Chapter 6
The Research Role of Vietnam's Universities

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Introduction

This chapter provides an overview of the research role of Vietnamese universities. It sets university research activities within the context of Vietnam's public sector research organisation and recent industrial development, paying particular attention to research funding, research personnel, research outputs and postgraduate training. While the Vietnamese government has set ambitious targets to enhance research and development (R&D) and university research as part of its overall objective to achieve industrialised country status by 2020, university research capacity is severely limited, although small numbers of universities in recent years have made impressive progress.

The government's science and technology (S&T) development strategy issued in 2003 clearly states that, in order to achieve the objectives of modernisation and industrialisation, S&T will need to 'contribute an important role in promoting the country's socio-economic development'.[1] The following year structural reforms were announced to encourage greater research training cooperation between industry, universities and research organisations.

More important from the perspective of university research was the Higher Education Reform Agenda (HERA) issued in 2005 that set out detailed planning objectives for higher education for the period 2006–2020, with the explicit aim to create a higher education system that by 2020 is 'advanced by international standards, highly competitive, and appropriate to the socialist oriented market system'.[2] Specific objectives include ensuring that 'by 2010 at least 40% of teachers have master's-level degrees and 25% a doctoral degree, and by 2020 these figures . . .[will be] 60% and 35% respectively'; increasing S&T activities being carried out within

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[1] Ministry of Science and Technology, Vietnam Science and Technology Development Strategy by 2010, Hanoi, 2003.

[2] Resolution no. 14/2005/NQ-CP, dated 2 November 2005.

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universities; developing key higher education institutions into major scientific centres for the entire country; and increasing 'income from science and technology activities... to [account] for at least 15% of total higher education income by 2010 and 25% by 2020'.

In pursuing these S&T and higher education objectives, Vietnam will be following strategies successfully employed by a number of transitional economies. In their various publications, international development agencies stress the importance of S&T in economic and social development and that universities and other tertiary education institutions can play significant roles in building capacity for participation in the knowledge-based world economy (The World Bank, 2002; Altbach and Balan, 2007). Close cooperation is essential between higher education and S&T since the capacity to generate and use scientific and technological information depends as much on education and training as investment in research (Harman, 2005b).

Universities, in particular, can play important roles in both training and research. According to recent studies on the determinants of national innovative capacity, countries that have located a higher share of their R&D strategy in the education sector have been able to achieve significantly higher patenting productivity. Graduates of postgraduate programmes are needed to staff R&D institutes as well as manufacturing firms that are the main mechanisms through which the results of research projects are transferred to the local economy (The World Bank, 2002).

Higher education in Vietnam has made substantial progress since key reforms were initiated in the early 1990s. Driven by a growing economy and strong student demand, enrolments have increased from 162,000 students in 103 institutions in 1992–1993 to 1.54 million students in 322 institutions in 2006–2007, transforming the system from one catering largely for elites to one providing education for a broader cross section of the population. Over this period, the number of universities increased from 9 to 139.[3] Although still dominated by smaller, discipline-specific institutions, universities have become more multidisciplinary with the formation of larger federated universities in Hanoi, Ho Chi Minh City and key regional centres. Universities also have started to become more oriented to research with research units and centres being reorganised and efforts made to integrate research and teaching activities within universities. At the same time, the role of Vietnamese universities is much weaker in research than in teaching, with their contribution to development being largely limited to production of an educated workforce rather than innovation. Even in training concerns are expressed about the quality and relevance of many courses.

Vietnamese universities suffer from structural disadvantages in contrast with universities in most of East Asian countries, with a Soviet-style model separating research largely conducted in research institutes from the higher education sector. This structure left universities not only with teaching as their main activity but also with little resources and inclination to engage in scientific research, except for a limited amount of more theoretical research, seldom involving large-scale

[3] See http://www.moet.gov.vn/?page=11.10&view=9266 for details. See also The World Bank, 2008: 7–8.

or sophisticated research facilities. While the character of universities has begun to change over the past 10–15 years, their research role continues to be limited. However, the fast-growing economy and the increasing need for innovation and high-quality skills are putting demands on a university system that it is still not able to meet.

