



Munich Personal RePEc Archive

The Viet Nam National Innovation System: A Diagnostic Review

Nguyen, Anh and Nguyen, Mai and Doan, Hung

Development and Policies Research Center (DEPOCEN)

May 2013

Online at <https://mpra.ub.uni-muenchen.de/58712/>

MPRA Paper No. 58712, posted 24 Sep 2014 06:22 UTC

THE VIET NAM NATIONAL INNOVATION SYSTEM

A DIAGNOSTIC REVIEW

Nguyen Ngoc Anh^{*}, Doan Quang Hung^{}, and
Nguyen Thi Phuong Mai^{***}**

^{*}Chief Economist, Development and Policies Research Center (DEPOCEN), Viet Nam
E-mail: ngocanh@depocen.org

^{**}Lecturer, Foreign Trade University, and Associate Researcher, DEPOCEN, Viet Nam
E-mail: hungdq@ftu.edu.vn, quanghung@depocen.org

^{***}Senior Researcher, DEPOCEN and National Institute for Science and Technology
Policy and Strategic Studies (NISTPASS), Viet Nam
E-mail: phuongmai@depocen.org

Abstract

National Innovation Systems (NIS) plays a crucial role in countries' efforts to catch up with technological advances which are critical for the long-term sustainable economic growth and development of countries. This paper provides a diagnostic review of the NIS in Viet Nam such that appropriate policies could be devised and implemented. This paper provides an analysis of the institutions, policies and linkages that characterize Viet Nam's national innovation system. It focuses on the strengths and weaknesses of the nation's system of innovation that Viet Nam has put in place in order to promote technological innovation for economic growth and development. The first part provides an overview of Viet Nam's 20 years of economic reform as the context within which innovation takes place. The remainder offers a deeper insight into Viet Nam's NIS, starting with the legal framework and institutions, including laws on science and technology, legislative government bodies and other supporting agencies. The current funding of R&D activities in general and in different sectors is given along with government's attempts to encourage investment or financial support for R&D. The key actors in Viet Nam's NIS are identified and investigated. The conclusion is a summary of rooms for improvement in Viet Nam's NIS.

Introduction

The Government of Viet Nam has set an ambitious target for the country. According to the Socio-Economic Development Strategy approved by the government, by 2020 Viet Nam will basically attain the status of a middle income industrialized country and science and technology (S&T) development is identified as key driving forces of the country's industrialization and modernization program. To achieve this goal of industrialization, growth will have to accelerate and productivity will have to rise rapidly. This necessarily implies diversification away from the low-valued added sectors towards industrialization, technology and higher productivity. Achieving these ambitious goals will necessarily

involve, among other things, a more effective application of science, technology and innovation (STI) in the economy in order to drive productivity growth and diversification in production.

NIS play a crucial role in countries' efforts to catch up with technological advances which are critical for the long-term sustainable economic growth and development of countries. Viet Nam has in place many of the individual components necessary for an efficient and effective STI system. Like many other developing countries, to date, however, the role played by STI in Viet Nam's development has been limited. The national innovation systems in developing countries such as Viet Nam are uncoordinated and fragmented, and thus constitute a

major problem in building the country's indigenous technological capabilities needed to strengthen sustainable economic development.

Viet Nam's government recognizes the role of knowledge and innovation in transforming the economy, reducing poverty and increasing the country's competitiveness in international and regional trade. This recognition is reflected in various Government national programs, such as the National Technology Innovation Program to 2020 approved by Prime Minister on 10th May 2011, the Program on National Products Development to 2020 approved by Prime Minister on 31 December 2010, the National Program on High Technology Development to 2020 approved by Prime Minister on 1 December 2010 and the Action Program in implementation of Strategy for Socio-economic Development 2011-2020 approved by Minister of Science and Technology in 2011. However, these policies need to be backed up by specific actions as the country's national innovation system is relatively small and underdeveloped compared to those of middle-income developing countries. There is still much more that the Government of Viet Nam needs to do to develop and stimulate the growth of a national system of innovation.

This paper provides an analysis of the institutions, policies and linkages that characterize Viet Nam's national innovation system. It focuses on the strengths and weaknesses of the nation's system of innovation that Viet Nam has put in place in order to promote technological innovation for economic growth and development. The first section is a brief overview of the country's economic setting. It discusses economic trends, foreign direct investment (FDI), and the trade policies and exports of Viet Nam. The second section focuses on the NIS. The last section offers recommendations for building the national innovation system to enable

Viet Nam to achieve the status of a middle-income economy.

Viet Nam's economic performance

According to Nguyen *et al.* (2011), after 20 years of reform, Viet Nam has put in place the fundamentals of a market economy and has opened up the economy to international flows of capital and trade in goods and services. The emergence of a market-based economy, with market-oriented institutions, a stable macroeconomic environment, and government support for business development, has allowed Viet Nam to:

- unlock the potential of its agriculture sector, turning Viet Nam from a food-hungry country to the world's third-largest rice exporter;
- encourage the development of a vibrant domestic private sector;
- attract substantial FDI; and
- realize its comparative advantages and gain more benefits from international trade.

Since the 1989 reforms, Viet Nam has made remarkable achievements in terms of GDP growth, macroeconomic stabilization, export expansion, and poverty reduction. The country is now recognized as being among the most successful developing countries in terms of economic growth and poverty reduction. During 1990–2008, the annual GDP growth rate averaged more than 7 per cent, and Viet Nam's growth rates today remain among the highest.¹

High and continuous GDP growth rates and successful economic development from 2000 to 2008 have resulted in significant improvements in the population's welfare and in substantial poverty

reduction. According to the Viet Nam Household Living Standard Survey, the total poverty incidence declined from 58 per cent in 1993 to 37 per cent in 1998, 29 per cent in 2002, 19.5 per cent in 2004, and 16 per cent in 2006 (SRV 2003; Nguyen 2009). In addition, improvements have been made in other aspects of human welfare — such as the sharp rise in the percentage of literate adults (to over 90 per cent), longer life expectancy (over 70 years), and a lower mortality rate for children less than five years old (40 per 1,000 live births in 2003).

