

## ECONOMIC ANALYSIS

### A. Introduction to the Economic and Financial Analyses

1. **Scenarios.** The University of Science and Technology of Hanoi (USTH) is expected to evolve through three phases—establishment, consolidation, and expansion—during which enrolments are expected to grow and sources of funding to change. The issues of economic impact and financial sustainability will be different in each phase. Accordingly, these analyses look at three scenarios:

- (i) A base scenario in which the USTH operates at design capacity (5,000 students), towards the end of the consolidation phase (about 2020). This scenario receives the most attention because it addresses the intended outcome of the investment funded from the Asian Development Bank (ADB) loan.
- (ii) An establishment scenario, where temporary premises are in use and student numbers are much lower (about 2014).
- (iii) An expansion scenario in which USTH starts to scale up in pursuit of higher standing in the region and the world (about 2026–2030). (This can be no more than impressionistic because it is so far ahead.)

2. **Currency and price bases, and project cost.** ADB and the Ministry of Education and Training (MOET) have agreed that the analysis should (i) use dollars as the currency base (the dong is converted to dollars at D20,680 = \$1), and (ii) be prepared mainly in constant 2009 prices. Projections of inflation up to 2016 are factored into the costing of the University of Science and Technology of Ha Noi Development (New Model University) Project.

3. **Project cost, loan terms, and repayments.** The estimates of the cost of the USTH comprise a base cost of \$210.0 million, plus \$3.0 million for resettlement. The government contributes \$20 million to the base cost and pays for resettlement. ADB proposes to fund the USTH through loans of \$170 million out of ordinary capital resources (OCR) and \$20 million out of the hard terms facility of the Asian Development Fund (ADFHT).

4. The following estimates of the cost of repaying these loans have been used in calculating costs per graduate in the economic analysis, and in assessing sustainability in the financial analysis:

- (i) OCR loan: 6-year grace period, 20-year repayment phase, simple annuity repayment, and a 4.40% rate of interest.<sup>1</sup> The annual cost of repaying the loan over the 20-year period on these assumptions averages \$12.8 million.
- (ii) ADFHT loan: 8-year grace period, 24-year repayment phase, simple annuity repayment, and a 2.02% rate of interest.<sup>2</sup> The annual cost of repaying the loan over the 24-year period is \$1.05 million.

5. These rates are technical assistance team assumptions. Amortization schedules for these loans will be decided between ADB and the State Bank of Vietnam during negotiations on the loan agreement. The use of discount rates can redistribute the repayment burden over time significantly. The analysis assumes that the government will repay the loans from the state budget and not on-lend them to the USTH.

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<sup>1</sup> OCR loans carry a floating rate of interest linked to the London interbank offered rate (LIBOR). In early 2011 the 20-year LIBOR fixed swap rate was about 4.1%, or 4.4% after adding a spread of 0.30%.

<sup>2</sup> ADFHT loans approved in 2011 carry an interest rate of 2.02% throughout the life of the loan.

## B. Economic Analysis

6. The terms of reference for this analysis are as follows: (i) conduct a detailed economic (cost–benefit) analysis of the inputs and outputs of the proposed project, and (ii) assess the potential job market for the proposed universities’ prospective graduates. The Job Market Assessment is Paper A under Academic Development in Volume 5 of the project preparation final report.

7. **Summary of findings.** The main findings are as follows: (i) Graduate output from the USTH will be small relative to annual graduate output from Vietnamese universities, but will be significant in terms of its quality and its emphasis on science and technology, particularly at the postgraduate level; (ii) Estimates for graduate output are given in Table 1, and for cost per graduate in Table 2; and (iii) The rate of return to university education in Viet Nam is more than 15%. It is not possible to calculate an economic internal rate of return for the investment in the USTH because of inadequate data and the novelty of this type of investment for Viet Nam. However, substantial economic benefit is expected for both the state, and for university graduates arising from the increased number of people highly qualified in science and technology, and by a more effective orientation of research towards industry needs.