Developing research capacity, particularly in S&T, is essential for Vietnam to transform itself into a modern industrialised nation. Higher education clearly needs a much stronger commitment to research, with appropriate research funding, facilities and personnel if it is to achieve national objectives. It also needs to learn to work effectively with both the research institutes and local industry and play an enhanced role of incubator in technology transfer that characterises modern advanced societies.

Research in Vietnam

Vietnam has an estimated 30,000 staff involved in research, including librarians, technicians and support staff, working in about 1,320 institutions involved in R&D. Whilst this number appears impressive, it includes numbers of small centres with one or two staff, often established for administrative reasons. Only about 11% of R&D institutions are located in universities and only about 5% are in the private sector (Tran and Nguyen, 2008: 8). Over two-thirds of the R&D institutions are located in Hanoi, about 15% are in Ho Chi Minh City and the rest are in a small number of major regional cities.

Three different kinds of public sector institutions are involved in R&D. By far the most important are the national research institutes that administratively report to the Office of the Prime Minister and are supervised by the Vietnamese Academy of Natural Science and Technology (VAST – formerly called the National Center for Natural Science and Technology) and the Vietnamese Academy of Social Sciences (VASS – formerly called the National Center for the Social Sciences and Humanities).

The Vietnamese Academy of Natural Sciences and Technology consists of 19 specialist institutes and 9 sub-institutes, covering a wide range of basic sciences (such as physics, chemistry and mathematics), as well as more applied research fields (such as tropical technology and tropical biology). The Academy also has well over a dozen state-owned companies that take special responsibility for research development and the application of research findings. Originally modelled on the Soviet Academy of Sciences, the Academy was restructured in 1993 to place more emphasis on applied research and experimental development. In recent years, increased emphasis has been given to international collaboration, while an advanced research training programme providing both research master's and PhD degrees has been introduced. Total staff number more than 2,000.

The smaller Academy of Social Sciences, which performs similar functions with regard to the study of society and culture, undertakes research to provide academic foundations for government planning, sustainable development and social policy

reform. It has 27 research institutes that conduct theoretical and applied studies as well as train master's research and PhD students. The research institutes cover a wide range of traditional disciplines (such as history, sociology and economics) as well as more applied areas (such as human studies, social sciences information studies and studies of the environment and of sustainable development). In 2004, the Academy had a total of about 1,400 employees, with 925 being research staff.

Second, there are about 180 R&D units (laboratories and institutes) within various national ministries or under the control of other government agencies. These units work closely with their parent organisations, undertaking mainly applied studies. According to Bezanson (2000), in many other countries this work would be found in industrial or business enterprises.

The third group of institutions are the public universities that undertake research within faculties, departments and their own research institutes. Only a limited number have the personnel, equipment, libraries and other resources needed to undertake serious R&D. Among these, the two national universities and the two largest polytechnic universities have the most developed research activities (Bezanson, 2000). The government, however, has made it clear in its public statements and in HERA that research capacity must be developed in universities, particularly the 14 key universities that were identified in 2004.

By the end of 2002, the university system included 167 scientific research and production units, of which 20 were research institutes, 143 were centres for research implementation, four were consulting offices and one was a university company. Over the period 1996–2002, the universities and colleges managed by the Ministry of Education and Training (MOET), together with the two national universities, implemented more than 3,800 research sub-projects and 90 ministerial-level projects. Of these, 21% were in education, 22% in economics, social sciences and humanities, 24% in engineering and technology, 16% in agriculture, forestry and fisheries, 4% in community health protection, 4% in environmental protection and 9% in other fields (MOET, 2005). Expenditure on R&D activities in universities constituted about 4% of total annual investment in S&T (Ca, 2006).

The three groups of public institutions involved in R&D are expected to work collaboratively with one another, but it appears that in many cases effective collaboration is limited by the way that the national R&D system is organised, financed and managed. Particularly important are the different lines of administrative responsibility to different national ministries and the lack of incentive structures to reward collaboration.

While the national research institutes have responsibility for basic research, more advanced forms of applied research and R&D, the institutes attached to particular national ministries have tended to undertake applied work specifically assigned to them by their ministry. Universities have had a limited role in research, although in a small number of cases well-qualified staff have become involved in more theoretical research, often based on their own PhD training in Russia or other countries of the Soviet bloc, or more recently in Western nations.

