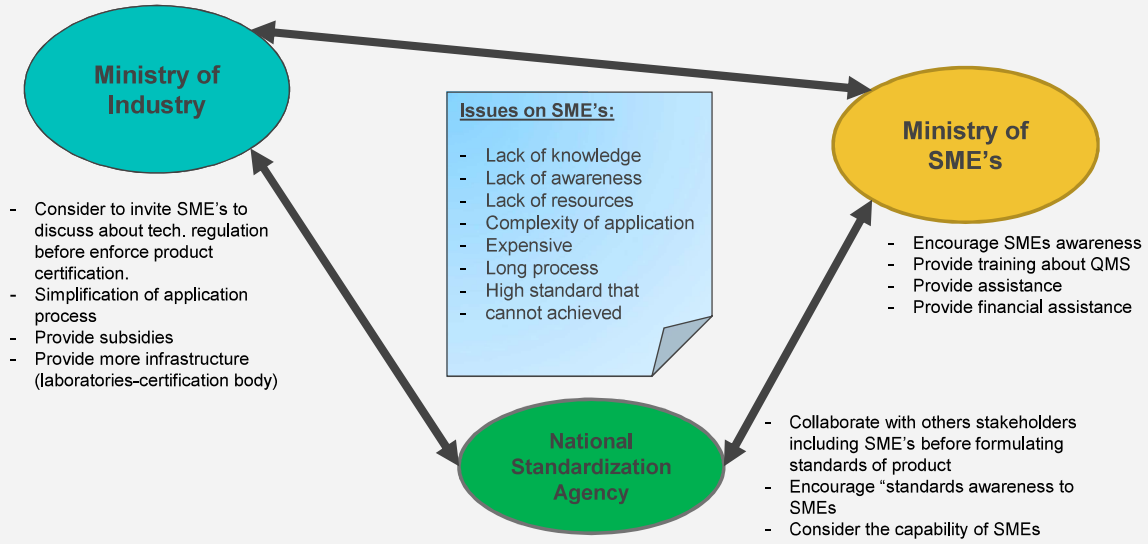
IMPLICATION FOR SME'S

Major Finding	Implication For SME's
- Top management commitment has positive and significant impact to operational performance	- Determine planning policies - Optimizing all the resource - Encourage the continuous improvement
- Top management has no significant impact to business performance	- Consider to shift from transactional to transformational leadership style
- Resource utilization has significant and positive relationship to SME's performance	- Maximizing human resources, - Monitoring and measure adequate resource - Maintaining infrastructure and work environment properly in accordance with product certification requirements.

IMPLICATION FOR SME'S

Major Finding	Implication For SME's
Documented information has significant and positive impact to SME's performance	- Plan what documents are required in the quality management system. - The document must be in the form of quality manuals, procedures, work instructions and also the records needed.
Operations factor plays an important role in improving company performance	- Use of statistical process control - Integration of quality factors to the product design. - Implementing continuous improvement and corrective action in all lines of the company.
Product quality related to the performance & has the most impact to business performance	- Use product quality factor as indicator of company performance evaluation

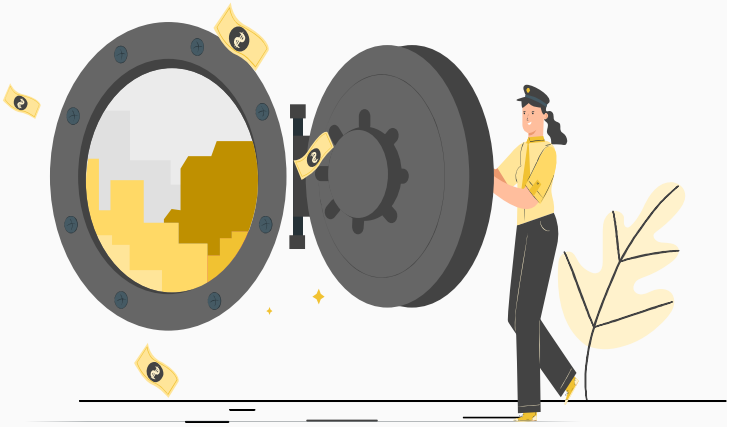
POLICY RECOMMENDATION



THANK YOU

Does anyone have any questions?

Addi.fanhas@gmail.com
+82 10 4564 2021
@addi.fanhas



Factors affecting SMEs' growth A comparative meta-analysis between Germany and South Korea

Kim, Minseo(Konkuk Univ.)
Park, Hyesu(Konkuk Univ.)

Factors affecting SMEs' growth : A comparative meta-analysis between Germany and South Korea

Minseo Kim(First author, Konkuk University, mskim.konkuk@gmail.com)
Hyesu Park(Correspoding author, Konkuk University, hsmot@konkuk.ac.kr)

This study analyzed the effect size of predictors that affects the growth of SMEs in Germany and Korea using meta-analysis. A total of 34,154 studies from six databases in English and Korean were collected, and finally 38 studies were selected by sorting related empirical studies. A total of 288 effect sizes was used by classifying the predictors from these studies. The classification was conducted based on resource-based theory and innovation-based theory. As a result, the effect size and ranking of factor of predictors that lead SME growth in Germany and Korea were different. However, the key factors in both countries for firm growth was entrepreneurship and innovation. In Germany, investment in human capital and physical capital for R&D was the important factor that led a firm to grow with global competitiveness.

Keywords: SMEs' growth, innovation, entrepreneurship, mittelstand, meta-analysis

Introduction

After the global economic crisis, Germany experienced a rapid economic recovery based on strong and sustained growth in manufacturing. A report by the World Bank in 2018 said that the value added of Germany's manufacturing sector accounted for approximately 30% of EU total gross value added in manufacturing, while the total gross value added of Germany stood at 3.55 trillion euros. The driving force behind this economic resurgence is the achievement of Germany's "Mittelstands," which generally refers to the country's small-medium enterprises(SMEs), which account for approximately 98% of Germany's manufacturing sector and plays a pivotal role in increasing employment and exports. Among the Mittelstands, 1,307 companies in particular are classified as "hidden champions(HCs)", relatively small but global market leaders in niche products(BMWi, 2015). Most of the HCs produce unremarkable products, but they belong to the top three companies in the world or number 1 on their continent, with less than 5 billion dollars in revenue(Simon, 1990). Simon(1990) reported that the core competitiveness of HCs' continuous profitable growth came from exceptional management skills such as strong leadership, employing experts, sufficient fundraising, and constant innovation activities. As a role model for sustainable economic growth, other countries have considered the application of strategic insights of HCs to their manufacturing sectors. In 2011, the Korean government launched the "Global Strong and Small Enterprises Nurturing Policy" to turn promising small companies into successful HCs. Korean SMEs that are in similar size and high value-added range to German HCs have been classified as "High-Potential Enterprises(HPEs)". The selected companies have been supported by various subprograms to accelerate their performance in the global market. Despite the Korean government's efforts, however, the ranking of global manufacturing competitiveness of Korea has dropped from third in 2010 to sixth in 2016, while the ranking of Germany has risen from eighth in 2010 to third in 2016(Deloitte, 2016). These facts indicate that the Korean government needs to find new alternatives to enhance the competitive advantages of the manufacturing sector. Therefore, this study focuses

on the factors that affect the performances of German and Korean SMEs. This suggests that comparing the performance determinants of German and Korean SMEs may yield effective means to establish a new paradigm for nurturing policies for Korean HCs.

Conceptual Model and Research Question Development

There are two mainstream company growth theories: the resource-based theory, and the innovation-based theory, or so-called Schumpeterian model. According to the resource-based view, companies can create sustainable competitive advantages through core competencies(Prahalad & Hamel, 1990). Core competencies derived from the optimal combination of multiple given resources enable companies to possess inimitable capabilities and to achieve sustainable performances in the marketplace. These resources include not only tangible resources such as financial assets and human resources, but also intangible resources such as process of organization, capabilities, information, and knowledge controlled by a company(Barney, 1991).

Another view is the Schumpeterian model, an innovation-based endogenous growth model introduced in 1911(Schumpeter, 2011). From this perspective, technological innovation and entrepreneurial activities are the main driving forces that transfer the productive resources of a static economy to dynamic innovations. It emphasizes the importance of innovations that can increase the productivity of production factors and develop differentiated products for long-run growth. It also explains that the success of innovations results from investments in R&D, knowledge, skills, and searching for new markets. These innovation-oriented activities, consequentially enable knowledge spillovers to occur in organizations and stimulate creative destruction.

Based on these classic theories, many previous studies have tended to analyze the relationship between a company's performances such as revenues, growth in sales, imports and exports, market shares, and innovations, and its resources or investments such as assets, human resources, capital investments, R&D intensity, etc(Block & Schwens, 2016; Capon et al., 1990; Crook et al., 2012). These empirical studies have focused on the factors that influence a company's growth according to Gibrat's rule of proportionate growth(Gibrat, 1931), but their results have been inconsistent due to differences between samples, time frames, and methodologies. Therefore, the large number of studies on firm growth with heterogeneous and sometimes even contradictory findings calls for studies to synthesize and generalize the evidence on key factors that determine growth.

This study integrates SMEs' growth factors based on two theories for a comparative analysis between Germany and Korea. These predictors are classified into firm characteristics, CEO characteristics, and innovation characteristics (Table 1). Furthermore, a meta-analysis is conducted to obtain generalized results of previous empirical studies and a better understanding of how different effect sizes of determinants are. The research questions are as follows.