During the course of transition to a market economy, Viet Nam's economy experienced gradual changes in terms of sectoral and ownership structures. During this period, the focus of the economy shifted toward industrialization and modernization. The proportion of agriculture, forestry, and fisheries in GDP declined from more than 27.2 per cent in 1995 to 20 per cent in 2010. At the same time, the share of industry and construction in GDP rose from about 28 per cent in 1995 to 41 per cent in 2010. The share of the manufacturing subsector (within the industry and construction sector) increased from 15 per cent in 1995 to 20 per cent in 2010, while the share of the services sector has remained at about 30–40 per cent in recent years.

The second important structural shift has been the change in the ownership structure of the economy. The share of the state-owned sector has decreased from more than 40 per cent in 1995 to 33 per cent in 2010, whereas the FDI sector has steadily raised its share from 6.3 per cent in 1995 to 19 per cent in 2011, demonstrating its increased role as an integral component of the economy. The private sector has also increased its role, accounting for more than 12 per cent of

the economy in 2011. Business households remain an important sector of the economy, accounting for 30 per cent of GDP. However, in terms of growth, the domestic private sector and the FDI sector have the highest growth rates, typically over 10 per cent per year.²

Investment and capital formation have played a key role in Viet Nam's successful economic growth strategy. The investment-to-GDP ratio has increased considerably from 28 in 2000 to a peak at 43 per cent in 2007. This is a high investment level, especially for a low-income country.³ Until 2006, the state sector was the most important source of investment in Viet Nam. But the state's share in investment has declined from 60 per cent in 2001 to 29 per cent in 2008 as private domestic investment and FDI have increased. The non-state domestic sector has increased steadily to become a key source of investment. Private sector investment increased from 27.6 per cent in 1995 to 40 per cent by 2008.⁴ FDI accounted for 30 per cent of investment in the mid-1990s, but fell to 20 per cent in the wake of the Asia financial crisis. Since then, the share of FDI in total investment continued falling until 2006. In 2007–08, however, FDI inflows increased substantially, fueled partly by government reforms associated with WTO accession (Figure 1), which created a buzz among international investors about Viet Nam's prospects. The reforms relaxed rules restricting FDI and made Viet Nam a more attractive FDI destination. Indeed, in these two years, FDI became the country's most important source of investment.

Viet Nam has also seen a steady growth in its international trade over the period. The average annual growth rate of exports and imports was about

¹ GDP growth declined during 1997–99 due to the Asian financial crisis and the dissipation of the effects of reform. Since 2000, the economy has regained its momentum. Its annual growth rate exceeded seven per cent — reaching 8.5 per cent in 2007 — then dropped back to an estimated 6.2 per cent in 2008, owing to the effects of the global recession.

² This shift remains slow as reflected in the relatively stable and significant share of GDP owned by the state sector and partly explained by the slow progress of equitizing SOEs.

³ The efficiency of the high level of investment has been questioned by various researchers owing to the high ICOR relative to other countries, such as Taiwan (Province of China), China, or Republic of Korea, when these countries were at the same stage of economic development. See also *Rebalancing Growth in Asia* by Prasad (2009).

⁴ Jensen and Tarp (2006) point out that private savings to fund private investment come as much from retained earnings of firms as from savings by households. Reinvestment of corporate profits appears to be an important means of maintaining high rates of investment and growth.

The Viet Nam national innovation system

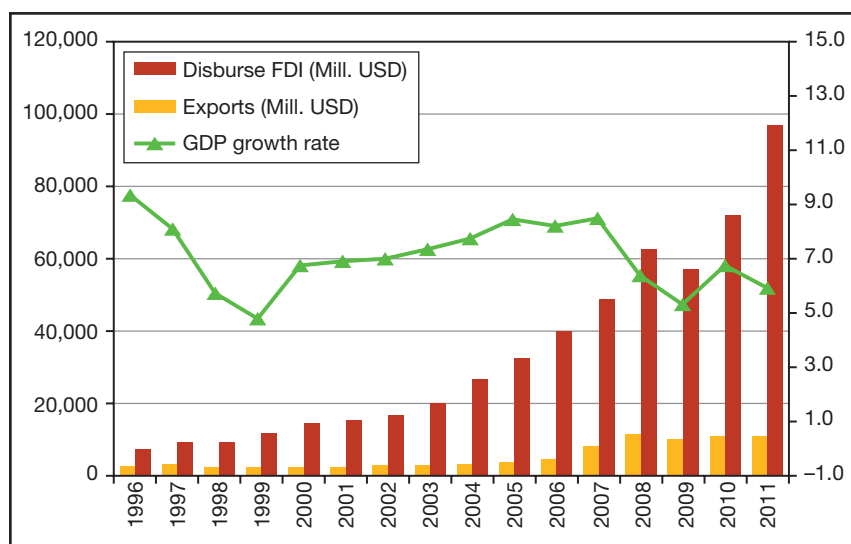


Figure 1: Viet Nam's economic performance up to 2011

Source: GSO

20 percent. The total value of international trade over GDP soared to 150 per cent in 2007 from 61 per cent in 1994. The structure of imports and exports has been substantially changed over the course of development. The composition of Viet Name's exports has gradually reflected the success of the industrialization process. The share of manufactured

products — particularly labor-intensive products like textile and garments, footwear, and seafood — has been increasing and these now have replaced traditional agricultural products. In spite of its fast growth rates, Viet Nam's manufactured export volume is still small in compare with other comparators and only marks the beginning of a transition to a higher

value economy. According to data from UNCOMTRADE Viet Nam's export share accounts for only a small proportion in world markets, accounting for only 0.74 per cent of world trade for manufactures in 2008.