In recent years, however, the emphasis given to different kinds of research by the different kinds of institutions has changed to some extent. For example, funding for basic research in national institutes has been reduced, forcing them to become

increasingly involved in applied research and technology services, with funding being based on contracts with ministries, government agencies and sometimes firms. Universities, on the other hand, have been encouraged to expand their basic research and also to seek contracts from ministries and the private sector (Bezanson, 2000; Nguyen, 2000).

Despite impressive economic development over the past decade, only a small proportion of Vietnam's R&D is conducted in productive enterprises. These are predominately SMEs (small and medium-sized enterprises), and many do not seek assistance from R&D organisations. Findings from NISTPASS (National Institute for Science and Technology Policy and Strategy Studies) surveys indicate that Vietnamese firms seek comparatively little technical assistance from R&D organisations and prefer to perform most services in-house. They tend to rely on their internal capacities for engineering, management and marketing while relying on outside sources for computer services and training (Tran and Nguyen, 2008: 5). This situation can be attributed to the absence of competitive pressures, a preference by SMEs to perform R&D in-house, negative perceptions about the supply capabilities of R&D organisations and the practice in industries such as white goods, electronics and motor vehicles for technology to be supplied by international partners. Many obstacles and disincentives, including limited capital and lack of technical expertise, prevent or discourage SMEs from developing their own innovation capacities or seeking assistance from R&D organisations.

On the other hand, it is clear that there is a small but growing demand for technology and training services, that universities and research institutes find difficult to meet. Further, in many of the traditional sectors, such as agriculture and forestry, and in some dynamic regions in the south, research institutes and universities play a vital role in bringing technical solutions to producers. For instance, in the Mekong River delta more than 80% of new rice varieties have been bred by the Mekong River Delta public research organisation, while the Institute of Southern Fruit Trees has been active in identifying suitable tree varieties for orchards and in disseminating technical knowledge to farmers.

Yet, in spite of increasing demand for technology services, the bulk of R&D activities sought by firms over the period from 1990 to 2001 were conducted not by universities but by national research institutes and the institutes attached to ministries. When asked about sources of innovative ideas, only 10% of respondents in firms cited R&D institutes and universities as important sources (Tran and Nguyen, 2008: 5). Taken as a whole, there are still limited opportunities in many industries for Vietnamese R&D institutes and universities to play a significant role in working with firms. Tran Ngoc Ca comments with regard to universities as follows:

> Many universities still use equipment and facilities in place since mid 1960s or 1970s. Libraries in many universities are small, outdated in both quality and holdings. Foreign language literature is still mainly Russian, dating back to the mid-1970s. Even those universities with access to English language literature, rate of use is minimal due to low English capability of staff and overload of teaching. As a result, teaching curricula are old, repetitive and lacking in innovative approaches and new knowledge. Moreover, there has been a lack of electronic links with a national library or central information and librarian system (Tran, 2006: 11).

Table 1 R&D personnel comparisons, Vietnam, China and Korea, 2001

Country	R&D personnel per 1 million population	GDP (billion USD)	Population (millions)	R&D personnel per billion USD of GDP
Vietnam	274	35.1	80.3	629
China	584	1,266.1	1,294.9	597.3
Korea	2,880	476.7	47.4	286.4

Source: Tran (2006: 6). (It is assumed that the data refer to 2001 rather than 1990–2001).

Whereas most OECD countries and China spent about 2% of GDP on R&D in the period 1990–2001, Vietnam spent only around 0.5% of GDP on these activities. Table 1 compares the number of R&D personnel in Vietnam, China and Korea in 2001. It will be noted that while Korea had almost 3,000 R&D personnel per 1 million of population, Vietnam had only 274.

Research Funding

Vietnam lags behind other Asian countries such as Thailand and Malaysia in terms of funding for R&D, leading to limited capacity for innovation and knowledge adoption. In Vietnam the state budget is the main source of funding for R&D, with negligible sums coming from other sources. In the year 2000, the state budget accounted for about 85% of total finance for R&D nationally. However, many universities depended on the state budget for well over 95% of their research income.