Research Question 1. Which factors among firm characteristics, CEO characteristics, and innovation characteristics that affect SME growth have larger effect sizes on firm growth?

Research Question 2. Is there any different factor that affects SMEs growth between Germany and Korea?

Materials and Methods

Database development and coding

The data for meta-analysis were collected from studies on German Mittelstand and Korean SMEs. Studies on Mittelstand were collected from Proquest, EBSCo, and ScienceDirect by the following process. 1) The database was searched using the terms “Mittelstand,” “Hidden champion,” “Germany,” “SME,” “Innovation,” and “Success”. 2) The articles retained were screened by articles including “Scholarly Journal,” “Studies,” and “English,” until 3,227 articles remained. 3) Studies that repeated were excluded, and 139 articles were selected. 4) Finally, 18 articles were selected for analysis by thoroughly checking the analysis model and variables. Studies on Korean SMEs were collected from “KISS,” “KCI,” and “DBpia” by the following process. 1) The data base was searched using the terms “SME,” “Innovation,” and “Success.” 2) From 30,927 articles, repeated studies were excluded and 323 articles were selected by checking abstracts. 3) And from the 323 articles, empirical studies on “Innovation type SMEs,” “Innobiz SMEs,” and “Korean global hidden champions” were selected. “Innovation type SMEs,” “Innobiz SMEs,” and “Korean global hidden champions” means companies with innovative competitiveness and global competitiveness that are similar to hidden champions. 4) Finally, 20 articles on Korean SMEs were selected for the analysis. In all, 38 articles were used for the empirical analysis in this study.

Variable classification

Firm Characteristics The resource-based view is a perspective where the firm historically determines the collection of assets or resources that are tied “semi-permanently” to the firm(Caves, 1980). A firm’s resources are classified into static and dynamic resources. Static resources infer a stock of assets that are appropriate semi-permanently, while dynamic resources infer capabilities, including an organization’s learning capacity, which generate additional opportunities over time(Barney, 1991; Peteraf, 2003; Rumelt, 1984). By possessing resources which other company cannot imitate, firms can lead with a competitive advantage which consequently enables the sustainable growth of firms.

CEO Characteristics Entrepreneurship has emerged as an important concept on both the individual and corporate level(Miller, 1983). An entrepreneur is someone who destroys the existing economic order by introducing new products and services, exploiting new raw materials, creating new forms of organizations, and founding new businesses and markets(Schumpeter, 1934). Entrepreneurship is described as “innovativeness,” “risk-taking,” and “proactiveness.” Firms with a high degree of entrepreneurial management tend to exploit promising opportunities more frequently than more conservative firms. Therefore, the relationship between entrepreneurial management and the growth of firms can be expected to be more positive.

Innovation Characteristics Innovation is a key factor in creating economic performance. The innovation capability of a firm refers to the ability to utilize technology for competitive product development, technology commercialization or related internal resources. This can be measured by various factors of the input and output of innovation activities. From the perspective of input, R&D, represented by innovation, is an indispensable strategy to improve the added value of products and services through product and process innovation and cost reduction(Kim & Kim, 2014). Many studies have shown the positive influence of innovation on rapid growth firms(Brüderl & Preisendörfer, 2000). And the relationship between innovation and firm performance verified by empirical studies might be influenced by firm size, age, and industry affiliation(Bausch & Rosenbusch, 2005). In this study, product, process, marketing, and organizational innovation, innovation intensity, R&D intensity, and R&D employees have been categorized by subfactors of innovation characteristics. In particular, product, process, marketing, and organizational innovation is defined by the OECD(OECD, 2005).

Table 1. Determinant factor classification

Factor	***Subfactor***	***Definition***	***Reference***
Firm Characteristics	Size	Size of firm (no. of employees, turnover, sales, etc.)	Audretsch & Elston(2006), Beck et al.(2019), Classen et al.(2014), Gruenwald(2016), Harms(2010), Harms et al.(2010), Kim(2013), Lee et al.(2014), Steeger & Hoffmann(2016), Yoon(2015), Yoon & Seo(2014)
	Age	Age of firm	Almus & Czarnitzki(2003), Andries & Czarnitzki(2014), Audretsch & Elston(2006), Bartz & Winkler(2016), Calabrò et al.(2017), Classen et al.(2014), Czarnitzki & Dlanote(2015), Harms(2010), Rammer et al.(2009), Rammer & Schmiele(2008), Steeger & Hoffmann(2016)
	Finance	Index of financial situation (Cash flow, revenue, property, assets, etc.)	Almus & Czarnitzki(2003), Audretsch & Elston(2006), Czarnitzki & Dlanote(2015), Gruenwald(2016), Harms(2010), Kwak(2011), Park(2011), Rammer & Schmiele(2008), Schaˇfer et al.(2017), Steeger & Hoffmann(2016)
	Subsidy	Whether public subsidies are received	Park(2011), Rammer et al.(2009), Schaˇfer et al.(2017)
CEO Characteristics	Entrepreneurship	Degree of entrepreneurship: innovativeness, risk-taking, proactiveness	Bouncken et al.(2016), Harms(2010), Kim(2014), Lee(2016), Yoon & Seo(2011), Yoon & Seo(2014), Yu(2017),
Innovation Characteristics	Product Innovation	Introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses	Kim(2014), Rammer & Schmiele(2008), Rant & Cerne(2017), Yoon(2015)
	Process Innovation	Implementation of a new or significantly improved production or delivery method	Kim(2014), Rammer & Schmiele(2008), Yoon(2015)
	Marketing Innovation	Implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing	Rammer & Schmiele(2008), Rant & Cerne(2017), Steeger & Hoffmann(2016), Yoon & Kim(2010)
	Organizational Innovation	Implementation of a new organizational method in the firm's business practices, workplace organization or external relations. Searching for external sources or cooperation agreements with external partners	Andries & Czarnitzki(2014), Beck et al.(2019), Classen et al.(2014), Hertel & Menrad(2016), Hyun & Choi(2013), Kwak(2011), Lee et al.(2014), Rammer & Schmiele(2008), You(2018)
	Innovation Intensity	Degree of innovation activity (investment in current innovation expenditure, patent stock per employee, number of technology	Andries & Czarnitzki(2014), Beck et al.(2019), Classen et al.(2014), Czarnitzki & Dlanote(2015),

	alliances, etc.)	Harms(2010), Hertel & Menrad(2016), Hyun & Choi(2013), Kwak(2011), Lee et al.(2014), Lim & Peltner(2011), Park(2011), Rammer & Schmiele(2008), Steeger & Hoffmann(2016), Yoo(2016), You(2018)
R&D Intensity	The ratio of expenditures on R&D to a firm's sales	Almus M & Czarnitzki(2003), Gruenwald(2016), Han(2008), Harms(2009), Kim(2013), Kim(2016), Lee et al.(2014), Lee et al.(2014), Lim & Peltner(2011), Park(2011), Rammer et al.(2009), Schaˆfer et al.(2017), Steeger & Hoffmann(2016), Yoo(2009), Yu(2017)
R&D Employees	The number of R&D employees	Andries & Czarnitzki(2014), Kim(2013), Park(2011), Yoo(2009)

Firm Growth The results of innovation activities of a firm can be labor-saving progress, capital-saving progress, and neutral progress where capital and labor saves at the same ratio by technological progress(Harrod, 1939; Hicks, 1932; Solow, 1956). This is based on production function and highly related to financial performance such as efficiency and effectiveness. Furthermore, innovation can create and diffuse new knowledge that contributes to expand the economy's potential to promote the development of advanced products and processes(OECD, 2005). In this study, innovation performance is defined as financial performance in quantitative terms and innovation success, which is non-financial performance from a qualitative aspect. Financial performance includes labor productivity, efficiency (the average of cost saving, reduction of costs by progress innovations), and effectiveness (the average of competitive position, growth, reduction of costs by process innovations). And innovation success includes new product development, process and market development, and product quality improvement.

Meta-Analysis Procedures

To answer these questions, this study engaged in an assessment by establishing a metricized baseline based on 38 empirical studies, with a total of 288 effect sizes. We conducted coding and analyzed the effect size based on correlation using Comprehensive Meta-analysis (CMA) 3.0. Using the methodology of Borenstein et al.(2009), it recalculates the effects of meta-analysis, employing a random effects model.

In previous studies, most research provided a correlation matrix that was selected as the effect size metric for the meta-analysis. However, few studies reported beta coefficients (β) or t-statistics (t), and not a correlation coefficient (r). Therefore, β and t have been transformed into r(Peterson & Brown, 2005; Wolf, 1986).

The equations for transforming t or β into r are as follows.

$$r = \sqrt{\frac{t^2}{t^2+df}} \quad or \; r = \sqrt{\frac{t^2}{t^2+n_1+n_2-2}}$$

$$r = \beta + .05\lambda \qquad (\lambda:\ \beta \geq 0 \ \ = 1, \qquad \beta < 0 \ \ = 0)$$

In Meta-analysis, r is converted into Fisher's Z (z) for minimizing biases, since the distribution of

transformed *r* is under the asymmetric distribution. The equation for transforming *r* into *z* is as follows.

$$z = \frac{1}{2}\ln\left(\frac{1+r}{1-r}\right)$$

Under the assumption that studies with larger samples are more reliable and accurate, studies that have a larger sample size are weighted using formulas of inverse-variance weighting (W_i) and weighted averages (M). Lastly, to report estimated effect sizes, z is converted to r for ease of understanding and interpretation(Borenstein et al., 2009).