The technology content of Viet Nam's export, an essential indicator of industrial capacity and competitiveness shows significant improvement. Table 1 shows the technological structure of manufactured export of Viet Nam and comparators in 2000 and 2008.⁵ It is clear that Viet Nam is the country that has biggest share of low-tech products in manufactured exports. From 2000 to 2008, low-tech export is still above 65% of total manufactured exports. High-tech and resource-based exports also have minor decrease while medium-tech exports change is most remarkable, from 10% in 2000 to 15% in 2008. It is a good signal in the trend of structure changing in Viet Nam: medium-tech export is gradually increasing while resource-based exports are (slowly) going down. Value of medium-tech exports in 2008 increased more than eight times in comparison with the year 2000.

Table 1: Technological structure of manufactured exports (% , 2000, 2008)

Country	2000				2008			
	HT	MT	LT	RB	HT	MT	LT	RB
Viet Nam	11%	10%	65%	14%	10%	15%	67%	8%
China	21%	24%	45%	9%	30%	28%	33%	9%
India	5%	13%	47%	34%	8%	20%	27%	45%
Brazil	15%	33%	17%	35%	10%	37%	11%	43%
Chile	1%	13%	6%	80%	1%	10%	3%	86%
Indonesia	15%	20%	32%	34%	6%	23%	23%	48%
Malaysia	55%	21%	10%	14%	34%	24%	13%	29%
Philippines	69%	12%	12%	7%	62%	16%	8%	14%
Thailand	32%	27%	22%	19%	23%	38%	16%	24%
Republic of Korea	35%	35%	18%	12%	28%	44%	12%	16%
Singapore	59%	21%	7%	13%	45%	22%	7%	27%
Taiwan (Province of China)	43%	28%	24%	4%	36%	32%	19%	13%
Mexico	24%	52%	18%	6%	19%	58%	13%	10%

Note: HT: high tech group; MT: medium tech group; LT: low tech groups; RB: resource-based export group

Source: UNCOMTRADE

⁵ In order to analyze the evolution of the technology content of Viet Nam manufactured exports, we adopted the technological classification of UNCTAD to classified world trade commodities, including Viet Nam, into high-tech group, medium, low-tech groups and resource-based export group. This exports structure is different from country to country and reflects the technological and industrial structure of the country.

A diagnostics of Viet Nam's national innovation system

STI policy regime

Legal framework and institutions

After more than 20 years of economic reform, changing from a centrally planned economy into the market economy, Viet Nam has undergone significant economic growth and become a lower 'middle-income' country in 2010. The country's patterns of growth change as income levels change. To avoid the middle-income, Viet Nam realizes that it needs to re-structure the economy and become an industrialized country. For industrialization to be realized, the education policy and Science and Technology (S&T) policy have to play important roles. For this purpose, the Viet Name government seems to have put into place a quite comprehensive legal framework for the development of S&T activities. The Law on Science and Technology promulgated in 2000 is served as backbone for the innovation in the country. In addition a range of many other regulations are in place. They include (i) Law on Intellectual Properties (2005) and Amendments of and Additions to some articles of Law on Intellectual Properties (2009), (ii) Law on Standardization and Technical Regulations (2006), (iii) Law on Technology Transfer (2006), (iv) Law on Good and Product Quality (2007), (v) Law on High Technology (2008), and (vi) Law on Nuclear Energy (2008). These laws and regulations have laid the essential foundation for the NIS. More recently, the Science and Technology Strategy 2011–2020 was approved in 2010 which sets out specific targets for the future development of Viet Nam NIS in the next 10 years.

According to current legislation, National Assembly (NA) and Government of Viet Nam (GOV) are in charge of approving national strategies and legislation (i.e., those listed above) for S&T development and innovation. The Committee of Science, Technology and Environment (under NA) and Department of Education, Science, Technology and Environment

(under GOV) assist these two organizations to make major decisions on innovation issues in Viet Nam.

In the realm of S&T activities, the Ministry of Science and Technology (MOST) is supposed to be the key actor which is mandated to oversee S&T activities, to formulate S&T policies and incentive programs to be submitted to the national government for approval, and to monitor the implementation of S&T strategy plans. Other line ministries such as Ministry of Education and Training (MOET), Ministry of Planning and Investment (MPI), and Ministry of Finance (MOF) are also important players in the national innovation system. The MPI and MOF are responsible for formulating policies and incentives for promoting innovation in Viet Nam. The National Council for Science and Technology Policy plays an advisory role. At the sub-national level, there are provincial departments for science and technologies (DOST) overseeing their respective regional and local S&T and innovation activities.

Besides these administrative agencies there are a number of other agencies that support innovation and R&D activities. These agencies are, however, mostly publicly funded bodies such as the National Fund for S&T Development, National Programs for S&T development, State Agency for Technology Innovation (SATI), the National Foundation for Science and Technology Development (NAFOSTED) provides funding for basic research, and the National Agency for Science and Technology Information (NASATI) and national programs for laboratory development. These agencies are usually attached to governmental authorities or line ministries.

Public funding for STI activities

In order for industrial policy to be successful and for the industrial base to develop to the point that it can be self-sustained, Viet Nam needs to have good domestic capacity to develop the industrial base. However, the investment by the country

into R&D, innovation and higher education does not seem to complement other interventionist industrial policies and support the development of the industrial base. Although Viet Nam has spent two per cent of its state spending on science and technology equivalent to 0.5 per cent of GDP since 2001, in absolute amount the figure is modest as compared to other countries. In particular, investment in R&D was nearly USD 400 million in 2007 only.⁶ The non-state sector invests around another 0.1 per cent of GDP in S&T thus increasing national investment in S&T to a total of 0.6 per cent of GDP. To put these figures in perspective, the EU invests 1.95 per cent of its GDP, Japan 3.15 per cent, China 1.31 per cent, the US 2.59 per cent, and Republic of Korea nearly per cent per cent. In terms of capacity, Viet Nam invests around USD 5 (2007) per capita while China invests USD 20 in 2004 and Republic of Korea USD 1,000 in 2007. In addition, this tiny amount of S&T investment is spread thinly among central and local government agencies. This would in turn render the S&T and innovation policies ineffective. To increase the investment for S&T activities, the government is looking to the private sector with the hope that the ratio of public to private investment in R&D would be 1:2 by 2010. However, due to its public nature and risks associated with S&T policies and investment, it would be difficult to achieve this target.