Estimated total expenditure for science, technology and the environment for the years 2004 and 2005 was VND 2,296 billion and 2,520 billion respectively, accounting for about 1.25% of the total state budget expenditure. Lack of appropriate levels of funding and lack of appropriate modern research equipment have forced many R&D institutions, regardless of their main objectives and responsibilities, to move increasingly to contract research, consultancies and supplying technical services (Le, 2005: 6–7).

Table 2 provides data for the five Vietnamese universities that received the largest research revenue in 2002, all of which are designated as key universities. The data highlight reliance on the state budget and very limited funding from other sources.

Apart from state funding, other R&D income comes from foreign sources through various forms of international collaboration and from commercial contracts with government agencies and firms. However, this diversification of income sources does not represent any fundamental reduction in the dependence of Vietnam's S&T system on state funding.

State funding comes to universities mainly in the form of grants for national research projects, projects funded by particular ministries and limited bloc research

Table 2 R&D Revenue in 2002 for five top-funded Vietnam universities

Universities	Total research income (in VND 1,000)	Percentage from state budget	Percentage from domestic revenue (not state budget)	Percentage from overseas revenue	Average income per academic staff member (in VND 1000)
Vietnam National University Hanoi	18,894,820	96	0	4	8,616
Vietnam National University HCMC	8,281,112	97	0.2	2.8	5,160
University of Mining and Geology	5,630,346	47	53	0	17,761
National University of Civil Engineering	5,588,693	58	42	0	11,245
Hanoi University of Technology	4,335,885	100	0	0	3,416

Source: The World Bank (2008: 36–37) (data are drawn from the MOET University Surveys 2002).

funding from MOET for ministerial research projects. The Ministry of Science, Technology and the Environment (MOSTE) funds national research projects. These grants are based on national socio-economic strategies and plans with project topics and potential outcomes being decided by the government. Lists of both science and technology and independent research projects are selected with the assistance of specialist committees of scientists and, once short outlines are developed for each, applications are invited from organisations and individuals. Successful applicants are chosen on the advice of the Committee on Science and Technology. MOET provides ministerial research projects to organisations under its responsibility with the aim of improving education and training as well as contributing to socio-economic development. These projects include both pivotal research projects awarded by MOET itself and other ministerial research projects that are allocated by rectors. Funding for projects allocated by rectors is relatively small. For example, recent ministerial research projects allocated by the rector of the National Economics University were funded at an average level of about VND 15 million (about US $1,000). University-based research projects are funded at lower levels. For example, recent projects at the National Economics University received, on average, funding of VND 5–10 million (Le, 2005: 6–7). While there are no published evaluations

of these schemes, members of academic staff complain that the procedures for identifying and selecting projects often are neither transparent nor objective. These staff members also perceive that the opportunities for involvement of younger academics in research projects are limited. Much of the work is applied, rather than theory-oriented, and a clear perception is that a preference for work in science and technology is not always closely related to the socio-economic development needs of the country.

Other funding to universities in the last decade to support teaching and research has come from the First World Bank Higher Education Project (HEP-1). This project employed a competitive grant mechanism to enhance university capacity in teaching and research, particularly in science and technology. Quality Improvement Grants (QIGs) were awarded under three classes of applications (Levels A, B and C), with an upper limit of a total of US $10 million to any one university. Grants could be used for training of academic staff, course restructuring and curriculum development, equipment and upgrading facilities to support research and teaching, renewal and enhancement of library resources and computers centres, and institutional computer networks. By April 2005, a total of US $83.5 million had been allocated in QIGs to 36 institutions. The three top-ranked universities (the two national universities and Hanoi University of Technology) received one-third of all QIG funds, while the 12 top-ranked HEIs received three quarters of total funds (Harman, 2005a). This and other initiatives have encouraged the introduction on funding mechanisms via advisory committees of experts, but various problems still need to be overcome to allow extension of this approach.

As already noted, HERA aims to dramatically increase funds generated by scientific research and related services to 15% of total higher education revenues by 2010 and 25% by 2020. These goals are ambitious when compared with current performance. In 2005, public revenues from research-related activities only accounted for slightly above half a percent of the total revenue of public universities, with revenue from contract R&D contributing only another 1.32%. Most research activities took place in those universities specialising in fundamental sciences, agriculture and forestry, and technology and engineering. Surprisingly, research income in universities specialising in medicine and pharmaceutical science has been negligible. This is a puzzle because research in these disciplines in developed countries is usually strongly supported by external research contracts.