Results and Discussion

Identifying Heterogeneity and Publication Bias

To identify heterogeneity, the null hypothesis that all studies have a common effect size is assumed and tested. The classical measure of heterogeneity uses Q statistic and I^2 statistic based on Cochran(1954). The null hypothesis of Q statistic is that Q statistic is equal to the degrees of freedom (df), and follows a central chi-squared distribution with $df = K$-1(where K is the number of r). And the p-value can be reported for any observed value of the Q statistic. In general, the null hypothesis that the studies are homogeneous is rejected when a p-value is less than 0.05(Borenstein et al., 2009). If the heterogeneity of the studies is confirmed, the random effect model should be preferred. In this study, high heterogeneity is verified since p-values are less than 0.05 and I^2 values are over 90%(Table 2)(Deeks et al., 2008). Therefore, the random effect model is used since we do not assume that studies within each subgroup share a common effect size.

Publication bias can be checked by fail-safe N, which shows the reliability of research results. When fail-safe N is lower than $5K$+10, it is considered hard to rely on(Rosenthal, 1979). In this study, there is no publication bias since fail-safe N for the entire model is higher than $5K$+10.

Results of Meta-Analysis

Table 2 presents the effect size for relationships between predictor variables and firm growth. The results provide information on the number of r (K) and effect size (ES_r). In the case of Model 1, the subfactor of firm growth, including financial performance and innovation success, was analyzed by 288 K. In Models 2 and 3, firm growth verified each ES_r by dividing the subfactors into financial performance and innovation success. And a few nonsignificant predictors were found. In particular, subsidy did not have an impact on financial performance and innovation success.

The results show that CEO characteristics has the highest ES_r relationship between firm growth from Model 1(Research Question 1), and the ES_r of CEO characteristics is also higher than other predictors from Models 2 and 3. In addition, the ES_r of innovation characteristics has a positive relationship with firm growth. In particular, in Model 2, financial performance has high ES_r of innovation intensity and R&D employees,

while in Model 3, innovation success has a significantly high ES_r of four types of innovation. Based on these results, we can confirm that entrepreneurship and firm innovation are key success factors for a firm's growth. These findings support previous research based on the innovation-based growth theory.

Table 2. The effect size for the relationship between predictor variables and firm growth

Predictor	*Model 1*			*Model 2* *Financial Performance*			*Model 3* *Innovation Success*		
	K	***ES_r***		***K***	***ES_r***		***K***	***ES_r***	
Firm characteristic									
Size	21	0.151	*	12	0.240	*	9	0.037	*
Age	17	0.101	*	10	0.131	*	7	0.085	*
Finance	48	0.206	*	39	0.274	*	9	0.027	
Subsidy	9	0.012	*	2	0.030		7	0.008	
CEO Characteristics									
Entrepreneurship	29	0.342	*	13	0.363	*	19	0.326	*
Innovation Characteristics									
Product Innovation	10	0.090	*	8	0.041	*	2	0.461	*
Process Innovation	6	0.086	*	4	0.020		2	0.374	*
Marketing Innovation	6	0.187	*	4	0.060	*	2	0.469	*
Organizational Innovation	42	0.271	*	11	0.086	*	31	0.342	*
Innovation Intensity	34	0.228	*	18	0.303	*	16	0.164	*
R&D Intensity	51	0.144	*	36	0.092	*	15	0.211	*
R&D Employees	11	0.219	*	4	0.259	*	7	0.196	*
K	288			158			130		
Q	9887.300			5999.990			3887.311		
df(Q)	287			157			129		
P	0.000			0.000			0.000		
I^2	97.097			97.383			96.692		
Fail-safe N	9338.000			2875.000			4368.000		

*P<.05

As a result of Research Question 2, we verified that the predictors that affect the growth of SMEs in each country were different(Table 3). The firm characteristics of Mittelstands in Germany have a stronger positive effect size on growth than in Korea. And firm size and age are important factors for Mittelstands' growth. These results and the fact that 45% of Mittelstands are family-owned companies imply that maintaining generational continuity builds up tactic knowledge and management strategies, which plays an important role in creating business performances[1].

Table 3.Comparison between Germany and South Korea

Predictor	*Germany*		*South Korea*	
	K	***ES_r***	***K***	***ES_r***
Firm characteristics				
Size	14	0.198*	7	0.047*
Age	15	0.140*	2	0.080
Finance	34	0.162*	14	0.312*
Subsidy	7	0.008	2	0.030
CEO Characteristics				
Entrepreneurship	2	0.252*	27	0.348*
Innovation Characteristics				
Product Innovation	6	0.030*	4	0.242*
Process Innovation	2	0.016*	4	0.168*

[1] Federal Ministry of Economics and Technology, www.bmwi.de.

Marketing Innovation	5	0.085*	1	0.784*
Organizational Innovation	28	0.159*	14	0.506*
Innovation Intensity	20	0.134*	18	0.342*
R&D Intensity	14	0.170	37	0.132*
R&D Employees	2	0.358*	9	0.191*

*P<.05

In Table 3, the Mittelstands in Germany show high effect sizes in R&D intensity and R&D employees in innovation characteristics, while SMEs in Korea show high effect sizes in innovation activities. In Germany, investments in R&D human resources and physical capital have been considered key success factors for Mittelstands' growth. Indeed, around 82% of all apprentices who are trained by various programs are working in Mittelstand companies[2]. This investment in R&D employees with capital investments of innovations by a company itself and the government contributes to promote cooperation between researchers and private firms and to strengthen firm competitiveness. Due to these efforts both the public and private sectors, Mittelstands have been able to outperform other SMEs.

However, to generalize these results, it will be necessary to analyze more related studies. We used inverse-variance weighting and weighted averages to reduce differences between predictors, but there are significantly large differences between predictors since each country's predictors have different sample sizes. Thus, follow-up studies will need to collect more related studies to balance the number of *K* in each predictor.

Table 4. Comparison of top 5 success factors: Germany and South Korea

Ranking	***Germany***		***South Korea***	
	Financial performance	***Innovation Success***	***Financial performance***	***Innovation Success***
1	Innovation Intensity	R&D employees	Entrepreneurship	Marketing Innovation
2	Size	Entrepreneurship	Finance	Organizational innovation
3	Entrepreneurship	Organizational innovation	Innovation Intensity	Product Innovation
4	Finance	Marketing Innovation	R&D employees	Innovation Intensity
5	R&D Intensity	R&D Intensity	Organizational innovation	Process Innovation

Finally, we compared the analysis result ranks of each country's growth subfactors with high *ESr,* which are financial performance and innovation success(Table 4). The five highest factors of *ESr* for German Mittelstand and Korean SME development were drawn by financial performance and innovation success. The factors, R&D intensity and R&D employees, could be considered firm characteristics because the relationship between R&D intensity and finance, as well as the relationship between R&D employees and firm size, is highly correlated(Dierickx & Cool, 1989). In this case, it has been verified that expanding

[2] Federal Ministry of Economics and Technology, www.bmwi.de.

innovation strategies based on a firm's discriminatory ability is essential for rapid growth.

Specifically, in the case of Germany, entrepreneurship and investment of human resources and finances in R&D were the key factors for firm growth. And in the case of Korea, culture and efforts for innovation and entrepreneurship were the key factors for firm growth. Innovation intensity was the most important predictor of financial performance for German Mittelstands, while entrepreneurship was the most important predictor for Korean SMEs. For innovation success, possessing R&D employees was the most important predictor for Mittelstands, while marketing innovation was the biggest success factor for Korean SMEs.

Conclusions

This study conducted a meta-analysis to verify and confirm the effect size of predictors on firm growth by combining data from previous studies on SME growth. By comparing Germany's Mittelstand, with strong competitiveness in the global market, and Korean SMEs, for which global competitiveness has fallen recently, we provided strategic implications for the growth of Korea's SMEs. The verification results of the research questions show that, first, entrepreneurship has a larger effect size on firm growth than other factors in both countries(Research Question 1). Secondly, R&D investment, including human resources and physical capital, has a strong relationship with Mittelstands' growth(Research Question 2).

Although the proportion of R&D expenditure to GDP by public institutions in Korea is the highest among OECD countries, R&D investments in SMEs are low. To promote Korean SMEs' sustainable growth, it is suggested that SMEs acquire competencies to develop competitive technologies and products by increasing R&D investments. Furthermore, human resource development programs, such as Germany's apprenticeship system, will be necessary to secure skilled employees, while there should be industry-university linkages for the continuous education and training of workers.

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베트남의 과학기술 ODA 수요분석과 정책적 시사점

신범철(경기대학교)
송치웅(과학기술정책연구원)

베트남의 과학기술 ODA수요 분석과 정책적 시사점

신범철
경기대학교 경제학부 교수(제1저자)
bccin@kyonggi.ac.kr

송치웅
과학기술정책연구원 연구위원(교신저자)
cusong@stepi.re.kr

이 논문은 베트남의 경제 및 사회적 상황과 교역, ODA 현황, 과학기술 시스템을 검토하고 설문조사를 바탕으로 과학기술ODA 수요를 분석하여 과학기술 협력사업 확대 방안을 논의하였다.

