

# Chapter Five

## Institutions and the Future II – Research and Research Funding

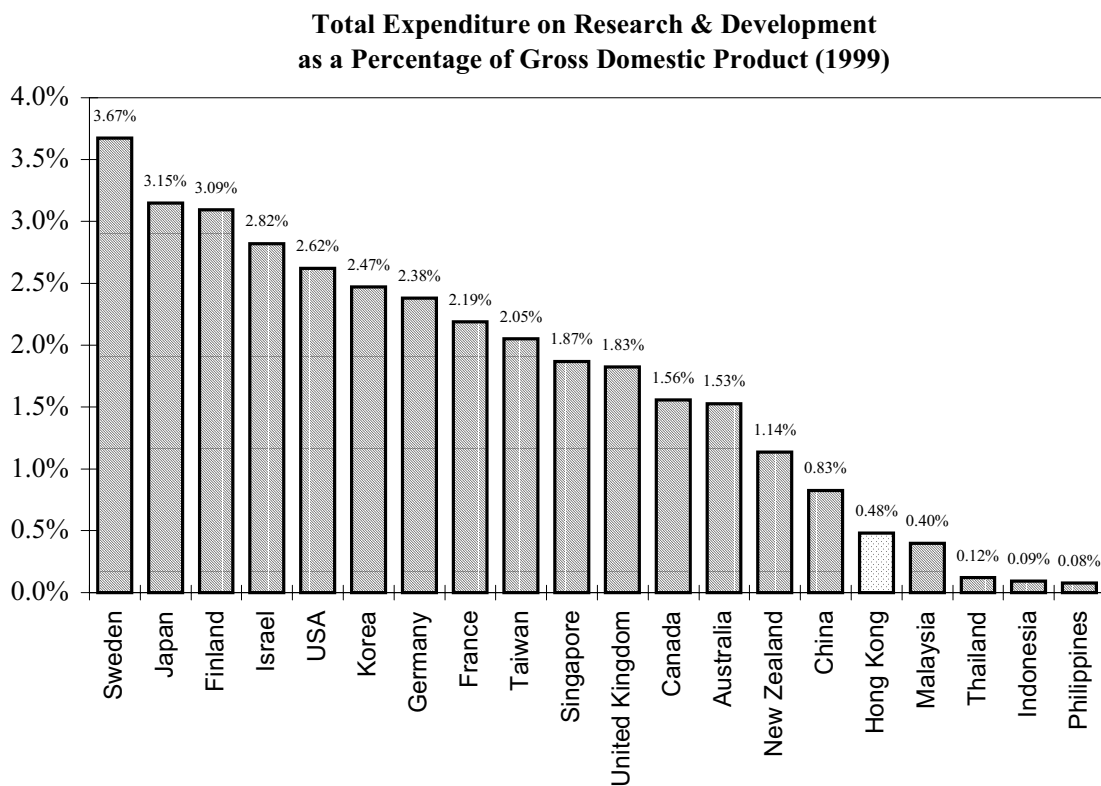
- 5.1. Research is in essence the means of extending human knowledge and understanding. It is one of the two major roles played by contemporary universities – the other being teaching, the transmission of knowledge and understanding. As I have argued, in universities teaching and research intertwine and a defining characteristic of university level teachers is that they are expected to undertake research to keep abreast of the extension in their field of knowledge.
- 5.2. The first and most important question about research which a report such as this must confront is not ‘Why do it?’ The answer to that is straightforward. If it is worth doing, then clever people will do it. The question for the Higher Education Review is rather, ‘Why should there be a significant public sector investment in research?’ The answers to that question, if compelling, will persuade the reader of this report of two things: the first is that Hong Kong is not alone in being unable to fund all likely demands to carry out research in its universities and colleges; the second is that there must be agreed policies and strategies therefore to maximise the impact of such public sector support as is made available.
- 5.3. The strongest argument for a society wanting to have a research capacity is to contemplate one in which there was no interest or wish to extend the boundaries of human knowledge and understanding. In the words of the President of one famous US University, ‘If you think knowledge is expensive, try ignorance!’ There have been such societies in the past, based on the view that to live well individually or socially, no new knowledge was necessary. Such societies usually turn in on themselves, and restrict interactions with other societies as a safeguard. They also cease to develop in a way that keeps pace with other human groups. The consequence is vulnerability to economic rivals and predators. Happily, Hong Kong shows no tendency to follow such a course. No developed or trading economy or city could contemplate being anything other than economically, and therefore cognitively, competitive.
- 5.4. The real questions for Hong Kong SAR, then, relate to how and what to invest in research. To answer these will require a review of what the objectives of research investment are. These objectives are a series of expressions of the different values which relevant groups attach to research, and not all of them will be shared by all stakeholders. I can identify and will now discuss three broad types of research which one group or another will attach to the idea of a strong research base, all of which are relevant to the questions of how much and how to invest in the research base.
- 5.5. First of all, when people talk about research they often think immediately of so-called blue sky research, or upstream research, undertaken by university teachers. This type of research is curiosity driven and bottom-up. It has to be said that the extension of human knowledge and understanding is one of the most noble and persistent human activities.