Not surprisingly in light of the low levels of R&D funding, Vietnam's universities measure up relatively poorly in terms of facilities and infrastructure. Computer access is limited, with only 187 higher education institutions having Internet access for students. In terms of laboratories, workshops and equipment, Vietnam's higher education institutions do poorly, although the two national universities and the regional universities in the cities of Can Tho, Da Nang and Hue do better, mainly because they are larger and more multidisciplinary in character. On average, national universities have 185 laboratories and regional universities, 10 laboratories in each institution and 36 pieces of equipment valued above US $5000 (The World Bank, 2008: 33).

Research Personnel

Some understanding of the organisation and key features of the academic profession in Vietnam is essential to understand the availability of personnel to assist with research activities in universities. In 2005, there were approximately 43,700 members of academic staff in Vietnam higher education institutions. As many as 40% of these staff members were female, which is reasonably high for Asian countries and reflects past employment practices in Vietnam. However, the student-to-staff ratio was about 30:1, which is viewed as being too high by international standards and particularly in relation to other South Asian countries such as the Philippines (with a student–staff ratio of 23:1), Malaysia (20:1) and Indonesia (15:1) (The World Bank, 2008: 29–30). Between 1995 and 2005, student enrolments in Vietnam higher education institutions increased by 4.43 times, but teaching staff numbers increased by less than one-half that rate. A heavy teaching load leaves little time for staff to engage in research and technology development.

A large proportion of academic staff members in Vietnam are at the level of lecturer and only 1.5% of all university staff in 2005 held the rank of professor, as demonstrated in Table 3. Relatively little change took place over the period 2002–2005. Most professors in 2005 were male, many were relatively old, and about one-half of them held appointments at one or other of the two national universities. This rank structure has unfortunate consequences, particularly in terms of increasing the difficulty universities have in retaining younger academics and depriving younger academics of opportunities to develop their leadership potential.

About 47% of academic staff in 2005 held postgraduate qualifications, most at the master's level. As shown in Table 4, while in 2005 almost 32% of staff in the national universities had doctorates, the overall figure for doctorates in Vietnamese universities was only just over 15% (The World Bank, 2008: 31). Younger members of academic staff are the most likely to have obtained a doctoral qualification,

Table 3 Distribution of academic staff by rank in Vietnam, 2002 and 2005

	2002				2005			
	Professor	Assistant Professor	Lecturer	Other	Professor	Assistant Professor	Lecturer	Other
National Universities	2.16	37.36	59.87	1.34	1.5	33.8	59.0	5.7
Regional Universities	0.08	36.29	59.87	3.77	0.28	24.4	74.8	0.41
Total University	1.23	29.69	64.87	4.21	1.5	22.9	68.3	7.2
Malaysia	5.32	17.42	60.68	16.38	NA	NA	NA	NA

Source: The World Bank (2008: 32). (Data come from the Association of Universities and Colleges of Canada 2002, Trends in Higher Education Ottawa; MOET University Surveys 2002 and 2005; and the Malaysian Department of Higher Education 2003).

Table 4 Percentage of academic staff with postgraduate degrees, 2002 and 2005

	2002		2005	
	Doctorates	Masters	Doctorates	Masters
Public Institutions	11.4	30.8	13.1	32.7
Semi-public institutions			19.6	35.4
Private Institutions	8.9	18.3	23.7	32.1
National Universities	25.6	43.3	31.6	32.4
Regional Universities	7.9	44.5	8.6	42.0
University	15.4	34.4	18.2	35.1
College	1.1	20.1	1.9	25.0
Total	11.3	30.2	14.4	32.7

Source: The World Bank (2008: 31) (data are drawn from the MOET University Surveys 2002 and 2005).

often as a consequence of having been fortunate in winning a scholarship to study overseas, usually in America, Europe, Australia or Japan. Donor countries and international agencies provide some scholarships, while in a small number of other cases Vietnamese universities provide opportunities for younger staff, in particular, to study abroad. The lack of a doctorate usually means that a member of staff is inadequately prepared to undertake high-quality research.