베트남에 대한 과학기술ODA 수요의 설문조사 결과, 우선 과학기술정책과 기술경영 전문가의 부족과 과학기술 프로그램의 중요성 인식하고 있다. 다음으로 과학기술 인적자원 개발, 과학기술과 국가발전, 국가 R&D, 테크노파크에 관련된 정책 교육에 대한 수요 순으로 나타나고 있다. 하지만 국가 과학기술 계획과 기술예측, 지적재산권, 국가 과학기술혁신인프라 정책에 대한 교육프로그램 수요는 다른 프로그램에 비해 미세한 차이지만 상대적으로 낮게 나타나고 있다.

마지막으로 미래 잠재적 기술경영 분야 교육프로그램 수요로, 기술이전 사업화 교육수요가 가장 높게 나타났고 R&D 글로벌화, 연구자 및 조직 경영, 전략적 기술경영에 교육 수요 등의 순으로 나타나고 있다. 그러나 기술혁신이론, 기술로드맵, 기술벤처 분야의 교육에 대한 수요는 상대적으로 낮은 수요를 보이고 있다.

핵심용어: 공적개발원조, 베트남 과학기술체계, 과학기술정책, ODA수요

An Analysis of Science and Technology System and ODA Demand in Vietnam

Beom Cheol Cin(First Author)
Professor, Division of Economics, Kyonggi University
bccin@kyonggi.ac.kr

Chi-Ung Song
STEPI, Researcher(Corresponding Author)
cusong@stepi.re.kr

This paper analyzes Vietnam's science and technology system and ODA demand for the S&T cooperation programs based on survey data.. We discuss first the issues about Vietnamese economic and social situation, trade, ODA and S&T system and policies.

To understatnd the demand for the S&T ODA programs, we implement a survey and interviews with S&T policy-decision makers and specialists in Vietnam. The survey methodology would make clear potential demands and needs of the aid beneficiaries. The survey results show that Vietnam respondents agree for lack of S&T expert and technology managers in Vietnam. Accumulation of S&T human capital by education and training is recognized as one of the most important factors for Vietnamese social development and economic growth in the long run. The high demand for training programs of S&T experts and researchers implies need for expanding Korean-Vietnam economic cooperation, specially in this S&T field.

Keywords: ODA, Vietnam's S&T system, S&T policies, ODA demand

I. 서 론

베트남은 인구 30억 명의 거대 시장인 아세안(6억)과 중국(13억), 인도(12억)를 연결하는 경제 허브로 한국의 新남방정책에서 핵심대상 국가 중 하나이다. 베트남은 원유, 철광석 등이 풍부한 자원부국으로 양질의 값싼 노동력을 보유한 커다란 성장잠재력을 가진 국가로 한국의 발전모델을 추구하는 전략적인 경제협력 대상 국가이기도 하다.

공적개발원조(Official Development Assistance: ODA)는 개개 공여국의 목적에 따라 다양하게 지원된다. 수원국의 입장에서 보면, ODA는 경제발전을 위한 저축격차(Savings Gap)과 외환격차(Foreign- Exchange Gap)를 메꾸는데 필요한 중요한 재원이 될 수 있다. Two Gap 모형에 따르면 수원국의 투자기회를 충족하기 위해 필요한 저축 부족과 자본재 및 중간재 수입 자금을 조달하기 위한 외환부족을 메꾸기 위해 ODA에 대한 수요가 발생한다는 것이다.[1] 또한 개도국은 정부투자의 재정격차와 기술격차를 메꾸기 위한 기술지원(Technical Assistance)의 ODA가 장단기 성장 촉진을 위한 민간투자 촉진의 재원이기도 하다(Smith & Todaro, 2015). 장기적으로 지속적인 경제성장을 위해 선진국의 전문가, 기술자, 과학자, 교육자, 경제정책자문가에 자문과 기술이전 형태의 해외원조가 개도국에 긍정적인 영향을 줄 수 있다는 것이다. 이는 단순 금융지원이 장기적인 경제성장에 긍정적인 영향을 주지 않았다는 부정론의 관점에서 보면 장기적 성장에 중요한 역할을 하는 과학기술ODA는 더욱 더 중요한 의미를 갖는다.

동남아시아 지역 국가들은 경제규모와 경제발전단계가 서로 상이하지만 아세안을 중심으로 경제통합이 본격화되면서 개발수요가 크게 증가되고 있다. 중저소득국가로 분류되는 베트남은 고용 확대 및 인력개발, 공업화 및 인프라 확충 등 많은 개발과제를 추진하고 있다. 특히, 90년대 중반 이후 아세안을 중심으로 경제통합이 본격화되면서 역내 개발격차 완화와 성장기반 확충을 위해 베트남의 개발수요가 확대되고 있다.

최근 아세안 국가의 경제발전과 사회경제적 불평등 해소 관련 해외원조에 관해서는 국내외적으로 많은 논의가 이루어지고 있으나 국가의 과학기술협력 ODA는 상대적으로 소홀히 다루고 있다.[2] 그럼에도 불구하고 과학기술 발전은 선진국의 경우 지속적 경제성장의 동인으로 작용되며 개도국의 경우 생산성 제고의 결정요인으로서 장기적 경제 성장과 발전의 동력이라고 할 수 있다. 따라서 생산요소의 투입 확대에 의한 성장전략뿐만 아니라 과학기술 발전과 생산기술력 제고 의한 성장전략이 동시에 추진되어야 할 것이다.

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1) Two Gap과 기술격차 모형에 관한 자세한 설명은 Todaro & Smith(2015) 참조.
2) ODA 효과에 대한 논란은 Burnside ad Dollar(2000), Collier(2008), Easterly(2006), 신범철(2017), 등 참조.

한류 붐과 함께 급성장한 한국경제에 대해 베트남과 아세안국가들의 관심이 높아지고 한국의 경제발전 경험을 공유하려는 인식이 확대되면서 한국과의 개발협력뿐만 아니라 과학기술협력 수요 역시 증가하고 있다. 이에 따라 한국의 과학기술 ODA에 대한 베트남과 아세안 국가들의 요구 증가와 협력의 필요성 역시 강조되고 있다. 특히, 中저소득국가인 베트남은 경제성장속도가 빠르고 물적 및 인적 자원이 풍부한 베트남과 기술협력은 양국에 이익이 될 수 있을 것이다. 베트남 입장에서 보면 단기적으로 산업발전을 위한 인프라 확장도 중요하지만 장기적으로 내생적 성장 기반을 확충할 수 있는 역량구축과 기술적 인프라 확대가 더욱 중요할 수 있다. ODA를 통해 Two Gap 축소뿐만 아니라 선진국과의 기술적 격차축소는 지속적 경제성장과 발전에 중요한 요인이기 때문이다.

이러한 베트남과 아세안국가들의 과학기술 수요의 상승은 ODA가 빈곤 퇴치나 저개발 지원뿐만 아니라 장기적으로 경제성장의 핵심요인인 과학기술개발을 위한 한국과 베트남, 한국과 아세안간의 과학기술 ODA 협력 프로그램을 확대할 필요가 있어 보인다.

이 논문은 첫째 베트남의 경제 및 사회적 상황과 한·베트남의 교역 및 ODA 현황을 검토할 것이다. 다음으로 베트남의 과학기술 시스템 분석하고 설문조사를 바탕으로 ODA 수요를 분석하여 과학기술 협력사업 확대 방안을 논의할 것이다. 베트남은 정치적 혹은 전략적으로 보나, 무역상 보완적 관계로 보나 동남아시아에서 중요한 국가 중 하나임은 분명하다. 하지만 지금까지 베트남에 대한 연구가 무역과 경제협력에 집중되어 있고 과학기술체계와 한-베트남 기술협력에 대한 연구가 부족한 것이 현실이다.[3] 이러한 이유로 본 논문은 베트남의 과학기술 ODA수요를 파악하기 위해 베트남 현지의 과학기술 관련 전문가를 대상으로 실시한 설문조사를 기반으로 한-베트남 간 과학기술 협력 프로그램을 논의할 것이다. 특히, 한-베트남의 네트워크 형성에 의한 외부효과를 극대화하여 양국 간 사회 및 경제적 협력을 촉진할 수 있는지가 중요한 관심 사안이다. 이 연구의 결과는 한-베트남간의 다양한 협력 증진 정책과 사업 수행에서 중요한 근거자료로 활용될 수 있을 것이다.

II. 한국의 과학기술 ODA 현황

1. 한국의 ODA 현황과 정책

3) 예컨대, 김학수(1991)는 對베트남 경제협력의 기본전략을 논의하였고 재경부KDI(2005)는 베트남의 민영화, 무역, 인적자원 개발, 거시경제 안정화에 관한 분석 등 대부분 경제협력에 관련된 주제에 제한되어 있음.

외교부에 의하면 “우리 공적원조는 개도국의 빈곤감소와 지속가능한 개발에 기여함으로써 인도주의를 실현하고 국제사회의 평화와 번영을 추구”를 목적으로 하고 있다. 우리 정부는 개발도상국의 경제·사회 발전을 지원하고 지속가능 개발목표(SDGs) 달성 등 국제사회의 노력에 기여함을 표방하고 있다.

한국의 공적원조는 글로벌 ODA의 비중이 0.8%(12억 달러)로 아직 미약한 수준이지만 2006년 이후 그 규모가 지속적으로 증가하는 추세이다.[4] 브뤼셀 행동 계획에서 설정 목표치인 GNI 대비 최빈개도국의 ODA 비율이 0.15%-0.2%의 기준에서 보면 0.04%를 기록한 한국은 OECD DAC 회원국에서 그리스와 함께 가장 낮은 수준에 머무르고 있다.

