

Financing Technology in Higher Education, Strategic Perspective on Sector Structural Implication

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ABSTRACT

The accelerating progress of ICT that has changed the education demands of individuals and nations needs a good understanding of the nature, role and implications of ICT in education, how to design specific measures of its supply, the constraints and conditions to be faced and structural changes implied by the use of technology at micro and macro level.

While the use of technology in education is apparently promising in boosting the quality of education, its financing will probably require a deeper consideration since for a country such as Indonesia with its only \$ 2000 GDP/Capita, competing demands in providing education infrastructure such as building, books, teaching aids, training as well as personnel wage and salaries etc are still not yet completely answered.

In this context, it is interesting to assess the likely financial impact of the accelerating progress and the use of ICT in higher education on the development opportunity of the majority of private Higher Education Institutions (HEIs) in Indonesia.

Keywords :

Technology, education, financing.

INTRODUCTION

It becomes a common wisdom already that education being considered as key determinant in creating human capital is expected to move to centre stage of strategies that promote economic prosperity, fuller employment, better health and well being. Education is increasingly considered an investment in the collective future of societies and nations rather than simply the future success of individuals.[4]

However, it takes more than great expectation to achieve the benefits that can flow from greater investment in this field. Low quality of educational processes produces low quality of human capital representing surely wasting efforts that serve to nothing.

As any organism that has to obey natural law in physics or biology, higher learning institutions have also to obey economic law, where spending and investment shall not exceed income and return could only be achieved on top of break even point.

The use of technology in education is surely not a new phenomenon at all since, dated back long time ago, the disciplines in basic sciences and engineering rely a lot on technology in

conducting their teaching learning methodology, in form of teaching aids, laboratory equipment etc. to be used in laboratory practices, workshops and even in their conventional classrooms.

However, the development and accelerating progress in information and communication technology with its application prospects in almost all aspects of the society, have been making the other disciplines previously depended a lot on conventional face to face classroom teaching methodology can't isolate themselves from the need of IC technology.

The ICT has touched and penetrated in all socio – econo-cultural dimensions of the society. In education sector, it is not only representing the new branches of sciences, technology and knowledge but it becomes also inseparable component and infrastructure of the higher learning institution management. The use of IC technology, is not limited for the purpose of academic development of any scientific branches but also for the objective of effective and efficiency of institutional organizational management.

Developed countries firstly inventing the ICT have been enjoying the widespread benefits of ICT invention and application accumulating in a significant value added of their economic activities as the result of multiplier effect of ICT progress in the development of sciences, engineering as well as its application in manufacturing technology and industry.

Indonesia, with its \$2000 GDP/capita, is still lagging behind the others countries including those who were at the early 50 – 60, found at the same level of development. At the moment where the education sector in Indonesia is still facing the growing pressure to improve the efficiency, equity and quality of education, the ICT progress is probably becoming a big challenge rather than a shortcut to speed up and catch up the economic welfare.

The failure of a number of nations including Indonesia in bringing up its economic welfare is seemingly due to its failure in providing social capital [2] necessary to the dissemination and extension of education, producing, at the end, low quality of human capital unable to create sufficient value added in their economic activities.

In any introduction of new technology aimed to improve national productivity, a certain level of social capital covering not only competency in mastering the technology but awareness of socio cultural context is needed. A number of models and studies have been provided in the field of techno-economy, revealing not only the success but also the failure of technology investments in developing countries in bringing up the economic welfare of the nations. Social capital has its roots not only in the tangible factors of any country but mostly in the quality and readiness of its

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intangible socio-cultural aspects such as institutional infrastructure and any factor related to the dissemination of technology.

It is becoming clear that the advancement and explosion of technology and information will imply an even greater transition from an emphasis on teaching to a more focus on learning. The use of IC technology in education is unavoidable since it accelerates and improves education productivity. The traditional ways of teaching and learning bound to some structural limitation. The extent of knowledge or expertise of any lecturer is limited, for any new topic to be taught a new expert needs to be provided.

In economic terms, technology facilitates acceleration in accumulation of knowledge that lead into improvement and growth of economic welfare and development as shown by the herebelow comparative development growth of the nations.