In recent years, Viet Nam has attempted to increase financial incentives for investment in science and technology and innovation. The government extends tax incentives to enterprises engaged in R&D and for investment in technologically advanced machinery and equipment. These include VAT exemptions on machinery that must be imported from abroad, tax deductions for expenditure on science and technology, and business income tax exemptions for income from contracts related to science and technology and for share dividends from joint stock companies.⁷ In addition to the general incentives available to all enterprises, specific

⁶ <http://english.vietnamnet.vn/reports/2008/11/811926/>

⁷ <http://english.vietnamnet.vn/fms/science-it/69785/science-technology-firms-can-t-receive-promised-support.html>

Table 2a: The Global Competitiveness Index 2012-2013, selected ASEAN countries

Country/Economy	GCI 2012-2013		GCI 2011-2012	
	Rank	Score	Rank	Change
Singapore	2	5.67	2	0
Malaysia	25	5.06	21	-4
Thailand	38	4.52	39	1
Indonesia	50	4.40	46	-4
Philippines	65	4.23	75	10
Viet Nam	75	4.11	65	-10

Source: World Economic Forum

Table 2b: Business and innovation environment 2012, selected ASEAN countries

	Value	Ranking
Indonesia	4.09	64
Malaysia	4.97	24
Philippines	3.69	107
Singapore	5.51	1
Thailand	4.24	54
Viet Nam	3.62	109

Source: Networked Readiness Index, World Economic Forum

programmes target key technologically-intensive sectors including information technology, biotechnology, building materials, and automation technology. A state fund has been approved to allow firms investing in technology to have easier access to credit, but this has yet to be fully implemented. A National Fund for

Technology Transfer was passed by law in 2006, but has yet to become operational. This fund aims to provide financial support for promoting the technology transfer process and to assist SMEs in technological innovation and improvement; accelerate technology transfer to mountainous and remote areas; support start-up of tech-

nological enterprises or incubators; and strengthen human resources in technology transfer and technical improvements.

Innovation performance

There are a number of indicators that we could use to measure the innovation capacity and performance of countries. The Global Competitiveness Index developed by the World Economic Forum is the index that could be directly used to evaluate the potential result of NIS of a certain country. According to the latest publication of Global Competitiveness index in 2012-2013 (Table 2a), Singapore ranks second among 144 surveyed countries. In contrast, Viet Nam stands at the 75th level, which is 10 levels lower than the previous year (2011-2012) and the lowest level among chosen ASEAN countries. In addition, the Business and Innovation Environment index for 2012 also developed by the World Economic Forum ranks Viet Nam at the lowest place among chosen ASEAN countries (Table 2b).

Two other indicators, the Knowledge Index (KI) and the Knowledge Economy Index (KEI), constructed by World Bank measures a country's ability to generate, adopt and diffuse knowledge and whether the environment is conducive for knowledge to be used effectively for economic development. Table 3 compares these indexes of Viet Nam with these figures of selected ASEAN countries and ranks them according to KEI. Singapore is always on the top in terms of two main indexes,

Table 3: Knowledge indexes, selected ASEAN countries

Rank	Change in rank from 2000	Country	KEI	KI	Economic Incentive Regime	Innovation	Education	ICT
23	-3	Singapore	8.26	7.79	9.66	9.49	5.09	8.78
48	-3	Malaysia	6.1	6.25	5.67	6.91	5.22	6.61
66	-6	Thailand	5.21	5.25	5.12	5.95	4.23	5.55
92	-15	Philippines	3.94	3.81	4.32	3.77	4.64	3.03
104	9	Viet Nam	3.4	3.6	2.8	2.75	2.99	5.05
108	-3	Indonesia	3.11	2.99	3.47	3.24	3.2	2.52

Source: KEI and KI Indexes (KAM 2012), World Bank

namely KI and KEI, and almost sub indexes. Besides, referring to KEI, Singapore ranks the 23rd among 145 countries in the world with 7.79, degrading three levels compared to 2000. On the other hand, Malaysia's ranking is 18 levels higher than Thailand's one. Furthermore, the distance between remaining countries and Thailand is considerably large. For example, Viet Nam has lower rank than Thailand, 38 levels in particular. Moreover, regarding subindexes, especially innovation and education index, Viet Nam has the lowest number. However, ICT index of Viet Nam, which is based on the number of computer, the number of Internet users (per 1000 people), is encouragingly equal to that of Thailand. This index is particularly high because of the highest growth rate of Viet Namese Internet users in the world. According to the statistics of International Telecommunications Union, UN (Table A1 in the Appendix), the percentage of Internet users in 2000 was only 0.25%, 51 times and 140 times lower than that percentage in 2005 and 2011, 12.74% and 35.07% respectively. In 2011, the percentage of Viet Nam is higher than that figure of Indonesia, the Philippines and Thailand by 17%, 5% and around 12% correspondingly.