We are curious creatures and that is one of the reasons for our current evolutionary dominance. This type of research does not necessarily demonstrate any immediate usefulness – it is ‘pure’, rather than ‘applied’, research. However, most major research discoveries owe their origin to this type of work, e.g. pure scientific research by particle physicists working in CERN (*Conseil Européen pour la Recherche Nucleaire*) in Geneva led to the invention of the worldwide web.

- 5.6. There is a second type of research that impacts on the economic and cultural well being of a community. For example, the extension of knowledge and understanding of the development of information technology is now an essential capacity of any nation whose economy is knowledge based. More specifically for Hong Kong, international competitiveness in finance or in the movement of freight demand respectively, cutting edge engagement with the development of financial processes and of logistics. This requires engagement at the frontiers around which patterns for the future are being formed. This second type of research is essential to help the businesses and industries which drive the economy and deal with practical problems of implementation and development. These areas of research are often referred to as applied research, or R&D. This type of research also has the capacity to identify for the economy early opportunities for engaging in new areas of economic growth. Biotechnology and software and electronics are amongst the most fruitful areas in many developed countries. In most developed countries the R&D budgets are driven by private sector investment, or strategic public sector investment, and both sources contribute to research capacity in the higher education sector.
- 5.7. The third type is what is commonly known as policy research. There are many and various applications of research ability in the public sector. Improvements in education, or health, or in the environment will require appropriate funding and commissioning of research abilities. The same is true of improvements in management. Extending the understanding of Hong Kong’s social and cultural history and achievements is another important area. Research into Hong Kong’s place in regional and global history will enhance not only the clarity of its identity, but also of its attractiveness as a centre of tourism.
- 5.8. So how do these three types of research, all of which are undertaken in universities, intertwine with teaching? University teachers will be the first to point out that the quality of the teachers and teaching in higher education is directly related to the capacity of those teachers to engage with the points of growth in their respective fields. This is not to claim that the best university teachers must be Nobel Laureates – that would certainly limit the number of good universities – but rather that university teachers must be able to show students not just what the current sum of knowledge and understanding is in a particular field, but where the likely changes and expansion of that field are to be found. Whether we like it or not, the international standing and reputation of the higher education sector in Hong Kong, as in everywhere else in the world, depends upon a strong and varied research capacity within that sector. A significant number of the benefits of that sector depend upon such standing and recognition. That is what it takes to attract and retain some of the best staff, and therefore some of the most able regional and international students.
- 5.9. Similarly, for research development to contribute to the knowledge economy properly, we need a constant stream of bright and clever people who do know, and who do

understand, where human capacity is going. A significant grouping of such people tend to be attracted by, and to cluster around, points of research excellence and growth. Often they are internationally mobile and their first loyalty and basic commitment is to the growth of knowledge and understanding. To attract such people to come to and remain in Hong Kong makes good economic and competitive sense. Not only will they contribute to the research base in Hong Kong, they will also train future generations of researchers who can continue the work.