Figure 1
Knowledge as a Key Factor in Economic Development [9]

The use of technology in education sector at micro level is similar to the above mentioned macro picture. It needs also deep understanding of its benefit against particularly investment. Information and communication technology in higher learning institutions embrace at least 4 different but related fields;

1. As supporting infrastructure in the conventional teaching learning process, face to face classroom teaching as well as student centered learning methodology.
2. New teaching methodology through e-learning and LMS, extensifying teaching learning models.
3. Subject matters to be taught not only in informatics and computer sciences, but related applications software in various disciplines.
4. Supporting infrastructure in higher learning institution management system such as academic information system, personnel, asset management, finance or any related management activities.

Investment capital needed for any organizational development should come first into management consideration consisting not only tangible investment in procuring the ICT hardware, software, network but also intangible investment in preparing human competency, personnel and continuing learning.

HIGHER EDUCATION SUB SECTOR IN INDONESIA

Unlike basic education which is, pursuant to the International Covenant on Economic, Social & Cultural Rights, 1966 ; declared to have two distinctive features being compulsory and available free to all; the higher education is not considered to be generally available but only available on the basis of capacity. Accordingly, while education is still perceived as a public good that benefits society, arguments favouring cost-recovery at higher education level, have been gaining support since it is believed that the service will benefit the individuals rather than the community at large, or at least it is considered as semi public and semi private sector. [1]

Although it is true that even in countries bound by constitutional law to provide free education, there are elements of cost sharing where considerable private financing exists and the range of schooling models has indeed grown that makes distinctions between public and private sector become blurred (Buckland, 1999; Bray, 2002), cited in [4], the above perspective fails to reveal the fact that invaluable knowledge creations contributing significantly in increasing economic value added and national welfare mostly triggered and found in tertiary and post tertiary education level.

With the growing proponent to the perspective considering the higher education as part of private services, the sub sector is actually more and more left to the market competition mechanism. Market system may contribute to general welfare provided there exists healthy competition among a number of good educational institutions. To a great extent such situation exists in USA and other western countries, but Indonesian context is totally different. Considerable disparity in economic development between rural and urban area still remains unsolved; not to mention the growing pressure to improve the efficiency, relevance, equity and quality which are not relied only on technology of education but on qualified academic staff or institutional setting as well. Huge different level in quality of education apparently has been forcing the economically and academically potential students to move to urban area to pursue their higher education and consequently the rural areas are left in a condition of education system characterized by "low price, low quality for low income people", that not permits accumulation of capital necessary for development.

It is a general common wisdom expecting that individual institutions investing in technology for their own benefit will increase the general level of competition pushing up the general level of knowledge in educational sector and the society, which in turn facilitates the accumulation of knowledge by others and so on, what starts as an individual initiative actually becomes a self amplifying virtuous cycle. However, "previous capital is needed to produce new capital, previous knowledge is needed to absorb new knowledge, skills must be available to acquire new skills and a certain level of development is required to create the infrastructure and the agglomeration economies". [7]

Up to this point then comes the question of whether that "previous capital, previous knowledge, previous skill" are already available in Indonesian higher education context? Will the investment in

technology bring the expected return or it will simply repeat the vicious cycle of insufficiency where low financing on higher learning operation results in low saving and investment, followed by low pace of capital and knowledge accumulation producing low quality of education that will never attract potential students nor sufficient financing.

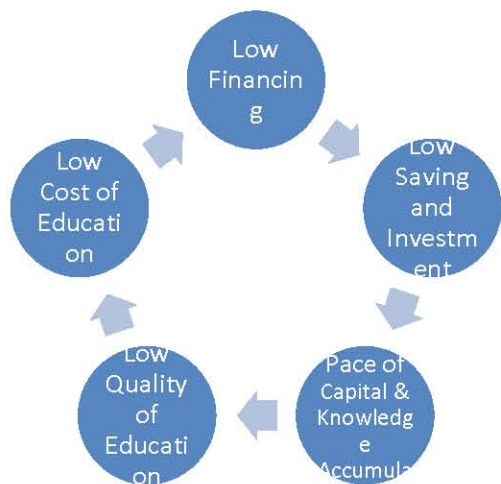


Figure 2. Vicious Cycle of Insufficiency

Indonesian higher education sub-sector is actually populated by more or less 3200 higher learning institutions (schools, polytechnics, institutes, universities) consisting of, in majority, private HEIs and about 80 public /state owned institutions, excluding particular professional educations (army, public administration, etc).