Beside these aggregated indexes above, two other indicators that reflect the innovation capacity of the countries are (i) patent applications and (ii) publication in refereed journals. In 1997, according to WIPO, the number of patent applications in Viet Nam is 30, significantly smaller than that of the Philippines, 125. However, in 2011, Viet Nam surpassed the Philippines with 300 against 186 applications. In general, Indonesia, the Philippines and Viet Nam are in the same level referring to the number of patent applications by resident. On the other hand, Thailand has created a larger gap with that group (Figure 2). The other indicator is number of Scientific and Technical Journal Articles per million of population. Figure 3 compares this index among several ASEAN countries and finds that Indonesia, Malaysia, Thailand and Viet Nam share the same starting point from 1999 to 2001. Nevertheless, only after 10 years, in 2011, Malaysia and Thailand surpassed three other countries, including Indonesia, the Philippines, and Viet Nam.

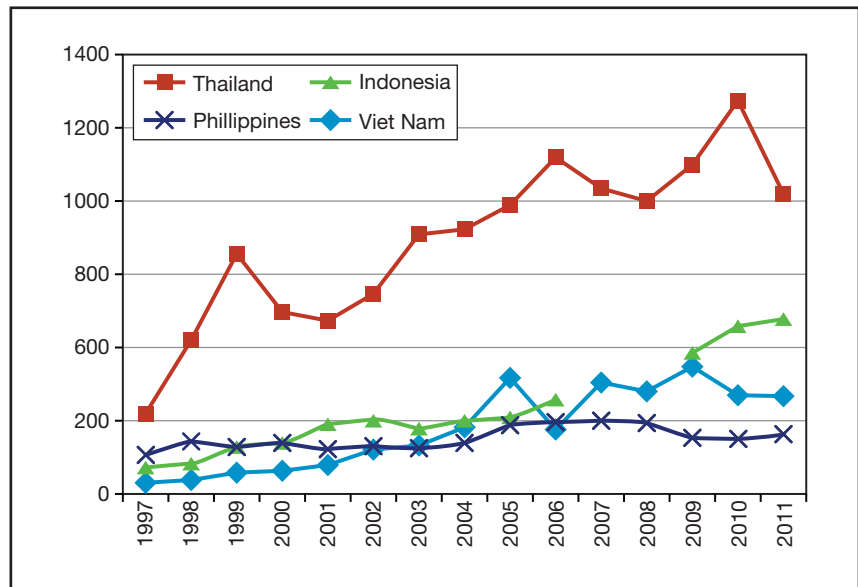


Figure 2: Patent applications by Resident in selected ASEAN countries, 1997-2011

Source: WIPO

In particular, Malaysia's number of publication per million population was 17.2 and 654 in 2001, and 2011. Meanwhile, that number of Viet Nam roughly remained constant during this period, fluctuating from 24 to 26.

to knowledge creation and research. This group includes the universities, colleges, R&D institutes and industry research organizations (i.e., those attached with the firms/enterprises). They can be public, semi-public, or private ones.

Key factors in Viet Nam's National Innovation System

R&D performers including enterprises and research organizations are core innovation actors in Viet Nam. Main functions of the organizations in this group relate

Business sector

The emergence of the private enterprise sector since the reforms is an important development within the framework of the national innovation system for Viet Nam.⁸ Economic reform during the last

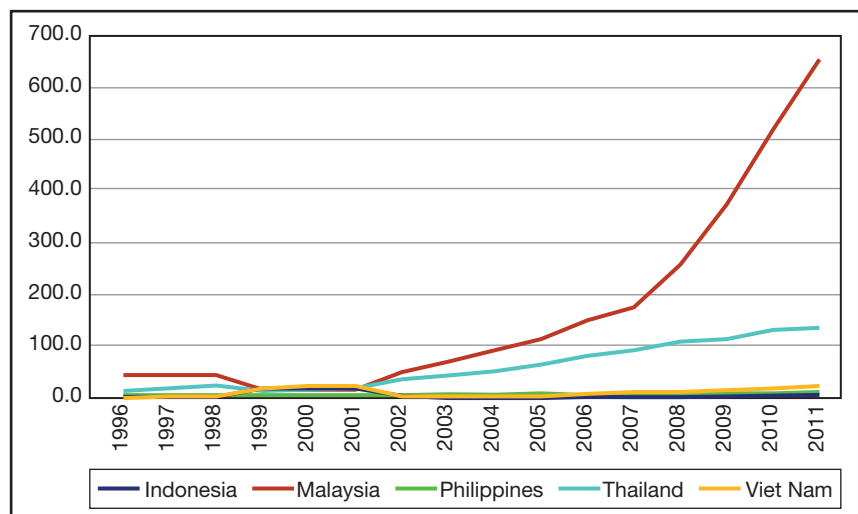


Figure 3: Number of publications per million population

Source: SJR, WDI and Author's calculation

Table 4a: Distribution of Small and Medium Enterprises 2000–2008 (by firm size)

	Total number of firms (including SME)	SME (%)	Micro enterprises (%)	Small enterprises (%)	Medium enterprises (%)	Large enterprises (%)
2000	42288	92	54	34	4	8
2002	62908	93	53	37	4	7
2004	91756	95	53	38	3	5
2006	131318	96	61	32	3	4
2008	205689	97	62	33	2	3

Table 4b: Growth rate of firms 2001–2008

	Total number of firms (including SME)	SME average (%)	Micro enterprises (%)	Small enterprises (%)	Medium enterprises (%)	Large enterprises (%)
2002	62908	22	18	29	16	15
2004	91756	29	33	25	16	6
2006	131318	17	26	3	7	5
2008	205689	33	33	34	10	6

Source: GSO. Calculation by authors. Classification by number of employees.

decades has directly stimulated the development of the private sector in Viet Nam which mostly consist of small and medium enterprises (SMEs). As can be seen in Table 4a and Table 4b the SMEs account for 97 per cent of the total number of firms in 2008, increased from 92 per cent in 2000. The average growth rate of the SMEs was 23 per cent in contrast with

the average rate of just seven per cent for the large enterprises.