5.10. The case for the adequate funding of research is clear. The real problems relate to what can be afforded and what societies wish to spend, granted the many other competing claims for resource in both public and private sector. The comparisons made in the table below show Hong Kong lags well behind its obvious economic competitors. This must clearly give concern to both public and private sectors.



Source : The World Competitiveness Yearbook 2001

5.11. Whatever the outcome of that process of reflection, it will nonetheless prove to be the case that there are more demands for research funding than can be met from the public purse. Tackling this question is likely to be a complex matter, but the fact that the pie has to be cut in one way rather than another cannot be avoided. The evidence from international comparators points unreservedly towards strategic and concentrated investment. Singapore has clearly followed this policy, and in the People's Republic of China, the strategy of building research capacity in a small group of universities is already paying dividends. One striking general statistic from the USA is that, of the roughly 2,000 four-year universities and colleges accredited to award first degrees, approximately only 10% (200) are accredited to award Ph.D. degrees. The international evidence is that competitiveness implies selectivity.

- 5.12. Such a policy of selectivity in Hong Kong would have important consequences. Indeed in the allocation of research funding the UGC is already following such a route, and it is not without cost. The use of an RAE plus the discretionary allocation of funded research postgraduate (RPG) places is enhancing the quality and research capacity of a small number of institutions in important ways. There are dangers in this. The first is that of complacency, and ossification. The second is that of un-nurtured, and possibly undiscovered, talent in other institutions. The third is that the quality of teaching may be diminished in what might be perceived as non-favoured institutions. I will return to these dangers later in this chapter, but I am strongly of the view that the selective concentration of research on groups and institutions where high talent and excellence is to be found is a policy which should continue. This follows inevitably from my first recommendation in this report (see Chapter One above).
- 5.13. To improve the outcomes for Hong Kong of the policy of selectivity, and to strengthen the ability of the UGC to operate this policy in a transparent way, there are improvements to the research funding system that can be made. But we need first to understand the status quo.
- 5.14. Within the UGC sector, the provision of research funds comprises two main elements. Under the ‘dual funding’ system, a major portion of the research funding is embedded in the UGC’s triennial block grants. This part of dual funding finances the research infrastructure of institutions and enables them to undertake research and professional activities to basic levels. The other part is provided in the form of earmarked grants allocated mostly on a competitive basis under two major schemes, namely, the competitive earmarked research grants (CERG) distributed through the RGC and the Areas of Excellence (AoE) scheme operated by the UGC. For technical reasons related to the UGC cash limit, these schemes are at present confined to academic staff of the eight UGC-funded institutions whose salary is paid from the block grant. Access is denied to others, e.g. those working for the Open University of Hong Kong and other institutions at the post-secondary level.
- 5.15. The origin of the dual funding system dates back to the mid-1980s and became embedded in 1991 when the RGC was formally set up within the UGC cash limit. The strength of dual funding for research is that the recurrent funding element provides for:
- the infrastructure and ethos which develop and sustain research, allowing the institutions flexibility to cope with the sometimes short term and unpredictable nature of RGC funding;
  - a second stream of research funding, supporting the notion that research funding streams should be multiple;
  - funding that is partly prospective, as well as retrospective (based on track record of the RAE), so as to encourage institutions to plan ahead and think strategically about research; and very importantly,
  - the protection of academic freedom.
- 5.16. The dual funding system is not perfect. However, to switch to an alternative, such as that used in the USA, whereby academic staff are contracted to the university for nine months a year so that they have to undertake fully costed research to supplement their salary would involve dramatic changes and upheaval to the higher education system, and require significantly enhanced sources of private research funding (although it has

to be said that most academic-year salary support in the USA comes from institutional funds). At a time when Hong Kong should be enhancing its R&D, dedicating an undue amount of efforts and energy to changing the processes of funding research would be counter-productive.