한국의 ODA 운영체계는 크게 양자 간 협력과 다자 간 협력으로 구분된다. 양자간 협력은 무상원조와 유상원조로 이원화되어 있고 무상원조에 해당하는 무상자금협력과 기술협력은 외교부 감독 하에 원조집행기관인 한국국제협력단(Korea International Cooperation Agency: KOICA)이 집행하고, 유상원조(대외경제협력기금, Economic Development Cooperation Fund)는 기획재정부 감독 하에 한국수출입은행이 집행한다. 다자간 협력의 경우 UN 등 국제기구에 대한 지원은 외교부가, 국제금융기관 등에 대한 출자와 출연은 기획재정부가 주관한다. 전체적으로 유·무상 원조의 효과적인 조정 및 부처 간 원활한 협의를 위하여 국제개발협력 위원회 및 실무위원회가 설치 운영하고 있다.

한국 경제의 위상과 경제력 증대에 상응하여 우리나라 ODA 규모가 크게 확대되어 1990년 이후 매년 평균적으로 약 18%가 상승하였으며 지난 5년(2011-2015년) 동안에는 전체 평균보다 다소 낮은 10.4% 확대되었다.

한국 ODA 규모는 2015년 19억 1,411만 달러 내외이며 OECD 개발원조개발위원회(DAC)에 회원국으로 가입한 2010년부터는 ODA 총액과 양자 및 다자간 ODA가 빠른 속도로 증가하고 있다. 한국의 ODA는 2015년 GNI 대비 0.14%를 기록하고 있고 지속적으로 상승해 왔다. ODA 총액에서 양자 간 무상원조는 14억6,739만 달러, 다자간 무상원조는 4억4,674만 달러이여 전체 유상원조는 5억6237만 달러에 이르고 있다. 양자간 ODA 비중은 전체기간에는 67.1%, 지난 5년간은 75%로 전체 평균보다 상승하였으며 무상원조 비중이 전체 기간 평균 57%이고 지난 5년간 평균은 61%로 다소 상승하였다.

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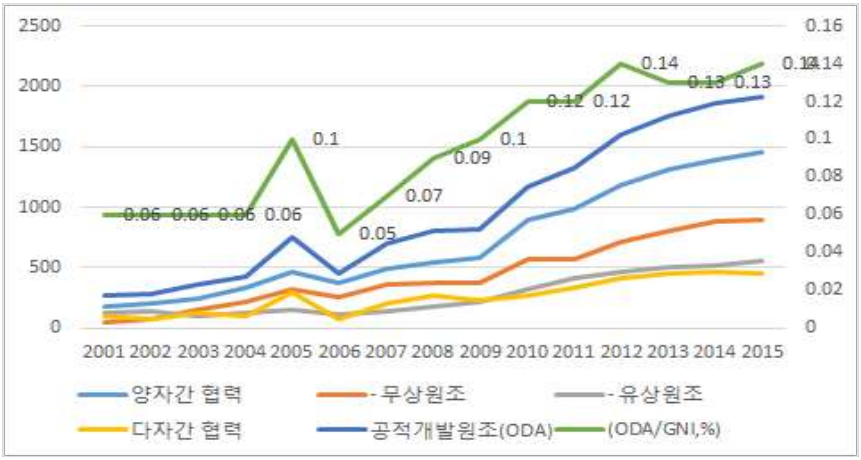
4) ODA의 금액기준으로 볼 때, 2003-2012년 기간 동안 세계에서 가장 크게 기여한 국가는 미국이고, 다음으로 일본, 독일 등의 순으로 나타나고 있다. 2012년 기준 미국 17.2%(260억 달러), 일본 9.5%(145억 달러), 독일 6.7%(102억 달러), 프랑스 6.2%(94억 달러), 영국이 6.0%(90억 달러)의 비중을 각각 차지하고 있다.

<그림 1> 한국의 ODA 추세

(단위: 백만 달러)

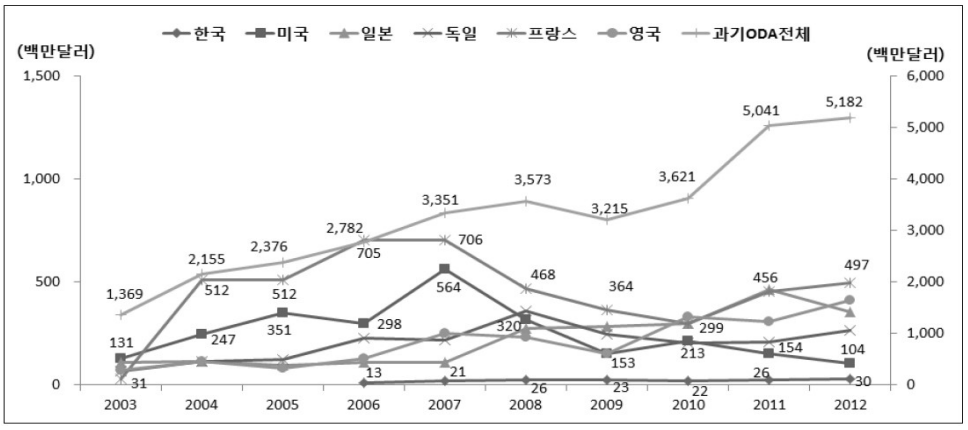


자료) 나라지표 http://index.go.kr/

2. 한국의 과학기술 ODA 현황과 정책

OECD DAC(Development Assistance Committee)에 따르면 2012년 세계과학기술 ODA 규모는 약 52억 달러로서, 전체 ODA 규모의 3.4% 수준이다. 2012년 기준 프랑스가 5억 달러, 영국이 4.1억 달러, 일본이 3.6억 달러, 독일 2.7억 달러, 미국 1.0억 달러 수준으로 각각 나타났으며, 한국은 3,000만 달러로 OECD 국가에 비해 상대적으로 낮은 수준이다.

<그림 2> 주요국별 과학기술 ODA 추세



자료) 강희종(2014), p.95

DAC에 의하면 ODA는 크게 사회인프라, 경제인프라, 생산부문, 다부문 등 4개 분야로 분류된다. 사회인프라는 교육, 보건, 인구정책 및 생식보건, 수자원 및 위생, 공급행정 및 시민사회가 포함한다. 경제인프라는 교통, 통신, 에너지 개발 및 공급, 금융 및 재무 서비스를 포함하고 있는 한편 다부문은 환경, 기타 교육, 연구기관 및 과학기관 등을 포함하고 있다. 마지막으로 생산부문은 농업, 임업, 제조업, 광물자원 및 광업, 건설, 통상정책 및 규정, 관광을 포함한다.

2012년 기준 ODA가 가장 많은 분야는 사회인프라이고, 이어서 경제인프라, 다부문, 생산부문 순이며, 2006년 이전에는 다부문이 가장 적었으나 이후 생산부문을 추월하고 있다. 2012년 기준 분야별 ODA 비중은 사회인프라(39.4%)가 가장 많고, 경제인프라(18.0%), 다부문(8.5%), 생산부문(7.5%) 순이며, 비중 변화의 경우 4대 분야 외 기타부문의 비중이 2009년 이후에는 30% 이하로 낮아짐으로써 2012년에는 4대 분야 합계가 73.4%를 차지하는 등 원조 효율이 증대하고 있다. 4대 분야에서 과학기술ODA를 볼 때, 2003년 2.0%에서 2006년 1.8% 소폭 감소하였다가 2012년에는 3.4%까지 증가하는 등 증가 추세를 보이고 있으나, 개도국의 과학기술역량을 근본적으로 제고시키기에는 부족한 수준이다.

분야별 지원 실적을 보면, 2015년 KOICA의 전체 지원금액 6,372억 원에서 교육분야의 비중이 20.9%로 가장 비중이 크고 기술환경에너지 분야가 17.9%, 보건의료와 공공행정 분야가 각각 16.5%, 농림수산 분야의 비중이 14.7% 등의 순으로 나타나고 있다.

한국의 지역별 ODA 공여는 주로 아시아국가에 집중되어 있고, 동남아시아 국가에 대한 한국의 공적원조는 25%에 달하고 있다. 2010년 정부에서 선정한 26개 중점 협력국 중에서 아시아는 12개국이 포함되었는데 특히 동남아시아 국가로는 베트남, 인도네시아, 필리핀, 캄보디아, 라오스, 동티모르 등 6개국 선정되었다. 지역별 무상원조를 보면 전체 지원금액 6,372억 원 중 아시아 국가들에 대한 원조가 39.7%로 가장 높고 아프리카 21.7%, 중남미 10.8% 등의 순으로 나타나고 있다. KOICA가 지원한 분야 중 기술환경에너지 분야 아사아지역에서 국가별 비중이 가장 높은 국가는 베트남으로 나타났고 필리핀, 인도네시아, 몽골, 미얀마, 캄보디아, 라오스 등의 순으로 나타나고 있다.

아세안 국가들과의 주요 협력 및 지원 분야로는 과학기술, 정보통신기술, 환경보전, 경제발전, 교육, 인재개발 등이 포함된다. 한-아세안 간 구체적 기술협력분야는 명시되지 않으나 CoST(Committee on Science & Technology)와 하위 위원회가 다양한 분야의 과학기술협력을 제안할 수 있다. 현재 주요 협력분야는 기술관리, 마이크로 전자공학, 생명과학, 기상학, 해양과학 등이다. 한국과 아세안은 과학기술분야 대화를 위한 정기포럼을 개최하지 못했으나 CoST와 함께 다양한 협력 사업을 시행해 왔으며 특히, 해양생물학 관련 지원이 진행되고 있다.[5)]

5) 아세안 내 과학기술 협력제도에 관해 자세한 것은 신범철(2016) 참조.