Table 5 provides information on the innovation activities of Viet Namese SMEs (mostly domestic companies). Interestingly, the SMEs seem not to invest in new products. Instead they are investing in new process with improved technology and product modification. At the current

stage of development, this may prove the right strategy. However, in order for the future development, investment in new product innovation will prove essential.

Thanks to the progressively liberalized regulations toward FDI, the FDI sector has now become an important part of the national economy. Although Viet Nam has been successful in attracting FDI in

Table 5: Innovation activities by SMEs

SMEs	2007				2009			
	Total number of firms	New product (%)	New process (%)	Modify product (%)	Total number of firms	New product (%)	New process (%)	Modify product (%)
All	2,635	5.24	15.41	43.61	2,659	2.86	13.92	40.58
Exporting firms	154	11.69	33.12	69.48	155	2.52	12.58	38.9
Non-export firms	2,481	4.84	14.31	42	2,504	8.39	35.48	67.74
Firms that supply FDI firms	80	12.5	36.25	62.5	130	6.15	35.38	61.54
Firms that not supply FDI firms	2,555	5.01	14.76	43.01	2,529	2.69	12.81	39.5

Source: SME survey 2005, 2007, 2009

⁸The 1990s also saw the emergence of the private sector, thanks to first the introduction of the company law and private enterprise law in 1991 (later amended in 1994). These two laws together with the adoption of the new land law in 1993 and the labor code in 1994 provided an important stimulus for the development of the private sector. However, the most significant reform in the development of the private business sector came in 2000 with the new Enterprises law. In order to create a more level playing field and to ensure that its laws allowed for national treatment for FDI enterprises prior to Viet Nam's 2006 accession to the World Trade Organization, Viet Nam promulgated, in 2006, two important laws, the Investment Law and the new Enterprise Law. Specifically, on November 29, 2005, the National Assembly of Viet Nam adopted the Law on Investment No. 59/2005/QH11 ("New LOI") and Law on Enterprises No. 60/2005/QH11 ("New LOE") which applies to all enterprises established by domestic and/or foreign investors creating a corporate law regime that applies to both foreign and domestic enterprises.

recent years, the real benefits from FDI still seem controversial. Previous studies have found little evidence of technical spillover from FDI-related enterprises to local counterparts (Nguyen *et al.*, 2008). Recently, Intel has invested one billion USD in chip assembly and test manufacturing plant and the success of Samsung and its recently launched a high technology complex in Thai Nguyen province with total investment of 2 billion USD would obviously improve the investment for R&D for enterprises in Viet Nam.

Higher education system

The education sector in Viet Nam has rapidly expanded, with the fastest growth taking place at the higher levels of education. Figure 4 and Table 6 show that within a very short time span the number of students enrolled in universities and colleges has drastically increased. It increased two and half times between 2000 and 2011, from 893,754 to 2,162,106.⁹ Together with the increased demand for higher education, the last decade has witnessed a rapid expansion of the higher education sector in Viet Nam in terms of expanding the capacity of existing institutions (including upgrading colleges to universities) and establishing new universities and colleges (both public and private). There were only 153 universities and colleges in the country in 1999. In 2011, this figure increased to 386 universities and colleges. Private provision has become an increasingly important share of the total. By 2010–2011, Viet Nam counted 80 private HE institutions, of which 50 are universities. The number of lecturers in the higher education sector (both college and universities) increased by 2.5 times between 2000 and 2011, from 30,309 to 74,573 (MOET, 2012). However, it also appears that access has been expanded at the expense of the quality of provision, with the proportion

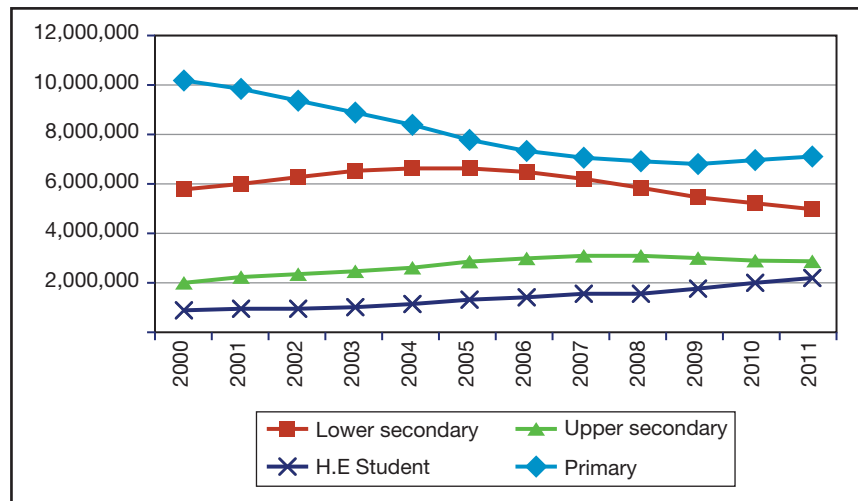


Figure 4: Enrolment trends in Viet Nam education system

Source: MOET 2012

of faculty having a doctoral degree falling over the last decade and with a large number of students for each faculty member (around 28–29 students per lecturer).

There are different types of educational institutions in the higher education system of Viet Nam such as public, people-established, and private institutions.¹⁰ The Government supports public institutions to ensure that they are playing the key role in the national education system. Basically there are two broad groupings of educational institutions in Viet Nam; the traditional single-disciplinary or specialized institution and the multi-disciplinary university. The first group was the more common in Viet Nam under the pre-Doi Moi (renovation) policy. It concentrates on a single area or subject of focus, for example law, fine arts, engineering, economics, etc. In the last several years many of these former single focus institutions have taken on a multi-disciplinary focus. Multi-disciplinary universities are on the increase.