According to Epsbed Database, Ministry of National Education, Directorate General of Higher Education, the 80 public HEI is actually serving around 1.4 million or ± 40 % of national student body (including approximately 580.000 students registered at open university - Universitas Terbuka Indonesia representing ± 16 % of national student population), while the remaining ± 2.2 million students are served by roughly the 3100 private HEIs. All are competing for annual 500.000-600.000 secondary graduates.

As evidenced by the herebelow table, the Indonesian higher education sub-sector shows a fragmented structure with each of 90 % HEIs accommodates less than 3000 local students, and only few big Universities that can be considered national wide.

Table 1. No of HEIs & Student Body

	No. of HEIs
< 1000	2616
1001 – 3000	302
3001 – 6000	123
6001 – 10.000	49
>10.000	60 *

*) Mostly Public Universities

Among the 3200 HEIs only 60 institutions having more than 10.000 students, and the top 100 HEIs are assuring higher education for the approximately 1.4 million students. However, recent assessment conducted by Directorate General of Higher Education in 2008 revealed that only 68 HEIs are considered of providing acceptable level of quality assurance system. Only 28 out of 80 public HEIs found on the list. [5]

It is then easy to conclude that more than 90 % of Indonesian HEIs is actually operating, each with only 500 students in average.

HIGHER EDUCATION FINANCING

The growing demand for higher education after the national independency in 1945 in one side and limited public fund in the other side became the driving forces that lead private initiatives to start the establishment of private higher learning institutions. Actually, around 3,6 million students are pursuing their higher study programs in approximately 3200 national higher learning institutions.

Lack of financial aids from public source and any other independent donating agencies have left the private institutions to rely heavily on student tuition fee as the only financial source to cover operational cost and capital investment necessary for conducting teaching learning processes, and sustainability of the establishment. With the exception of few private HEIs where the contribution of diverse sources to education finance is significant; education investment come mainly from the private purse (households) in almost all private institutions. To maintain survival of the institution, the private sectors has to manage wisely their limited financial sources, permitting accumulation of capital that leads to a long term objective of quality improvement. Up to this point, the concept of mass production applied in industry becomes so relevant and drives the private sectors towards market share strategy in order to increase their student body. Only those who are able to reach the minimum economic number of students can maintain education operational cost and some saving for capital investment.

With the new decree of national act on education, the higher education sector in Indonesia is presently entering the framework of system to be dominated by the doctrine of private initiative, organized by the rule of competition, regulated by market mechanism and constrained by more and more restricted regulation.

The scenario and future impact assessment presented in this paper are based on estimates of the real financial structure of typical private HEIs in Indonesia and the assumption that all other elements of the education cost such as student-lecturer ratios; teaching staff compensation, average income GDP/capita , etc , remain at current levels and that current and capital expenditure evolves proportionate to the number of personnel and students.

For practical purpose, the following description of income and expenses is not presented in standard accountancy format. The objective is simply to expose financial structure of typical private HEIs in Indonesia as the basis in assessing their financial posture in facing the need of IC Technology capital investment in higher education. In general, incomes of private HEIs in Indonesia come through the following entries :

- Admission and related test (English, Computer literacy)
- Development contribution
- Tuition Fee
- First year (freshmen) student orientation
- Short/Remedial Semester
- Laboratory practices, workshop
- Final assignment
- Graduation
- Other teaching – learning revenues
- Interests and financial incomes
- Miscellaneous income

while, on the other side, the educational expenses excluding capital investment in lands and buildings, are mostly disbursed for personnel (salary & compensation), consumable, seminar and research sponsorship, maintenance and any operational expenses such a electricity, water supply, transport etc, development budget including personnel training and education, system development, marketing, etc.

Example taken from Widyatama University with its 4500 – 5000 active students out of 6000 registered students, (table 2) shows typical proportion of expenses in % of revenues for each category of the basic higher education missions (education, research, community service and institutional development)

It can be seen that personnel expenses represents the highest cost component and in line with marginal production cost model, it is expected that proportion of personnel and operational expenses will be higher in HEIs with lower student body. The empirical data taken from study programs with less than 500 students within Widyatama has supported the above mentioned tendency, where saving for investment could only be maintained at ± 5% of revenue.