기존 협력사업의 재원은 한국-아세안 특별협력기금에 의존했고, 이후 한국의 지속적 펀드지원을 기대하고 있다. 2004년 한-아세안 정상회의에서 포괄적 협력파트너십에 관한 공동성명에 서명하였고, 2005년 이를 설천하기 위한 한-아세안 행동계획을 수립하였다. 과학기술분야에 과학기술경쟁력 향상을 위한 정보의 교환촉진과 아세안 내과학기술 전문가와 실무자의 능력개발을 위한 과학기술 관리와 혁신지원을 목표하고 있다. 생명과학, 식량 기술, 신소재, 마이크로 전자공학, 기상학, 해양생물학 또는 유전공학분야의 최신기술의 고부가가치 산업분야에서의 협력활동 강화, R&D협력 촉진, 기술개발과 사업화 협력을 통한 아세안 경제발전과 공동체 건설에 기여할 것을 목표로 한다.

III. 베트남 경제 및 과학기술 체계와 정책

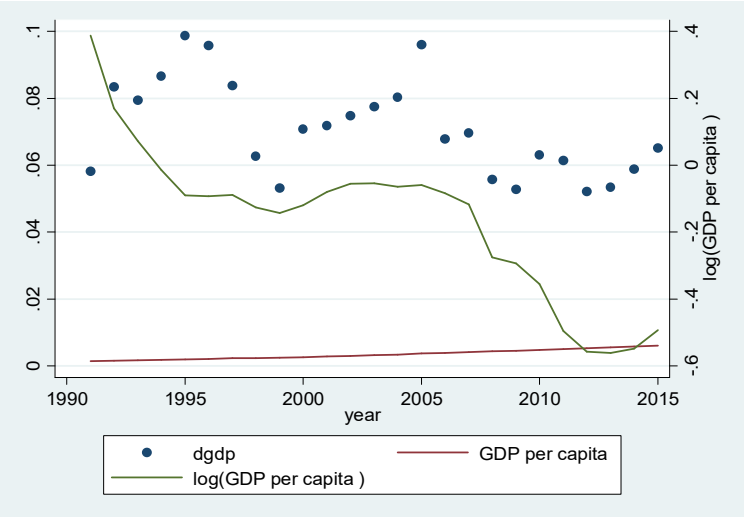
1. 경제 현황 및 추세

1986년에 도입된 도이모이(Doi Moi) 정책과 ODA 유입, 외국인 투자 확대로 베트남 경제가 빠른 속도로 성장하고 있다. 도이모이 정책의 기본적 방향은 시장경제체제의 도입을 통한 국민경제 및 투자 구조 조정, 소유제도의 다양화, 경제관리 메카니즘의 개혁, 국가행정조직의 재구축, 그리고 대외경제관계의 다변화 등이었다(조명철·홍익표, 2000).

1990년 초 이러한 정책이 부분적으로 성공하면서 경제성장이 촉진되었으나 아시안 금융위기로 인한 투자 감소로 다소 경제 성장이 둔화되었다. 하지만 2000년대 해외직접투자가 다시 확대되면서 2000년-2010년 연평균 경제성장률이 7.26%에 이르고 있다. 이후 베트남의 경제성장률은 약 5%로 안정적 상태를 유지하고 있으며 실업률 역시 매우 낮은 편이다.

명목 GDP는 약 1,700억 달러로 세계 58위이며 1인당 명목 GDP가 1,902달러로 세계 135위로 중저소득국가로 분류되어 비교적 안정적인 1인당 GDP 증가가 유지되고 있다. 베트남의 10개년 사회경제발전계획에 의하면, 베트남은 2020년 1인당 GDP를 3000-3200 달러 달성을 목표로 하고 있다.

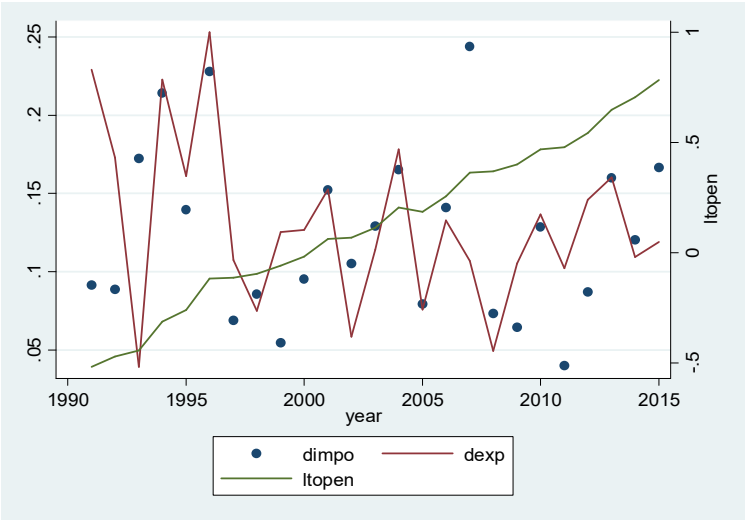
<그림 3> 베트남 경제성장률, 1인당 GDP 및 1인당 실질GDP



주) 경제성장률(dgdp), 1인당 GDP, 1인당 실질GDP.

2012년도에 이어 무역수지 흑자를 기록, 외국투자기업들의 고부가가치 제조업에 대한 투자 확대가 이어지고 있어 이들에 의한 수출구조 고도화로 인해 무역수지 흑자 기조는 지속 유지될 가능성이 높다.

<그림 4> 베트남 수출증가율, 수입증가율 및 무역개방도



주) 수출증가율(dexp), 수입증가율(dimpo), 무역개방도(ltopen)

베트남은 한국의 6위 수출대상국, 16위 수입대상국, 교역대상국으로 9위이다. 베

트남의 입장에서 단일국가 기준, 한국은 3위의 교역국가(수출 4위, 수입 2위)인 셈이다. 2013년 교역규모는 전년대비 약 30.22% 증가한 283억 달러를 기록, 무역흑자는 139억 달러로 베트남은 한국의 4번째 무역 흑자국가이다. 1위의 흑자국은 중국(628억 달러), 2위는 홍콩(258억 달러), 3위는 미국(205억 달러)이다. 수출은 전년대비 약 32.2% 증가한 210.9억 달러, 수입은 25.4% 증가한 71.7억 달러를 기록, 무역수지 흑자는 약 28% 증가하여 139.2억 달러 달성하고 있다. 對베트남 한국기업의 투자 진출이 활발해 짐에 따라 관련 원부자재의 수출이 크게 증가하며 무역수지 흑자 규모 확대를 주도하고 있다. 하지만 베트남의 제조업 수출은 저기술제품에 편중되어 있고 이러한 현상은 2000년 이후 지속되어 오고 있다. 이는 베트남이 지속적 성장을 위해 고부가가치 산업에 대한 투자를 확대하고 기술협력을 통한 제품과 부품의 품질 고도화가 무엇보다 필요함을 시사한다.

베트남의 산업구조를 살펴보면, 1차 산업(농업, 임업, 어업)이 20%, 2차 산업이 39%, 3차 산업이 41%를 구성하고 있다. 전체 인구 중 농업과 임업, 어업에 종사하는 인구가 약 53%를 차지하고 있어 베트남 경제의 대부분을 차지하고 있다. 한국과 중국의 발전 경험의 관점에서 보면 이러한 베트남의 산업구조는 경제 성장과 발전을 위해 변화될 필요가 있음을 시사하고 있다.

2. 베트남 과학기술 체계와 정책

(1). 과학기술 거버넌스

베트남 과학기술정책 관련 조직은 우선 정부부서(Office of Government: OoG)로 과학교육부(Ministry of Science, Technology and Higher Education)가 있고, 31명의 전문가로 구성되어 있는 수상의 자문기관인 과학기술정책위원회(National Council for Science and Technology: NCST)가 있다. 주된 과학기술관리 부서로 과학기술부(Ministry of Science and Technology: MoST)와 베트남의 과학기술원(Vietnam Academy of Science and Technology: VAST)로 구성되어 있다.