Many problems related to the quality and performance of members of academic staff in Vietnam relate to the relatively low salaries paid to public university staff as civil servants. There are also cumbersome procedures for promotion that do not appear adequately to reward achievement. Appointments and promotion in public universities are made subject to the Civil Service code. Entrepreneurial spirit is lacking, except for seeking second and third jobs through additional teaching in their own institutions, teaching in private higher education institutions, or through consulting.

While it is difficult to estimate total income that university and college academics derive from various forms of employment, including part-time employment, over and above their salaries, official data show that salaries in the education and training sector for those with higher education degrees are slightly lower than that in other sectors. The Ministry of Home Affairs (MOHA) sets the salary structure for civil servants, including permanent university and college academics.

Research Outputs and Productivity

In view of the relatively low proportion of doctorates in Vietnamese universities and the age and rank structure of the academic profession, it is not surprising that most university academics in Vietnam are not actively engaged in research, as measured by the number of articles and other publications produced. Table 5 provides data for research outputs in 2003 for public, semi-public and non-public institutions.

Table 5 Research output indicators for higher education institutions in Vietnam 2005

Ownership	Type of management	Number of published articles	Percentage in international journals	Average publications per academic staff
Public	Total	17,088	0.03	0.45
	National	146	0	0.36
	Regional	292	0.09	0.09
	Other	15,941	0.02	0.80
	Local	30	16	0.03
	Colleges	726	28	0.07
Semi-public		72	0	0.07
Non-public		38	0	0.01
Total		17,198	0.03	0.39

Source: The World Bank (2008: 37–38) (data are drawn from the Ministry of Education and Training Survey 2005).
Note: There are only three local universities in the survey and all of the publications come from a single university, Hong Duc University, which focuses on fundamental sciences.

Public institutions had by far the best record with a total of just over 17,000 publications, but only 0.03% of these were in international journals. The two national universities and the regional universities were the most productive. Even at these institutions, the productivity level in terms of articles published per staff member was low (0.36 articles per staff member in the national universities and 0.09 in the regional universities).

Patenting activity is similarly limited. Table 6 provides information on the registration in Vietnam of invention patents by Vietnamese and foreign applicants over the period 2001–2005. While in 2001 there were only 87 patents for inventions awarded to Vietnamese residents, a total of 1,201 patents were registered by foreign applicants. Interestingly, in that same year, a total of 47,721 patents for inventions were registered in Taiwan, and 121,742 patents for inventions were registered in Japan.

Table 6 Registration on invention patents in Vietnam

Years	2001	2002	2003	2004	2005	Total
Registration by Vietnamese applicants	87	136	145	179	362	909
Registration by foreign applicants	1,201	1,206	1,136	1,390	1,800	6,733
Rate of Vietnamese registrations to foreign ones	7%	11%	13%	13%		

Source: Tran and Nguyen (2008: 11) (data are drawn for MOST survey in 2006).

The relatively low number of patents in Vietnam may be due to a lack of capacity to innovate, but it may also reflect weaknesses in the intellectual property of legal framework. Le (2002) reports that only about 10% of total inventions in Vietnam are created by enterprises and universities, and that many university scientists and creators are unable to afford the expense of registering their inventions and discoveries, fear disclosing secrets and know-how to others, or are ignorant of patenting procedures.

On the other hand, limited data point to some growing university successes with research and technology transfer contracts. Over the period 1996–2000, 20 technology and agricultural universities signed nearly 13,000 contracts with government agencies and firms, yielding total revenue of VND 1,188 billion. From this sum, universities contributed almost VND 33 billion to improved infrastructure for research facilities. In the year 2002, the Ho Chi Minh City National University signed 800 contracts yielding a total revenue of VND 55 billion, while Hanoi University of Technology implemented 402 contacts yielding a total revenue of VND 67 billion (MOET, 2005).