8. **Graduate output and costs per graduate: scenario A–student numbers.** This scenario is pitched around the year 2020. Table 1 projects the intakes needed for the USTH to achieve its design capacity of 5,000 students, on the basis of a distribution between bachelor, master, and doctorate courses, and assumptions about dropout rates, which have been discussed with the MOET and the French international strategic partner.

**Table 1: Projected Student Numbers, 2020**

Description	USTH		
	Bachelor	Master	Doctor
Intakes to first year of course	1,125	540	275
Course length (years)	3	2	3
Annual rate of drop-out (%)	5	10	10
Resulting enrollment	3,209	1,026	745
Annual number of graduates	965	437	200

Sources: The intake and drop-out figures are TA Team assumptions. Course lengths are as advised on the USTH web-site. The assumptions are explained and discussed in an earlier paper available on the ADB website at

<http://www.adb.org/Documents/Reports/Consultant/VIE/42079/42079-01-vie-tacr-05.pdf>

9. The USTH makes its most significant contribution at postgraduate level. In 2007–2008, 152,000 students graduated in Viet Nam at bachelor level, 9,828 at masters level, and 420 at doctorate level. Estimated outputs from the USTH around 2020 represent increments of 0.6% at bachelor level, 4.4% at masters level, and 47.8% at doctorate level.

10. Scenario A: costs per graduate. **The calculation of costs per graduate assumes that operating funding per student in 2020 is \$5,000 at 2009 prices, and that OCR and Asian Development Fund loan amounts and repayments are as stated in para 3.** The sum of \$5,000 per student creates a pool of operating funding of \$25 million for the USTH. This pool is shared between different courses pro rata to cost-weighted student numbers. Weights are assigned as shown in Table 2. Loan repayment costs (calculated as in para. 3) are shared out pro rata to operating costs, on the grounds that the higher the level of the course and the greater its use of laboratories, the more accommodation and equipment are required. On the basis of the data cited above, costs per graduate for the USTH are shown in Table 2.

**Table 2: Cost Weights, and Costs per Graduate, for Level and Type of Course**

Description	Bachelor	Master	Doctor
<b>Cost Weights</b>			
Classroom-based course	1.0	1.4	1.8
Laboratory-based course	1.7	2.3	3.0
<b>Costs Per Graduate</b>			
Classroom-based course (\$)	13,990	13,810	27,830
Laboratory-based course (\$)	23,790	22,690	46,900

Source: Cost weights are explained at p.13 of the paper at <http://www.adb.org/Documents/Reports/Consultant/VIE/42079/42079-01-vie-tacr-05.pdf> For calculations, TA Team spreadsheet "Costs per graduate: USTH Revised 14-02-11".

11. The figures in Table 2 are approximate and depend to a large extent on the assumed drop-out rates and cost weights. They include costs funded from student tuition fees as well as those funded from the state budget. In the consolidation phase to which the costing per graduate relates, the student fee would average 25% of the \$5,000 benchmark for operating costs.

12. **Support for tuition fees.** The technical assistance team has made recommendations for student support,<sup>3</sup> which is important for equity and for sustainability. The costs are reckoned as shown in Table 3.

**Table 3: Illustrative Student Support Costs in Consolidation Phase**

Description	Beneficiary Numbers	Fee Help Cost (\$ million)	Living Costs (\$ million)
Undergraduate fee exemptions or rebates	1,280	1.20	0.00
Postgraduate scholarships	360	0.45	0.63
<b>Total</b>	<b>1,640</b>	<b>1.65</b>	<b>0.63</b>

Source: TA Team estimates explained at p. 17 of <http://www.adb.org/Documents/Reports/Consultant/VIE/42079/42079-01-vie-tacr-05.pdf>

13. The fee help assumptions do not affect the calculation of costs per graduate, but simply redistribute costs between the body providing fee help and students. For undergraduates that body is the state budget; for postgraduates it may be either the state budget or another scholarship provider. Help with living costs would add to costs per graduate.