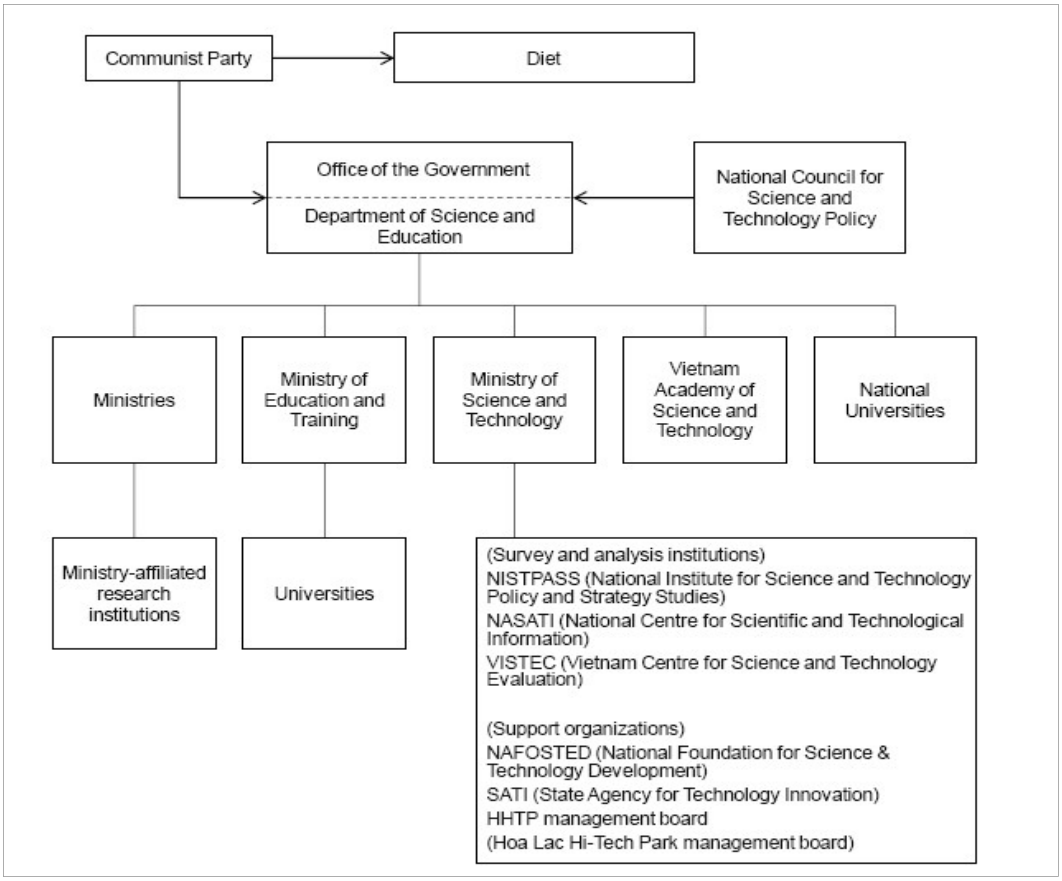
과학기술부(MoST)는 일반적인 과학기술 문제를 관리하는 부서로 전체 정부의 과학기술 사정책의 계획과 조정을 수행하며, 원자력, 지적재산권, 상품표준 및 기상 업무, 연구와 분석 수행, 과학정책의 기획부서 그리고 연구개발 지원기관이다.

OoG 부서 산하에 과학기술관련 활동을 수행하는 연구기관이 귀속되어 있으며, 교육훈련부는 대학과 같은 고등교육기관을 담당하고 농업발전부는 베트남 농업과학협회와 많은 연구소를 관리하고 있다.

베트남의 과학기술원과 베트남사회과학원(Vietnam Academy of Social Science:

VASS)이 대학의 기초연구능력과 개별 기업의 연구활동 강화를 목적으로 과학기술 촉진정책을 수행하고 있다. VAST 와 VASS는 수상의 직속기관으로 다수의 중앙 및 지방 연구소가 여 기관에 지배되고 있으며 연구를 담당하는 총 대학의 숫자는 150개이고 이 중 하노이와 호치민 시의 두 개의 베트남 국립대학이 총리 직속 산하에 있다.

<그림 5> 베트남 정부 조직 구성



(2). 과학기술 관련 주요 제도와 정책

과학기술을 촉진하기 위해, 2000년 과학기술법, 2005년 지식재산권법, 2007년 과학기술이전법, 2009년 하이텍법 등 과학기술촉진 기본법을 제정 시행하고 있다. 이 중 과학기술이전법은 사회경제발전, 자원의 효과적 활용, 환경보호, 문화형성, 국민

삶의 질 향상, 국방과 안보 등에 관련된 과학기술 촉진을 목적으로 하고 있다. R&D 연구기관, 대학, 과학기술서비스 조직과 연구의 역할 분담, 책임과 의무 사항으로 중앙 및 지방 정부의 기획, 연구수행기관의 선정, R&D 수행평가, R&D 결과 활용관련 사항이 포함되어 있다. 또한 하이텍기술의 발전에 대한 투자 결정, 국제 협력 촉진 및 산업발전 정책 사항 등이 규정되어 있다. 특히 하이텍법은 주로 다음 4가지 기술관련 사항을 규정하고 있디. 즉, IT, 바이오텍, 신재료기술, 자동화기술에 관련한 사항이다.

과학기술 촉진 정책으로 다음과 같은 정책이 포함된다. 인적자원개발, 과학기술에 의한 고용과 혜택, 우선적, 호혜적 예산 배정, 사적 투자 촉진, 중앙 및 지방 정부 과학기술 발전기금 설립 및 조성, 조세체계, 차관 및 ODA 활용 방안 설정 등이다.

베트남 전체 정부예산과 과학기술예산은 증가하고 있으나 전체 예산 중 과학기술예산 비중은 다소 감소하고 있다. 2013년 기준을 보면 정부 예산은 약 1,000경 Dong(약 5경원)이고 이중 과학기술예산은 20경 동(약 4천억원)이다. 중앙정부와 지방정부 예산 비중은 6:4이며 지방정부의 예산 부담이 상대적으로 높은 편이다.

<표 1> 베트남의 과학기술 예산

연도	과학기술예산	증가율(%)	총 예산에서 차지하는 비중
2006	5,429		1.85
2007	6,310	16.22	1.81
2008	6,585	4.36	1.69
2009	7,867	19.46	1.62
2010	9,178	16.66	1.60
2011	11,499	25.28	1.58
2012	13,168	14.51	1.46
2013	14,144	7.41	1.44

자료) OECD(2014), Science and Technology in Vietnam

베트남은 2011년 1월 10개년 사회경제발전전략 2011-2020(Socio-Economic Development Strategy)을 수립한 바, 10개년 과학기술발전전략은 이 발전전략에 포함되어 있다. 10개년 과학기술발전 전략의 목적은 인문과 사회과학, 자연과학과 기술발전의 조화, 과학기술을 현대산업사회로의 발전에 원동력으로 활용하고자 하는 것이다.

2020년까지 일부 과학기술분야에서 아세안 국가 수준 더 나아가서 세계 수준에 도달하는 것이다. 2020년까지 GDP에서 과학기술비용이 차지하는 비중을 2%까지 확대하고, 과학기술예산 비중을 2%이상, 하이텍 상품의 생산비중을 45%까지 높이고, 인구 1000명 당 연구자와 엔지니어 숫자를 11-12명으로 증가시키는 것 등이다.

(<표 2> 참조)

<표 2> 과학기술 정책의 목표

지표	2015년	2020년
과학기술 비용이 GDP에서 차지하는 비중	1.5%	2%
정부예산 중 과학기술예산이 차지하는 비중	2% 이상	2% 이상
1000명 인구당 연구자 및 엔지니어 숫자	9-10	11-12
GDP 중 하이텍 상품의 비중		45%
하이텍 관련 엔지니어 숫자	5,000	10,000
국제수준의 연구기관 숫자	30	60
과학기술 기업의 숫자	3,000	5,000

베트남 정부에 의하면 2011년 베트남의 R&D 지출은 5경 2,940조 동(Dong)(약 265억 원)으로 GDP 대비 0.21%에 해당한다. 이는 아세안국가인 싱가포르와 말레이시아 보다 낮고 태국과는 비슷 수준이지만 인도네시아와 필리핀 보다는 높은 수준이다(UNESCO Report 2010).

2011년 부문별 R&D 지출의 기금원천별 구성은 정부가 64.5%, 국영기업을 포함한 기업이 28.4%, 대학이 3.13%, 해외부분이 4%로 나타나고 있다. 2002년 정부가 74.1%, 기업이 18.1%인 것과 비교해보면 정부 부문이 감소되고 있음을 알 수 있고 이는 정부가 정부의 R&D 비중을 축소하겠다는 정책 목표가 반영된 것으로 볼 수 있다.

R&D 활동 유형별 비중을 보면 기업을 제외한 공공연구기관과 대학에서 기초연구 비중이 30%, 응용연구개발이 53%, 개발실험이 17%를 차지하고 있다. 공공연구기관을 보면 이 비중은 각각 35%, 50%, 15%이고 대학의 경우 각각 41%, 50%, 9%로 나타나고 있다. 이는 공공연구기관의 활동이 대학의 연구 활동보다 훨씬 크게 나타나고 있으며 공공연구기관이 기초연구 비중이 높고 개발프로젝트는 상대적으로 작은 것으로 해석된다. 2011년 연구자의 숫자는 105,230명이고 이중 여성연구자가 43,844명으로 41%에 해당하여 여성연구자가 상대적으로 높은 비율로 나타나고 있다(OECD, 2014).

IV. 베트남 과학기술 ODA 수요 조사

베트남의 과학기술 ODA 수요 조사를 위해 2016년 11월-12월 기간 동안 국내 및 베트남 현지 전문가와의 면담과 설문조사를 실시하였다.[6] <표 3>에 제시된 베

6) 이에 대해 자세한 것은 신범철 외(2016) 참조.

트남 과학기술 교육 프로그램 수요를 보면, 베트남 전문가들 역시 인도네시아, 캄보디아, 미얀마와 같이 자국 내 과학기술정책 관련 전문가와 기술경영전문가가 부족하다고 인식하고 있다. 반면 자국의 과학기술 중요성의 설문조사 결과는 평균 3.68로 나타나 인도네시아, 캄보디아, 미얀마 등 동남아시아 국가들 보다 상대적으로 낮게 나타나고 있다.