Low research productivity seems to stem from a number of factors, particularly lack of adequate time for research (with high teaching loads and high student numbers), lack of appropriate working conditions (with many academics not having their own offices or places to conduct research) and the absence of financial incentives to engage in research. These conditions will need to change if a strong research culture is to develop in Vietnamese universities. Tran Ngoc Ca notes,

> Most Vietnamese universities are not perceived as centres of R&D excellence. They lack autonomous status, and despite the fact that their operations have been increasingly independent, they still receive many directives from above and operate under regulations of MOET. Especially in public universities staff faces constraints in terms of salary ceilings, human resource management regulations and financial incentives. Basically they are still seen as government officials rather than as academics (Tran, 2006: 13).

Academics in Vietnam understandably have a strong orientation to teaching which takes up most of their time. Amongst many academics there is a relatively low interest in research for which funding is limited especially for junior staff. Universities do not see technology transfer activities as being crucial for their existence. In many instances, technology facilities and innovation rates in universities are behind that of leading firms. Within universities, research institutes with research-only staff undertake the bulk of research activity.

Many problems related to staffing are officially recognised by government authorities but there remains a need for realistic strategies and funding allocations to make a difference. Staff–student ratios are recognised to be too high. There are notable variations in the quality of academic staff across institutions, while there is no effective framework for decisions about career advancement, particularly appointment at the professorial level. Seldom are there effective systems of induction for academic staff to teaching and learning, many facilities are inadequate, salaries are low and academic staff lack strong incentives to remain committed to academic work. Salary scales for civil servants including academics

at public universities are unrealistically low. It has become customary for civil servants to seek to augment their income by accepting additional employment after hours.

PhD Training

Limited enrolments of postgraduate students in Vietnamese universities affect the capacity of universities to expand total higher education enrolments, find replacement for retirements and enhance the commitment of universities to research. Low postgraduate enrolments also contribute to low research outputs since, internationally, and especially in S&T, research students are responsible for a great deal of the experimental and fieldwork studies undertaken. Relatively low enrolments at undergraduate levels in the hard sciences act as a further barrier to strengthening the R&D capacity of universities. Some other Asian countries have developed special scholarship programmes to attract undergraduate students to disciplines such a science and engineering.

Most postgraduate students in Vietnam are enrolled in one or other of the two national universities but even there enrolments are small in comparison with such Asian countries as Korea, Malaysia and China. As shown in Table 7, in 2005 only 3.7% of total student numbers in Vietnam were postgraduate students. Of these, only 12% were enrolled in doctoral programmes. In contrast, Korea had 15% of its total student numbers enrolled in postgraduate courses, with 14% of these being in

Table 7 Enrolment of postgraduate students in Vietnam and selected other countries, 2005

Management levels	Doctoral total	Percentage of total postgraduate	Masters Total	Percentage of total postgraduate	Postgraduate students as % of total students
Vietnam	4,805	12	34,831	88	3.7
• National University	678	8	7,456	92	7.9
• Regional	1,111	23	3,767	77	2.8
• Other Public	3,016	11	23,521	89	4.2
• Local	0	0	0	0	0
• Semi-public	0	0	87	100	0.3
China	65,257	20	261,028	80	4
Korea	17,932	14	105,979	86	15
Malaysia	5,068	16	27,316	84	5.7

Source: The World Bank (2008: 37–38). (Data are from China Statistical Yearbook 2005 (for 2004 enrolments); Ministry of Education and Human Resource Development, Korean Educational Development Institute, 2005; and Vietnam Ministry of Education and Training, 2005, University Survey).

doctoral programmes. In the past, Vietnam relied on PhD training abroad, primarily in the Soviet Union, but now there is an urgent need to increase the opportunities for PhD study in Vietnam.

Data from a 2000 NISTPASS study pointed to various weaknesses in the linkages between R&D and postgraduate study including the following:

- universities contribute to training needs but their direct services to enterprises are insignificant;
- there is a serious imbalance between subject fields, with most postgraduate students being enrolled in the social sciences and humanities while areas such as engineering, agronomy, forestry, sciences and technologies are underdeveloped;
- most organisations that send staff for postgraduate training are government agencies rather than productive enterprises; and
- links between industries and research institutes are not strong (NISTPASS, 2000).

In addition, there is a serious need for substantial investment in academic staff development, particularly if the research capacity of universities is to be enhanced. Academic staff development includes not only putting a much greater emphasis on postgraduate education but also developing appropriate induction programmes for new staff, introducing performance reviews and establishing appropriate incentive and reward mechanisms.