Although official statistics indicates that Viet Nam is among the highest literate country in the region, there is

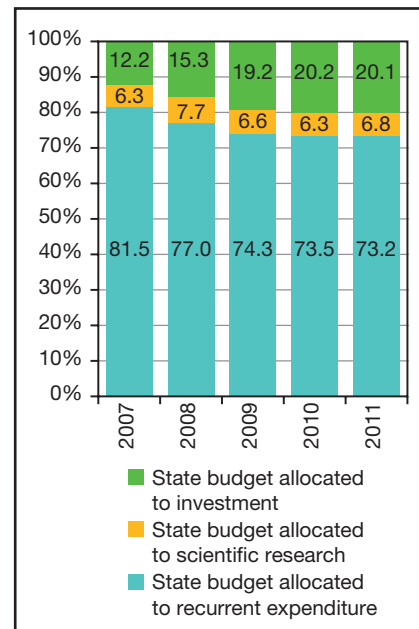


Figure 5: Decomposition of public funding for public universities

Source: University Survey 2012, calculation by authors

⁹We expect that this trend will continue further into the coming years. Our expectation is based on a number of grounds: (i) the high growth of the economy would create more demand for higher qualified labor force, (ii) the government policy to encourage wider participation in higher education, and (iii) Viet Namese culture that highly values higher education. Over the same period, demographic changes have resulted in a significant decline in primary education enrolments (followed recently by slow growth) and a leveling off of lower and upper secondary enrolments, with both beginning to decline after the peak cohort from primary education reached entry age for that level of education.

¹⁰Public institutions are established by the State (center or provinces) and receive funding for infrastructure, facilities and operational expenditures. People-established institutions are funded by the communities for their infrastructure, facilities and operational expenditures. Private institutions are funded by social, professional, economic organizations or individuals for their infrastructure, facilities and operational expenditures; legally, they are for-profit enterprises and many are owned by firms.

Table 6: Higher education sector in Viet Nam

Student/pupil enrolment												
	2000	2003	2005	2007	2009	2010	2011					
Higher Education	893,754	1,020,667	1,319,754	1,540,201	1,719,499	1,935,739	2,162,106					
College	173,912	215,544	273,463	367,054	476,721	576,878	726,219					
University	719,842	805,123	1,046,291	1,173,147	1,242,778	1,358,861	1,435,887					
Higher Education Institutions in Viet Nam												
	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011
University	69	74	77	81	87	93	104	139	140	146	149	163
Public	52	57	60	64	68	71	79	109	100	101	103	113
Non Public	17	17	17	17	19	22	25	30	40	45	46	50
College	84	104	114	121	127	137	151	183	206	223	227	223
Public	79	99	108	115	119	130	142	166	182	194	197	193
Non Public	5	5	6	6	8	7	9	17	24	29	30	30
Total HEIs	153	178	191	202	214	230	255	322	346	369	376	386
Staff and qualification in higher education sector												
	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011
Total Lecturers	30309	32205	35938	38608	39985	47646	48579	53518	56120	61190	70558	74573
College Lecturers	7703	7843	10392	11215	11551	13677	14285	15381	17903	20183	24597	23622
University Lecturers	22606	24362	25546	27393	28434	33969	34294	38137	38217	41007	45961	50951
College (%)												
Doctor	1.2	1.4	1.5	1.7	1.6	1.8	2.1	1.4	1.4	1.7	2.7	2.5
Master	17.2	18.7	18.9	20.3	21.7	22.5	24.0	23.9	27.1	28.7	27.9	31.8
University and College	77.7	77.6	76.9	74.4	74.1	73.0	71.4	71.5	69.6	67.8	66.0	63.2
Others degree	3.9	2.7	2.8	3.6	2.6	2.7	2.6	3.3	1.9	1.8	3.4	2.5
University (%)												
Doctor	19.4	18.3	18.8	19.3	18.2	17.6	16.7	14.9	14.8	14.3	14.0	14.4
Master	24.2	27.1	29.7	30.4	32.4	33.7	35.7	38.3	40.4	41.6	43.2	44.9
University and College	52.7	51.0	48.4	47.1	46.7	46.0	45.9	45.3	43.6	42.9	41.5	39.4
Others degrees	3.7	3.7	3.1	3.2	2.7	2.7	1.7	1.6	1.3	1.2	1.2	1.4

Source: MOET 2012

evidence that the country's education system fails to provide employers with the needed qualified personnel, and poorly prepares students for the jobs they might hope to have in the future. There are also a number of problems within the higher education sector. First, also according to the WB report, Viet Nam's higher education is still not a source of technical innovation as it is in upper or middle-income countries. Second, the higher education system is skewed toward a few disciplines

(almost 50 per cent enrolled in economics, business and education; only 1–15 per cent in science and technology). The situation is illustrated in Table 7 below which provides data obtained from UNESCO on the number of university graduates during the last few years and the breakdown by specialization.

On the research side, the higher education system is not performing to expectation. According to the survey in 2012 by the World Bank, as presented in Table 8

the research output of over 70 universities in Viet Nam is very worrying. This is explained by the very poor funding for research at universities as illustrated in Figure 5 and Table 9.