다른 한편 과학기술 교육훈련 프로그램에 대한 수요가 매우 높게 나타났으며 한국에서의 교육보다는 베트남 자국 내에서 교육 받기를 더 선호하는 것으로 나타나고 있다. 한국 내 과학기술 정책 관련 교육훈련 프로그램과 기술경영 프로그램이 한국 내에서 진행되는 것을 동의하기는 하나 자국 내에서 프로그램을 이수하기를 더 선호하고 있다.

기술경영 프로그램에 대한 수요 역시 높게 나타나고 있으며 큰 차이는 아니나 한국 보다는 자국에서 교육훈련을 받기를 더 선호하는 것으로 나타나고 있다.

<표 3> 과학기술 교육프로그램 수요

설문항목	표본수	평균	표준편차	최소	최대
• 베트남 내 다수 과학기술정책 전문가 존재	20	2.95	0.69	2	4
• 베트남 내 다수 기술경영 전문가 존재	20	3.25	0.72	2	5
• 베트남 내 과학기술 프로그램 중요성	19	3.68	0.82	2	5
• 베트남 내 과학기술 교육훈련 프로그램에 대한 수요가 높음	20	3.45	0.83	2	5
• 한국의 과학기술 정책 관련 교육훈련 프로그램에 다수 참가 여부	20	3.20	0.77	2	5
• 베트남 내 기술경영프로그램의 중요성	20	3.85	0.75	2	5
• 베트남 내 기술경영프로그램의 수요가 높음	20	3.60	0.75	2	5
• 한국 내에서의 기술경영 교육훈련프로그램 참가 선호	20	3.40	0.68	3	5

<표 4>에 제시된 결과를 보면, 베트남 내에서 과학기술 교육훈련 참여여부에 대해 53%가 Yes라고 답변한데 비해 한국에서의 교육훈련 참여는 5%만이 Yes라고 답하여 한국 내에서의 과학기술훈련 참여에 대해 부정적이다.

한국에서의 과학기술 교육프로그램의 적정기간은 대체로 6개월에서 1년 기간 사이로 나타나고 있으며 4개국 평균 수준이다.

<표 4> 과학기술 교육프로그램 내용

설문항목	표본수	평균	표준편차	최소	최대
• 베트남 내에서 과학기술 교육훈련 선호 여부	19	1.53	0.51	1	2
• 한국에서의 과학기술 교육훈련 선호 여부	19	1.05	0.23	1	2
• 한국에서의 과학기술 교육훈련 적정 프로그램 기간	19	2.05	1.18	1	4

<표 5>에 제시된 베트남의 미래 과학기술정책 분야 교육프로그램의 수요를 살펴보면, 우선 베트남은 산학연 연계와 과학기술 법과 행정 관련 정책 교육프로그램에 대한 수요가 평균 3.95로 가장 높게 나타나고 있다.

다음으로 과학기술 인적자원 개발, 과학기술과 국가발전, 국가 R&D, 테크노파크에 관련된 정책 교육에 대한 수요 순으로 나타나고 있다. 하지만 국가 과학기술 계획과 기술예측, 지적재산권, 국가 과학기술혁신인프라 정책에 대한 교육프로그램 수요는 다른 프로그램에 비해 미세한 차이지만 상대적으로 낮게 나타나고 있다.

<표 5> 미래 잠재적 과학기술정책 관련 교육프로그램 수요

관련 프로그램	표본수	평균	표준편차	최소	최대
• 과학기술과 국가발전	19	3.84	0.50	3	5
• 국가 과학기술 계획	20	3.75	0.55	3	5
• 과학기술법과 행정	19	3.95	0.78	3	5
• 기술예측	20	3.75	0.97	2	5
• 지적재산권	20	3.75	0.72	3	5
• 국가 과학기술혁신 인프라 구조	20	3.60	0.50	3	4
• 공공연구소	19	3.79	0.79	3	5
• 산학연 연계	20	3.95	0.76	3	5
• 과학기술 인적자원 개발	20	3.90	0.79	3	5
• 국가 R&D 프로그램	20	3.80	0.95	3	5
• 테크노파크	20	3.80	0.83	3	5
• 지역혁신	19	3.74	1.05	2	5

<표 6>에 제시된 미래 잠재적 기술경영 분야 교육프로그램 수요를 보면, 기술이전 사업화 교육수요가 인도네시아와 여타 국가에서처럼 가장 높은 수요를 보였다. 다음으로 R&D 글로벌화, 연구자 및 조직 경영, 전략적 기술경영에 교육 수요 등의 순으로 나타나고 있다. 그러나 기술혁신이론, 기술로드맵, 기술벤처 분야의 교육은 전체 4개국에서처럼 큰 차이는 아니지만 상대적으로 낮은 수요를 보이고 있다.

<표 6> 미래 잠재적 기술경영 분야 교육프로그램 수요

분야	표본수	평균	표준편차	최소	최대
• 기술혁신이론	19	3.58	0.77	3	5
• 기술로드맵	20	3.50	0.69	3	5
• 기술이전 사업화	20	4.05	0.76	3	5
• 연구자 및 조직경영	20	3.80	0.70	3	5
• 기술벤처	20	3.40	0.50	3	4
• 산업R&D경영	19	3.58	0.69	3	5
• R&D 글로벌화	20	3.85	0.67	3	5
• 전략적 기술경영	20	3.65	0.81	3	5

V. 요약 및 시사점

베트남 경제는 1986년 채택된 Doi Moi(혁신) 정책을 통해 빠른 속도로 성장하고 있다. 하지만 이는 베트남의 저임금비용을 활용하기 위한 한국과 일본의 투자로 유발된 것이고 할 수 있다. 가공산업을 기반으로 하고 있는 베트남 경제에서 인건비가 상승할 경우 향후 베트남 경제성장이 지속적으로 이루어질 것인지는 아직 미지수이다.

베트남은 2000년대 지식재산권법, 과학기술 이전법, 과학기술 촉진법, 하이텍법 등을 제정 시행해 오고 있다. 특히, 하이텍산업의 발전과 이에 대한 정부의 지원이 매우 중요한 정책 아젠다로 대두되고 있다. 과학기술정책은 베트남 정부의 핵심적인 정책이며 적극적 지원정책을 추진해오고 있으나 이러한 정책 효과는 여전히 미지수이며 향후 지속적 관심이 요청되고 있다.

해외개발원조는 개발도상국가 빈곤축소, 다양한 재난으로 부터의 탈피, 지속적 경제발전과 성장 촉진 등의 다양한 목적에 따라 이루어진다. 긴급 재난구조 지원이나 빈곤축소, 보건과 안전을 위한 원조는 상대적으로 긍정적인 효과를 거두고 있지만 장기적 경제성장 촉진을 위한 지원의 효과는 여전히 논란이 되고 있다. 해외개발원조의 효과를 제고하기 위해 다자체계에 의한 지원 확대, 예측가능성 제고로 안정적 지원, 지원금의 책임성과 투명성 강화, 지원의 단순화와 결과에 집중 등 다양한 정책이 수행되고 있다. 하지만 지속적 경제성장 촉진을 위해서는 전문가와 과학자, 교육자, 정책자문가 등의 육성을 위한 지원과 선진국과의 과학기술 ODA와 협력사업이 확대될 필요성이 있다.

베트남에 대한 과학기술 ODA수요 분석 결과, 과학기술정책과 기술경영 전문가의 부족과 과학기술 프로그램의 중요성 인식하고 있다. 우선 베트남은 산학연 연계 정책과 기술이전 사업화에 관련된 기술경영 교육프로그램의 수요가 가장 높게 나타난다. 즉, 산학연 연계와 과학기술 법과 행정 관련 정책 교육프로그램에 대한 수요가 평균 3.95로 가장 높게 나타나고 있다. 이는 산업화 촉진을 통한 경제발전에 필요한 미래 과학기술인재를 양성하기 위해 한-베트남 협력프로그램이 유용함을 시사한다. 예컨대, 한-베트남 공동학위프로그램을 운영하여 산학협동사업에 참여하고 현장훈련 기회를 확대하자는 것이다.

다음으로 과학기술 인적자원 개발, 과학기술과 국가발전, 국가 R&D, 테크노파크에 관련된 정책 교육에 대한 수요 순으로 나타나고 있다. 하지만 국가 과학기술계획과 기술예측, 지적재산권, 국가 과학기술혁신인프라 정책에 대한 교육프로그램 수요는 다른 프로그램에 비해 미세한 차이지만 상대적으로 낮게 나타나고 있다.

마지막으로 미래 잠재적 기술경영 분야 교육프로그램 수요를 보면, 기술이전 사업화 교육수요가 가장 높은 수요를 보였고 R&D 글로벌화, 연구자 및 조직 경영, 전략적 기술경영에 교육 수요 등의 순으로 나타나고 있다. 그러나 기술혁신이론, 기술로드맵, 기술벤처 분야의 교육은 여타 아시아국가와 비교해서 큰 차이는 아니지만 상대적으로 낮은 수요를 나타내고 있다.

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[웹사이트]
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KOTRA, 해외비즈니스 정보 포털 http://www.globalwindow.org

『국제지역연구』편집위원회

국제지역학회 사무국
(06974)
서울특별시 동작구 흑석동 84, 중앙대학교 310관
(경영경제관, 100주년 기념관) 1216호
Tel: 010-8772-6344
E-mail: iaasadm@gmail.com

국제지역연구 편집위원회
(30147)
세종특별자치시 시청대로 370 세종국책연구단지
과학인프라 B동 701호
Tel: 044-287-2123
E-mail: iaas2019@naver.com