Conclusions

While the Government of Vietnam has ambitious plans to enhance the role of R&D and give universities an expanded role in research and technology transfer, the current research capacity of universities is severely limited. Reference has been made already to key barriers, including the bifurcated system of universities and research institutes, the heavy orientation of universities to teaching, inadequate research facilities, lack of trained younger research personnel, inadequate public research funding and lack of a strong research culture that values research activities and the production of research outputs.

Various government actions have the potential to assist universities to achieve the objectives set for them with regard to research. In the first place, additional research funding for university research is essential. While HERA provides a blueprint for university development that makes admirable sense for a transitional economy, it fails to provide detail on how the transformation of universities will take place and the extent of state funding that should be allocated to universities in order to expand their research facilities and research role.

Second, a strong case can be made for further concentrating research funding in a limited number of stronger universities and creating a number of centres of

research excellence. In most developed nations, there is an increasing emphasis on further concentrating research funding among a limited number of institutions, departments and researchers in order to develop larger groups of highly qualified and productive researchers with access to superior equipment, facilities and technical and financial support. This process is often referred to as achieving a 'critical mass' of researchers. Even wealthy countries recognise that research resources are limited, and therefore pursue policies of selectivity and concentration (Harman, 2005b). Centres of excellence have been established in many Asia Pacific countries including Japan, Korea, Australia and New Zealand. Japan, for example, in 2002 launched its twenty-first century COE (Centre of Excellence) Program with the aim of promoting research units of world-class excellence in selected fields. The fields supported in 2002 were life sciences, chemistry and materials science, information technology, electrical engineering and electronics, humanities and interdisciplinary subjects. Each research unit selected was allocated between JPY 100 and 500 million for 5 years. In Vietnam, possibly a limited number of centres of excellence allocated competitively could combine R&D and teaching, and support high-quality, research relevant R&D on applied topics of special interest to Vietnamese industry.

Third, Vietnam could consider a well-conceived programme of competitive research grants to be allocated to researchers and research groups in universities and possibly in research institutes. Many leading economies have such schemes under the control of specialist agencies or committees. For example, the United Kingdom has eight specialist research agencies that allocate grants to universities while the United States depends on the National Science Foundation, the National Institutes of Health and various specialist agencies. Developed nations invariably use competitive allocations based largely on peer review and analysis of performance data. This principle also has worked effectively in developing countries where it has been demonstrated that well-designed competitive funds can greatly stimulate the performance of higher education institutions (The World Bank, 2002: 105). However, Vietnam has not yet established this type of agency and instead research money is allocated to universities, particularly key universities, based largely on student numbers and programme specialisation. A recent important innovation has been used by the first World Bank higher education project of an independent panel to evaluate grant proposals and recommend allocations.

Fourth, more attention needs to be paid to achieving enhanced levels of collaboration between R&D providers, particularly national research institutes and universities. Closer cooperation in postgraduate teaching as well as research seems highly desirable, having the potential to draw on both research institute and university expertise. Better linkages are also needed between research producers and research users. A number of countries have enhanced these forms of cooperation by the use of incentive funding, for example, for joint university–industry research projects. Such funding could well be a more effective way of achieving collaboration than would be institutional mergers of national research institutes with particular universities.

Fifth, another urgent need for Vietnam is to increase the outputs of graduates with appropriate research qualifications. As already noted, postgraduate enrolments are low by international and regional standards and there is an urgent need to provide increased numbers of well-qualified higher degree graduates with appropriate research backgrounds to staff both universities and research institutes. While international donors can provide some assistance in funding research training in foreign countries, the future of Vietnam's universities will depend largely on the nation's own capacity to expand enrolments in PhD and research master's programmes.

Finally, Vietnam clearly needs better statistical collections for higher education and R&D, and better mechanisms to monitor research activities, research funding, postgraduate enrolments and productive links between research institutions and firms. Monitoring is essential for a serious approach to the formative evaluation of planning. Enhanced statistical collections will make it simpler to compare Vietnam's progress with comparator nations and to chart progress towards achievements of the HERA objectives for university research.

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