Table 2 Condensed Educational Expenses in % of Revenue

	Yrs	Personnel	Operational (consumables, maintenance, etc)	Saving for investment
Teaching Learning	07	54,01	20,2	
	08	54,01	19,6	
	09	54,02	21,5	
	Average	54,0	20,4	13,8
Research & Comm service (*)	07	0,12	0,20	
	08	0,12	0,17	
	09	0,41	0,31	
	Average	0,24	0,26	16,7
Develop ment	07	3,0	6,9	
	08	2,8	6,6	
	09	2,9	6,8	
	Average	2,9	6,8	15,5
Total		57,2	27,4	15,3 (**)

(*) Excluding any sponsorship from external sources which is in practice totally (100%) redibursed to the beneficiaries.

(**) 3 years average

With the national average of educational revenue (tuition fee, etc) falls within the range of Rp 6 – 8 million per student a year, any institution operating with 500 students or less which is the picture of 90% of HEIs in Indonesia, will face difficulties to fulfill the need for technology capital investment, even in providing

minimum bandwidth of 0.75 -1.00 kbps per student as implied by National Accreditation Body.

The above scenario indicated that in the long run, disparity in quality of education between low and high student body HEIs will become sharper implying more than 50% of student population will be condemned to receive only low quality of education.

CONCLUSION & RECOMMENDATION

The new technologies bring both advantages and disadvantages which are not evenly distributed among the population or countries. This means every new technologies benefits some and may sometime harm others. [8]

It is likely that the application and cost of new technology needs some more funding implying a tension between efforts to take benefits of their effectivity and productivity against funding priority among competing demands in providing appropriate and sufficient education infrastructure including personnel welfare. The risk of falling into investment trap is much higher where the investment spending unable to reach the minimum level required to yield economic return.

A consequence that has to be avoided in a country with a very limited product and private resources is to leave the challenge to be faced by any educational institutional individually.

Bearing in mind the important role of higher education which is an investment in the collective future of the society and the nation, and considering as well the existing disparity in financial capacity of majority of HEIs in Indonesia, the debate is no longer as clear cut as public against private investment but in balancing the role of public and private initiatives, in order to optimize the limited national resources.

An important context of allocating resources by region and by nature of study programs is the limited financial capacity and competency of private institutions. Pursuant to the model of economic market mechanism, the Government intervention is needed in sectors or areas where private initiatives are not available or economic return is negative. Accordingly, suggestion that can be raised regarding the role of public and private investment is probably as depicted in the following portfolio matrix.

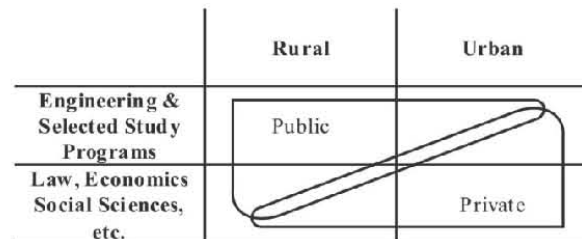


Figure 3 Public & Private Investment Area

The upper left side of the diagonal shall be mainly the public investment domain while the lower right side could be left to private initiative.

The public investment is expected to take major role in rural/remote areas where the income per capita is much lower than

urban regions and also in the disciplines where the massive technology capital investment is needed such as engineering education or unpopular study programs (basic sciences, anthropology, literature, etc.) where the number of applicants doesn't reach the economic lot size, while the remaining may be left to private initiative. Leaving the higher education sector to face market mechanism where the private HEIs confront head to head the public institutions as it happens today will result in wasting precious and scarce private sources.

The demand for higher education has continued to grow in Indonesia since the growing rates of participation at the primary and secondary level [6] have increased demands for further education.

If the tertiary education is considered to provide greater returns to the individual and greater responsibility for funding to individuals to reflect this benefits, the target public then shall support to those who are more economically disadvantaged which in majority live in rural/remote areas and at the same time, the government has to introduce a range of mechanisms to lower cost barriers and enable higher education opportunities for the poor. Concerns about this type of rationale have been raised regarding of unequal access to and level of education quality offered by higher education institutions and whether the government is able to accurately target disadvantage student population and in the same time flourishes private initiative and investment to optimize all of resources owned by the country.

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