- 5.17. I have already alluded to a technical problem with dual funding, which at present precludes researchers from outside the UGC sector from competing for research funds made available to the RGC. Indeed, in the course of this review, representations from the continuing education sector and the Open University of Hong Kong have been made to me about their ineligibility to apply for RGC funds. As I have argued in, and reiterated throughout this report, all university level teachers must be engaged in research. Therefore, it is understandable and indeed justifiable for them to seek research funds. The RGC should be able, and is indeed willing, to provide a service to this constituency, by advising any funding agency (both public and private) on whether research proposals submitted by researchers from the non-UGC sector merit funding support by these agencies. Effectively, the RGC would be acting as an assessor of research quality (to ensure comparability of research standards in the higher education sector) and as a vetting agent of proposals, for research funds outside the UGC cash limit.
- 5.18. A second and more radical option, which can only be implemented when the economic conditions are right, is to set up an endowment fund which is sufficiently large to generate a steady source of income and which is not subject to any encumbrance as far as remit is concerned, to support generally academic research. The potential benefits of an endowment fund will be its accessibility to a diversity of research organisations and its capacity to generate capital funding, or matching funds, from a variety of sources from both the public and private sectors. The creation of an endowment fund would allow the RGC eventually to operate independently of the UGC. This is an option to be considered for the long term future. An endowment fund could only be a reality when the financial conditions have improved, and the setting up of an endowment fund is a necessary condition before the separation of the RGC from the UGC could be contemplated.

**Recommendation 9:**

**That the dual funding system for research be maintained whereby the RGC, as an integral part of the UGC, plays its part in enhancing the research base in the universities and in promoting research activities outside the UGC sector.**

- 5.19. Whilst it is appropriate, under dual funding, for RGC grants not to cover the full cost of a research project, the same is not true of other sources of research funding. When funds for research are sought outside the RGC with other Government agencies or the private sector, I suggest that the funds should be awarded on a fully costed basis. That means paying for all indirect costs, including infrastructural costs and staff time, as well as direct costs. Otherwise, money from the Education Vote which is transmitted to the education institutions under the dual funding system could be seen as subsidising non-educational research. Full cost funding of research projects is extensive in the US research environment, and increasingly so in the UK. The same should happen in Hong Kong too. This may have the effect of trading off quantity for increased quality,

because the number of research projects that are funded might reduce, but it would ensure that approved projects are fully funded through the combination of UGC block funding, and project specific funding.

**Recommendation 10:**

**That institutions should not use the UGC block grant to subsidise externally funded research, whether from private or public sources; and, as a corollary, that bodies funding research should accept their responsibility for funding research at full cost.**

- 5.20. The SAR Government has in recent years properly focused on R&D in public policy issues. Through various initiatives, the Government has committed approximately HK\$11 billion in capital to funding strategic and applied research. The largest commitments are to the Innovation and Technology Fund (ITF), the Applied Research Fund (ARF), and the Quality Education Fund (QEF). The health sector also makes some provision, but at a comparatively low level. *Appendix F* sets out the major research funding streams outside the UGC/RGC budgets. These sources of funding provide a huge capacity for strategic and applied R&D on the economic, cultural and environmental well being of the community, and consideration should be given for further support in areas like the transport system, and environmental issues, etc.
- 5.21. Building on these real Government commitments, there should be a joint review of the role and potential of investment of public sector monies in applied and strategic research. This should be undertaken by a working group with representatives from the Government, the private sector, the higher education institutions, the UGC and the RGC. Ideally, business and industry should also be reviewing their respective commitments to R&D, not least in the light of the poor investment record (as shown in the bar chart at paragraph 5.10 above).
- 5.22. Should this low level of R&D investment continue it will exercise a significant constraint in the directions which the Hong Kong economy can take. Almost certainly it will exclude Hong Kong from being a proportionately significant player in large areas of the knowledge economy. The review proposed would identify the resources available to institutions on a competitive basis, to develop their base in strategic and applied research. The responsibility of the UGC would be to align its current moves towards mission-based funding with such funding sources. Another advantage of such a review is that it would create, particularly between the universities and business and industry, a forum which could articulate more clearly the strategic directions of Hong Kong's economic and cultural future.
- 5.23. The preceding discussion focused on the research funding at project level. Under the dual funding model, the other element of research funds is channelled to institutions through the triennial block grant. This element of UGC funding is determined by the outcome of the RAE, which is based on qualitative peer review judgement rather than a formula driven simply by volume and pro rata equity of treatment. The RAE aims to assess research output performance of the UGC-funded institutions by cost centre. The last RAE in 1999 adopted one single quality threshold which was defined as:

*Quality of output equates to an attainable level of excellence appropriate to the discipline in Hong Kong, and showing some evidence of international excellence.*

The scoring methodology provides for academic staff who reached or exceeded the threshold being counted as '1', and those below the threshold are assigned fractional scores commensurate with their quality.

- 5.24. This has the advantage of simplicity. Evaluation team members need only focus on one rating criterion and agreement emerges readily. In describing the development of higher education as a success story, I have already outlined the substantial research achievements of the universities (see Chapter One). Whilst this simple assessment method based on peer review was useful as the research capacity in the universities was developing, it is a relatively blunt instrument for determining higher levels of excellence which is what we are seeing in university research. The RAE in its present form is ready for further evolution and the time is ripe to sharpen it so that the highest levels of international excellence can be identified and funded accordingly, in line with Recommendation 1.

**Recommendation 11:**

**That, in consultation with the institutions, the UGC build on the success of the RAE in allocating research funds on the basis of research performance, and devise means to sharpen the RAE so that the highest levels of research excellence can be identified and funded accordingly.**

- 5.25. There are a variety of ways in which the RAE could be refined. For instance, the peer review process could be informed by an enhanced use of performance indicators. This would reflect international opinion on the value of combining objective performance indicators with the judgements of peer review. Performance indicators are formulaic, transparent and, once in place, relatively cheap and easy to administer. It is relatively easy to investigate how the RAE could incorporate more performance indicator driven information in its decision making, based on practices elsewhere. Another way, which could supplement the performance indicators, is the development of a multi-point scale of ratings. The UK for instance has seven differentiating ratings.
- 5.26. In Recommendation 1, and indeed throughout this report, I have emphasised the importance of selectivity if our institutions are to achieve international excellence. Another area in which there are severe pressures to be selective is in the allocation of RPG places. Just as the RAE needs to be sharpened up, so does the allocation of RPG places, and again greater use of performance indicators in the allocation has to be developed. Two obvious indicators are completion rates and completion times. In Hong Kong, the normative periods for M.Phil. and Ph.D. programmes are 2 and 3 or 4 years respectively. Combining completion times and completion rates would mean that completions are measured in terms of X% of research students graduated within Y years. To provide some tolerance, Y can be the normative period plus 1 or 2 year(s). Another indicator, which would need development, is the kind of employment obtained by graduates. For instance, do they pursue careers at international levels of attainment?
- 5.27. An emphasis on completions, rather than enrolments, will encourage those departments with high drop-out rates to attend to this problem. Just as importantly, the indicators will

discourage departments from enrolling poorly equipped or under-qualified students into their research degree programmes. Further selective allocation of RPG places will enable high quality research training to focus in those institutions which have the requisite research infrastructure and to develop critical masses.