Public research organizations

Until now, the public sector plays the major role in the innovation system in Viet Nam. These organizations were under the administration of line ministries and specialized in areas such as natural

Table 7: External efficiency: Skill mismatch — Graduates from HE institutions Viet Nam and other countries

Program	Viet Nam	Singapore	Philippines	Malaysia
	2010	2010	2004	2009
Enrolment in general programs	3.3%	0%	0%	0%
Enrolment in education	22.1%	3%	17%	12%
Enrolment in humanities and arts	3.9%	9%	3%	3%
Enrolment in social sciences, business and law	34.7%	37%	28%	32%
Enrolment in sciences	0.0%	15%	12%	14%
Enrolment in engineering, manufacturing and construction	21.0%	28%	16%	24%
Enrolment in agriculture	7.1%	0%	3%	1%
Enrolment in health and welfare	4.2%	6%	13%	11%
Enrolment in services	3.9%	1%	1%	3%
Enrolment in unspecified programs	0.0%	0%	7%	0%
Enrolment in all programs	100%	100%	100%	100%

Source: UNESCO

Table 8: Result of research activities

Indicators		2008	2009	2010	2011
		Articles in national journal	Total	2761	3631
	Mean	37	49	55	55
Article in international journal	Total	492	642	648	661
	Mean	7	9	9	9
Patents registered	Total	9	11	12	8
	Mean	0	0	0	0
Patents granted	Total	3	8	3	3
	Mean	0	0	0	0
Transferred technologies	Total	64	78	95	128
	Mean	1	1	1	2
Technology contracts	Total	586	393	374	239
	Mean	8	5	5	3

Source: University survey 2012, calculated by authors

Table 9: Adequacy for research

	Absolutely disagree	Fairly disagree	Neither agree nor disagree	Fairly agree	Absolutely agree
Insufficient time for research due to teaching activities	5.5	19.4	23.0	41.2	10.9
Insufficient facilities for research activities	1.8	10.4	26.8	49.4	11.6
Insufficient fund for research activities	0.6	7.2	16.9	51.8	23.5

Source: Lecturer Survey 2012, calculated by authors

sciences, social and cultural research, agriculture, and engineering. Unfortunate feature is that these research institutions have no or limited connection with the polytechnic universities and isolated from other innovation actors including the private sector. Recently significant change takes place with the participa-

tion of non-state actors in establishing research organizations (Table 10). R&D institutes operated by the private sector and non-governmental organisations now account for 48% of the total. A current challenge is that a large number of public R&D institutes lack adequate funding.

Conclusion

The Viet Nam's National Innovation System is in the making. With long-term commitment toward S&T activities, the government of Viet Nam seems to have put into place the fundamentals of a comprehensive national innovation system. However,

Table 10: Public sector research organizations

Sector	1995		2000		2005	
	Number	(%)	Number	(%)	Number	(%)
Public	374	72.06	517	60.61	639	52.4
Line ministries/agencies	289	5.68	342	4.09	456	37.3
Universities	51	9.82	120	14.06	116	9.11
State Owned Corporations	34	6.56	55	6.46	67	5.49
NGOs	130	25.04	311	35.64	524	43.1
Private	15	2.89	25	2.86	57	4.5
TOTAL	519	100	873	100	1220	100

Source: MOST

the Viet Nam NIS is still very much at the early stage of development and faces many weaknesses. Among other, the most significant are:

- Isolation of research institutions including universities from the productive sectors of the economy;
- Within the productive sectors of the economy, the linkages between the more advanced (FDI) sectors with the laggard (domestic SMEs) are weak;
- There is a still favorable bias toward the state sectors;
- Higher education sector is not operating properly as the source of knowledge creation and transfer;
- Inadequate level of coordination between the policies, especially incentives for R&D for the business community; and
- Insufficient coordination between S&T policies at the national, regional, and community levels.

References

✓ Nguyen, Anh Ngoc, Thang Nguyen, Le Dang Trung, Ngoc Quang Pham, Nguyen Chuc Dinh, Nhat Duc Nguyen (2008), *Foreign Direct Investment in Viet Nam: Is There Any Evidence Of Technological Spillover Effects*, Working Papers 18, Development and Policies Research Center (DEPOCEN), Viet Nam. Retrieved from <http://depocenwp.org/modules/download/index.php?id=36>.

✓ Jensen, H. T., and F. Tarp (2006), *A Viet Nam Social Accounting Matrix SAM for the Year 2003*, Discussion paper PRG1.06.02, Central Institute of Economic Management (CIEM), Hanoi, Viet Nam.

✓ Nguyen, Anh Ngoc, Duc Nhat Nguyen, Dinh Chuc Nguyen, and Thang Nguyen (2011), *Surprising Resilience but Challenges Ahead*, The Great Recession and Developing Countries: Economic Impact and Growth Prospects, pp 545–595, (eds) Mustapha K. Nabli, The World Bank.

✓ Nguyen, Viet Cuong (2009), *Can Viet Nam Achieve Millennium Development Goal on Poverty Reduction in High Inflation and Economic Stagnation?* Working Papers 01, Development and Policies Research Center (DEPOCEN), Viet Nam.

✓ Prasad, Eswar S. (2009), *Rebalancing Growth in Asia*, NBER Working Paper No. 15169. Retrieved from <http://www.nber.org/papers/w15169>.

✓ Policy Consultant Group and Research Team of Department of Public Expenditure (Ministry of Finance (2012)), *Financial Autonomy and Financial Reform Orientation to Public Universities in the Period of 2012–2020*, Review of Finance, ISSN-005-56: pp. 44–49.

✓ SRV (Socialist Republic of Viet Nam) (2003), *The Comprehensive Poverty Reduction and Growth Strategy*, Government Office, Hanoi, November. ■

Appendix

Table A1: Internet users in 2010 as a percentage of population in selected ASEAN countries

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Indonesia	0.93	2.02	2.13	2.39	2.60	3.60	4.76	5.79	7.92	6.92	10.92	18.00
Malaysia	21.38	26.70	32.34	34.97	42.25	48.63	51.64	55.70	55.80	55.90	56.30	61.00
Philippines	1.98	2.52	4.33	4.86	5.24	5.40	5.74	5.97	6.22	9.00	25.00	29.00
Singapore	36.00	41.67	47.00	53.84	62.00	61.00	59.00	69.90	69.00	69.00	71.00	71.00
Thailand	3.69	5.56	7.53	9.30	10.68	15.03	17.16	20.03	18.20	20.10	22.40	23.70
Viet Nam	0.25	1.27	1.85	3.78	7.64	12.74	17.25	20.76	23.92	26.55	30.65	35.07

Source: International Telecommunications Union, UN