14. **Rate of return to higher education in Viet Nam.** Studies<sup>4</sup> of the rate of return to higher education in Viet Nam use data from the Vietnam Household Living Standards Survey (VHLSS). They relate to persons who obtain higher education, without distinction by degree subject or level of degree. The World Bank team found that, using 2004 VHLSS data, the return to "college and higher education" relative to just secondary education was about 10.0% (10.0% on one model, 10.7% on another). Applying the same model to VHLSS 2002 data, the World Bank team found that the rate of return increased during 2002–2004 from 7.4% to 10.7%. The World Bank commented that their 10% return for Viet Nam was still low compared with returns found in other transition economies in East Asia and Latin America.

<sup>3</sup> ADB. 2009. *Preparing the Higher Education Sector Development Project*. Midterm Report. Manila. p. 43.

<sup>4</sup> World Bank. 2008. *Vietnam: Higher Education and Skills for Growth*, World Bank Report 44428-VN, Washington DC; and, Gibson, J, and T. T. Doan. *Do Returns to Schooling Go Up During Transition? The Not So Contrary Case of Vietnam*, University of Waikato Working Paper. Hamilton, October 2009.

15. The New Zealand team derived rates of return to “university education” from data derived from the VHLSS in 1998 and 2004. They obtained rates of 7.2% in 1998 and 17.7% in 2004. Tinh T Doan of the New Zealand team has advised that the main reasons why the New Zealand findings for 2004 are much higher than the World Bank’s are that: (i) they use a Heckman selection bias-corrected model rather than a basic Mincerian model; (ii) the New Zealand team did not control for urban status and north location in its comparisons, because this would conceal part of the effect of extra education; and (iii) the New Zealand team excluded college graduates from its analysis of returns to higher education, on the grounds that their starting salaries were the same as for vocational graduates.

16. The New Zealand team published a further analysis in 2010<sup>5</sup> which examines rates of return to additional years of schooling in Viet Nam using data from the VHLSS sweeps of 1998, 2002, 2004, 2006, and 2008. It finds a further increase in the average rate of return—from 9.1% in 2004 to 10.0% in 2008. A further paper<sup>6</sup> published by Tinh T. Doan in 2011 includes separate figures for the rate of return to university education in 2008, of about 17% for each year of university, comparable to rates found elsewhere in Asia.

17. Rates of return to university education in Viet Nam are much higher than the returns to an additional year at school. The difference is driven by the wage premium which university graduates command. The data show a clear trend for the university graduate wage differential to increase between 1998 and 2006, as one would expect in a transition economy. The rate of increase in returns to university education may now be flattening out, but at a level that makes higher education a good investment for the individual and the state. The rate of return to education at a high-quality, high-cost university of science and technology such as the USTH may differ from the average return to university education. Other things being equal, the quality of the degree and the science and technology orientation should raise the return, while the higher cost will lower it. The problem is to gauge how much difference quality will make.

18. Vietnamese families weigh up cost and quality when they decide to support study abroad by family members. The number of Vietnamese tertiary education students abroad has grown rapidly—to almost 28,000 in 2007.<sup>7</sup> The USTH will offer an internationally accredited degree in Viet Nam at much lower cost than the major overseas hosts—the United States, Europe, and Australia—can offer. Study at the USTH should therefore be an excellent investment for Vietnamese students. From the state’s point of view, study at the USTH will add to demand within the Vietnamese economy, in contrast to study overseas which is effectively an import.

19. The USTH sets out to add value by teaching a theme-based curriculum that fosters creativity and problem solving and by linking its research effort to the socioeconomic needs of Viet Nam, including through cooperation with other investors at the Hoa Lac High Tech Park and in the region. The French international partner will work with the Vietnamese staff on the orientation of research towards industry needs. The USTH will also focus on the training of academic staff, with a view to spreading approaches pioneered at the USTH more widely within the Vietnamese higher education system. In this way qualitative improvements introduced at USTH will impinge on the wider higher education system of Viet Nam.

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<sup>5</sup> Doan, T. T. and J. Gibson. 2010. *Return to Schooling in Vietnam during Economic Transition: Does the Return Reach its Peak?* University of Waikato Economics Bulletin. Hamilton. vol. 30 no.2 p. A2.

<sup>6</sup> Doan, T. T. Labour Market Returns to Higher Education in Vietnam, Munich Personal RePEc Archive.

<sup>7</sup> UNESCO. *Global Education Digest* 2009.