- 5.28. By definition, selectivity implies that some will not be selected. Given the efforts required in submitting for the RAE and bidding for RPG places, I believe that institutions should be encouraged to make strategic decisions about whether to enter individual departments for the RAE. Those departments which opt out of the RAE could instead be given a lower level of non-competitive funding to support R&D, and scholarship which underpins teaching. In line with the arguments in Chapter One, those departments, or even institutions, which are not research-led but yet have the capacity to develop as centres of excellence in teaching and learning should accordingly be able to opt out of the RAE. It is my contention that if any expansion of the post-secondary sector to 60% were to occur in these departments and institutions, it would be achieved at a lower unit cost. This is a point to which I will return in the next, concluding, chapter.
- 5.29. Another vehicle for selectivity is the AoE scheme. At present the AoE scheme focuses on basic research, and was initiated on rather broad premises emphasising excellence and building on strengths. At present it is undergoing an exploratory phase seeking a clearly defined and broadly endorsed vision and criteria. A framework is taking shape which could support AoE networks that advance the creative nexus between basic and applied research, leading to a balance of research investment in both discovery and linkages. The rationale is that integration, or linkages, within R&D is emerging as a major determining factor in the wealth of nations. But the AoE scheme need not be confined to research excellence. The scheme could be developed to benefit centres of excellence in teaching and learning, as described in the preceding paragraph. It could also serve as a vehicle for individual academics to work outside of their institutions in areas where they excel.
- 5.30. In this way, the AoE scheme would be enhanced in its focus to support critical mass in areas of strategic importance. Over time, with strong government and community support, adequate and long term resources and a more established track record, a greater application of top-down criteria can be applied, to target and fund areas that have been identified as key development areas. The UGC can direct its priorities, be they research or teaching and learning, or whether they are from research-led institutions, more purposefully.
- 5.31. Before concluding this chapter, I want to return to the dangers earlier identified in the selective concentration of research resources (see paragraph 5.12 above). In relation to the first – the danger of complacency and ossification – I have argued that there should be even greater stringency in the qualitative assessments made. The judgements should be even sharper and the benchmark of comparison should always be the best in the world, not simply the best in Hong Kong. The growth in research quality in Hong Kong over recent years makes this a realistic policy.
- 5.32. In relation to the second danger of the possibility of un-nurtured or undiscovered talent in other institutions, there will be situations where talented researchers, particularly in high cost areas of research, find that their teaching contract in one institution effectively



excludes them from the research infrastructure which they require, and which has been developed elsewhere in Hong Kong. In a society of the geographical and economic size of Hong Kong, this is an unnecessary waste of talent. It is certainly not beyond the wit of intelligent men and women to devise structures to deal with such situations, and the AoE scheme which crosses institutional boundary is a conduit of such structures. The real problem is usually one of attitude. The research institutions which benefit from this policy have a responsibility to deal with this problem. Equally, the UGC has a responsibility to monitor how effective the response of the institutions is to inter-institutional collaborative research, and perhaps, to oil the wheels of specific co-operative ventures.

- 5.33. In relation to the third potential problem – the dangers of teachers losing contact with the advancing edges of their discipline – the UGC has particular responsibilities which must be shared with the institutions. In particular, the calculation of the triennial grant should have factored into it the need for all university teachers, irrespective of the research capacity of their departments or institutions, to keep abreast of the expansion of knowledge. The normal scholarly means of doing this includes time for personal study, access to adequate sources of books and periodicals, to appropriate conferences and staff development opportunities, and to strategic sabbatical leave. In addition, there should be a means of encouraging the shared use of specialist teachers between institutions.
- 5.34. In summary, the support of the UGC and the institutions for mission differentiation implies that a diversity of kinds and levels of research activity will be undertaken in the higher education sector. It is necessary to apply the appropriate funding mechanisms to support this differentiation. There is a clear difference, under the dual funding system, between research supported by RGC funds and university-based research funded from all other sources which must be on a fully costed basis. There are clear implications for the private sector in their attitude to funding research. The same applies to the public sector from existing funds (e.g. ITF, ARF and QEF), as well as to new funding pockets such as transport and the environment (see paragraph 5.21 above). These are realistic aspirations for the future of research, since Hong Kong has already made huge progress in research achievements, and it is now more than ready to move on to the next stage and take its proper place on the highest internationally competitive stage. We have a strategy with a clear sense of purpose, and a variety of purpose, for the future R&D of Hong Kong.